3 Environmental Setting, Impacts, and Mitigation Measures

3.0 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

3.1 INTRODUCTION

This chapter provides an evaluation of the potential impacts associated with implementation of the Water Trail Plan (WT Plan or Plan). This evaluation builds on the Initial Study (IS) for the project that was completed in November 2007 (Appendix B).

3.1.1 INITIAL STUDY FINDINGS

During the IS, the WT Plan was reviewed to identify which of 16 environmental and related resources included in the CEQA checklist could be affected by the implementation of the Plan. The IS concluded that, based on the activities that would potentially be conducted during implementation of the WT, nine resources could potentially be affected, and seven resources would not be affected at more than an insignificant level. The resources that would not be affected are:

- Agricultural Resources
- Air Quality
- Geology/Soils
- Mineral Resources
- Noise
- Population/Housing, and
- Utilities/Service Systems

These resources are not considered further in this document. Potential impacts to ten remaining resources are analyzed in detail in this chapter. The resources analyzed in this chapter are:

- Recreation
- Navigation
- Public Services
- Aesthetics
- Biological Resources
- Cultural Resources
- Hazardous Materials
- Hydrology and Water Quality
- Land Use Planning
- Transportation, Circulation, and Parking, and
- Greenhouse Gas Emissions and Climate Change (added since the Initial Study was completed)

3.1.2 ORGANIZATION OF CHAPTER 3

The introduction to Chapter 3 (Section 3.1) is followed by an overview of the regulatory setting for the entire project (Section 3.2). This introduction and overview are then followed by a detailed analysis of potentially affected resources (Sections 3.3 - 3.15).

Each resource-specific section (3.3 through 3.15) is organized in the same manner. A description of the regional and local setting for the resource and its specific regulatory setting are presented first, building on the information in the regulatory setting overview. This discussion is followed by a summary of the Initial Study findings for that resource, a description of the significance criteria used to determine whether impacts to the specific resource(s) are potentially significant, an explanation of the methodology used to evaluate potential impacts, identification and assessment of the potential impacts, and, if impacts may potentially be significant, the mitigation measures required to reduce the potential impact(s) to a less than significant level.

The impact analysis is divided into regional impacts and impacts that would occur on a site-specific level. Regional impacts would occur due to the implementation of the WT Plan as a whole, or from designation of a number of WT trailheads. Regional impacts or effects discussed in this chapter are associated solely with implementation of the WT. The potential *cumulative* impacts of the entire WT in combination with other projects are discussed in Chapter 4. Site-specific impacts would be associated with use of or potentially with facility construction at a specific location.

3.1.3 OVERVIEW OF IMPACT ANALYSIS IN CHAPTERS 3, 4, AND 5

As described in Chapter 2 (Project Description), the 24 strategies defined in the WT Plan would be used to guide the implementation of the WT. The strategies are an integral part of the WT Plan, and thus are an integral part of the project being evaluated in this document. The impact analysis therefore considers potential impacts that could occur as the WT is implemented using the appropriate strategies at both regional and local levels. While the intent of the strategies is to minimize or avoid potential impacts associated with the implementation of the WT, in certain cases, the strategies contained in the WT Plan may not suffice to ensure that all potential impacts remain less than significant, or may require additional specificity to ensure potential impacts remain less than significant. In these cases, mitigation would be required. Mitigation may take the form of specific modifications to existing strategies or new strategies. Other forms of mitigation may also be required to address a potential impact.

Significance criteria that define whether a potential impact would be considered significant were developed for each resource area. These criteria were derived from the criteria provided in the CEQA checklist. Where appropriate for this project, significance criteria were modified to provide more specific significance thresholds, or to more clearly define the potential range of effects that would be considered significant.

Under CEQA, agencies are required to mitigate all "significant" impacts if feasible. Significance "thresholds" may be fairly well defined and measurable (quantifiable), such as "exceeding air emissions standards," or they may require more qualitative judgment to be exercised in cases where, for example, CEQA Guidelines indicate that a significant effect will result if a "substantial" increase in a specific undesirable outcome would occur. This Program (or “Programmatic”) EIR focuses on the impacts of the WT and its foreseeable effect on NMSB use over its entire geographic area, including activities carried out as part of the designation process and potential funding of trailhead facilities, rather than site-specific impacts associated with trailhead designation. Therefore, the mitigation measures provided in this document are also programmatic. They are intended to reduce or eliminate general types of program impacts that

are identified as possible at one or more sites or at a regional level. Some of these measures are programmatic revisions to the WT Plan. Others are intended to guide project-level environmental review, and to provide a menu of feasible mitigation options for mitigation at that time. Some mitigation measures would only apply to certain WT sites (e.g., may apply only to sites located near sensitive habitats). The determination whether or not a mitigation measure applies to any given site would be made during the site-specific CEQA review completed as part of the trailhead designation process. To streamline the site-specific CEQA review process, especially for High Opportunity Sites (HOSs), this EIR considers reasonable worst-case impacts that could occur at any site, and provides mitigation as feasible at the programmatic level. This document also provides guidance as to whether certain sensitive resources may be present in certain areas. Site-specific (project-level) review of potential impacts will occur during the trailhead designation process, and will rely on the programmatic evaluation to the extent that the programmatic evaluation is sufficiently detailed and applicable to site conditions and circumstances.

At the regional level, potential impacts are assessed by comparing the likely increase in NMSB use associated with implementation of the WT as a whole to the baseline of current use. The Cal Boating study of non-motorized boating in California found that NMSBs were used an estimated 5.3 million times in the Bay Area in 2006 (Cal Boating 2009),[1] and that participation in non-motorized small boating will increase by approximately 16.3 % by 2010 (an estimated 6.2 million participant-days) without the implementation of the WT. The implementation of the WT, while increasing safe boating practices and environmental awareness through the planned educational and outreach activities, is likely to result in only a small increase in use due to a variety of factors, as discussed in Chapter 2.

As required by CEQA, cumulative impacts of implementation of the WT Plan in conjunction with other similar projects (e.g., the Bay Trail) are also evaluated and are presented in Chapter 4. Finally, to form a basis for comparison, the proposed project (implementation of the Draft WT Plan, as analyzed in this chapter) is compared to the No Action alternative, and two other action alternatives – the "HOS Only" alternative, and the Enhanced Water Trail Plan alternative – in Chapter 5.

[1] This value is calculated based on the total number of participant days for the San Francisco Bay Region (an estimated 7.4 million, Table 2.13), and then subtracting the number of participant-days associated with inflatables (28.3%), which are not used on San Francisco Bay.

3.2 REGULATORY SETTING

This section presents an overview of the laws and regulations that potentially govern activities occurring in connection with implementation of the WT Plan. Water trail managers will work within the existing regulatory framework, and in partnership with land and resource managers to develop and manage access that is consistent with all federal, state and local regulations. Each resource section (beginning with Section 3.3) describes the specific components of the various laws and regulations that are applicable to that resource.

3.2.1 FEDERAL LAWS, REGULATIONS AND RELATED PLANS

Federal laws and regulations potentially applicable to the WT Plan include land use and planning, navigation, wildlife conservation, hazardous materials, air quality, cultural resource, and water quality laws and regulations.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

The National Environmental Policy Act (NEPA) established environmental policy to ensure that federal decision makers take environmental impacts into account when evaluating the potential impacts of projects on federal land. NEPA's requirements apply to a federal agency decision to act, including financing, assisting, conducting, or approving projects or programs; agency rules, regulations, plans, policies, or procedures; and legislative proposals. Site-specific WT construction or improvement projects located on federal land would be subject to NEPA review. NEPA is administered by the Environmental Protection Agency (EPA) and implemented by the federal governmental agency involved in the decision that triggers the procedural requirements of NEPA.

PUBLIC TRUST DOCTRINE

The Public Trust Doctrine encompasses the notion that title to lands under navigable waters up to the high water mark is held by the state in trust for the people.[2] The U.S. Constitution grants states sovereignty over their tide and submerged lands, and the Supreme Court established the states' duty to protect (in perpetuity) the public's interest in these areas.[3] The California Supreme Court has interpreted the range of public interest values in these waterways to include general recreation activities such as swimming and boating; and preservation of lands in their natural state as open space, as wildlife habitat, and for scientific study.[4,5]

[2] The concept of a public trust resource originated in Roman law. Through U.S. federal and state constitutional and case law, the doctrine has been applied to these resources in the U.S. For a more detailed discussion of the evolution of public trust law in California, refer to the Public Trust Statements at the California State Lands Commission website: <http://www.slc.ca.gov/Policy%20Statements/Policy_Statements_Home.htm>

[3] *Illinois Central Railroad v. Illinois*, 1892. 146 U.S. 387. The Public Trust Doctrine has yet to be applied to federal lands and waters through statutes or case law.

[4] *Marks v. Whitney.* 1971. 6 Cal.3d 251; *National Audubon Society v. Superior Court.* 1983. 33 Cal.3d 419; *People* v. *California Fish Co.* 1913. 166 Cal. 576.

[5] Frank, R.M. 1983. "Forever Free: Navigability, Inland Waterways, and the Expanding Public Interest. *University of California, Davis Law Review*, 16:579. California case law also establishes a link between navigation and recreation, and verges on treating the two as interchangeable public interests.

State and local governments have two forms of authority to manage navigation that enable them to strike a balance between recreation and environmental needs: (1) control over development of tide and submerged lands that can affect navigability of waterways, and (2) recreational boating rules. Under the first category, the State Lands Commission manages public uses of navigable waters through its leasing program. When a public or private entity applies for a permit to lease tide and submerged lands, the Commission reviews the application to ensure that the proposed use (e.g., a marina or pier) will maintain the public benefits of the overlying navigable waters. Usually the city or county fulfills this review role because most tide and submerged lands are owned by local authorities through past legislative grants of state lands.

Under the second category, recreational boating rules in Section 660 of the Harbors and Navigation Code empower local governments to establish ordinances that regulate navigation in waters within their jurisdiction through time-of-day restrictions, speed zones, special-use areas, and sanitation and pollution controls.[6]

THE INLAND NAVIGATION RULES ACT OF 1980 AND THE PORTS AND WATERWAYS SAFETY ACT OF 1972

In the United States, two sets of regulations govern navigation. The Inland Navigational Rules Act of 1980 (33 USC Chapter 34, Subchapter I, Part A), more commonly known as the Inland Rules, governs navigation in the Bay and associated rivers and inland waterways. These rules are described in Chapter 2.

The second set of regulations, the Ports and Waterways Safety Act of 1972 (Title 33, Chapter 25, Section 1221), authorized the U. S. Coast Guard (USCG) to establish, operate, and maintain vessel traffic services for ports, harbors, and other waters subject to congested vessel traffic. As a result, in 1972 the USCG established the Office of Vessel Traffic Management to maintain the Vessel Traffic Service (VTS) for San Francisco Bay. The Office designates traffic lanes for inbound and outbound vessel traffic, specifies separation zones between vessel traffic lanes, and sets up rules to govern vessels entering and leaving ports. The USCG operates the VTS, which acts as a clearinghouse of real-time information on commercial vessel movements in the Bay. The USCG monitors all commercial, Navy, ferry, tug, dredging, tanker, passenger ship and marine traffic within San Francisco Bay and local coastal waters. The USCG recommends, but generally does not require, recreational and fishing vessels to participate in the VTS; however, they "are encouraged to monitor the VTS channels, as needed, to gather traffic movement information" (USCG 2009). The VTS is also described in Chapter 2.

NATIONAL PARK SERVICE ORGANIC ACT OF 1916

The National Park Service (NPS) Organic Act of 1916 establishes a dual mission for the park system: to conserve natural and historic features and wildlife, while providing for public enjoyment of these features.[7] The NPS owns and manages three bayfront National Parks with water trail sites: the Golden Gate National Recreation Area (GGNRA), the San Francisco Maritime National Historic Park, and the Rosie the Riveter/ World War II Home Front National

[6] Harbors and Navigation Code §660 (b); and *Personal Watercraft Coalition v. Marin County Board of Supervisors.* 2002. 100 Cal. App. 4th 129; and *People* ex. rel. *Younger v. County of El Dorado,* 96 Cal App.3d. 403.

[7] 16 U.S.C. §1

Historical Park. NPS Management Policies stipulate that park managers only allow uses that are "(1) appropriate to the purpose for which the park was established, and (2) can be sustained without causing unacceptable impacts to park resources or values. Recreational activities and other uses that would impair a park's resources, values, or purposes cannot be allowed."[8] Recreation policies for these parks, and other WT sites, will be addressed in detail as part of the trailhead designation process.

AMERICANS WITH DISABILITIES ACT OF 1990

The Americans with Disabilities Act of 1990 (ADA) generally prohibits the denial of services or benefits on the basis of physical or mental disability. The ADA mandates that individuals with disabilities must be given an equal opportunity to access public facilities and that reasonable accommodations must be made to account for physical and mental limitations of individuals with disabilities. Title II of the ADA ensures accessibility to government programs, services and activities and also requires State government to follow accessibility requirements standards of Section 508 of the Federal Rehabilitation Act, which ensures the accessibility of electronic and information technology. The Department of the Interior and other federal agencies oversee the implementation of the Act within their jurisdictions. Water Trail Strategy 10 calls for development or improvement of launch facilities to make them accessible to individuals with disabilities.

The ADA does not provide definitive measures of accessibility; accessibility guidelines are developed pursuant to the ADA to provide measurable guidelines for compliance. The ADA Accessibility Guidelines (ADAAG) were published in 1991; however, the recreational facilities portion was held in reserve pending development of appropriate guidelines. Recreational accessibility guidelines were initially developed in 2002, and then merged with guidelines from the 1968 Architectural Barriers Act (ABA) in 2004 to develop ADA-ABA Accessibility Guidelines (ADA-ABA AGs). Oversight and enforcement of the ADA-ABA AGs fall under at least four different agencies. The United States General Services Administration (GSA) has jurisdiction over federal agencies, while the United States Department of Justice (DOJ) has jurisdiction over states, local agencies, and the private sector. GSA approved the federal (ABA) component of the ADA-ABA AGs; however, DOJ has not yet approved the ADA-ABA AGs, and guidelines remain pending. Thus, while access guidelines for many land-side facilities (such as routes to and through parking areas, restrooms, parking, picnic areas, walkways, and railings) were addressed many years ago, and are well established, there are no approved accessibility guidelines for recreational boating facilities (marina berthing facilities and boat launching facilities). Compliance with ADAAG for accessible land-side facilities and compliance with pending ADA-ABA Accessibility Guidelines for recreational boating facilities would be addressed as part of project-level CEQA review and permitting.

THE NATIONAL HISTORIC PRESERVATION ACT OF 1966

The National Historic Preservation Act (NHPA) (16 U.S.C. 470) created the Advisory Council on Historic Preservation (ACHP), an independent Federal agency, to advise the President and Congress on matters involving historic preservation. The ACHP is authorized to review and

[8] National Park Service. 2001. Management Policies. Chapter 8.1. Retrieved February 27, 2006 from: http://www.nps.gov/refdesk/mp/

comment on all actions licensed by the Federal government which will have an effect on properties listed in the National Register of Historic Places, or are eligible for such listing. The regulations implementing Section 106 (36 CFR Part 800), as amended, of the NHPA require a federal agency with jurisdiction over a federal, federally-assisted, or federally-licensed undertaking to identify all cultural properties on land under its control or jurisdiction that meet the criteria for inclusion in the National Register of Historic Places (NRHP). The regulations also require that the Advisory Council on Historic Preservation be given an opportunity to comment on those actions which may affect these resources.

THE AMERICAN INDIAN RELIGIOUS FREEDOM ACT OF 1978

The American Indian Religious Freedom Act of 1978 requires federal agencies to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.

FEDERAL ENDANGERED SPECIES ACT

The purpose of the Federal Endangered Species Act (ESA) of 1973 is to conserve species populations that are endangered or threatened and therefore require special protection. The Act provides mechanisms for listing species as endangered or threatened, identifying critical habitat areas used by these species, and establishes criminal penalties for the "take" of listed wildlife and fish. Take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct," and includes significant habitat alteration where such alteration kills or injures a listed species through impairment of essential behavior. Harass means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering."[9] Responsibility for implementing this Act is shared by the U.S. Fish and Wildlife Service (USFWS) for terrestrial and freshwater species and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries Service) for marine and anadromous species.

NATIONAL WILDLIFE REFUGE SYSTEM ADMINISTRATION ACT OF 1966 AND NATIONAL WILDLIFE REFUGE SYSTEM IMPROVEMENT ACT OF 1997

The National Wildlife Refuge System Administration Act of 1966 conserves and protects listed endangered and threatened species and migratory birds through protection and restoration of species' habitats, and by managing uses, such as recreation, of Refuge areas to prevent negative impacts to these species. The National Wildlife Refuge System Improvement Act of 1997 designates wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as "priority general public uses." When these activities are compatible with species protection goals (as determined by USFWS), they are welcome on refuges and receive priority over other uses. In the San Francisco Bay area, the USFWS owns and manages National Wildlife Refuges and Bay waters totaling

[9] 50 C.F.R 17.3

30,000 acres. The San Francisco Bay Refuge complex comprises a significant portion of the Bay environment, and includes the following:

- Don Edwards San Francisco Bay National Wildlife Refuge
- Marin Islands National Wildlife Refuge, and
- San Pablo Bay National Wildlife Refuge

THE MIGRATORY BIRD TREATY ACT (MBTA) OF 1918

The Migratory Bird Treaty Act (MBTA) of 1918 implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. The MBTA prohibits take of waterfowl, shorebirds, songbirds, hawks, and others. Both USFWS and DFG are responsible for implementing the MBTA and issue permits for incidental take of migratory birds, as well as hunting licenses for game species.

THE MARINE MAMMAL PROTECTION ACT (MMPA) OF 1972

The goal of the Marine Mammal Protection Act (MMPA) of 1972 is to reduce marine mammal mortalities and injuries; the MMPA regulates scientific research in the wild and other activities to protect marine mammals. It protects all marine mammals, including cetaceans (whales, dolphins, and porpoises), pinnipeds (seals and sea lions), sirenians (manatees and dugongs), sea otters, and polar bears within the waters of the United States. Under the MMPA, it is unlawful to "take" any marine mammal. Take includes harassment or attempting to harass, feed, hunt, capture, collect, or kill any marine mammal. USFWS is responsible for implementing the MMPA for otters (and certain other species not found in the Bay), while NOAA Fisheries Service is responsible for all other marine mammals.

THE CLEAN WATER ACT, SECTION 404, AND THE RIVERS AND HARBORS ACT, SECTION 10

Section 404 of the Clean Water Act (CWA) requires authorization from the U.S. Army Corps of Engineers (Corps) for work involving placement of fill into any "waters of the United States."[10] Section 10 of the Rivers and Harbors Act[11] requires Corps authorization for work or structures in or affecting navigable waters of the U.S.

A WT project developing or improving trail access to rivers, streams, or in wetland areas will likely require a permit from the Corps. Under the Corps' general policy, a project should:

1. Provide public benefits that outweigh foreseeable detriments
2. Not unnecessarily alter or destroy wetlands
3. Conserve wildlife
4. Be consistent with water quality standards
5. Protect historic, scenic, and recreational values
6. Not interfere with adjacent properties or water resources projects, and
7. Comply with approved coastal zone management programs.[12]

[10] 33 U.S.C. §1344

[11] San Francisco Bay Trail Project. March 2001. The Bay Trail: Planning for a Recreational Ring Around San Francisco Bay. Association of Bay Area Governments. Oakland, CA. p.II-2; and 33 U.S.C. §1344 and §403.

[12] 33 C.F.R. §320.4

These approval criteria are important considerations in trail planning and trailhead design. (Clean Water Act section 401 requirements are discussed below under state laws.)

THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Fishery Conservation and Management (Magnuson-Stevens) Act establishes a management system for national marine and estuary fishery resources. The Act requires all federal agencies to consult with the NOAA Fisheries Service regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). Essential fish habitat is defined as waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. The legislation states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. Within the context of the Magnuson-Stevens Act, the phrase "adversely affect" refers to the creation of any impact that reduces the quality or quantity of EFH. Federal activities that occur outside an EFH but that may nonetheless have an impact on EFH waters and substrate also must be considered in the consultation process. Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must be considered as well.

The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other federal statutes, such as NEPA, CWA, and ESA. Essential fish habitat consultation requirements can be satisfied through concurrent environmental compliance requirements if the lead agency provides NOAA Fisheries Service with timely notification of actions that may adversely affect EFH and if the notification meets the requirements for EFH assessments.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 AND THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) provides broad regulatory authority to respond to releases or threatened releases of hazardous substances that may affect public health or the environment. The Act establishes the requirements for identification, evaluation, and remediation of abandoned (non-operating) hazardous waste sites. It provides for both short-term responses to hazardous releases and long-term permanent reduction in the hazard level at sites on a National Priority List (NPL). The NPL list is made up of sites with known or suspected releases of hazardous substances, pollutants or contaminants. The NPL has 33 Final NPL sites and one proposed site that are located within the Bay Area. CERCLA also mandates training for hazardous waste site workers. The Superfund Amendments and Reauthorization Act of 1986 (SARA) provides a regulatory program for underground storage tanks and the Emergency Planning and Community Right-To-Know Program (EPCRA).

RESOURCE CONSERVATION AND RECOVERY ACT OF 1980 AND HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

The Resource Conservation and Recovery Act of 1980 and Hazardous Solid Waste Amendments of 1984 define the solid (including hazardous) waste management and control responsibilities of site owners and operators at active facilities. RCRA governs generation, handling, storage, transportation, treatment, and disposal of hazardous wastes. It also provides requirements for

testing to determine whether a given solid waste is hazardous, and requires site owners and operators to ensure that potential contaminants released onto their property remain within the property boundary. Where hazardous waste releases may have occurred, RCRA requires investigation and remediation sufficient to ensure that off-site areas remain unaffected and/or remediation of any affected off-site areas. In 1986 amendments the Act was revised to include the regulation of underground tanks storing petroleum products and hazardous substances. In California, RCRA is implemented by the California Environmental Protection Agency Department of Toxic Substances Control. Under California law, petroleum products are also considered hazardous waste, although they are not included as hazardous waste under RCRA. The Hazardous and Solid Waste Amendments (HSWA) to RCRA focused on waste minimization, phasing out land disposal of hazardous waste and corrective action for releases (EPA 2009a).

COASTAL ZONE MANAGEMENT ACT OF 1972

The purpose of the Coastal Zone Management Act (CZMA) is to preserve, protect, and restore or enhance the nation's coastal zones. The Act is administered by the states; for the San Francisco Bay it is administered by the San Francisco Bay Conservation and Development Commission (BCDC) as described under the McAteer-Petris Act, below.

OIL POLLUTION ACT OF 1990

The Oil Pollution Act of 1990 (OPA) was passed to expand the government's ability to respond to oil releases and provide funding for those spill cleanups, and increase enforcement and penalties for non compliance (EPA 2009b). It also provided new requirements for contingency planning developed in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

EXECUTIVE ORDER 11990–PROTECTION OF WETLANDS

This federal Executive Order (issued in 1977, in furtherance of NEPA) protects wetlands and requires that all federal agencies minimize the destruction, loss or degradation of wetlands, and preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of federal lands and facilities; and (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities (42 FR 26961, 3 CFR, 1977 Comp).

3.2.2 STATE AND REGIONAL LAWS, REGULATIONS, AND RELATED PLANS

THE CALIFORNIA ENDANGERED SPECIES ACT

The California Endangered Species Act (CESA) has objectives and requirements that are similar to those of the federal ESA except that a permit is required for incidental take of *all* state listed species (including plants).[13] The California Department of Fish and Game (DFG) implements CESA.

[13] California Fish and Game Code §2080

Agencies or other organizations must consult with DFG on proposed actions (e.g., issuing permits, funding projects) that could jeopardize endangered or threatened species. Section 2081 of CESA provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species, except for certain species designated as "fully protected" under the California Fish and Game Code. Under Section 2081, a take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for a Section 2081 permit are similar to those used in the ESA Section 7 process. In general, the requirements include identification of impacts on listed species; development of mitigation measures that minimize and fully mitigate impacts; development of a monitoring plan; and assurance of funding to implement mitigation and monitoring.

CALIFORNIA NATIVE PLANT PROTECTION ACT (NPPA)

In addition to the California Endangered Species Act, the Native Plant Protection Act (NPPA, Fish and Game Code Section 1900, et seq.) protects endangered and "rare" species, subspecies, and varieties of native California plants. The species listed under this law, which preceded CESA, now overlap with those of CESA. NPPA contains many exemptions for agriculture and forestry, and many exceptions, but otherwise generally prohibits unauthorized "take" of listed plants. NPPA contains "notice and salvage" provisions that require landowners to notify DFG to "salvage" (rescue by transplanting – a technique no longer generally scientifically supported) listed plants in the path of land-clearing or development activities.

CALIFORNIA MARINE LIFE PROTECTION ACT OF 1999

The Marine Life Protection Act (MLPA) requires 1) the reevaluation of all marine protected areas (MPAs) and 2) designation of new MPAs, if needed, to achieve the goal of creating a cohesive network of protected marine areas. The MPAs are made up of state marine reserves, state marine parks, and state marine conservation areas, which are being developed by region to meet specific regional goals. An initiative to improve the MPAs in and around San Francisco Bay will be completed by 2011. Most existing MPAs are offshore, but Fagan Marsh State Marine Park, Corte Madera State Marine Park, Marin Islands State Marine Park, Alameda Mudflats State Marine Park, Robert Crown State Marine Conservation Area, Redwood Shores State Marine Park, Bair Island State Marine Park, and Peytonia Slough State Marine Park are within the project area. The MLPA places restrictions on consumptive uses such as fishing as well as non-consumptive recreational uses; the specific restrictions are dependent on the level of protection for a given site and the species of interest within the area.

PORTER-COLOGNE WATER QUALITY CONTROL ACT OF 1969, SECTION 401 OF THE FEDERAL CLEAN WATER ACT, AND THE REGIONAL WATER QUALITY CONTROL BOARD BASIN PLAN

The Porter-Cologne Water Quality Act (PCWQCA) derives its authority from the federal CWA. The PCWQCA provides the state with broad jurisdiction over water quality and waste discharge, and also provides the state the authority to prepare regional Basin Plans to protect the state's water resources. Under the PCWQCA and Section 401 of the federal CWA, the State Water Resources Control Board and the San Francisco Regional Water Quality Control Board (SFRWQCB) regulate discharges to surface waters (including wetlands), groundwater, and point and non-point sources of pollution. The Basin Plan designates existing and potential beneficial uses for each water body within its geographic region, sets numeric and narrative water quality

objectives to protect the beneficial uses, and describes strategies and time schedules for achieving these water quality objectives.

The SFRWQCB permit authority includes the issuance of waste discharge requirements and conditions on CWA Section 401 water quality certification authorizations. Such permits may be required for projects to develop or improve Water Trail access sites. In addition, where a discharge of waste to land has occurred and threatens or may threaten groundwater quality, the SFRWQCB may require remediation and clean-up of the waste and affected soil and groundwater. Because the PCWQCA derives its authority from the Clean Water Act, it regulates petroleum products, and provides regulations for the installation, operation, and remediation of above ground and underground petroleum storage tanks.

CALIFORNIA HARBORS AND NAVIGATION CODE

Under the authority of the Federal Boating Act of 1958, the State Harbors and Navigation Code was amended to provide registration of vessels by the State of California instead of the Coast Guard and establish a comprehensive set of state laws and regulations governing the equipment and operation of vessels on all waters of the state. The Harbors and Navigation Code authorizes the California Department of Boating and Waterways (Cal Boating) to establish and enforce recreational boating operation and equipment regulations in conformity with federal navigation rules promulgated by the Coast Guard. Most of these rules address boating practices, equipment requirements and liability issues.[14] The mission of Cal Boating is to provide safe and convenient public access to California's waterways and leadership in promoting the public's right to safe, enjoyable, and environmentally sound recreational boating.[15]

LEMPERT-KEENE-SEASTRAND OIL SPILL PREVENTION AND RESPONSE ACT OF 1990

In 1990, the California state legislature enacted the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (OSPR) (California Government Code Chapter 7.4). OSPR created, among others, the Harbor Safety Committee of the San Francisco Bay Region. The purpose of the Harbor Safety Committee is to prepare a Harbor Safety Plan that considers all vessel traffic to ensure safe navigation and operation of tankers, barges, and other vessels. The original Harbor Safety Plan for San Francisco, San Pablo and Suisun Bays was adopted in 1992. The most recent available San Francisco Bay Region Harbor Safety Plan is for 2009. The Committee meets regularly to develop additional strategies to further safe navigation and oil spill prevention.

STATE SCENIC HIGHWAY PROGRAM

The State Scenic Highway Program was established in 1963 to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. Scenic highway nominations are evaluated using the following criteria:

[14] Harbors and Navigation Code §660 (b). In terms of managing access on navigable waters, the department makes rules within cities, counties or other political subdivisions where "no special rules or regulations exist," or when "the department determines that the local laws regulating the use of boats or vessels on that body of water are not uniform and that uniformity is practicable and necessary."

[15] Harbors and Navigation Code §660 (a).

- The State or county highway being considered consists of a scenic corridor comprised of a memorable landscape that showcases the natural scenic beauty or agriculture of California
- Any existing visual intrusions do not significantly impact the scenic corridor
- There is demonstrated strong, local support for the proposed scenic highway designation, and
- The proposed scenic highway is not less than a mile and is not segmented.

For a highway to be officially designated as a State Scenic Highway, a local jurisdiction must define the scenic corridor that is adjacent to and visible to a motorist on the highway, adopt a scenic corridor protection program, apply to the California Department of Transportation (Caltrans) for a scenic highway approval, and receive notification that the highway has been adopted as a Scenic Highway. The agency must then adopt or document ordinances to preserve the scenic quality of the corridor.

CALIFORNIA FISH AND GAME CODE STREAMBED ALTERATION AGREEMENTS

In 2003, the California Legislature repealed and re-enacted with modification Section 1600 of the Fish and Game Code. Its primary purpose is the protection of the state's fish and wildlife resources from harmful impacts of activities that occur near any rivers, streams, lakes and other water bodies in the state, regardless of the amount or duration of flow. "Fish" are broadly defined in the Fish and Game Code (Section 45) as aquatic organisms, including mollusks, crustaceans, invertebrates, or amphibians. Prior to undertaking stream-altering activities that may adversely affect fish or wildlife, applicants must notify DFG, pay fees, and enter into an agreement with DFG for authorization. DFG may authorize (for up to five years) alteration of streams with scientifically sound, reasonable conditions to avoid or minimize harm (substantial adverse effects) and protect fish and wildlife resources. DFG has discretionary authority to modify the conditions of a Section 1600 Stream Alteration Agreement.

THE CALIFORNIA HAZARDOUS WASTE CONTROL LAW OF 1972 AND AMENDMENTS

The California Hazardous Waste Control Law (HWCL) is the state equivalent of RCRA (DTSC 2009). The HWCL is the state's basic hazardous waste law and has been amended to address current requirements and bring it into compliance with federal law. The act is similar to RCRA in its requirements for hazardous waste but is more stringent in the regulation of non-RCRA wastes, including aspects such as small quantity generators, transportation, recycling, and permitting.

CARPENTER-PRESLEY-TANNER HAZARDOUS SUBSTANCE ACCOUNT ACT OF 1981

The Hazardous Substance Account Act (HSAA) is the state's equivalent of CERCLA (CalEPA 2009). It is similar to CERCLA except in areas of assigning liability for a site and in particular for petroleum site clean-up. This Act established an account to cover the cost of cleanup, response equipment and associated activities for the hazardous waste disposal.

HAZARDOUS WASTE AND SUBSTANCES SITES (CORTESE) LIST

All hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code (HSC) are documented in the Hazardous Waste and Substance Sites List

(also known as the "Cortese list"). This list, created pursuant to California Government Code Section 65962.5, is updated annually by local governments.

CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In 2006, California passed the California Global Warming Solutions Act of 2006[16] (AB 32), which requires the California Air Resources Board (CARB) to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions will be reduced to 1990 levels by 2020. AB 32 establishes regulatory, reporting, voluntary, and market mechanisms to achieve quantifiable reductions in GHG emissions to meet the statewide goal.

In December 2007, CARB approved the 2020 emission limit of 427 million metric tons of carbon dioxide equivalents[17] (CO_2e). The 2020 target of 427 million metric tons of CO2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the state's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual). The total reduction for the recommended measures is 174 million metric tons/year of CO_2e, slightly exceeding the 169 million metric tons/year of CO_2e of reductions estimated to be needed.

CARB released the Climate Change Proposed Scoping Plan in October 2008 (CARB 2008). The Proposed Scoping Plan proposes a comprehensive set of actions designed to reduce overall carbon emissions in California. Key elements of the Proposed Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
- Achieving a statewide renewable energy mix of 33 percent
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard, and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

The Climate Change Proposed Scoping Plan includes recommended measures that were developed to reduce greenhouse gas emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures also put the state on a path to meet the long-term 2050 goal of reducing California's greenhouse gas emissions to 80 percent below 1990 levels.

[16] Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq.

[17] Greenhouse gases vary in their ability to trap heat. To simplify evaluation of potential greenhouse gas emissions, scientists convert the various gases to carbon dioxide equivalents; i.e., how much carbon dioxide it would require to have the same heat-trapping effect as the amount of the other gas(es) in question.

These measures were presented to and approved by the CARB on December 11, 2008. The measures in the Proposed Scoping Plan will be in place by 2012.

SENATE BILL 97

In August 2007, California adopted Senate Bill 97[18] (SB 97). The legislation provides partial guidance on how GHG emissions should be addressed in certain CEQA documents. SB 97 required the Governor's Office of Planning and Research (OPR) to prepare CEQA guidelines for the mitigation of GHG emissions, including, but not limited to, effects associated with transportation or energy consumption. OPR and the Resources Agency are required to periodically review the guidelines to incorporate new information or criteria adopted by CARB pursuant to the Global Warming Solutions Act (criteria are due by 2012).

Under this legislation, on December 30, 2009, the Resources Agency adopted amendments to the CEQA Guidelines, which describe the process and methodology for assessing the effects of GHG emissions under CEQA. It then transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law (OAL). The amendments are final and took effect on March 18, 2010.

Although the amended Guidelines provide direction on the process and methodology for assessing a project's GHG emissions, the amendments do not establish any bright-line threshold for determining significance of GHG emissions, whether as an individual effect or a cumulative one. Likewise, CARB has not yet established any specific criteria or thresholds.

CALIFORNIA STATE PARKS SYSTEM AND THE CALIFORNIA RECREATIONAL TRAILS ACT OF 1978

California's Department of Parks and Recreation (State Parks) has a mission to "provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation."[19] The California Recreational Trails Act of 1978 (CRTA) was enacted to increase accessibility and enhance the use, enjoyment, and understanding of California's scenic, natural, historic, and cultural resources. One of the stated goals of the act is to increase opportunities for recreational boating on designated waterways (PRC 5070.5(d)). CRTA and the mission of State Parks are implemented through a series of plans, including the State Parks Strategic Plan, State Parks System Plan of 2002, and 2009 California Recreational Trail Plan. In addition, each park has a general plan that describes the specific purpose of the park and the planned use for the facilities.

The State Parks strategic plan outlines five core programs for the park system: resource protection, education/interpretation, provision of facilities (including camping and restrooms) at parks, public safety, and recreation. Each park has a general plan that describes the specific purpose of the park and the planned use for the facilities. The State Parks System Plan of 2002 (State Parks 2002b,c) describes how the State Parks System will advance its primary goals, including outdoor education and recreation. State Parks' *California Recreational Trail Plan*

[18] Chapter 185, Statutes 2007

19 Department of Parks and Recreation. 2004. Retrieved on March 9, 2006 from the CA State Parks website: <http://www.parks.ca.gov/?page_id=91>

(State Parks 2009b) further describes the goals of the Parks System trails, which include the following (State Parks 2009a):

- Promote and encourage the incorporation of trails and greenways development and linkages into all local and statewide land use planning processes
- Develop and encourage expanded cooperation and collaboration among trail advocates, wildlife advocates, and cultural resource advocates to maximize resource protection, education, and trail use opportunities
- Promote adequate design, construction, relocation, and maintenance of trails in order to optimize public access and resource conservation, and
- Encourage public use of and support for trails programs throughout California

State Parks manages five parks of relevance to the Water Trail project – Benicia State Recreation Area, China Camp State Park, Angel Island State Park, East Shore State Parks, and Candlestick Point State Recreation Area.

CALIFORNIA DISABILITY STATUTES

In 1992 the California Legislature amended the Unruh Civil Rights Act (California Civil Code Section 51) to extend protection from discrimination to those with disabilities and, at the same time amended or added provisions to other related laws to substantially increase the protections afforded persons with disabilities.

California Civil Code sections 54-55.2 require access for persons with disabilities and provide that "individuals with disabilities or medical conditions have the same right as the general public to the full and free use of the streets, highways, sidewalks, walkways, public buildings, medical facilities, including hospitals, clinics, and physicians' offices, public facilities, and other public places."

California Government Code sections 11135-11139.8 require protection from discrimination in any program or activity that is conducted, funded directly by, or receives any financial assistance from the State. These provisions bring into State law the protection of Title II of the ADA. Programs and activities subject to these provisions must meet the protections of the laws of California or the ADA, whichever is stronger.[20]

Under California Government Codes sections 4450 et seq., all buildings, structures, sidewalks, curbs, and related facilities, that are constructed using state, county, or municipal funds, or the funds of any political subdivision of the state are required to be accessible to and usable by persons with disabilities. Regulations adopted under this statutory requirement and with which such construction must comply are found in Title 24 of the California Code of Regulations.

California does not have any statutes that definitively address accessibility of boating facilities. Guidelines will be developed when DOJ approves the pending ADA-ABA Accessibility Guidelines. The only California requirement that exists is in Section 1132B.2.4 of the California Building Code (for Parks and Recreational Areas). It simply states:

> "Boat docks. Boat docks, fishing piers, etc. shall be accessible."

[20] *People v. Levinson*, 155 Cal. App. 3d 13, 16 (1984)

EXECUTIVE ORDER W-59-93, CALIFORNIA WETLANDS CONSERVATION POLICY

This state policy established by the Governor of California in 1993 provides substantive environmental goals to ensure no overall net loss of wetlands, and to achieve a long-term net gain in the quantity, quality, and permanence of wetlands in California, with due concern for private property and stewardship.

EXECUTIVE ORDER S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05. Executive Order S-3-05 proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea level. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced progressively to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050. These targets are consistent with the targets in AB 32.

THE MCATEER-PETRIS ACT OF 1969 AND THE SUISUN MARSH PRESERVATION ACT OF 1977

The McAteer-Petris Act of 1969 and the Suisun Marsh Preservation Act of 1977 establish the authority of BCDC to issue and deny permits for Bay filling; extracting materials; changing the use of any land, water, or structure within the area of its jurisdiction; dredging; Bay-related shoreline development; and marsh development. The design and implementation of all WT improvements including signs will be within the jurisdiction of BCDC and may require BCDC permits.

BCDC's *San Francisco Bay Plan*, as amended (Bay Plan) (BCDC 2007a) identifies five types of priority use areas (ports, water-related industry, water-oriented recreation, airports and wildlife refuges) and provides development policies for these areas. In issuing permits for shoreline development, BCDC must require applicants to provide "maximum feasible public access." The Bay Plan Public Access policies include specific requirements for permit applicants to prevent significant adverse effects on wildlife, habitat, and water quality. Specific guidelines developed by BCDC for public access improvements along the Bay shoreline are summarized in *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay* (BCDC 2005).

The Suisun Marsh Protection Plan was developed by BCDC in response to the Suisun Marsh Preservation Act. The goals of the Suisun Marsh Protection Plan are to "preserve the integrity and assure the continued wildlife use of the Suisun Marsh."[21] The plan requires local agencies to develop local protection programs to bring county policies and ordinances into conformity with the Suisun Marsh Preservation Act. The Plan's findings and policies on Recreation and Access support provision of public access and recreation as long as it does not adversely impact the environmental or aesthetic qualities of the Marsh.[22]

[21] San Francisco Bay Conservation and Development Commission (BCDC). 1976. Suisun Marsh Protection Plan. San Francisco, CA, p. 9.

22 BCDC 1976, pp. 28-29.

ASSOCIATION OF BAY AREA GOVERNMENTS – BAY TRAIL PLAN

The San Francisco Bay Trail is a planned recreational corridor designed to encircle San Francisco and San Pablo Bays with a continuous 500-mile network of bicycling and hiking trails. To date, approximately 300 miles of the alignment have been completed. Depending on the location of its segments, the Bay Trail consists of paved multi-use paths, dirt trails, bike lanes, sidewalks or city and county streets signed as bike routes.

The Bay Trail Plan was adopted by the Association of Bay Area Governments (ABAG) in July 1989 (ABAG 1989). It includes a proposed alignment; a set of policies to guide the future selection, design and implementation of routes; and strategies for implementation and financing. Bay Trail policies and design guidelines are intended to complement rather than supplant the adopted regulations and guidelines of local managing agencies. The majority of jurisdictions along the Bay Trail alignment have incorporated it into their general plans.

Bay Trail alignment policies reflect the goals of the Bay Trail program, which highlights the wide variety of recreational and interpretive experiences offered by the diverse Bay environment. The Bay Trail offers access to commercial, industrial and residential neighborhoods; points of historic, natural and cultural interest; recreational areas like beaches, marinas, fishing piers, boat launches, and over 130 parks and wildlife preserves totaling 57,000 acres of open space. Bay Trail policies also include the investigation of water trails as an enhancement to the shoreline trail system. The Bay Trail currently passes within close proximity (approximately 1,000 feet) of 72 of the 112 WT Backbone Sites (see Table 3.3.3-1).

SAN FRANCISCO BAY WATER EMERGENCY TRANSPORTATION AUTHORITY (WETA)

The San Francisco Bay Water Emergency Transportation Authority (WETA) is a regional agency authorized by the State of California (SB 976) with control of all public transportation ferries in the Bay Area region, except those owned and operated by the Golden Gate Bridge District. It was created in 2007 from the San Francisco Bay Water Transit Authority (WTA). The WTA adopted an Implementation and Operations Plan which describes the current ferry system within the Bay (WTA 2003). WETA has also adopted the Final Transition Plan, which describes the expansion of the existing ferry service within the Bay (WETA 2009). These plans are described in Section 3.4 (Navigational Safety).

3.2.3 OTHER REGIONAL AND LOCAL PLANS AND POLICIES

There are over 50 local and regional entities that could potentially have jurisdiction over Water Trail access sites. Many of these agencies and special districts have prepared plans, policies, or regulations governing development and recreation in their respective jurisdictions. The local and regional plans, policies, and regulations applicable to each specific WT trailhead will be identified in the Site Descriptions developed as part of the trailhead designation process. Section 3.13 (Land Use and Planning) provides additional discussion of the types of local and regional plans and policies that may have some bearing on implementation of the Water Trail Plan.

3.3 RECREATION

This section identifies potential impacts on recreational resources that could result from implementation of the WT Plan. Recreation issues addressed in this section include boating and general recreation use levels at proposed WT launch and destination sites (Backbone Sites), potential changes in recreation use, potential conflicts among recreational users, and physical impacts to recreational facilities from program-related recreation development and use.

3.3.1 INITIAL STUDY FINDINGS

Two potential impacts to recreational resources are considered in the Initial Study checklist. Potentially significant impacts would occur if the project would:

- 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.
- Include recreation facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Both impacts were identified as potentially significant in the Initial Study, and complete evaluation of these potential impacts to recreational resources is presented in this section. Navigational issues are addressed separately in Section 3.4, Navigational Safety. Similarly, secondary impacts of project-induced changes in recreational use that may affect land use, biological resources, water quality, public services, cultural resources, and aesthetics are addressed in those respective sections.

3.3.2 REGIONAL SETTING

Chapter 2 provides a detailed description of NMSB use and conditions in the Bay Area. San Francisco Bay, as the largest open space resource in the region, provides environments for all types of NMSBs and presents significant opportunities for dispersed use[23] and eco-recreation[24]. As discussed in Chapter 2, natural variables that affect the levels and patterns of NMSB use include tides, currents, winds, and depth of water. These attributes combine to provide a highly variable mix of recreational boating settings in different locations. Wildlife habitats and the species they support can also affect patterns of NMSB use by serving as attractions and destinations. Other variables that affect NMSB use and use patterns are location of access points, safety exclusion zones, and other boating activities such as commercial shipping, water transit vessels, and motorized small boats.

Existing access onto the Bay for NMSBs consists of many more than the 112 Backbone Sites identified in the WT Plan. Many NMSBs, particularly canoes and kayaks, can be transported on a car top, can be carried for short distances, and can be launched from any location that has reasonable vehicular and pedestrian access near the bay shoreline. There are hundreds of informal sites where the physical terrain and shoreline conditions could theoretically be used for

[23] Dispersed Recreation: Recreation that does not occur in a developed recreation site.

[24] Eco-Recreation: Low-impact recreation where the natural and/or cultural resources are the major attraction; outdoor recreation opportunities dependent upon a diverse and undisturbed landscape setting; recreational opportunities and facilities using alternative, sustainable design (such as solar/wind power and composting toilets) so as not to impact the natural/cultural resources.

NMSB access to the Bay. The South Bay, San Pablo Bay and Suisun Marsh have fewer informal or formal access points than the Central Bay.

At formal launch sites, NMSB users frequently share access with other recreationists. Most commonly, launch sites used by NMSBs are also used by motorized boats. These launch sites may be located in urban parks or natural areas used for other recreational activities such as hiking, fishing, bicycling, wildlife viewing, swimming, sunning, picnicking, or play in organized playgrounds or open lawn areas. Levels of use at launch sites vary widely.

Numerous interest groups in the Bay Area have formed around, or offer, a variety of NMSB pursuits, share information, promote safety, and protect Bay resources. Table 3.3.2-1 provides a representative listing of these organizations. There are also numerous rowing clubs associated with high schools and colleges throughout the Bay Area that teach boating safety.

TABLE 3.3.2-1. NON-MOTORIZED BOATING GROUPS AND ORGANIZATIONS

Organization	Location	Description
Bay Access Inc. (http://www.bayaccess.org/)	Area-wide (web-based)	A nonprofit organization of kayakers dedicated to improving non-powered boat access and water trails
Bair Island Aquatic Center (http://www.gobair.org/)	Redwood City	A nonprofit organization focused on human-powered water sports such as rowing, sculling, paddling, and dragon boating
Bay Area Sea Kayakers (http://www.bask.org/)	San Francisco	Club dedicated to the safe enjoyment of the sport of sea kayaking
Berkeley Paddling and Rowing Club (http://www.berkeleyrowingclub.org/)	Berkeley	Local chapter of U.S. Canoe/Kayak organization
Benicia Outriggers	Benicia	Outrigger canoe club
California Dragon Boat Association (http://www.cdba.org/)	San Francisco	Nonprofit organization to foster the growth and development of dragon boating in the San Francisco Bay Area
Bay Area Whaleboat Rowing Association (http://www.bawra.org)	San Francisco	Represents over 12 Rowing Clubs in the Bay Area
Dolphin Club (http://www.dolphinclub.org/)	San Francisco	Nonprofit, public-access athletic organization
DragonMax Dragon Boat Club of Berkeley (http://www.dragonmax.org/)	Berkeley	Outrigger canoe club
Embarcadero Rowing Club (http://www.rowrenegade.org/)	San Francisco	A non-profit organization for whaleboat rowing
Friends of the Napa River (http://www.friendsofthenapariver.org/)	Napa	Nonprofit organization dedicated to the protection and restoration of the Napa River; sponsors canoe and kayak trips
Friends of the Petaluma River (http://www.friendsofthepetalumariver.org/)	Petaluma	Nonprofit organization dedicated to celebrating and conserving the Petaluma River, its wetlands and wildlife
He'E Nalu o'Marin Outrigger Canoe Club (http://www.heenaluocc.org/)	Larkspur	Outrigger canoe club

TABLE 3.3.2-1. NON-MOTORIZED BOATING GROUPS AND ORGANIZATIONS

Organization	Location	Description
Ho'okahi Pu'uwa Outrigger Canoe Club (http://www.hpocc.com/)	Foster City	Outrigger canoe club
Hui Wa'a O San Jose Outrigger Canoe Club (http://www.kanuclub.org/)	Redwood City	Outrigger canoe club
Jack London Aquatic Center (http://www.jlac.org/)	Oakland	Organization that provides dragon boats, kayak, and rowing programs
Kaimanu Hawaiian Outrigger Canoe Club (http://www.kaimanu.com/)	San Leandro	Outrigger canoe club
Kamali'i 'O Ke Kai Outrigger Canoe Club (http://www.kamaliiokekai.org/)	San Jose	Outrigger canoe club
Kilohana Outrigger Canoe Club (http://www.kilohanaocc.org/)	Fremont	Outrigger canoe club
Lokahi Outrigger Canoe Club (http://www.lokahiocc.org/)	Petaluma	Outrigger canoe club
Marin Canoe and Kayak Club (http://www.marincanoeclub.org/)	San Rafael	Encourages and supports boating
Marin Rowing Association (http://www.marinrowing.org/)	Greenbrae	A non-profit organization
North Bay Rowing Club (http://www.northbayrowing.org/)	Petaluma	Rowing club
Oakland Strokes (http://www.oaklandstrokes.org)	Oakland	Rowing club for high school ages
O Kalani Outrigger Canoe Club	Alameda	Outrigger canoe club
Ohana Wa'a Outrigger Canoe Club	Petaluma	Outrigger canoe club
Open Water Rowing Center (http://www.owrc.com/)	Sausalito	A Limited Liability Corporation (LLC) for open water sculls whose partners are rowers and members of the OWRC
Pacific Rowing Club (http://www.pacificrowingclub.org/)	San Francisco	Sculling club
Petaluma Paddlers	Petaluma	Local canoe and sea kayak paddling group
Petaluma Small Craft Center Coalition (http://starbirdcreative.com/PSC3/)	Petaluma	Encourages and supports human-powered watercraft on the Petaluma River
Pu Pu O Hawai'i Outrigger Canoe Club (http://www.pupuohawaii.org/)	Los Gatos	Outrigger canoe club
San Francisco Bay Area Kiteboarding (http://www.bayareakiteboarding.com)	Area-wide (web-based)	Website with information about kitesurfing
San Francisco Boardsailing Association (http://www.sfba.org/)	San Francisco	A non-profit organization that addresses concerns of boardsailing

TABLE 3.3.2-1. NON-MOTORIZED BOATING GROUPS AND ORGANIZATIONS

Organization	Location	Description
San Francisco Outrigger Canoe Center (http://www.sfocc.org/)	South San Francisco	Outrigger canoe organization
Save the Bay (http://www.savesfbay.org)	Oakland	Nonprofit organization working exclusively to protect, restore and celebrate San Francisco Bay; sponsors canoe and kayak outings on the Bay often associated with restoration programs
South End Rowing Club (http://www.south-end.org/)	South San Francisco	Local rowing club
Stanford Kayak Club (http://www.stanford.edu/group/KayakClub/)	Palo Alto	Local kayak club
Stanford Canoe and Kayak (http://www.stanford.edu/group/sck/)	Redwood Shores	Local chapter of U.S. Canoe/Kayak organization
Tamalpais Outrigger Canoe Club (http://www.geocities.com/paddletam/)	Sausalito	A non profit organization which provides instruction in basic and advanced techniques in the sport of outrigger canoeing
Wavechaser Paddle Series	Area-wide (web-based)	Winter racing organization for outrigger canoes and kayaks
Western Sea Kayakers (http://www.westernseakayakers.org/)	San Jose	Sea kayak club
Women on Water (http://www.uswindsurfing.org/WOW/WOWhome.htm)	San Francisco	Promotes women's windsurfing and kitesurfing

ROUTES OF TRAVEL

Recreational NMSB use on San Francisco Bay is typically a dispersed recreation activity (i.e., NMSB users may use any portion of the Bay); however, certain types of use may occur preferentially in certain areas (e.g., windsurfers have preferred areas depending on the wind conditions). While there are some localized restrictions regarding appropriate boating areas (e.g., as implemented by Marin Audubon Society for Richardson Bay[25]), with the exception of established exclusion zones enforced by the U.S. Coast Guard (see Section 3.4), no regulatory agency or specific bay-wide program directs boaters where, or where not, to travel. Though general, there are selected recreational routes of travel and locations that are popular for non-powered small boat recreation, commercial eco-tourism, nature observation, and environmental education. Some of the more popular routes of travel are listed below. It should be noted, however, that the patterns of NMSB use vary significantly among the different boat types.

- From Crissy Field to Marin Headlands/Kirby Cove (camping permitted) and Sausalito
- From Horseshoe Cove to Angel Island (camping permitted)

[25] The Richardson Bay Audubon Center & Sanctuary waters are closed annually to boat traffic (including non-motorized boats) and in-water activities from October 1st through March 31st for the benefit of migratory waterfowl (Richardson Bay Regional Agency Ordinance 92-1). See http://www.tiburonaudubon.org/conserve_boat.html for more detail.

- From Sausalito/Richardson Bay/San Francisco to Angel Island (camping permitted)
- From Gallinas Slough to China Camp, the Sisters Islands, and McNears Beach County Park
- Along the East Bay from Richmond to Emeryville shoreline
- Along the City of San Francisco shoreline
- Along the Oakland inner harbor shoreline
- From Jack London Square to Yerba Buena and Treasure Islands
- Around Alameda Island
- Around the Bair Island Ecological Reserve and Corkscrew Slough

In addition to specific routes of travel, there are also certain popular paddling areas in the project area. These include:

- China Camp Shoreline, Marin County
- Newark Slough, SF Bay National Wildlife Refuge
- San Leandro Bay, San Leandro
- Petaluma River and Petaluma Marsh, Lakeville
- Tolay Creek, Sonoma County
- Bull Island, Napa
- Arrowhead Marsh, Martin Luther King Regional Shoreline, Oakland
- Newark Slough, Newark
- Palo Alto Baylands, Palo Alto
- Bothin Marsh, Mill Valley
- Gallinas Creek, San Rafael
- Heron's Head Marsh, San Francisco

REGIONAL AND SITE-SPECIFIC GROWTH TRENDS

Understanding the potential growth patterns and changes in use that could be caused by implementation of the WT Plan is essential to evaluating the potential effects of the WT on recreation. As discussed in Chapter 2, growth in NMSB use could occur regionally or at the local site level, and would occur with or without the WT. While the Cal Boating Survey (Cal Boating 2009) includes considerable information on statewide non-motorized boating activity, and provides some regional information, no comprehensive NMSB use and trend data are kept for San Francisco Bay.

POTENTIAL REGIONAL GROWTH OF NMSB USE

As noted in Chapter 2, factors that drive regional non-motorized boating growth include population trends, overall participation trends in the various NMSB sports, and the population age profile. The Cal Boating survey (Cal Boating 2009) provides low, medium, and high estimates of the number of California households and participants that are expected to own non-motorized boats in the year 2010. For the purposes of this document, the Cal Boating medium estimate of 3.84% annualized growth of NMSB ownership and use is used as the growth rate absent the WT. While the regional increase in use associated specifically with

implementation of the WT cannot be quantified, as was explained in Section 2.2.2, it is likely that the effect will be quite small compared to the regional growth absent the WT. This is because most of the proposed Backbone Sites already exist and there is a relatively high barrier to entry for NMSB use. Publicity by itself is unlikely to lead to large increases in participation, and WT funding for facilities would be small relative to the total infrastructure investment at existing sites.

The 2009 Cal Boating survey assumes that, at a minimum, NMSB ownership rates (i.e., the percentage of households in the state that own NMSBs) would remain the same between 2006 and 2010, and that growth in NMSB use in this low-growth scenario would therefore be due only to growth in population. Locally, ABAG estimates that the regional population of the nine-county Bay Area will grow at an annualized rate of 0.7% between 2005 and 2010, and at an annualized rate of 0.8% long-term (between 2005 and 2035) (ABAG 2009). This growth rate would likely represent the minimum growth rate in NSMB use, absent any of the demographic trends which have contributed to, and are expected to continue to contribute to, growth in NMSB use.

Several demographic trends are expected to contribute to increases in NMSB use beyond that solely attributable to population growth. As described in the Cal Boating survey (Cal Boating 2009), the characteristics of boaters participating in the sport for less than five years suggest that the trend is toward higher participation by Asian, Black, or Latino Californians, possibly indicating that non-motorized boating is becoming more diverse and reflective of the population in the State. New boaters also tended to have less formal education, and have less household income, than the overall population of boaters. In addition, those boating less than five years had a greater proportion of young boaters (24 years or less) and boaters in the middle age groups (35 to 44 and 45 to 55). Both of these age groups are currently growing in size.

SITE-SPECIFIC GROWTH

Growth at the site-specific level is expected to be most influenced by improvements to facilities and services at a given site, although increases commensurate with population changes could also occur. While all facility enhancements would improve the quality of a NMSB user's experience at a site, some enhancements may draw additional users, whereas other enhancements would not be expected to have an effect on the number of users at a given location. Publicity may also have site-specific effects. If publicity materials promote certain sites or caution against the use of certain sites, usage patterns at those specific sites may change. A shift toward increased use could also be triggered by new knowledge about a site (if boaters did not know it existed, for example) or the creation of a site that did not previously exist.

Additions/enhancements of facilities or amenities such as additional or improved parking, provision of classes or tours, and new overnight accommodations could support site-specific growth. The conversion of a site that is not accessible to disabled persons to one that is would also be attractive to some people who could not previously use the site. Potential site enhancements are discussed in detail in Section 2.3.4. While most site enhancements are likely to contribute to some level of increased use, the following enhancements would not be expected to have any discernable effect on the number of users at a given site:

- New or improved signage

- Simple improvements to parking facilities, such as paving a gravel parking lot or adding striped parking spaces
- Improved restrooms, and
- Decorative landscaping

Although the WT program does not have a dedicated funding source, the Conservancy would lead efforts to find funding to implement the WT Plan, as mandated in the WT Act. Funding made available because of implementation of the WT Plan could increase the likelihood that certain facility improvements would be constructed and thus could lead to an increase in site-specific use. However, many of the facility improvements that could potentially be funded with WT-related grants might also eventually be constructed through other non-WT-related funding sources obtained by or originating with the site owners. Site owner interest in constructing improvements is likely to be driven more by owners' missions, advocacy by local non-motorized small boating enthusiasts, and increases in population than by the availability of WT-related funding. Further, the amount of WT-related funding that may be available over time is likely to remain small relative to the total non-WT-related investment in NMSB facilities throughout the nine-county Bay Area.

Promoting the creation of new access sites in areas that currently lack access could also contribute to site-specific growth. However, most new sites are likely to be created as a result of local agency initiatives and/or permit requirements (e.g., BCDC or local use permits), and would not be driven by the WT. Development of new locations would be supported by the WT, as appropriate, but would be dependent on the initiative of the potential site owner in creating the new access. Thus, the WT's role in promoting the creation of new access sites would be minor compared to other factors that may drive the creation of new sites.

The likely effect of any specific enhancement at a specific site would have to be assessed in the context of that site, as many factors (other enhancements, competition from nearby sites, seasonal restrictions, weather and tide patterns, and more) would influence the actual effect. In some cases, the number of site users may be constrained by multiple factors, and implementation of a single site enhancement would not be sufficient to eliminate restrictions on site use. For example, a site may lack parking and have limited launch space. If additional launch space is provided, but parking remains limited, the total number of users at the site may not change.

Finally, use of certain sites may also decrease. A shift toward decreased use of a site could be triggered by new knowledge about a site (for example, if seasonal avoidance of sensitive wildlife areas is recommended); the creation of a site that did not previously exist (drawing users to the new site if it is more desirable than one(s) previously used); or the addition/enhancement of facilities or amenities at other sites (drawing users to that site and away from other sites). Other factors unrelated to the WT may also affect site use, such as natural disasters or closure of a site by the site owner or manager.

TRENDS IN NMSB USE

Studies on NMSB use trends differ significantly in their quantitative conclusions, but tend to agree on conclusions about interest. The available studies on NMSB use in California point to an increase in use. According to a report released in 2003, between 1997 and 2002, the statewide

participation in paddlesports[26] increased from 18.3% to 23% (State Parks 2003). The randomized, statistically-designed survey regarding participation in NSMB use in California conducted by Cal Boating indicated that NMSB use grew at an annualized rate of 3.84% between 2002 and 2006 (Cal Boating, 2009). Based on the Cal Boating survey, approximately 8.25% of Californians participated in NMSB activities of all types in 2006 (Cal Boating, 2009).

KAYAKING

Of all the boating types targeted by the WT, kayaking has shown the most dramatic increase in popularity over the past few years. National kayak participation rates were first measured in 1994, when they were still quite low, at 1.3% of the national population (National Marine Manufacturers Association, *2005 Boating Statistical Abstract*). In the early 1990s, kayaking was considered a specialty sport, requiring some training and a relatively high level of skill for either of the sport's two main subsets: whitewater kayaking or sea kayaking. More recently, the advent of the recreation/sit-on-top kayaks has changed kayaking use levels. Recreational kayaks are relatively inexpensive, easy to operate, and appropriate for entry-level NMSB users. When rented, sit-on-top kayaks do not require a safety training session, which also adds to their popularity.

By 2005, national kayak participation had increased to about 4.0% (Outdoor Industry Foundation, *Outdoor Recreation Participation Study – Eighth Edition for the Year 2005*, June 2006). Participation nationwide in non-whitewater kayaking increased significantly (+26.3%) between 2003 and 2005. That increase was largely due to recreation/sit-on-top kayaking (+34.4%), with touring/sea kayaking as an outdoor recreation participation decreasing (-4.7%) during the same period.

CANOEING

Canoeing is the most traditional NMSB activity in the nation, and has been tracked for the longest period of time. Recently, nation-wide canoeing participation rates have slightly declined. There are several sources of data on canoe participation and demographics, although some combine canoeing with kayaking, or other paddle sports. These include (see Appendix F in Cal Boating 2009):

- U.S. Forest Service, National Survey on Recreation and the Environment
- American Recreation Coalition, The Recreation Roundtable Survey
- Outdoor Industry Foundation, Outdoor Recreation Participation Study, and
- American Sports Data, Superstudy of Sports Participation

Based on the Cal Boating survey, 10.5% of all NMSB use in California consists of canoes. Participation nationwide in canoeing increased 8.5% between 1998 and 2005 but decreased by 8.7% between 2003 and 2005, indicating that the peak of popularity occurred between 1998 and 2005. The data indicate that the popularity of canoeing peaked in 2001 when a record number of Americans not only participated in canoeing but also participated much more frequently. However, the total number of outings has significantly declined since 2001. In 2005 there were

[26] The term "paddlesports" involves many types of boats and is a general classification also applied to river and lake recreation, and whitewater rafting. NMSB use on the Bay is a much more limited activity.

83 million outings taken compared to 192 million outings in 2001. National canoe sales reflect this trend. Since 1999, the general slow decline in national canoe participation and more rapid decline in national canoe sales are in contrast to the rapid rise of recreational kayaking.

WINDSURFING AND KITESURFING

Windsurfing is a sport whose popularity peaked in the 1980s and early 1990s, and has since declined in popularity (Cal Boating 2009). Because of the demanding physical requirements of the activity, participation rates represent a relatively low percentage of the population even though windsurfing participation rates in California appear to be slightly higher than national rates. The 2005 national participation rate for windsurfing ranged between 0.2 percent and 1.1 percent; the Cal Boating survey indicates that in 2006, 1.2% of NMSB use consisted of sailboards, including kitesurfers. Sailboard sales peaked between 1980 and 1990, when sales were at 42,000 units. The highest year on record was 1987, at 70,000 units. Sales have declined in each of the years since.

ROWING

In participation studies there is no standard definition of rowing, so the category could include sculls and shells, rowboats, dinghies, tenders, dories, driftboats, dragon boats, and rowing boats that are sometimes used with a motor. Row boats of all types represent approximately 8% of NMSB use in California. National rowing participation rates have essentially been the same since 1994 when records were first measured (Cal Boating 2009).

TEAM BOATING

The popularity of group-rowing activities such as in dragon boats, outrigger canoes, sculls, and whale boats is increasing. However, the aggregate of these users is a small fraction compared to other boating types. In the Cal Boating survey, teamboating is included with "other" boating, which comprises a total of 1.7% of NMSB use in California (Cal Boating 2009).

3.3.3 LOCAL SETTING

Existing formal launch sites vary significantly in terms of the level of development and management that supports NMSB activities. Sites may be located in waterfront parks, marinas and harbors, sites with public launch ramps or floats, public access areas, wildlife refuges and privately owned sites. The Bay Trail currently leads to or is near (within 1,000 feet) 72 of the 112 WT Backbone Sites (See Table 3.3.3-1).

3.3.4 REGULATORY SETTING

FEDERAL REGULATIONS

AMERICANS WITH DISABILITIES ACT (ADA)

The ADA mandates that individuals with disabilities be given an equal opportunity to access public facilities and that reasonable accommodations must be made to account for physical and mental limitations of individuals with disabilities. Compliance with ADAAG and pending ADA-ABA Accessibility Guidelines for recreational boating facilities would be required if new or improved facilities would be constructed at a site; there is no requirement to "retrofit" existing facilities if no facility modifications are being conducted. Compliance with accessibility

TABLE 3.3.3-1. WT BACKBONE SITES ADJACENT TO EXISTING BAY TRAIL SPINE

Site Map Key[27]	Site Name	Existing or Planned Site	Launch or Destination Site	Bay Trail at or near Site
Alameda County				
A1	Albany Beach	Existing	Launch	Yes
A2	Berkeley Marina, Ramp	Existing	Launch	Yes
A4	Point Emery	Existing	Launch	Yes
A5	Shorebird Park	Existing	Launch	Yes
A6	Emeryville City Marina	Existing	Launch	Yes
A8	Middle Harbor Park	Existing	Launch	Yes
A9	Jack London Square	Existing	Launch	Yes
A11	Estuary Park/Jack London Aquatic Center	Existing	Launch	Yes
A12	Grand Avenue Boat Ramp	Existing	Launch	Yes
A14	Robert Crown Memorial State Beach	Existing	Launch	Yes
A15	Encinal Launching and Fishing Facility	Existing	Launch	Yes
A18	Doolittle Drive; Airport Channel	Existing	Launch	Yes
A20	San Leandro Marina	Existing	Launch	Yes
A22	Eden Landing Ecological Reserve	Planned	Launch	Yes
A24	Jarvis Landing	Existing	Launch	Yes
A25	Tidewater Boathouse	Planned	Launch	Yes
A26	Berkeley Marina, Small Boat Launch	Existing	Launch	Yes
A27	Coyote Hills	Planned	Destination	Yes
A28	Elmhurst Creek	Existing	Launch	Yes
A30	Hayward's Landing	Planned	Destination	Yes
Contra Costa County				
CC1	Martinez Marina	Existing	Launch	
CC2	Carquinez Strait Reg. Shoreline (Eckley Pier)	Existing	Launch	Yes
CC5	Rodeo Marina	Planned	Launch	
CC6	Pinole Bay Front Park	Existing	Launch	Yes
CC8	Point Molate Beach Park	Planned	Launch	
CC9	Keller Beach	Existing	Destination	Yes
CC10	Ferry Point	Existing	Launch	Yes
CC11	Boat Ramp Street Launch Area	Existing	Launch	Yes
CC14	Richmond Municipal Marina	Existing	Launch	Yes
CC15	Marina Bay Park & Rosie the Riveter Memorial	Existing	Launch	Yes

[27] Site locations are shown on 2.1.4-1A and 2.1.4-1B

TABLE 3.3.3-1. WT BACKBONE SITES ADJACENT TO EXISTING BAY TRAIL SPINE

Site Map Key[27]	Site Name	Existing or Planned Site	Launch or Destination Site	Bay Trail at or near Site
CC16	Shimada Friendship Park	Existing	Launch	Yes
CC17	Barbara & Jay Vincent Park	Existing	Launch	Yes
CC19	Point Isabel Regional Shoreline	Existing	Launch	Yes
CC20	SS Red Oak Victory	Planned	Destination	
CC21	Point Pinole	Planned	Destination	Yes
CC22	Bay Point Regional Shoreline	Planned	Launch	
CC23	Rodeo Beach	Planned	Launch	
Marin County				
M1	Kirby Cove	Existing	Destination	
M2	Horseshoe Cove	Existing	Launch	
M3	Swede's Beach	Existing	Destination	
M4	Turney Street Public Boat Ramp	Existing	Launch	
M5	Dunphy Park	Existing	Launch	
M6	Schoonmaker Point	Existing	Launch	
M8	Clipper Yacht Harbor	Existing	Launch	
M10	Shelter Point Business Park	Existing	Launch	Yes
M11	Bayfront Park	Existing	Launch	Yes
M13	Brickyard Park	Existing	Launch	
M16	Richardson Bay Park/ Blackies Pasture	Existing	Launch	Yes
M17	Angel Island State Park	Existing	Destination	
M19	Sam's Anchor Café	Existing	Destination	
M25	Higgins Dock	Planned	Launch	
M27	Bon Aire Landing	Existing	Launch	
M28	Marin Rowing Association Boathouse	Existing	Launch	Yes
M29	Ramillard Park	Existing	Launch	Yes
M30	San Quentin	Existing	Launch	
M31	Jean & John Starkweather Shoreline Park	Existing	Launch	Yes
M33	Harbor 15 Restaurant	Existing	Destination	
M35	Loch Lomond Marina: Ramp	Existing	Launch	
M36	Loch Lomond Marina: Beach	Existing	Launch	
M38	McNear's Beach	Existing	Launch	
M39	China Camp State Park	Existing	Launch	Yes
M40	Bull Head Flat	Existing	Launch	Yes

TABLE 3.3.3-1. WT BACKBONE SITES ADJACENT TO EXISTING BAY TRAIL SPINE

Site Map Key[27]	Site Name	Existing or Planned Site	Launch or Destination Site	Bay Trail at or near Site
M41	Buck's Landing	Existing	Launch	
M43	John F. McInnis Park	Existing	Launch	Yes
M47	Black Point Boat Launch	Existing	Launch	
Napa County				
N1	Cutting's Wharf	Existing	Launch	Yes
N2	JFK Memorial Park	Existing	Launch	Yes
N6	Napa Valley Marina	Existing	Launch	
N7	Green Island Boat Launch Ramp	Planned	Launch	
N8	Riverside Drive Launch Ramp	Existing	Launch	
Santa Clara County				
SC2	Alviso Marina	Planned	Launch	Yes
SC3	Palo Alto Baylands Launching Dock	Existing	Launch	Yes
San Francisco County				
SF1	Candlestick Point State Recreation Area	Existing	Launch	Yes
SF2	India Basin Shoreline Park	Existing	Launch	Yes
SF4	Islais Creek	Existing	Launch	Yes
SF6	"The ""Ramp"""	Existing	Destination	Yes
SF7	Pier 52 Boat Launch	Existing	Launch	Yes
SF8	South Beach Harbor (AKA Pier 40)	Existing	Launch	Yes
SF9	Treasure Island	Existing	Launch	
SF10	Aquatic Park	Existing	Launch	Yes
SF11	Gas House Cove (aka Marina Green)	Existing	Launch	Yes
SF12	Crissy Field	Existing	Launch	Yes
SF13	Brannan St Wharf	Planned	Launch	Yes
SF14	Northeast Wharf Park	Planned	Launch	Yes
San Mateo County				
SM2	Ravenswood Open Space Preserve	Existing	Launch	Yes
SM4	Redwood City Municipal Marina	Existing	Launch	Yes
SM6	Docktown Marina	Existing	Launch	
SM9	Redwood Shores Lagoon	Existing	Launch	
SM11	Beaches on the Bay	Existing	Launch	Yes
SM12	Foster City Lagoon Boat Park	Existing	Launch	
SM13	East 3rd Ave	Existing	Launch	Yes

TABLE 3.3.3-1. WT BACKBONE SITES ADJACENT TO EXISTING BAY TRAIL SPINE

Site Map Key[27]	Site Name	Existing or Planned Site	Launch or Destination Site	Bay Trail at or near Site
SM16	Seal Point Park	Existing	Launch	Yes
SM17	Coyote Point, Marina	Existing	Launch	Yes
SM18	Old Bayshore Highway	Existing	Launch	Yes
SM20	Colma Creek/Genentech	Existing	Launch	Yes
SM21	Oyster Point Marina	Existing	Launch	Yes
SM22	Brisbane Marina	Existing	Launch	Yes
SM23	Coyote Point, Beach	Existing	Launch	
SM24	Westpoint Marina	Planned	Launch	Yes
SM25	Corkscrew Slough Viewing Platform	Planned	Destination	
Solano County				
So1	Brinkman's Marina	Existing	Launch	Yes
So2	California Maritime Academy	Existing	Launch	Yes
So5	Belden's Landing	Existing	Launch	
So7	Matthew Turner Park	Existing	Launch	Yes
So8	West 9th Street Launching Facility	Existing	Launch	Yes
So9	Benicia Point Pier	Existing	Launch	Yes
So10	Benicia Marina	Existing	Launch	Yes
So12	Suisun City Marina	Existing	Launch	
Sonoma County				
Sn3	Hudeman Slough	Existing	Launch	
Sn5	Papa's Taverna/ Lakeville Marina	Existing	Launch	
Sn6	Petaluma Marina	Existing	Launch	
Sn7	Petaluma River Turning Basin	Existing	Launch	

guidelines would be addressed at the site-specific level (during development of the Trailhead Plan) for those sites where new or improved facilities are proposed.

NATIONAL PARK SERVICE

The National Park Service (NPS) has jurisdiction over three bayfront National Parks, including the Golden Gate National Recreation Area, San Francisco Maritime National Historic Park, and the Rosie the Riveter Historic Park. A key mission of the NPS is to identify, protect and preserve geological, biological, and cultural resources for future generations. Any changes that are contemplated to improve proposed Backbone Sites on NPS lands would require the approval by NPS specialists for these parks. Recreation policies for these parks are discussed in more detail in Section 3.13, Land Use Planning.

U.S. FISH AND WILDLIFE SERVICE

The National Wildlife Refuge System Improvement Act of 1997 designates wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as "priority general public uses." When these activities are compatible with species protection goals (as determined by USFWS), they are welcome on refuges and receive priority over other uses. USFWS recreation policies for Bay refuges are discussed in more detail in Section 3.13, Land Use Planning.

STATE AND REGIONAL REGULATIONS

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION, BAY PLAN

The design and implementation of all WT improvements will be within BCDC jurisdiction and most are expected to require a BCDC permit. Specific guidelines developed by BCDC for public access improvements along the Bay shoreline are summarized in *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay* (2005). Guidelines are provided for a full range of specific public access improvements, including parking and staging areas and boat launching ramps. *The Bay Plan* and these guidelines are applicable to proposed WT-related improvements at WT Backbone Sites.

REGIONAL AND LOCAL NON-REGULATORY PLANS

ASSOCIATION OF BAY AREA GOVERNMENTS (ABAG) – BAY TRAIL PLAN

There are many local, non-regulatory plans of relevance to the Water Trail. Those plans will be reviewed during the site-specific analysis of the trailhead designation process. The Bay Trail Plan is regional and although non-regulatory, is described here because of its importance to the evaluation of potential recreational impacts on a regional level.

To date, approximately 300 miles of the alignment, over half the Bay Trail's ultimate length, have been completed. Bay Trail policies and design guidelines are intended to complement rather than supplant the adopted regulations and guidelines of local managing agencies.

Bay Trail alignment policies reflect the goals of the Bay Trail program—to develop a continuous trail which highlights the wide variety of recreational and interpretive experiences offered by the diverse bay environment and is situated as close as feasible to the shoreline, within the constraints defined by other policies of the Bay Trail Plan. Bay Trail policies also include the investigation of water trails as an enhancement to the shoreline trail system. Depending on the location of its segments, the Bay Trail consists of paved multi-use paths, dirt trails, bike lanes, sidewalks or city streets signed as bike routes.

3.3.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The Proposed Project would be considered to have a significant impact to recreation resources if:

- Construction or expansion of recreational facilities may have an adverse physical effect on the environment. This criterion is addressed in the other sections of this EIR, as well as the Initial Study (see Appendix B).

- There is a substantial increase in 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.
- The location, design or use of proposed WT Backbone Sites would preclude existing recreation activities.

METHODOLOGY

Potentially significant impacts identified in the Initial Study were evaluated for their impact after implementation of the WT, including the strategies defined in the WT Plan. Potential impacts to recreational resources were evaluated based on a literature review, interviews with boating organizations and establishments providing boating services, and professional judgment. For each impact area, the recreation impact analysis discusses the WT strategies that would minimize potential impacts where applicable and identifies additional program strategies or strategy refinements for mitigation if needed. Applicable WT strategies (See Appendix B) are referenced and summarized as appropriate.

REGIONAL IMPACTS AND MITIGATION MEASURES

IMPACT REC-1: REGIONAL EFFECTS ON RECREATION

Potential impacts of the WT related to recreation resources generally would be site specific and not regional. At many locations, existing recreation resources would overlap or co-exist with the WT. For example, regional agencies such as East Bay Regional Park District have local and regional trails and other recreational facilities that may also include WT sites. Implementation of the WT Plan would provide multi-faceted opportunities at existing recreational sites such as waterfront parks. The WT would add a new layer of recreational opportunities for residents and visitors. Implementation of the WT Plan would typically complement the San Francisco Bay Trail program by providing for a full range of non-motorized recreation opportunities at the numerous locations where the Bay Trail and WT would overlap. The WT could support existing outreach efforts conducted by other agencies providing recreational opportunities by including them in WT promotional materials.

A possible concern posed by implementation of the WT Plan is the potential for more users at existing high use sites/areas. This impact would be site-specific and is addressed by Impact Rec-4. However, implementation of the WT Plan is likely to enhance the existing recreational opportunities and experiences of local residents and visitors. Therefore, the WT's effect on recreational resources would be generally a positive one and is considered **less than significant**.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT REC-2: INCREASED USE OF EXISTING SITES OR OTHER RECREATIONAL SITES CAUSING ACCELERATED PHYSICAL DETERIORATION OF THE FACILITY OR SUBSTANTIAL UNPLANNED EXPANSION

As described in Chapter 2, NMSB use in the Bay Area is expected to increase due to population growth, other demographic factors, and possibly specific activities of the WT. As discussed earlier, potential growth associated solely with the implementation of the WT Plan is expected to be only a small percentage of the overall (population-driven) growth.

Increased use of existing facilities that become WT trailheads could lead to an incrementally accelerated increase of wear and tear on facilities. However, NMSB users represent a small percentage of overall shoreline use. WT facilities could be anticipated to have a normal life-span that would be experienced by any other public shoreline facility.

The WT Plan specifically anticipates and addresses these types of concerns, and implementation of Strategies 6 (Management Resources) and 7 (Operations and Maintenance) during the trailhead designation process[28] would ensure that sufficient budget and an effective plan for maintenance are in place at all WT sites. Use of these strategies would ensure that the WT Plan is implemented consistent with local agency level-of-service standards and available resources to manage and operate sites.

The trailhead designation process would include an assessment of the likelihood of increased use, and potential impacts to facilities. Based on anticipated changes in overall use levels and the ability of the WT Plan strategies to direct and manage use, this potential impact is considered **less than significant** and no mitigation is required.

IMPACT REC-3: INCREASED USE OF WT SITES BY MOTORIZED BOATS FROM IMPLEMENTATION OF THE WT PROGRAM

A secondary non-quantifiable impact of implementation of the WT is that it may stimulate use of WT trailheads by motor boats, or unauthorized motor boat use of NMSB-only WT launch and destination sites. Most commonly, potential WT launch sites are already also used by motorized boats. However, the designation of WT sites and the potential for multi-day itineraries could induce motorized boats to make similar trips and use WT launch sites, including those only intended for non-motorized watercraft. WT education and outreach strategies, including signage, (Strategies 17, 18, 19, 20, 21, and 22) would serve to mitigate these potential impacts. Additionally, the detailed design of NMSB-only launch sites in the Trailhead Plan, consistent with Strategy 3, could essentially preclude most motorized boats from using them if a shallow draft depth were incorporated into the design. Strategy 7 would address potential site management issues, and maintenance and operations plans could include monitoring appropriate use of facilities by the designated user groups. This potential impact is considered **less than significant** and no mitigation is required.

IMPACT REC-4: CONFLICT WITH, AND PRECLUSION OF, EXISTING RECREATION ACTIVITIES DUE TO FACILITY IMPROVEMENTS, INCREASED USE OF WT SITES, OR INCREASED BOATING

Existing access onto the Bay for NMSBs consists of more than 135 launch and landing sites. In most cases, the 112 WT Backbone Sites are multi-use areas and, as such, require various types of recreation users to functionally co-exist in order for the site to operate smoothly. However, conflicts between recreation uses can and do occur. The potential for the WT designation to preclude existing recreation from taking place could result from the following: where access plans for facilities would displace or exceed the capacity of existing facilities, or where increased use related to the WT could create sufficient conflicts among recreation users of any type such that some existing users do not return. Conflicts between WT users and other existing recreation activities could occur both on the shoreline and in the water. Conflicts could be created by:

[28] See Chapter 2 for a detailed discussion of how the strategies would be implemented.

- Poor site planning (for example, placing WT access routes, boat ramps, or rigging areas in direct conflict with other recreation activities, such as the use along the Bay Trail)
- Competition for limited parking at some locations
- Use of WT access facilities by motorized boats, and
- On-water capacity conflicts among all types of boating at popular public launch ramps where ramp and dock space are scarce or in narrow waterways where maneuvering options are limited.

Potential navigational conflicts between motorized and non-motorized small boats are addressed in Section 3.4.

Potential use conflicts can be characterized into five scenarios. Scenario 1 consists of increased use at existing sites, including HOSs. Here existing use levels and any associated use-conflicts at sites can be assumed to be part of the baseline condition. However, some of these sites may be experiencing significant use and management challenges where any additional recognition may only serve to exacerbate problems for management. For example, access and parking at Crissy Field and Kirby Cove are often at capacity and additional use frustrates both park visitors and management (personal communications: Steve Ortega and Mia Monroe, NPS, January 7, 2008). If a facility becomes overcrowded, NMSB users could also shift their use to other recreation sites and informal sites, potentially putting stress on the facilities at those sites.

Scenario 2 consists of existing, developed sites that may be enhanced to introduce features that, if not sensitively planned and designed, could conflict with existing use patterns. For example, the Bay Trail currently passes between the rigging area at the East 3rd Avenue site in Foster City (Site SM13) and the two launch areas. This site is popularly used by windsurfers and kiteboarders

Scenario 3 would involve substantial new improvements and would be introducing NMSB launching activities to areas or sites where they do not now exist. As each site is unique, site-specific use impacts and appropriate mitigation cannot be assessed at a program level, and would be addressed in the development of the Trailhead Plan and in project-level CEQA review if and when expansions of existing facilities or construction of new sites are proposed.

Scenario 4 would consist of new or increased use of WT sites by motorized boats. The proposed WT Plan is intended to increase visibility of boating opportunities on the Bay and adjoining waterways. Many WT sites are designed for both motorized boats and NMSBs; however, some access sites are used only or primarily by NMSBs. If WT publicity makes motorized boat users aware of and use sites that were formerly only or primarily used by NMSBs, conflicts could ensue between NMSBs and motorized boats.

Scenario 5 would consist of increased on-water conflicts, primarily due to increased NMSB use of areas currently open to hunting. State Wildlife Areas and portions of the National Wildlife Refuges in San Francisco Bay permit hunting during certain times of year. Increased use of these areas by NMSB users could adversely affect hunting conditions and could also expose NMSB users to personal danger.

Some amount of increased use of existing Backbone Sites is inherent in the WT Plan in that the WT Plan is both an improvement program and a management plan. Trailhead locations and improvements would be implemented and managed in accordance with WT Plan Strategies 1, 3, and 24 (see Table 2.3.3-1 and Appendix D); implementation of these strategies would direct both the levels of WT use and the patterns of use that may be encouraged by the WT Plan. Strategies 17, 18, 19, 20, and 21 (see Table 2.3.3-1 and Appendix D) govern how the boating public is made aware of trailhead locations and destination opportunities and would help control NMSB use of the various access sites.

As described in Chapter 2, the trailhead designation process for all potential WT sites requires development of a Site Description. For sites requiring more than signage to be designated as a trailhead, a Trailhead Plan is also required. The Site Description includes a description of user groups, site management, and potential user conflicts.

The Trailhead Plan is site-specific and would apply the guidance contained in the WT Strategies in a practical, explicit way, as appropriate to the uses and features of the site that are WT-specific. Potential user conflicts would be addressed by integrating the requirements of the following strategies into the Trailhead Plan:

- Strategy 3 – The type and design of trail-related improvements should match site characteristics, including existing facilities and uses.
- Strategy 4 – Trailhead development should be consistent with existing policies, plans and priorities of land and resources managers at and around trailheads. If such plans include other facilities and uses, then the WT Trailhead Plan would need to accommodate those facilities and uses.
- Strategy 6 – Management resources should match the planned use of the site, and may include enforcement. This would help control inappropriate uses and resolve user conflicts.
- Strategy 14 – Periodic site reviews should be conducted to identify trail-specific problems, including user conflicts.
- Strategy 22 –Trailhead Stewards could assist in resolving use conflicts.
- Strategy 24 – Limitations on trailhead use may be appropriate; parking restrictions could be used to potentially limit use at trailheads and thereby avoid user conflicts.

The presence of the general public who would use WT sites provides a level of observation not typically provided by a managing agency, unless there is a full-time staff member assigned to a particular site. WT Strategies 17, 18, and 19 (see Table 2.3.3-1 and Appendix D) address a variety of means to inform the public about the WT, but do not provide a channel for the public to inform the Project Management Team about their opinions of the WT and its use. In addition, the potential conflict between hunting and NMSB use is not explicitly addressed in the strategies. Therefore, for sites where existing use levels are at capacity, and/or where NMSB users may more frequently enter areas currently open to hunting, implementation of the WT Plan could result in a **potentially significant but mitigable** impact.

MITIGATION MEASURE REC-M4A: WEB-BASED COMMENT FORM

Strategy 14 shall be modified to provide a web-based comment form for users to document use observations and conflicts. The web page address for this form shall be posted on applicable education/outreach materials.

MITIGATION MEASURE REC-M4B: CONDUCT RECREATIONAL USE EVALUATIONS AND DEVELOP/IMPLEMENT ADAPTIVE MANAGEMENT RECOMMENDATIONS IF USER CONFLICTS OCCUR

Based on the requirements contained in the Trailhead Plan and/or the professional judgment of the site owner/manager, and consistent with WT Plan Strategies 6, 14, and 22, when presented with information about use conflicts, the site owner/manager and/or volunteers shall evaluate the information presented, and monitor recreation use for a reasonable period, if appropriate. The evaluation and any monitoring conducted shall be used to determine if additional physical or management measures are necessary to alleviate use conflicts. Any such measures shall be incorporated into the periodic Site Review provided by Strategy 14 and a plan for implementing the appropriate measures shall be developed collaboratively by the site owner/manager and WT staff.

MITIGATION MEASURE REC-M4C: SAFETY SIGNAGE

Signage at trailhead locations within four miles of areas currently open to hunting shall include language that alerts NMSB users to the specific areas open to hunting (including dates) to enable NMSB users to avoid these areas during the hunting season.

3.4 NAVIGATIONAL SAFETY

Navigational and on-water safety issues relating to WT users are addressed in this section.

3.4.1 INITIAL STUDY FINDINGS

Navigation and navigational safety are not issues that are specifically included in the CEQA Initial Study (IS) checklist. However, the IS did identify a potential need for increased emergency response services associated with implementation of the WT. The potential need for increased emergency response capability would, in part, be due to potential accidents on the water.

This section of the EIR evaluates the potential navigational safety impacts associated with implementation of the WT. Potential impacts to public services are addressed in Section 3.5.

3.4.2 REGIONAL SETTING

The 548-square-mile San Francisco Bay has an irregular 1,000-mile shoreline composed of a variety of urban and suburban areas, marshes, and salt ponds.

NAVIGATIONAL RISKS FOR NMSBS

There are significant risks associated with NMSB use on San Francisco Bay.
Navigational risks for NMSBs and boating in general can be divided into six categories:

- Tides and currents;
- Inclement weather and fog, particularly winds
- Shallow water (mudflats, shoals and islands)
- Recreational motorized boating traffic
- Commercial vessel traffic, including ferries and vessels at anchorages
- Structures (including bridges)
- Bridge construction
- Dredging operations
- Debris (sunken vessels and other debris located in areas that may be accessed by NMSBs)

The combination of tides, currents, weather (fog and wind), and water depths presents an endless array of conditions challenging the safety and navigation skills of NMSB users. Even a skilled boater who is familiar with Bay conditions can get into trouble and require emergency services from either the Coast Guard or from land-based emergency response providers.

Navigating the Bay becomes more difficult during periods of restricted visibility due to winter storms and fog. Shorelines and obstacles (including other vessels, shallow waters, and structures) as well as changes in the water surface that could indicate dangerous conditions are more difficult to discern in storms and fog. The risks of accidents or becoming disoriented increase. Changes in the tide can result in NMSBs being swept off course away from shore and/or farther out into open waters, and can make landings difficult for the unaware (i.e., at launch sites or destination sites that are only accessible at certain water depths). Although in general NMSBs are able to maneuver in much shallower water than most other vessels, users could still become stranded by mudflats or low water areas at low tide. Sudden changes in weather can also result in

increased fatigue (e.g., as boaters are battling strong winds and/or waves) and medical emergencies such as hypothermia.

The inherent challenges for NMSB navigation in San Francisco Bay are exacerbated by the large number of vessels that are used on the Bay. As discussed in Section 2.2.2, based on the available information, the number of motorized (registered) boats and NMSBs that may be used on San Francisco Bay are generally in the same range.[29]

The potential for collisions between NMSBs and other boats – particularly where scale and speed differences are significant, such as with commercial vessels and ferries – raises concerns for public safety. This concern is much greater where NMSB launches are in close proximity to commercial and ferry vessel terminals or where NMSBs may enter into a designated shipping or ferry route. According to the Harbor Safety Plan, thousands of recreational boats are concentrated near the major inbound and outbound Bay shipping lanes (HSC 2009). NMSB users could also encounter construction activities in the Bay. There are numerous crane barges and construction boats moving in and around the Bay Bridge, for example. Dredging operations occur throughout the Bay, and there are many on-going dredging operations that occur in small channels leading to private marinas. Anchorages could also be a place where increased risk of collision exists between larger vessels and NMSBs, such as at the two main anchorages in South San Francisco Bay (Anchorages 8 and 9); other anchorages are located in the Central and North Bays. The movements of vessels proceeding to anchorages are governed by wind, current, and sometimes spacing requirements, and will be unpredictable to NSMB users (T. Boone, USCG, pers. comm., April 23, 2010). Some of the potential WT sites, particularly in the Central Bay from southern Marin and Contra Costa Counties south to Redwood City and San Leandro, are located in such areas or near airports, ferry terminals, and exclusion zones. These areas present additional potentially dangerous situations for NMSB users. Although boating regulations (see Section 3.3.4, below) apply to all boaters and are designed to prevent collisions, not all NMSB users are sufficiently familiar with these regulations.

Existing structures may pose a collision hazard. In general, NMSB users would be expected to be aware of existing structures, and know to avoid them; however, collisions could occur as a result of extreme weather and tide conditions, or when trying to avoid a collision with another vessel. Finally, underwater or partially sunken debris exists in some areas of the Bay, such as Contra Costa County, where parts of shorelines are degraded by abandoned recreational and commercial vessels, dilapidated docks, old pilings, buildings, and junk (CCC 2008). Recently, during the economic downturn, there has been a significant increase in the number of vessels that are abandoned each year (CCC 2008). Debris located in shallow waters could damage a NMSB, cause groundings in deeper water, and result in injuries to NMSB users as a result of collisions and capsizings. Much of this debris also contains hazardous materials, or may spill untreated sewage, leading to potential health impacts due to poor water quality.

[29] The estimated number of NMSBs that could be used on San Francisco Bay (i.e., excluding inflatables) in 2006 was 174, 017. The estimated number of motorized recreational boats was 158,223 in 2000, with approximate annual growth of 1.4% to 2.5% per year. This range of growth rates would lead to an estimated 172,000 – 183,500 motorized boats in San Francisco Bay by 2006.

NMSB ACCIDENTS

Navigational accidents and loss of life related to NMSB use do occur. Tables 3.4.2-1 through 3.4.2-3 present boating accident and fatality statistics for selected NMSB use in California.

TABLE 3.4.2-1. USCG NATIONAL FATALITY DATA FOR CANOES AND KAYAKS -- 2005

Fatalities	Canoes	Kayaks
Drownings	40	24
With PFD	3	14
Without PFD	37	10
Percent without PFD	93%	42%
Other deaths	9	5
Total	**49**	**29**

Source: Cal Boating 2009

TABLE 3.4.2-2. TYPES OF NON-MOTORIZED BOATING ACCIDENT IN CALIFORNIA (1995 TO 2006)

Type of Reported Accident	Number of Reported Accidents
Capsizing	114
Collision with vessel	59
Falls overboard	23
Collision with fixed object	8
Flooding/swamping	8
Fall in boat	8
Struck submerged object	7
Struck by motor/propeller	3
Collision with floating object	1
Fire/explosion	1
Other/unknown	10
Total	**242**

Source: Cal Boating 2009

TABLE 3.4-3. NUMBER OF NON-MOTORIZED BOATING DEATH AND INJURY ACCIDENTS BY VESSEL TYPE IN CALIFORNIA (1995 TO 2006)

Vessel Type	Number of Deaths	Number of Injuries
Canoe/kayak	47	69
Raft	32	35
Rowboat	9	14
Sailboard	3	10
Kiteboard	1	1
Small sailboard	1	1
Paddle boat	1	5
Amphibious Tricycle	1	0
Inflatable dinghy	0	1
Rowing scull	0	3
Total	**95**	**139**

Source: Cal Boating 2009

As described in the 2009 Cal Boating report, NMSB accidents typically fall into three categories:

1. Relatively inexperienced users on flat water without personal flotation devices (PFDs), often fishing
2. Relatively inexperienced rafters, often without PFDs, in conditions beyond their experience levels, and
3. Highly experienced and well-outfitted paddlers, typically kayakers with PFDs, attempting to paddle extreme and challenging conditions (e.g., white water kayaking)

While reporting of accidents is required (as described in the regulatory setting section), both the USCG and Cal Boating believe that non-fatal accidents are greatly under-reported (Cal Boating 2009). While many sailboats and motor boats are on the Bay, particularly on weekends, few near-misses or accidents are reported to the USCG or VTS. A number of reported and unreported "near misses" occur which might be prevented by small boats properly yielding the right-of-way to large vessels that cannot change course (HSC 2009). No accidents or near-accidents involving board sailors and vessels have been reported to the USCG or Vessel Transit Service (VTS) during the past several years. However, many board sailors cross in front of tankers and container ships off Crissy Field, which is close to the Golden Gate Bridge. Competitive races are sponsored at this location during the year.

The actual number of fatalities reported for NMSBs in California is relatively low compared to motorized boating: a total of 139 injuries and 95 fatalities, comprising just over 200 separate incidents, were reported for the entire state in the 12 years from 1995 through 2006 (Cal Boating 2009). Over 90 percent of the fatalities were due to drowning. In contrast, there were 35 motorized boating fatalities in 2006 alone. Although the greatest number of fatalities was associated with white water kayaking (36, or 38%), perceived low risk activities including fishing, recreating, and general paddling accounted for the remainder. San Francisco Bay had eight reported NMSB accidents during this period (the number of fatalities, if any, in San Francisco Bay during this period is not available).

SHIPPING LANES AND FERRY ROUTES

As noted earlier, recreational NMSB use in San Francisco Bay is a dispersed recreation activity. With the exception of established exclusion zones enforced by the USCG, no agency or specific Bay-wide program directs NMSBs where or where not to travel. For safety, larger vessels are constrained to specific routes as described below.

REGULATED NAVIGATION AREAS

The area monitored by the USCG Vessel Traffic Service ("VTS area") "begins" at the outer limit of the Offshore Sector (a 38.7-nautical-mile radius around Mount Tamalpais), includes Central San Francisco Bay, and ends at the Port of Redwood City in the south. To the north and east, it extends to the entrance to the Petaluma River, into the Napa River as far as the Mare Island Causeway Bridge, and upriver to Sacramento and Stockton. Central San Francisco Bay is the busiest part of the VTS area. It must be traversed by each tanker, container ship, and other large vessel inbound to any of the Bay Area's ports, and also by almost every scheduled ferry route in the Bay Area. It is also one of the most popular recreational sailing areas in the United States, resulting in a challenging transit for large ships on busy summer weekends. The VTS area is shown in Figure 3.4.2-1.

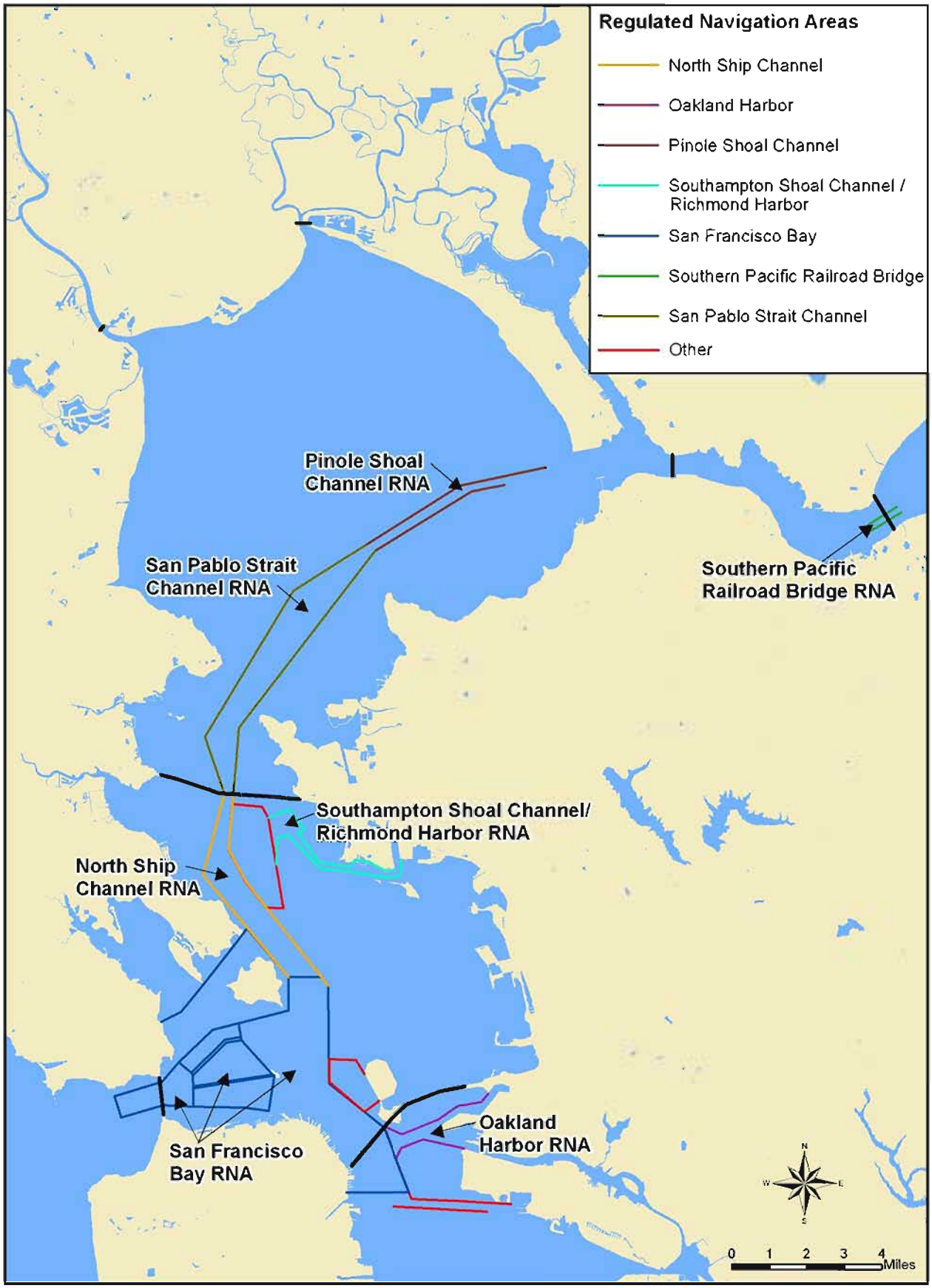


Figure 3.4.2-1
Regulated Navigation Areas in the San Francisco Bay VTS Area

Navigation data from WTA EIR

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file: Navigation-routes_1134_2010-0211lee.mxd

Within San Francisco Bay itself, the Coast Guard has established the Regulated Navigation Areas (RNAs) shown in Figure 3.4.2-1 and summarized in Table 3.4.2-4. The RNAs increase navigational safety by organizing traffic flow patterns for large vessels; reducing meeting, crossing, and overtaking situations between large vessels in constricted channels; and limiting vessel speed. RNAs apply to large vessels only, defined as power-driven vessels of 1,600 or more gross tons, or tugs with a tow of 1,600 or more gross tons. When navigating within the RNAs, large vessels follow specific guidelines. They must have their engines ready for immediate maneuver, operate their engines in a control mode and on fuel that allows for an immediate response to any engine order, and not exceed a speed of 15 knots through the water. RNAs have a high density of large vessel traffic, and thus may pose additional hazards to NMSBs.

FERRY ROUTES

There are currently six major ferry routes on the Bay, with an average of 78 daily one-way transits. Operating ferry terminals are located in San Francisco, Larkspur, Sausalito, Tiburon, Vallejo, Harbor Bay, Oakland, and Alameda (Figure 3.4.2-2).

The San Francisco Bay Water Emergency Transportation Authority (WETA) is a regional agency authorized by the State of California (SB 976) with the authority over and control of all public transportation ferries in the Bay Area region, except those owned and operated by the Golden Gate Bridge District. It was created in 2007 from the San Francisco Bay Water Transit Authority.

Figure 3.4.2-2 also illustrates proposed ferry routes being considered by WETA for ferry service expansion. New terminals may eventually be located in Antioch, Berkeley, Hercules/Rodeo, Martinez, Mission Bay (San Francisco), Oyster Point (South San Francisco), Redwood City, Richmond, and Treasure Island (San Francisco) (WETA 2009).

SECURITY ZONES AND RESTRICTED AREAS FOR SAN FRANCISCO BAY

Security zones are areas that must be avoided by boaters not expressly permitted to enter them. They are monitored and enforced by the USCG, and a violation may result in six months in jail and/or $250,000 in fines (criminal) or a $32,500 civil fine. Temporary moving security zones have been established for cruise ships and tank ships (tankers) as well as naval and contract naval vessels which enter and depart from San Francisco Bay. The purpose of these zones is to provide boater safety and prevent terrorist acts. These temporary moving security zones are activated when the vessel passes a specific point when entering the Bay and are deactivated when the vessel leaves that zone. When activated there is a security zone that is a 100-yard radius around the ship. Temporary fixed security zones are activated when a ship docks at any San Francisco Bay or Delta port. Specific rules have been established for vessels proposing to enter security zones (33 CFR 165.T11-098) and must be followed to avoid the penalties outlined above.

TABLE 3.4.2-4. REGULATED NAVIGATION AREAS

Name	Description
San Francisco Bay RNA	Extends from the precautionary zone east of the Golden Gate Bridge to Alcatraz Island. Because of the large number of vessels entering and departing San Francisco Bay, traffic lanes are established under the Golden Gate Bridge and in the Central Bay to separate opposing traffic and reduce vessel congestion. Because vessels converge and cross in such a manner that one-way traffic flow patterns could not be established, two precautionary areas were established in this RNA. These are the Golden Gate Precautionary Area, which encompasses the waters around the Golden Gate Bridge between the Golden Gate and the Central Traffic Lanes; and the Central Bay Precautionary Area, which encompasses the large portion of the Central Bay and part of the South Bay.
Oakland Harbor RNA	Encompasses the Oakland Bar Channel, Oakland Outer Harbor Entrance, Middle Harbor, and Inner Harbor Entrance channels. A power-driven vessel of 1,600 or more gross tons, or tug with a tow of 1,600 or more gross tons, cannot enter this RNA while another vessel or tug meeting these same criteria is navigating within its boundaries, if such an entry would result in meeting, crossing, or overtaking the other vessel.
North Ship Channel and San Pablo Strait Channel RNAs	Consists of the existing charted channels and delineates the only areas where the depths of water are sufficient to allow the safe transit of large vessels. The strong tidal currents in these channels severely restrict the ability of large vessels to safely maneuver to avoid smaller vessels.
Pinole Shoal Channel RNA	A constricted waterway where use is reserved for vessels 1600 gross tons or greater.
Benicia-Martinez Railroad Drawbridge RNA	Consists of a small, circular area, 200 yards in radius, centered on the middle of the channel under the Bridge. The limited horizontal clearance results in a greater chance of vessel collisions with the bridge, which is significantly increased when visibility is poor. Large vessels are prohibited from transiting through the bridge navigation lift span when visibility is 0.5 nautical miles or less.

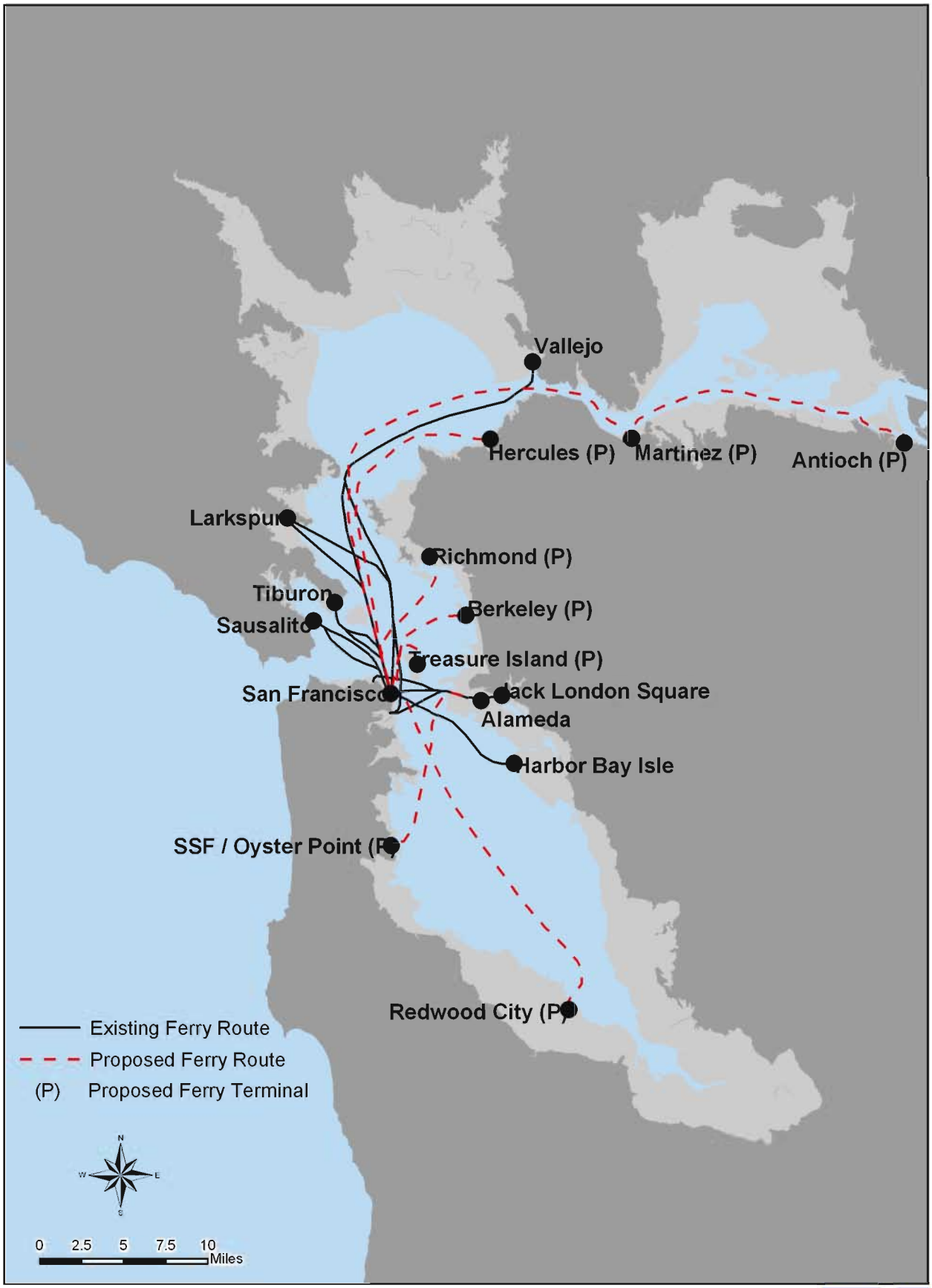


Figure 3.4.2-2: Existing and Proposed Ferry Routes

Data Sources: Bay Area Eco Atlas 1999 SFEI, Water Emergency Transportation Authority

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file: Ferry-routes_1134_2009-0820lee.mxd

The following sites also have security zones (USCG 2008):

- Coast Guard Island Pier in the Oakland Estuary encompassing the waters around the pier and extending out to the edge of the channel;
- 25 yards around any pier and abutment of the Golden Gate and San Francisco/Oakland Bay Bridges
- 500-yard slow transit zone around all naval vessels or contract naval vessels greater than 100 feet in length
- 200 yards around the San Francisco and Oakland International Airports marked by buoys, in navigable waters of the Bay
- 500 yards around the three existing piers at the Military Ocean Terminal Concord during periods when military shipments are being moored; all other times it is 100 yards

"Restricted Areas" are defined for the purpose of prohibiting or limiting public access to a specified water area. Restricted Areas generally provide security for U.S. Government property and/or protection to the public from the risks of damage or injury arising from the U.S. Government's use of that area. The following location is the only Restricted Area (33 CFR 334) in San Francisco Bay:

- 100 yards around the eastern shore of Yerba Buena Island, surrounding the Coast Guard Base

The Yerba Buena Restricted Area has the following limitations (33 CFR 334.1065):

1. All persons and vessels are prohibited from entering the waters within the Restricted Area for any reason without prior written permission from the Commanding Officer of the Coast Guard Group San Francisco on Yerba Buena Island.
2. Mooring, anchoring, fishing, transit and/or swimming shall not be allowed within the Restricted Area without prior written permission from the Commanding Officer of the Coast Guard Group San Francisco on Yerba Buena Island.

(c) *Enforcement.* The regulation in this section shall be enforced by the Commanding Officer of the Coast Guard Group San Francisco on Yerba Buena Island, and such agencies and persons as he/she shall designate.

3.4.3 LOCAL SETTING

Potential navigational risks and challenges vary greatly depending on the specific location of the site (including local security zones, RNAs, tides, currents, weather patterns, and the presence of other recreational boats), as well as the time of year and potentially the time of day. Potential site-specific navigational risks and challenges will be evaluated as part of the trailhead designation process.

3.4.4 REGULATORY SETTING

WT sites will be subject to a variety of federal, state, county, and municipal regulations pertaining to navigation.

FEDERAL REGULATIONS

U.S. COAST GUARD

The USCG oversees management and enforcement of navigation in San Francisco Bay through a series of regulations that govern navigational practices, marine events, and safety and security zones within the Bay. The Inland Navigational Rules and the VTS mandated by the Port and Waterways Safety Act of 1972 were described previously. The Inland Navigation Rules apply to all watercraft and address vessel sailing and steering, as well as use of lights and sound. Knowing and following the Rules is required for all mariners – including those using NMSBs. As discussed above, large commercial and naval vessels are required by Coast Guard regulations to use designated traffic lanes when traveling in inland waterways, and the Rules oblige other vessels (including NMSBs) not to "impede the passage" of these deep-draft vessels traveling in the lanes. Ferry boats and other small commercial vessels (e.g., tugboats and private vessels) often do not navigate within specific traffic lanes, but rather travel in the most direct route. For interactions between other vessel types that are common on the Bay, particularly for NMSBs, the Rules are less explicit.

Although some small and private vessels are not required to coordinate their movements by contacting the VTS, the USCG monitors all commercial, Navy, and private marine traffic within San Francisco Bay and local coastal waters. The USCG also enforces the Security Zones and Restricted Areas described above.

STATE REGULATIONS

LEMPERT-KEENE-SEASTRAND OIL SPILL PREVENTION AND RESPONSE ACT/HARBOR SAFETY COMMITTEE OF THE SAN FRANCISCO BAY REGION

The Harbor Safety Committee of the San Francisco Bay Region was created by the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act. The purpose of the committee is to prepare a Harbor Safety Plan that considers all vessel traffic for the safe navigation and operation of tankers, barges, and other vessels. The original Harbor Safety Plan for San Francisco, San Pablo and Suisun Bays was adopted in 1992. The most recent available San Francisco Bay Region Harbor Safety Plan is for 2009 (HSC 2009).

The Harbor Safety Committee of the San Francisco Bay Region is composed of representatives from the maritime community, port authorities, pilots, tug operators, the USCG, the Office of Spill Prevention and Response (OSPR), the petroleum and shipping industries, and others with expertise in shipping and navigation. The Committee meets regularly to develop additional strategies to further safe navigation and oil spill prevention. The Harbor Safety Committee includes a Prevention through People subcommittee that focuses on safety for non-motorized vessels.

CALIFORNIA DEPARTMENT OF BOATING AND WATERWAYS (CAL BOATING)

The California Harbors and Navigation Code vests authority with Cal Boating to regulate matters of navigational safety for the state's boating public. Cal Boating has a number of programs to support recreational boating, including grants and loans for boating law enforcement and boating safety education. Cal Boating also maintains a system for reporting boating accidents. California

law (Section 656 of the California Harbors and Navigation Code) requires a boater who is involved in an accident to file a written report with Cal Boating when:

- A person dies, disappears, or is injured requiring medical attention beyond first aid; or
- Damage to a vessel or other property exceeds $500, or there is complete loss of a vessel.

Cal Boating staff review reported accidents, determine the causes, and identify preventative measures and specific safety-related problems. Safety education and public information program staff incorporate these safety problems and related solutions into updated course materials, promotional activities, and brochures.

OTHER REGIONAL AND LOCAL AGENCIES AND REGULATIONS

The San Francisco Bay Water Emergency Transportation Authority (WETA) is the regional agency which controls all public transportation ferries in the Bay Area region, except those owned and operated by the Golden Gate Bridge District. The Implementation and Operations Plan (WTA 2003) described the current and proposed future ferry routes within the Bay. On June 18, 2009 the WETA adopted the Final Transition Plan, which discusses the expansion of ferry service, addition of new routes, and/or rerouting service that will be implemented as funding is available. The following new routes are expected to be constructed: Oakland to South San Francisco Bay to begin service in 2011, Berkeley to San Francisco service to begin in 2012, and Treasure Island to San Francisco (no date of service), as well as other longer-term expansion.

As discussed earlier, under the California Harbors and Navigation Code, local governments can also regulate recreational boating in waters within their jurisdiction through time-of-day restrictions, speed zones, special-use areas and sanitation and pollution controls. These local regulations would be evaluated as part of the trailhead designation process.

3.4.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Impacts to navigational safety would be considered significant if implementation of the WT Plan would:

- Affect safe navigation on the Bay, resulting in increased death by drowning (as reported to Cal Boating and/or the USCG), and/or
- Result in substantial increases in the number of incidents reported by the VTS

METHODOLOGY

Potentially significant impacts identified in the Initial Study are evaluated for their impact due to implementation of the WT Plan. Potential impacts were identified based on review of applicable regulations, and on information gathered from various agencies having responsibility for navigational safety, including the USCG, Cal Boating, and WETA. For each impact area, the navigational safety impact analysis incorporated the WT strategies that would minimize potential impacts where applicable and identified additional program strategies or strategy refinements for mitigation if needed. Applicable WT strategies (See Appendix D) are referenced and summarized as appropriate.

REGIONAL IMPACTS AND MITIGATION MEASURES

IMPACT NAV-1: INCREASED RISK OF INCIDENTS INCLUDING ACCIDENTS INVOLVING LOSS OF LIFE, OR COLLISIONS BETWEEN NMSB USERS AND OTHER BOATS

Accidents involving NMSBs can be grouped into those that involve only the NMSB, and those that involve other vessels. An accident involving more than one vessel is referred to as a multi-vessel accident. A single-vessel accident could include a vessel colliding with a stationary object, a vessel capsizing due to rough water or poor user skills, and similar accidents. Those that involve other vessels may also be the result of indirect effects, where an inappropriate boating practice by a NMSB user leads to evasive action by another vessel, and causes that vessel to have an accident. Available accident data indicate that the majority (168 of 204) of reported NMSB accidents statewide between 1995 and 2006 were single-vessel accidents (Cal Boating 2009).

The WT does not provide for specific routes of travel, such as a system of point-to-point buoys that orient and direct use. WT users would more typically boat around the Bay margins rather than in the middle of the Bay. However, boating associated with the WT program may occur anywhere on the Bay, whether given conditions of the day make it safe or not.

NMSBs are often the smallest boats on the Bay, and most difficult for other mariners to see and avoid. Also, once on the water, a NMSB might enter or cross defined shipping channels and ferry routes presenting a potential navigational safety impact to both the larger vessels and the NMSB user.

Single-vessel accidents would typically be due to NMSB users either failing to take basic safety precautions (e.g., failing to wear PFDs), or overestimating their abilities to handle challenging conditions (e.g., being unable to control their vessels under challenging weather or tide and current conditions). Multi-vessel accidents (collisions) could be due to NMSB users being unable to control their boats, or lacking knowledge regarding navigation rules. An increase in NMSB use could potentially lead to an increased number of single and multi-vessel accidents. Increased NMSB use could also lead to increases in indirect accidents (e.g., groundings caused when a vessel tries to avoid a NMSB that is failing to properly yield right-of-way).

When WT Backbone Sites are located near commercial shipping activity or ferry vessel terminals, the chances for accidents between vessels increase. For WT sites located near or at existing or planned commercial or ferry terminals, potential boating conflicts can be minimized through careful site planning and design that clearly separate NMSB use launch areas and terminals (pers. comm., John Sindzinski, WETA, January 9, 2008).

Finally, wildlife protection buffer zones, if poorly planned, could result in directing NMSBs into unsafe areas, either areas that pose challenging environmental conditions (e.g., strong currents), or that are preferentially used by commercial or other larger vessels.

Several WT Strategies address the issue of navigational safety. The WT program includes the following strategies (see Table 2.3.3-1) that would be required prior to site designation to encourage navigational safety and minimize NMSB use incidents and accidents:

- Strategy 3 requires that the type and design of trail-related improvements match site characteristics, including avoiding uses of the site that are incompatible with safe boating.
- Strategy 12 encourages on-site concessions to provide site-specific safety information.
- Strategies 17 through 24 include a variety of programs that would educate the user about boating safety or provide for organized use that recognizes safety as a goal.

Impact Nav-1 would be reduced by the WT Plan strategies, but would remain potentially significant. The WT would increase educational materials and opportunities for NMSB users, and would emphasize safe boating practices. However, many factors that could lead to accidents on the water are not under the control of the WT. For example, drinking while boating is a major contributing factor to drownings. No system of education and training, including the WT programs and the mitigation measures outlined below, can ensure absolute user compliance with navigational rules and safe boating practices, or provide for risk-free navigation on the Bay. Implementation of the WT strategies would reach a large number of boaters, thereby increasing the percentage of NMSBs users who are familiar with and likely to practice safe boating. Impact Nav-1 is considered **potentially significant but mitigable** and would be mitigated by the addition of Mitigation Measures Nav-M1A through Nav-M1D, below.

MITIGATION MEASURE NAV-M1A: DEVELOP AND IMPLEMENT SAFETY SIGNAGE

As outlined in Strategy 17 and in cooperation with Cal Boating and site owners/managers, the WT program shall ensure inclusion of notices and/or maps of nearby commercial shipping or ferry terminal routes into signs at WT sites.

MITIGATION MEASURE NAV-M1B: SPONSOR WT TRAINING AND EDUCATION PROGRAMS

Additional training, education, and public advisory programs for NMSB users related to navigational safety requirements could reduce the risk of incidents associated with boating on the Bay. Therefore, consistent with WT Strategies 19 and 21, the WT program shall help coordinate education and training programs and provide links to web-based information to promote boating safety and to educate users about the unique conditions of operating NMSBs in the Bay's environments.

MITIGATION MEASURE NAV-M1C: DESIGN OF WT SITES NEAR COMMERCIAL SHIPPING AND FERRY TERMINALS.

Consistent with Strategy 3, for all sites near commercial shipping or ferry terminals, potential boating conflicts shall be minimized through careful site planning and design to clearly separate commercial shipping and NMSB use areas.

MITIGATION MEASURE NAV-M1D: PLANNING OF WILDLIFE BUFFER ZONES

For all sites where permanent buffer zones are implemented to protect wildlife, the buffer zones shall be evaluated to ensure that they are compatible with safe boating.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT NAV-2: INCREASED RISK OF INCIDENTS DUE TO CHANGES IN FACILITIES OR NEW SITES

Significant changes in facilities and/or new WT sites could alter NMSB use patterns on the Bay, resulting in changes in travel patterns that could potentially put additional users into challenging

or high vessel traffic areas. In accordance with Strategy 3, facility improvements at individual sites would be consistent with the individual site's characteristics. With implementation of Strategy 3, this potential impact would be **less than significant**.

3.5 PUBLIC SERVICES

This section discusses the potential impacts of WT Plan implementation on public services. Navigational safety was addressed in Section 3.4, above.

3.5.1 INITIAL STUDY FINDINGS

The IS found potentially significant impacts associated with the need for increased fire and police protection, and increased service for parks and other public facilities. Implementation of the WT Plan would not affect the need for schools or services at schools.

3.5.2 REGIONAL SETTING

The USCG is the primary search and rescue agency in an aquatic emergency; however, many County sheriff departments, municipalities, and marina managers also provide emergency response when called for. For some non-emergencies the USCG may refer boaters to a commercial tow-boat service.

3.5.3 LOCAL SETTING

In most cases, regional and local municipal public agencies provide basic on-site services for recreation-related operations and management of existing marinas, shoreline parks, open space areas, and refuges. These services, however, are often complemented by other public agencies that provide shoreline fire protection, police protection, and emergency response services to recreational boaters while they are either accessing or boating on the Bay.

There are a myriad of agencies and organizations that individually provide public services to potential WT sites or do so through cooperative agreements with the site owner/ manager. Fire protection and emergency medical services are most often provided by local fire departments. Law enforcement services for selected WT sites are provided by managing agencies that have their own ranger/police units, such as the National Park Service, DFG, and the East Bay Regional Park District. Law enforcement services at the majority of WT sites, however, are provided either directly or through contract with County sheriff departments or local municipal police departments.

3.5.4 REGULATORY SETTING

FEDERAL REGULATIONS

The USCG oversees management and enforcement of navigation in San Francisco Bay through a series of regulations that govern navigation practices, marine events, and safety and security zones within the Bay (see discussion in Chapter 2 and Section 3.4). In addition to enforcement of navigation rules, the USCG also provides emergency rescue services.

STATE REGULATIONS

The California Harbors and Navigation Code vests authority with Cal Boating to regulate matters of navigational safety for the state's boating public (see discussion in Section 3.4). Cal Boating law enforcement staff also communicate these safety problems during Department-sponsored training sessions for law enforcement officers.

3.5.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Impacts would be considered significant if they would result in substantial increases in public service needs to maintain acceptable service ratios, response times or other performance objectives for police protection, parks operations, fire protection, water or sewer services, or emergency rescue on land or on the water.

METHODOLOGY

Two aspects of public services were evaluated: emergency response (accident-response, whether at the trailhead or on the water), and public safety (security and crime prevention). The potential additional emergency services needs resulting from the incremental increase in NMSB use associated with implementation of the Water Trail Plan was evaluated by assessing the estimated current number of incidents, and assuming a linear increase in emergencies with increased NMSB use based on projections provided by the Cal Boating survey (2009). The potential for the safety education provided as part of WT implementation to reduce the overall need for emergency response was also evaluated.

The need for added public safety services was evaluated in the same manner. New facilities or services provided at existing sites as a result of the trailhead designation process were considered in evaluating the potential need for additional public safety services.

REGIONAL IMPACTS AND MITIGATION MEASURES

Potential impacts associated with the need for additional public services would be site-specific. Given the very small number of incidents involving NMSBs recorded for San Francisco Bay (eight incidents between 1995 and 2006, Cal Boating 2009), and the anticipated relatively small incremental increase in NMSB use attributable to implementation of the WT Plan (see Chapter 2, Section 2.2), no significant regional increase in public service demand is anticipated. Furthermore, the safety education and safe boating messages that would be part of the implementation of the WT Plan would reach many boaters, not just those boaters attributable to the implementation of the WT. Thus, implementation of the WT Plan would not have an adverse impact (and could have a positive effect) on emergency service demands regionally.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT PS-1: NEED FOR NEW FACILITIES OR SUBSTANTIAL INCREASE IN DEMAND FOR PUBLIC SERVICES

All launch sites require some active management to maintain and operate the launch access and related facilities. Without sufficient funding and staff resources devoted to upkeep, launch sites tend to degrade, becoming unusable or unsafe, and managers may be forced to remove or close access. Insufficient management resources for enforcement at launch sites can also leave site managers with little choice but to remove or restrict launching access. For example, vandalism or inability to prevent access to sensitive wildlife areas could force managers to restrict access to avoid further problems.

High Opportunity Sites would not be expected to have a substantial increase in use; therefore, there would be little change in the demand for public services at those sites. At other sites, however, development of new facilities, especially overnight facilities, may create a need to increase existing levels of ranger/police patrols; maintenance; sewer and water services; and/or fire and other emergency response services. Entirely new sites could likewise require increased public services.

The management responsibility for trailheads would rest with the site owner and/or manager. Implementation of the education, outreach and stewardship program of the Water Trail Plan, in accordance with Strategies 17, 18, 19, and 21 (see Table 2.3.3-1 or Appendix D) would support their efforts.

WT strategies recognize the challenges of ongoing management and maintenance needs. These strategies include WT Strategy 9 addressing restrooms and Strategy 13 addressing overnight accommodations. In addition, prior to site designation, the WT program includes the following actions that would help reduce the impacts to public services:

- Strategy 6 addresses the need to match facility improvements to management resources, including staffing and funding.
- Strategy 7 addresses the need to develop a plan for trailhead facility maintenance and operation, including identification of responsible parties.. This would be part of a Trailhead Plan.
- Strategy 22 specifically identifies a program of Trailhead Stewards that would assist the property owner/site manager with maintenance and other on-site management responsibilities.

Facility improvements at some WT sites may lead to increased use that may, in turn, result in small numbers of additional calls for local police or emergency services. Because WT sites are dispersed throughout the Bay, demands presented by most day-use WT users on police, emergency response, and fire services would be spread among a number of departments and would not excessively burden any one locality. This would allow departments to maintain acceptable service ratios while addressing the needs of the proposed project. At WT sites located near areas where safety or homeland security issues may exist, such as near airports or industrial areas, however, the introduction of a new WT site or increase in recreational use could require a police presence not typical in recreational settings.

Potential concerns associated with public services will be addressed through involvement of the site owner/manager in the development of the Trailhead Plan and by ensuring that management resources are available to support the proposed improvements (as required by Strategy 6), and that a maintenance and operations plan is developed as part of the trailhead designation process (Strategy 7). In addition, WT Strategy 23 would provide additional training to help local law enforcement become more effective in preventing environmental and wildlife violations at trailheads. Finally, development of new or support of existing trailhead steward programs would provide added resources at some trailheads to reduce vandalism and related activities. Implementation of Strategies 6, 7, 22, and 23 would make this impact **less than significant**.

IMPACT PS-2: SUBSTANTIAL EXPANSION OF PUBLIC SERVICE NEEDS FOR SITES DESIGNATED FOR OVERNIGHT USE OR UNACCEPTABLE INCREASE IN SERVICE RATIOS, RESPONSE TIMES OR OTHER PUBLIC SERVICE PERFORMANCE OBJECTIVES

Two overnight camping areas, both of which are identified as WT Backbone Sites, exist on the Bay. These are Kirby's Cove operated by the National Park Service, and Angel Island operated by the California Department of Parks and Recreation. Both of these camping areas are available on a reservation basis, and are typically booked months in advance.

Overnight use at new WT campsites and overnight parking areas would increase the need for policing and security patrols. While certain WT sites could accommodate camping, the addition of camping facilities could only occur if the organizational structure were in place to provide round-the-clock emergency and safety services and the funding necessary for managing overnight use. The addition of overnight use would particularly impact those land-managing agencies that do not currently allow overnight use within their jurisdictional lands. Availability of overnight camping may also draw significant interest from other recreationists.

Water Trail Strategies 6, 7, and 13 would minimize potential impacts from sites with overnight use. WT Strategy 13 encourages the designation of overnight accommodations consistent with land managers' policies and resources. The primary concern with regard to public services at sites that will provide new overnight camping facilities is the long-term management of the site, including ensuring that sufficient funding is available for public service providers. Implementation of Strategies 6 and 7 in accordance with the implementation process for all strategies described in Chapter 2 would make this impact **less than significant**.

3.6 AESTHETICS

This section of the EIR assesses the potential impacts on aesthetic resources from the implementation of the WT. Because site-specific facility improvement plans are unknown at this time, this section focuses on potential visual quality effects of standard facilities as they may affect the aesthetic quality of typical Bayfront landscapes.

3.6.1 INITIAL STUDY FINDINGS

The IS found that implementation of the WT may have potentially significant impacts associated with visual quality. Other aesthetic considerations (noise, odors, light, and glare) were determined to have no potential for significant impacts in the Initial Study, and therefore were eliminated from further review.

3.6.2 REGIONAL SETTING

Urbanization and industrial uses characterize much of the San Francisco Estuary's margins, but major portions of the area around San Francisco Bay remain undeveloped or relatively free of buildings. In particular, views of and from tidal flats and salt marshes in many areas around the Bay include expanses of open space and natural areas. The ability of the shoreline landscape to visually absorb changes associated with development of the WT Backbone Sites and related activities thus varies with location. The general landscape setting within the geographic scope of the WT is discussed below.

URBAN SHORELINES

The visual character of urban shorelines as viewed from San Francisco Bay is generally dominated by a developed and highly managed landscape composed of an artificial shoreline edge in the foreground, with structures and landscaping in the middleground and background. The artificial edge may be port structures, piers, revetments, rip-rap, seawalls, or other structures. Narrow strips of tidal wetland vegetation may occur locally along the urban shoreline.

Urban shorelines are common over a broad part of Central San Francisco Bay. The few urban shorelines that do not fit the typical characteristics as described above include Arrowhead Marsh in San Leandro Bay, Crown Beach/Elsie Roemer Marsh in Alameda, and Crissy Field in San Francisco. They are nonetheless included in this group because they are surrounded by a highly developed, urban environment.

URBAN/WILDLAND INTERFACE

Urban development along the Bay shoreline often occurs adjacent to large expanses of wetlands within regional parks, wildlife refuges, and ecological reserves. This mix of urban development and natural-appearing wildlands prevails in South San Francisco Bay; most of the Marin County portion of Central San Francisco Bay; around expanding cities in San Pablo Bay along the northern Contra Costa County shoreline; and northern Suisun Marsh.

Natural areas intermixed with residential, commercial, and industrial or military port/marina developments occur along shorelines in Vallejo, Fairfield, Concord, San Rafael, and Richardson Bay.

RURAL OPEN SPACE / AGRICULTURAL

Visually undeveloped open space lands along the Bay edge are largely confined to San Pablo Bay, the vicinity of Suisun Marsh, and sections of the South Bay including the Coyote Hills Regional Park and the San Francisco Bay National Wildlife Refuge. Much of these areas are marshland, or wetland with sloughs and levees and, in the south Bay, salt ponds. A few of these areas have sandy or pebble beaches. The adjacent uplands may have trails or other recreational facilities, but these are visually subordinate to the vastness of the Bay and its margins. These landscapes are not dominated by prominent structures.

3.6.3 LOCAL SETTING

URBAN SHORELINES

Of the 112 Backbone Sites, 85 are located in urban areas where the shoreline's visual character is dominated by other development in the immediate vicinity. These sites are listed in Table 3.6.3-1. Of the 85 urban sites, 71 of the sites are existing launch sites, five are existing destinations, eight are planned launch sites and one is a planned destination.

URBAN/WILDLAND INTERFACE

Of the 112 Backbone sites, 17 are at the urban/wildland interface (see Table 3.6.3-1). Of the 16 sites at the urban/wildland interface, 13 of the sites are existing launch sites, two are existing destinations, and one is a planned destination.

RURAL OPEN SPACE/AGRICULTURAL

The remaining 10 Backbone sites are located in rural open space and agricultural areas (see Table 3.6.3-1). Four of these sites are existing launch sites, two are existing destinations, two are planned launch sites, and three are planned destinations.

3.6.4 REGULATORY SETTING

FEDERAL REGULATIONS

There are no applicable federal regulations that would affect potential alterations of the visual quality associated with the Backbone sites. However, specific plans applicable to certain sites on federal lands (e.g., NPS General Management Plans) may include specific requirements and standards.

STATE AND REGIONAL AGENCIES AND REGULATIONS

STATE SCENIC HIGHWAY PROGRAM

The State Scenic Highway Program was established in 1963 to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. As of July 2009, the following highways located near WT Backbone Sites were eligible to become State Scenic Highways, although none had yet received that designation (CalTrans 2009).

TABLE 3.6.3-1. VISUAL SETTING OF BACKBONE SITES

Site Map Key[30]	Location	City/County	Characteristic Landscape
Urban Shoreline			
A1	Albany Beach	Albany	urban waterfront park
A2	Berkeley Marina, Ramp	Berkeley	urban marina/harbor
A4	Point Emery	Emeryville	urban waterfront park
A5	Shorebird Park	Emeryville	urban waterfront park
A6	Emeryville City Marina	Emeryville	urban marina/harbor
A8	Middle Harbor Park	Oakland	urban waterfront park
A9	Jack London Square/CCK	Oakland	urban boat launch
A11	Estuary Park/Jack London Aquatic Center	Oakland	urban waterfront park
A14	Robert Crown Memorial State Beach	Alameda	urban waterfront park
A18	Doolittle Drive; Airport Channel	Oakland	urban waterfront park
A12	Grand Avenue Boat Ramp	Alameda	urban boat launch
A15	Encinal Launching and Fishing Facility	Alameda	urban boat launch
A20	San Leandro Marina	San Leandro	urban marina/harbor
A25	Tidewater Boathouse	Oakland	urban boat launch
A26	Berkeley Marina, Small Boat Launch	Berkeley	urban boat launch
A28	Elmhurst Creek	Oakland	urban public access area
CC1	Martinez Marina	Martinez	urban marina/harbor
CC5	Rodeo Marina	Contra Costa County	urban marina/harbor
CC6	Pinole Bay Front Park	Pinole	urban waterfront park
CC9	Keller Beach	Point Richmond	urban waterfront park
CC10	Ferry Point	Point Richmond	urban waterfront park
CC11	Boat Ramp Street Launch Area	Richmond	urban boat launch
CC14	Richmond Municipal Marina	Richmond	urban marina/harbor
CC15	Marina Bay Park & Rosie Riveter Memorial	Richmond	urban waterfront park
CC16	Shimada Friendship Park	Richmond	urban waterfront park
CC17	Barbara & Jay Vincent Park	Richmond	urban waterfront park
CC19	Point Isabel Regional Shoreline	Richmond	urban waterfront park
CC20	SS Red Oak Victory	Richmond	historic ship – docked in urban port setting
CC23	Rodeo Beach	Contra Costa County	urban waterfront park
M3	Swede's Beach	Sausalito	urban waterfront park

[30] Site locations are shown on Figures 2.1.4-1A and 2.1.4-1B

TABLE 3.6.3-1. VISUAL SETTING OF BACKBONE SITES

Site Map Key[30]	Location	City/County	Characteristic Landscape
M4	Turney Street Public Boat Ramp	Sausalito	urban boat launch
M5	Dunphy Park	Sausalito	urban waterfront park
M6	Schoonmaker Point	Sausalito	urban waterfront park
M8	Clipper Yacht Harbor	Sausalito	urban marina/harbor
M10	Shelter Point Business Park	Mill Valley	urban boat launch
M13	Brickyard Park	Strawberry	urban waterfront park
M16	Richardson Bay Park/ Blackie's Pasture	Tiburon	urban waterfront park
M19	Sam's Anchor Café	Tiburon	private launch adjacent to restaurant
M25	Higgins Dock	Corte Madera	urban boat launch
M27	Bon Aire Landing	Larkspur	urban boat launch
M28	Marin Rowing Association Boathouse	Larkspur	urban boat launch
M29	Ramillard Park	Larkspur	urban waterfront park
M30	San Quentin	San Rafael	urban waterfront park
M31	Jean & John Starkweather Shoreline Park	San Rafael	urban waterfront park
M33	Harbor 15 Restaurant	San Rafael	urban launch adjacent to restaurant
M35	Loch Lomond Marina: Ramp	San Rafael	urban marina/harbor
M36	Loch Lomond Marina: Beach	San Rafael	urban marina/harbor
M38	McNear's Beach	San Rafael	urban waterfront park
N6	Napa Valley Marina	Napa	urban marina/harbor
SC2	Alviso Marina	San Jose	urban waterfront park
SF1	Candlestick Point State Recreation Area	San Fran. Co.	urban waterfront park
SF2	India Basin Shoreline Park	San Francisco	urban waterfront park
SF4	Islais Creek	San Francisco	urban waterfront park
SF6	The "Ramp""	San Francisco	urban boat launch adjacent to restaurant
SF7	Pier 52 Boat Launch	San Francisco	urban boat launch
SF8	South Beach Harbor (AKA Pier 40)	San Francisco	urban marina/harbor
SF9	Treasure Island	San Francisco	urban public access area
SF10	Aquatic Park	San Francisco	urban waterfront park
SF11	Gas House Cove (aka Marina Green)	San Francisco	urban marina/harbor
SF12	Crissy Field	San Francisco	urban waterfront park
SF13	Brannan St Wharf	San Francisco	urban boat launch
SF14	Northeast Wharf Park	San Francisco	urban waterfront park
SM4	Redwood City Municipal Marina	Redwood City	urban marina/harbor

TABLE 3.6.3-1. VISUAL SETTING OF BACKBONE SITES

Site Map Key[30]	Location	City/County	Characteristic Landscape
SM6	Docktown Marina	Redwood City	urban marina/harbor
SM9	Redwood Shores Lagoon	Redwood Shores	urban waterfront park
SM11	Beaches on the Bay	Foster City	urban waterfront park
SM12	Foster City Lagoon Boat Park	Foster City	urban waterfront park
SM13	East 3rd Ave	Foster City	urban waterfront park
SM16	Seal Point Park	San Mateo	urban waterfront park
SM17	Coyote Point, Marina	San Mateo	urban marina/harbor (adjacent to waterfront park)
SM18	Old Bayshore Highway	Burlingame	urban public access area
SM20	Colma Creek/Genentech	So San Francisco	urban public access area
SM21	Oyster Point Marina	So San Francisco	urban marina/harbor
SM22	Brisbane Marina	Brisbane	urban marina/harbor
SM23	Coyote Point, Beach	San Mateo	urban waterfront park
SM24	Westpoint Marina	Redwood City	marina/harbor
Sn6	Petaluma Marina	Petaluma	urban marina/harbor
Sn7	Petaluma River Turning Basin	Petaluma	urban boat launch
So1	Brinkman's Marina	Vallejo	urban boat launch
So2	California Maritime Academy	Vallejo	urban boat launch
So7	Matthew Turner Park	Benicia	urban waterfront park
So8	West 9th Street Launching Facility	Benicia	urban waterfront park
So9	Benicia Point Pier	Benicia	urban waterfront park
So10	Benicia Marina	Benicia	urban marina/harbor
So12	Suisun City Marina	Suisun City	urban marina/harbor
Urban/Wildland Interface			
CC2	Carquinez Strait Reg. Shoreline (Eckley Pier)	Martinez	waterfront park
CC8	Point Molate Beach Park	Richmond	waterfront park
CC21	Point Pinole	Pinole	waterfront park
CC22	Bay Point Regional Shoreline	Contra Costa County	waterfront park
M1	Kirby Cove	Sausalito	waterfront park
M2	Horseshoe Cove	Sausalito	waterfront park
M11	Bayfront Park	Mill Valley	waterfront park
M39	China Camp State Park	San Rafael	waterfront park
M40	Bull Head Flat	San Rafael	waterfront park

TABLE 3.6.3-1. VISUAL SETTING OF BACKBONE SITES

Site Map Key[30]	Location	City/County	Characteristic Landscape
M41	Buck's Landing	San Rafael	private marina
M43	John F. McInnis Park	San Rafael	waterfront park
M47	Black Point Boat Launch	Novato	boat launch
N1	Cutting's Wharf	Napa County	public boat launch
N8	Riverside Drive Launch Ramp	Napa	public boat launch
SC3	Palo Alto Baylands Launching Dock	Palo Alto	waterfront park
SM2	Ravenswood Open Space Preserve	Menlo Park	waterfront park
Sn5	Papa's Taverna/ Lakeville Marina	Petaluma	marina/restaurant
Rural and Agricultural			
A22	Eden Landing Ecological Reserve	Hayward	refuge/reserve
A24	Jarvis Landing	Newark	privately owned (business)
A27	Coyote Hills	Fremont	refuge/reserve
A30	Hayward's Landing	Hayward	refuge/reserve
M17	Angel Island State Park	Marin County	waterfront park
N2	JFK Memorial Park	Napa	waterfront park
N7	Green Island Boat Launch Ramp	Amer. Canyon	public boat launch
SM25	Corkscrew Slough Viewing Platform	Redwood City	refuge/reserve
So5	Belden's Landing	Fairfield	public boat launch
Sn3	Hudeman Slough	Sonoma County	public boat launch

- Highway 37: From Marin County where it joins Highway 101, east through Sonoma to Solano until the junction with Interstate 80 in Solano County
- Highway 121: In Sonoma County from the junction with Highway 37 northeast to near the junction with Highway 12 near the City of Sonoma and from the near the junction with Highway 221 in Napa to the junction with Trancas Street in Napa.
- Highway 29: In Solano County from the junction with Highway 37 to Napa County with the junction of Highway 221
- Highway 1: On the approach to the Golden Gate Bridge in San Francisco and in Marin County until the split with Highway 101
- Highway 4 and 160: In Contra Costa County from the Delta crossing on Highway 160 south and inland
- Interstate 80: On the approach to the Bay Bridge to the Interstate 580 split

These eligible highways would become designated as State Scenic Highway if the local governing body applies to Caltrans for scenic highway approval, adopts a Corridor Protection Program, and receives notification that the highway has been officially designated a Scenic Highway.

LOCAL AND REGIONAL REGULATIONS

MCATEER-PETRIS ACT AND SUISUN MARSH PROTECTION ACT

BCDC adopted the *San Francisco Bay Plan* (1968, 2007a) to regulate land uses within its shoreline band (the land area between the shoreline and the line 100 feet upland and parallel to the shoreline). The *Bay Plan* contains the following recommendations with respect to visual quality:

Appearance, Design and Scenic Views

1. *To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.*
2. *All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay…*
4. *Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline…*

CITY AND COUNTY GENERAL PLANS

Each city and county has a general plan with land use, open space, conservation, recreation, and other elements containing policies pertaining to scenic resources, and may identify areas within their jurisdictions of high scenic value (including sensitive viewsheds, scenic routes, and viewpoints) that require special consideration when making development decisions. Special districts and other jurisdictions (e.g., East Bay Regional Park District) may also have plans and policies pertaining to scenic resources. These plans and policies would be identified at a site-specific level during the trailhead designation process.

3.6.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Impacts would be considered significant if they would:

- Substantially degrade the existing visual character or quality of the site and its surroundings, and/or
- Have a substantial adverse effect on a scenic vista

METHODOLOGY

This visual analysis is based on the methodology used by the California Department of Transportation (Caltrans), the U.S. Department of Transportation, and the Federal Highway Administration. Three visual traits that are considered are intactness, vividness, and unity. "Intactness" is the visual integrity of the landscape (natural and man-made) and the degree to which various elements seem to belong together. "Vividness" is the visual power or

memorability of the landscape. "Unity" is the visual harmony of the landscape considered as a whole (DOT 1983). Visual impacts are also considered in terms of viewer sensitivity, which is a measure of public concern for changes to scenic quality that includes viewer activity, view duration, distance from visible objects (foreground, middleground, and background), adjacent land uses, and special planning designations such as scenic route designation.

San Francisco Bay and its environs are known worldwide as a scenic resource. Viewer groups from around the Bay that may be affected include tourists, individuals pursuing a variety of outdoor recreation pursuits and residents with views of the Bay shoreline. Viewer sensitivity levels are considered high throughout the Bay region.

REGIONAL IMPACTS AND MITIGATION MEASURES

The visual effects of implementation of the WT Plan would be localized, at and near the Backbone Sites. Most sites would not be visible, or would have minimal visual presence, in views of or from any other WT Backbone Site. In addition, visual changes attributable to the implementation of the WT would be very limited. They would consist of site-appropriate signage at all trailheads, and a variety of improvements to facilities at some specific trailheads. Therefore, implementation of the WT Plan would not result in the potential for any regionally significant impacts.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

Potential visual impacts to WT trailheads would occur primarily at sites where construction of some type is undertaken. However, limited visual impacts could also occur from the installation of signage. Potential site-specific impacts are discussed below.

IMPACT AESTH-1: DEGRADATION OF VISUAL QUALITY OF A WT SITE OR ITS SURROUNDINGS

Any changes in visual characteristics at a trailhead attributable to implementation of the WT would be due to the construction of new facilities or improvements to existing facilities. As described in Chapter 2, Project Description, potential WT improvements at non-HOS launch sites could include:

- **Signage.** The size, design, and location of a sign determine its aesthetic impacts. The content and size(s) of WT signs at trailheads will vary depending on the needs at a specific trailhead. Signs may include various types of educational and safety information, and provide specific information about sensitive environmental resources in the vicinity of the trailhead. All trailheads will have a signage plan (either a stand-alone plan for HOSs, or as part of the Trailhead Plan for other Backbone Sites). The Signage Plan will consider the aesthetics of the proposed WT signage for each site. In addition, all signs will be consistent with BCDC's signage guidelines.
- **Boat Launching Ramps and Boarding Floats.** The type of boat launching ramp or boarding float constructed determines its potential visual impact. Because of their low profile, simple wooden boat launching ramps (without guard rails) and boarding floats are not highly visible from land or the Bay (see Figures 3.6.5-1a and b) and do not represent a visually prominent component in the landscape. Wooden boat launching ramps with guard-rails are slightly higher profile and more visible (see Figure 3.6.5-1c). Boat launching ramps that are wheelchair accessible can be larger structures that, depending on the

materials used, may be visually prominent unless they are screened by topography or vegetation as seen from the Bay or other vista points (see Figure 3.6.5-1e).

- **Parking**. Parking is required at most launch sites, and not necessary at destination sites. Parking lots can occupy a substantial portion of land areas at access sites. Although most facility parking would be low-lying and not visually prominent, larger parking lots may be visible from the Bay or from vista points that are elevated above the WT site. BCDC guidelines suggest that parking be located inland from the Bay's edge so as not to impact views to or from the Bay.
- **Restrooms.** Restrooms are present at all but two (M10 and SF7) of the HOSs. Of the existing non-HOSs, seven have restrooms while 31 do not. Restroom facilities may range from small portable toilets to larger structures up to 15 feet or more in height (see Figure 3.6.5-1f). Depending on their design and location, restroom structures could be a visually prominent component in the landscape and could possibly block views towards the Bay.
- **Boat Storage and Concession Facilities:** WT facilities may include boat houses for all boat types; fenced outdoor storage areas for outrigger canoes; modified shipping containers for kayaks and sailboards; and provision of inside dock ties at marinas for in-water storage of dragon boats, whaleboats, and kayaks. Boat houses and other forms of land-side boat storage can be visually prominent depending on their design and materials. Concession stands for boat rentals and for food and beverage also may be developed at some WT sites.
- **Overnight Camping Facilities:** Overnight camping facilities may be developed as part of the WT (beyond the two existing sites at Kirby Cove and Angel Island). Overnight camping facilities would be similar to those of many shoreline parks and may include picnic tables, maintenance access routes, and trash and recycling containers. Camping features are generally low in profile and, depending on their design and materials, would not be visually prominent components in the landscape.
- **Additional Use Amenities:** WT site improvements may include many features typically found along shoreline parks, such as family and/or group picnic areas (with tables, drinking fountains, and trash and recycling containers); landscaping; bicycle racks; lighting[31]; emergency phones; trail system connections, and signage. Rigging areas (for sailboarders) and boat-washing facilities are additional WT access amenities that may not be found in typical parks. These features are generally small in scale and, depending on their design and materials used, would not be highly visually prominent or affect the visual unity of the overall landscape.

Visual changes to sites designated as HOS, which make up 57 of the 112 Backbone Sites would, by definition, be limited to only minimal improvements (i.e., signage). The development of the

[31] Lighting was not considered to have a significant impact in the Initial Study and is not addressed further in this EIR.

FIGURE 3.6.5-1: VISUAL CHARACTER OF WT SITES AS SEEN FROM LAND

Figure 3.6.5-1a. Highly developed site: marina with ramp, floats and commercial kayak rentals (City Kayak, South Beach, San Francisco)

Figure 3.6.5-1b. Highly developed site: marina with ramp and float (Petaluma Marina)

Figure 3.6.5-1c. Relatively undeveloped site in waterfront park: ramp with floats (Doolittle Dr. MLK Shoreline Park, Oakland)

Figure 3.6.5-1d. Beach launch inaccessible when tide is out (Middle Harbor Park, Port of Oakland)

Figure 3.6.5-1e. Wheelchair-accessible boat ramp (Pier 1½, San Francisco)

Figure 3.6.5-1f. ADA-compliant bathroom (Middle Harbor Park, Oakland)

Signage Plan and conformance with BCDC signage guidelines will ensure that potential aesthetic impacts from signage at these sites will be less than significant. In addition, twelve sites (including three HOSs) are designated as destination-only sites rather than launch sites and improvements for these sites would likely be minimal. All of these sites, provided signage and other minimal improvements are designed in accordance with WT guidelines, would not be expected to have a significant effect on the aesthetic values of a site.

Some of the remaining 43 non-HOS launch sites could potentially be subject to substantial facility improvements, especially the seven planned launch sites. Any such improvements would be described in a Trailhead Plan that would be required prior to designation of the site as a WT trailhead. Potential effects to the general bayfront landscape types from potentially substantial facility improvements are summarized below.

Urban Shorelines

Given the complexity of the built environment at the water level for the majority of sites in urban shoreline areas, it is unlikely that any facility improvements associated with the WT would be distinguished from other local development. Several sites are located in areas of particular scenic beauty along San Francisco Bay, with views of the most famous features of the built environment (such as the Golden Gate Bridge, Bay Bridge, City of San Francisco, Alcatraz) and of the background natural setting of undeveloped hills and mountains. Given the scale and panoramic nature of these shoreline area views, localized facility improvements at WT sites would not intrude into or dominate the view. As seen from the water, the WT access point facilities in urban shoreline areas would not necessarily be particularly visually prominent. The existing level of development would dominate the visual prominence of any additional facilities, which would tend to blend in with the site as seen from the immediate foreground views.

Many of the WT sites are in urban waterfront parks that appear as open, landscaped areas in an otherwise densely populated urban setting. Generally they are developed with a variety of amenities. See Figures 3.6.5-1c, Martin Luther King Shoreline Park, and 3.6.5-1d, Middle Harbor Park, both in Oakland, for typical examples of waterfront parks.

A large number of the urban WT sites are located in marinas. Typical marina development includes larger motorized boats and a variety of docks, floats and walkways. The marinas often are associated with restaurants, cafes and other small retailers in a dense patchwork of waterfront buildings. These areas may receive large numbers of visitors whose main purpose is water-based recreation or enjoyment of the waterfront scenery. Some of these areas have only recently been redeveloped from former industrial sites. The Oakland waterfront near Jack London Square is an example of this.

For sites in urban areas with modified shorelines and significant existing improvements, the visual impacts of WT improvements with design considerations that respect the characteristic setting would be less than significant.

Urban/Wildland Interface

Many WT sites in urban/wildland interface settings are located in existing park or open space lands that are generally prized for their less-developed character in an otherwise densely populated setting. Many provide spectacular views of the Bay. These areas generally have

visitor-serving amenities such as parking, restrooms, and trails. If the WT access point is near existing improvements, NMSB facility improvements would not greatly affect the visual integrity of the area. If the WT site is located in a more naturally appearing, undeveloped area, however, it may be highly visually prominent and detract from the intactness and unity of the area.

Examples of WT sites at the urban/wildland interface, not located in park or open space lands but still located outside the major urban centers are N1: Cutting's Wharf, Napa County and Sn5: Papa's Taverna/Lakeville Marina. Existing improvements at such sites are usually very simple with a dock and possibly a ramp, perhaps parking or a restroom, with the area maintaining a low-development character. These basic facilities, already present, do affect the view of the site and from the site.

Some of the WT sites are located at undeveloped beaches where the provision of access facilities might be highly distinctive as seen from the Bay, although perhaps less visually prominent from the land as they may be screened by topography and vegetation.

Rural/Agricultural

In general there are few existing amenities at these sites. Two of the existing launches (A24: Jarvis Landing; Sn3: Hudeman Slough) within this type of landscape do not have restrooms, although they do have parking. As the areas are generally low-lying, new restroom or storage buildings near the shoreline could be visually prominent components of the landscape as seen from inland and from the Bay. Any noticeable change in the undeveloped character and unity of these sites caused by site construction may require modification of natural features or removal of vegetation but would be unlikely to restrict views.

WT Strategies and Required Design Reviews

For those Backbone Sites where enhancement is expected to be more than a minimal improvement, such as the installation of a sign, a Trailhead Plan would be created and development plans would be reviewed by BCDC as part of the permitting process. Depending on the level of proposed development, the BCDC permit would be subject to design review conducted either administratively or by the BCDC Design Review Board. The aesthetic design of the proposed facilities and visual impacts of a project would be considered prior to the issuance of a BCDC permit. Specific guidelines developed by BCDC for public access improvements along the Bay shoreline address aesthetics and are summarized in *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay* (2005). In addition, most local agencies have design review provisions in their zoning ordinances that would apply to WT improvements on privately owned sites in their jurisdictions.

The Trailhead Plan would be reviewed by the Project Management Team and Advisory Committee for compliance with the following WT Plan strategies that are intended to reduce visual impacts:

- Strategy 3 requires that the type and design of trail-related improvements match site characteristics, including helping preserve the character of the trailhead setting and increasing the quality of boaters' experiences.
- Strategy 5 requires the development and updating, as needed, of design guidelines for trail-oriented access improvements.

Even with BCDC design review and implementation of the above strategies, the potential impact to aesthetic resources from substantial construction at a WT site, particularly a less-developed site located in a relatively more natural setting, is considered **potentially significant**. To reduce visual impacts of site improvements to **less than significant** levels, the following mitigation measure shall be implemented:

MITIGATION MEASURE AESTH-M1: INCLUDE VISUAL CHARACTERISTICS AND SITE RELATIONSHIPS IN DESIGN GUIDELINES AND TRAILHEAD PLANS.

When design guidelines are developed for WT trailhead improvements pursuant to Strategy 5, and for each Trailhead Plan for new or expanded WT sites, the following design relationships shall be addressed:

- New access facilities, including restrooms, parking lots, boat storage buildings, and ramps shall be designed to be as low in profile as feasible, made from materials that are in character with the surroundings and, if possible, screened from view with native landscaping.
- For sites where the characteristic landscape is essentially natural in appearance, WT facilities shall be restricted to the minimum necessary to implement the WT Plan.
- Locations for all new sites shall be chosen to avoid blocking view corridors to and from the water, where feasible, or shall be designed to minimize blockages to the view corridors.
- New or expanded parking facilities shall not be located directly on the water's edge, and shall preferably be shielded from views to and from the water by existing structures and/or native landscaping.

IMPACT AESTH-2: DEGRADATION OF A SCENIC VISTA OR VIEW FROM AN ELIGIBLE STATE SCENIC HIGHWAY

No State Scenic Highways have yet been designated in areas that would be affected by WT sites. Some WT sites may be located in an area of notable scenic value, or part of a scenic vista where counties or cities may have enacted ordinances that guide development. Site-specific impacts and any conflicts with visually sensitive sites, viewsheds, or vistas designated in local or regional plans are possible and would be assessed in project-level reviews. Strategy 4 calls for trailhead plans to be consistent with plans, policies and priorities of local land and resources managers. It also calls for education, signage and design guidelines to be consistent with existing policies, plans, and standards. Because all trailhead plans will be reviewed to assure compliance with the WT strategies, this impact would be **less than significant**.

3.7 BIOLOGICAL RESOURCES – VEGETATION

The discussion of biological resources is divided into three sections. This section (3.7) discusses the existing sensitive vegetation resources of San Francisco Bay and provides an assessment of the potential impacts to these resources. Wildlife resources are discussed in Sections 3.8 (Birds) and 3.9 (Other Species). An overview of the habitats of San Francisco Bay and a discussion of the regulations applicable to biological resources is presented here, but pertains to Sections 3.8 and 3.9 as well.

Vegetation resources could be affected by project-related construction and increased NMSB use. "Vegetation" refers to the overall plant cover of a habitat, including its structural and other physical features, in addition to the species composition. Vegetation provides:

- Value as wildlife habitat (cover, food resources),
- Physical ecological functions (sediment trapping, erosion buffering),
- Chemical ecological functions (biogeochemical soil processes: sequestering or cycling carbon, mineral nutrients, contaminants), and/or
- Inherent biological diversity (rare plant species or biologically important genetic variation among populations).

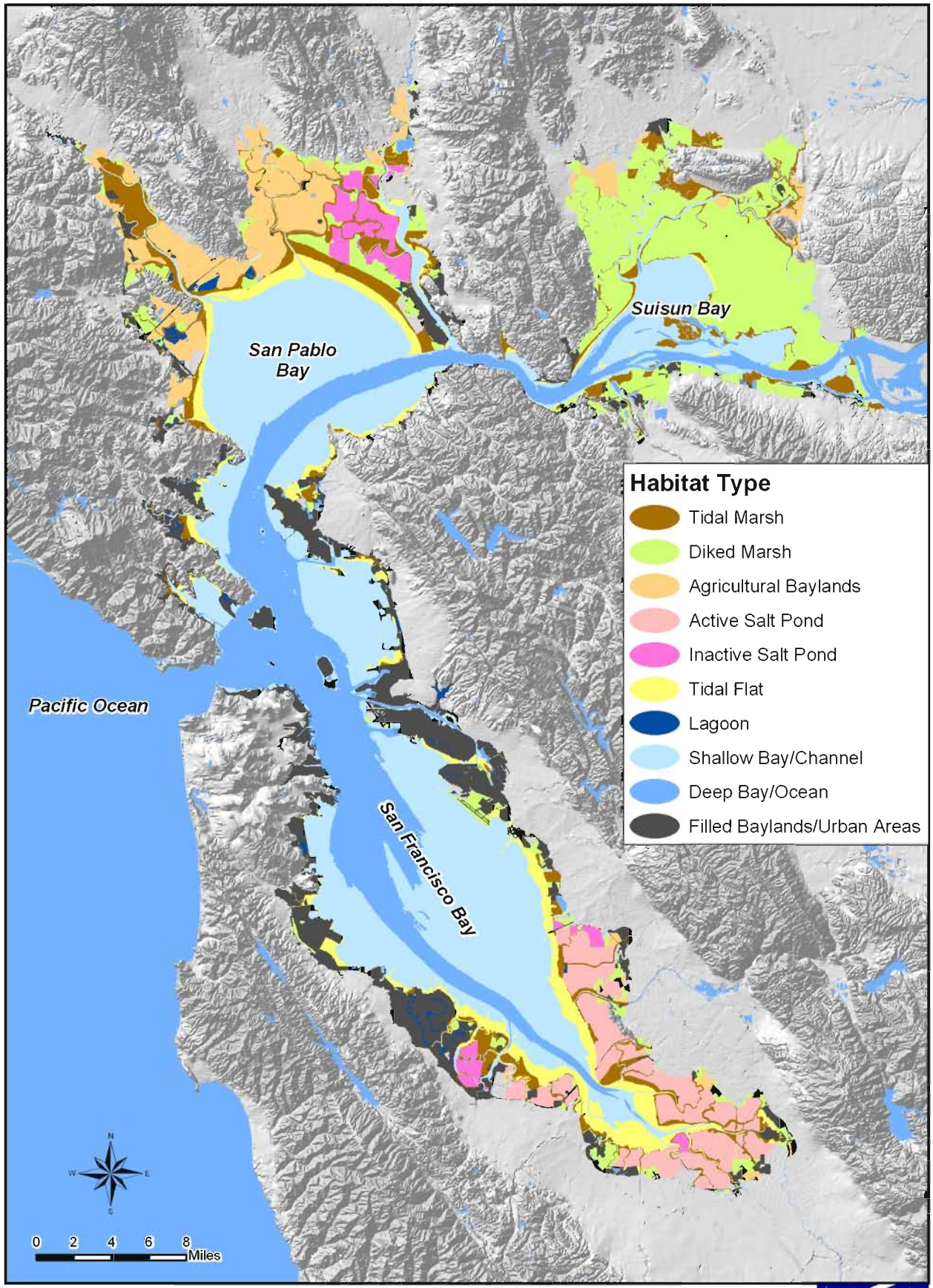
Important biological diversity of plants may occur at the level of population (genetic variation), species (rare plant conservation), and community (e.g., relatively intact or natural vegetation stands). Some plants can also have negative resource values, particularly invasive non-native noxious weeds of wetlands and terrestrial habitats. This section identifies potential impacts to vegetation resources, and recommends mitigation strategies to reduce or eliminate those impacts.

3.7.1 INITIAL STUDY FINDINGS

The Initial Study for this project identified potentially significant impacts to wetlands and other sensitive habitats, and to sensitive species. The IS also identified potential conflicts with Habitat Conservation Plans, other approved conservation plans, and local ordinances protecting biological resources, as well as the potential for spread of invasive species. Potential impacts related to vegetation are evaluated in this section; potential impacts to birds and other species are addressed in Sections 3.8 and 3.9, respectively.

3.7.2 REGIONAL SETTING

There is substantial regional variation in the vegetation of tidal and non-tidal baylands in the San Francisco Estuary (Goals Project 2000). WT sites may be located near areas ranging from only sparse or weedy non-native vegetation with limited habitat function, to extensive marshes with well-developed, mature native marsh vegetation. In addition, different types of marshes and shoreline vegetation in different parts of the Estuary support different plant and wildlife species (including special-status species). Geographic variation in vegetation and habitats provides an important context for evaluating potential WT impacts to special-status plant and wildlife species, and wetlands. Major bayland vegetation communities and habitats are summarized below. Bayland habitats are indicated on Figure 3.7.2-1. The general landscape structure of the region's vegetation and habitats within the geographic scope of the WT is described below.



Wetland habitat data from EcoAtlas (1998)

Figure 3.7.2-1
Bayland Habitats

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file:Wetland-habitats_1134_2009-0826lee.mxd

REGIONAL LAND USES

The bayland environment varies among geographic subregions in the Bay (Figure 3.7.2-1) and with the predominant land uses: urban (commercial, residential, industrial/port), urban/wildland interface, rural, and agricultural. For the purposes of discussion of biological resources, San Francisco Bay is divided into Suisun Bay, San Pablo Bay, Central San Francisco Bay, and South San Francisco Bay (see Figure 3.7.2-2). The habitat types and associated vegetation vary within each type of land use.

URBAN SHORELINES

Urban shorelines in the San Francisco Estuary are generally formed by artificial fill and structures armored with revetments, seawalls, rip-rap, pilings, and other structures. Waterways and embayments adjacent to urban shores are often dredged. Where present, tidal wetland vegetation and habitats adjacent to urban shores are often formed on steep slopes, and are relatively recently formed (historic infilled sediment) in narrow strips. They are usually dominated by relatively few widespread and common marsh species, with a high proportion of non-native marsh species. Special-status plant species, with a few important exceptions, are usually absent in urban shores. On the terrestrial side of urban shorelines, natural or native vegetation is generally lacking or minimal. Non-native terrestrial vegetation (especially annual grasses, broadleaf weeds, and escaped or planted non-native ornamental trees and shrubs) is prevalent along most urban shores of commercial developments, ports, frontage roads, former military bases, and industrial sites. Many Backbone Sites are located in an urban landscape setting.

Urban land uses predominate in the Central Bay and tend to override natural or potential geographic variation in vegetation and habitats of adjacent baylands and shore vegetation. Exceptions occur where significant erratic patches of natural or restored native shore vegetation are included within entirely urbanized landscapes, such as Arrowhead Marsh in San Leandro Bay, Crown Beach/Elsie Roemer Marsh in Alameda, or Crissy Field in San Francisco. In northern SF Bay (San Pablo Bay and eastward) intensive urban land uses more often occur within a matrix of open space and wildland vegetation, where more sensitive native vegetation and habitats co-occur with urban development.

URBAN/WILDLAND INTERFACES

Urban (or suburban) development along the shores of the Bay is extensive, and often occurs adjacent to large blocks of wetland habitats within regional parks, wildlife refuges, and ecological reserves owned and managed by state or municipal agencies. Large, continuous blocks of native vegetation and habitats, often including old and species-rich remnants, are close to urban shorelines in these areas. This matrix of urban/wildland interface prevails in shorelines of South San Francisco Bay, most of Marin County along Central San Francisco Bay and San Pablo Bay, around expanding cities in San Pablo Bay along the northern Contra Costa shoreline, and northern Suisun Marsh. The proximity of source populations of sensitive species to urban areas also increases the potential for sensitive species to establish opportunistically in urban shorelines.

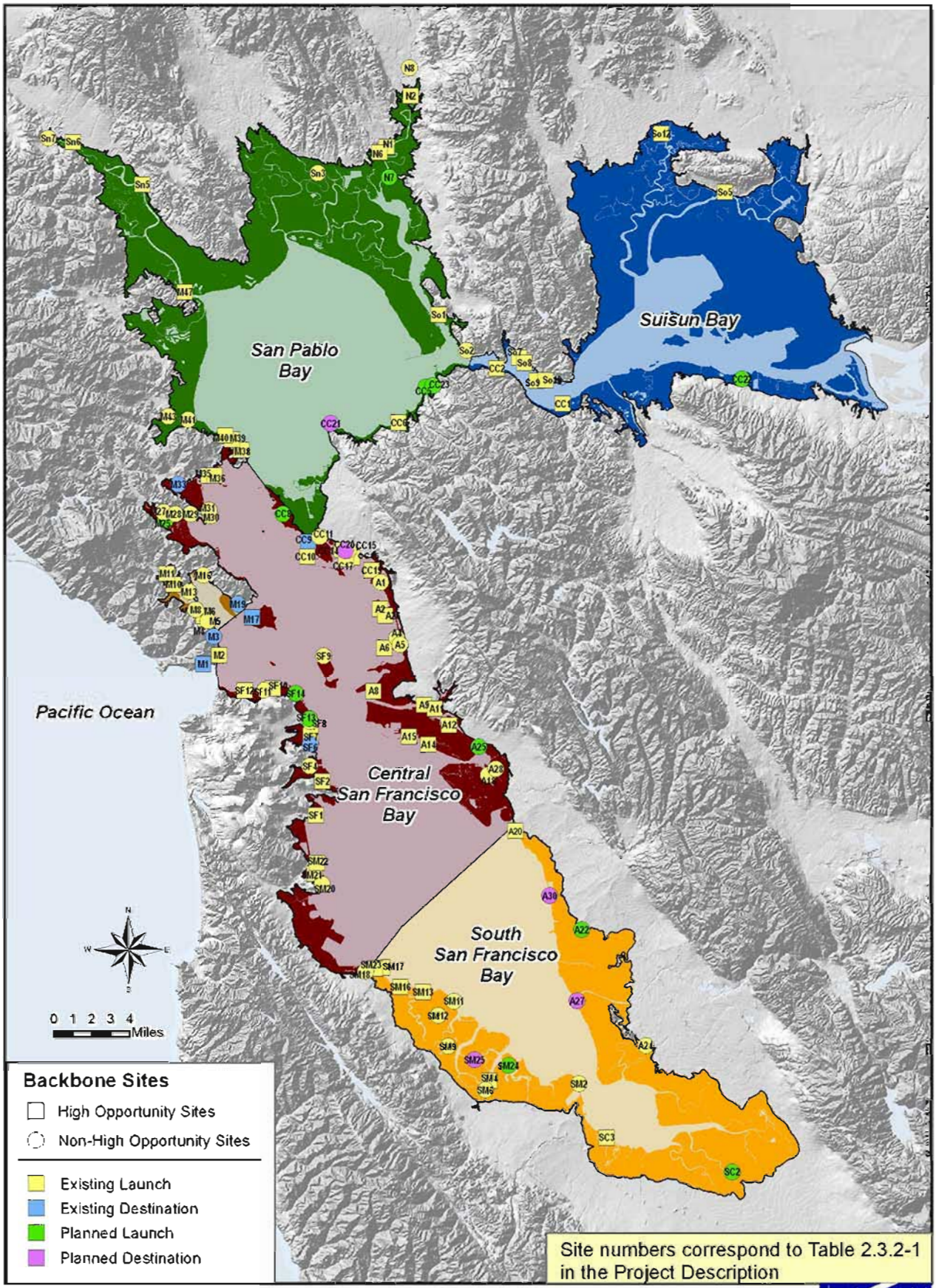


Figure 3.7.2-2
Bay Subregions

Bay Water Trail GIS data provided by BCDC
Bay subregion data from SFEI EcoAtlas

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file. Basin-plan-zones_1134_2010-0712lee.mxd

For example, some sensitive plant populations occur adjacent to residential, commercial, and industrial or military port/marina developments along shorelines in Vallejo, Fairfield, Concord, San Rafael, and Richardson Bay. The density of Backbone Sites is relatively high in the urban/wildland setting.

RURAL AND AGRICULTURAL HABITATS

Large blocks of ecologically important wetland and adjacent upland habitats are most likely to occur in rural and agricultural settings of the Bay, where travel distances to major urban populations are longest. True undeveloped open spaces (i.e., areas with original soils intact) along the bay edge are largely confined to San Pablo Bay and the vicinity of Suisun Marsh. The entire matrix of the landscape is likely to support at least remnants of the original pre-reclamation biological diversity of native habitats. The density of Backbone Sites is relatively low in the rural and agricultural landscape setting of San Pablo Bay and Suisun Marsh.

HABITAT TYPES

There are eight primary habitat types within the areas potentially impacted by the Water Trail. These include two types of open water habitats, four types of wetland habitats (tidal salt marsh, tidal brackish marsh, diked non-tidal salt marsh, and diked non-tidal fresh to brackish marsh), estuarine beaches, and other terrestrial habitats bordering the Bay shoreline. WT users may encounter these habitats at or near a trailhead and during excursions. Some of these habitats could also be affected by construction of facilities at WT sites.

OPEN WATER HABITATS

Open water habitats within San Francisco Estuary are classified into two categories: shallow bay defined as subtidal areas above 18 foot depth below Mean Lower Low Water (MLLW)[32], and deep bay defined as subtidal channels deeper than 18 feet below MLLW. San Francisco Bay currently contains almost 172,000 acres of shallow bay/channel habitat, and more than 82,000 acres of deep bay/channel habitat (Goals Project 1999). Primarily unvegetated soft bottom sediments (bay muds and sand deposits) lie underneath most shallow and deep-water habitats, but some shallow bay habitats contain stands of eelgrass (*Zostera marina*), which serve as valuable habitat for a wide range of fish and invertebrates. Eelgrass beds are also associated with uncommon nearshore areas with coarser sediment, or rocky substrates infilled with mud or sand. The restoration of eelgrass habitats is currently the focus of multiple research and implementation efforts throughout the Bay. Other shallow bay areas are focal areas for the restoration of native oyster beds, which have largely disappeared from the Bay.

TIDAL SALT MARSH

Tidal salt marshes are jurisdictional (state- and federally regulated) wetlands (see Section 3.7.4). They are distributed primarily around San Francisco Bay and the inner margins of San Pablo Bay. They are characterized by prevalence of native marsh plants that can tolerate wetland soil salinity that frequently approaches marine salinity (34 parts per thousand salt) during the growing season. Most modern salt marshes in the Bay are generally dominated by relatively few

[32] Lower low water is the lower of the two low waters of any tidal day. Mean lower low water is the average height of the lower low waters over a 19-year period. For shorter periods of observation, corrections are applied to eliminate known variations and reduce the result to the equivalent of a mean 19-year value.

native plant species, such as pickleweed (*Sarcocornia pacifica*), saltgrass (*Distichlis spicata*), fleshy jaumea (*Jaumea carnosa*), and sometimes large summer "blooms" of parasitic salt marsh dodder mats (*Cuscuta salina*). Marsh gumplant (*Grindelia hirsutula*; syn. *G. stricta* var. *angustifolia, G.* x *paludosa*) vegetation is widespread along marsh banks of tidal sloughs, where it provides important high tide cover for wildlife. A suite of non-native plant species, many of which are highly invasive, has established abundantly in salt marsh vegetation, including hybrid cordgrass and Mediterranean saltwort (*Salsola soda*) (see "Invasive Species of Tidal Marshes and Adjacent Baylands" below).

TIDAL BRACKISH MARSH

Tidal brackish marshes are jurisdictional (state- and federally regulated) wetlands. Tidal brackish marshes are characterized by an assemblage of plants associated with bay water that is diluted enough by fresh water during the growing season to support a prevalence of tall, emergent sedge family plants, such as tule, bulrush (*Schoenoplectus* spp.), alkali-bulrush (*Bolboschoenus* spp.), and sometimes cattail (native *Typha latifolia,* non-native *T.* x *glauca, T. angustifolia*) species. Tidal brackish marshes border navigable sloughs in the Alviso/San Jose area, Palo Alto, and nearly all of northern San Pablo Bay, Suisun Marsh, and the northern Contra Costa shoreline, and often occur near Backbone Sites in these locations.

Tidal brackish marshes typically support gradients or sharp zones of vegetation between slough banks and marsh plains. Brackish marsh plains usually support patchy mixtures of salt marsh plants like saltgrass and pickleweed, with other brackish marsh plants such as rushes (*Juncus arcticus*; syn. *J. balticus*), and many other tidal marsh broadleaf plants. Invasive non-native broadleaf pepperweed (*Lepidium latifolium*), or invasive non-native populations of common reed (*Phragmites australis*) are widespread and often dominant over extensive areas in brackish tidal marshes.

DIKED NON-TIDAL SALT MARSH

Diked, non-tidal salt marshes adjacent to tidal waters (separated by dikes) are generally jurisdictional (state- and federally regulated) wetlands. Diked non-tidal salt marshes ordinarily support simple vegetation with low plant species diversity. They are usually dominated by pickleweed, or simple mixtures of pickleweed and saltgrass. Such diked non-tidal salt marshes often decline in salinity over time, and admit various non-native weeds such as broadleaf pepperweed.

Diked non-tidal salt marsh and other seasonal wetlands sometimes border navigable sloughs. They are highly visible from adjacent levees, and are often mostly drained from spring to fall. Diked non-tidal salt marshes occur throughout San Francisco Bay and San Pablo Bay, and some, mostly near Fremont (Warm Springs vicinity), Napa, and Fairfield, may contain subsaline/alkaline vernal pool habitats.

DIKED NON-TIDAL FRESH TO BRACKISH MARSH

Non-tidal, diked fresh-brackish marshes adjacent to tidal waters (separated by dikes) are generally jurisdictional (state- and federally regulated) wetlands. They support predominantly freshwater perennial marsh vegetation (tules, cattails, common reed) or sedge family plants that tolerate higher peak soil salinity, such as alkali-bulrush. Some diked baylands, particularly in the

North Bay, also support variable fresh-influence brackish marsh vegetation in seasonal shallow ponds, and even some vernal pool-associated plants. Diked non-tidal fresh to brackish marshes are widespread in northern San Pablo Bay, Suisun Marsh, and the Contra Costa shoreline, and they also occur locally in diked baylands near points of nonsaline wastewater discharges near San Jose, Mountain View, Sunnyvale, and Palo Alto.

ESTUARINE BEACHES

Beaches composed of sand, shell fragments, gravel, or artificially placed sediments occur mostly in Central San Francisco, South San Francisco, and San Pablo Bays. Beaches support a mix of native estuarine beach and dune plants that are uncommon within the San Francisco Estuary. Beaches near public access are often attractive and heavily used for recreation, but inaccessible bay beaches are often protected as sensitive shorebird, tern, or marine mammal habitats (e.g., sand spits of Brooks Island, Richmond; Roberts Landing in San Leandro) and support native beach vegetation. Bay beaches are also highly attractive, accessible and efficient for use as landings by small craft.

OTHER TERRESTRIAL HABITATS BORDERING ESTUARY SHORELINES

Other terrestrial vegetation types in natural or artificial soils occur adjacent to the Estuary's shorelines (Holstein 2000), but most terrestrial vegetation near potential WT trailheads would occur in bay fill or levee soils in diked Baylands, and would typically be highly disturbed and composed primarily of non-native landscaping. This is because most true natural terrestrial soils and general vegetation types (such as coastal bluff scrub, oak woodland, riparian woodland) are associated with steeper hillslope soils or valleys that seldom contact the modern Bay, as a result of historic diking.

SENSITIVE AND SPECIAL-STATUS PLANTS

A number of special status plant species occur around wetlands of the Bay. These are listed in Table 3.7.2-1 and summarized by Bay region below. With a few important exceptions, sensitive plant species are either absent or very rare along urbanized shorelines close to the largest populations of recreational NMSB users. Shorelines of semi-urban, agricultural, or rural settings, shoreline and marsh habitats are more likely to support sensitive plant habitats and populations. The distribution of sensitive plant species is highly variable around the Bay, and each sub-region within the Bay supports a distinct regional suite of sensitive species. Special status species other than those noted below have been recorded in the region, but are either extinct or are in habitats that would not be affected by the project, and therefore are not discussed further in this section. For example, smooth popcornflower and soft popcornflower (*Plagiobothrys glaber*, *Plagiobothrys molli*s) are both presumed extinct in the San Francisco Bay area, and have not been reported from the vicinity of lowlands bordering the Bay, or baylands, in over a century. Many other special-status plant species occur around the Bay Area (appearing in special-status species lists based on location within U.S. Geological Survey quadrangle sheets), but are too remotely located to be relevant to impacts associated with WT activities, which would be concentrated in shoreline or marsh vegetation, or on open water.

Central San Francisco Bay

Richardson Bay supports numerous populations of northern or Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*), which sometimes occurs in high salt marsh edges near

TABLE 3.7.2-1. SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO BE AFFECTED BY WT PLAN

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence in Areas of WT Use
Arthrocnemum subterminale Alkali pickleweed	SoC - regional	Perennial subshrub, similar to common pickleweed, but regionally rare in San Francisco Estuary; not rare statewide. Typically occurs near alkali clay soils. Recent populations are known from Fremont and Suisun Marsh.	**Low potential.** Infrequently occurs near tidal slough banks, and shorelines near open water access mostly near Suisun Marsh.
Atriplex joaquiniana San Joaquin saltbush	CNPS 1B, SoC	Annual forb occurs primarily in interior alkali soils, seasonal wetlands, but also rarely in tidal marsh edges. Seeds are dispersed by floating fruits. Populations may be transient at specific locations. Recent populations are reported from Fremont, Napa River, and Suisun Bay area. Not easily identified or detected.	**Low potential.** May opportunistically colonize high tide shorelines in northeast San Pablo Bay, Suisun Marsh, Contra Costa shoreline. May occur in seasonal saline/alkaline wetlands, southeast San Francisco Bay.
Astragalus tener var. ***tener*** Alkali-milkvetch	CNPS 1B, SoC	Small low-growing annual forb of alkali seasonal wetlands, vernal pools. Limited seed dispersal, but likely able to persist as dormant seed. Recent populations are known to occur in Fremont. Not easily identified or detected.	**Very low potential.** Historic localities in Solano, Alameda counties.
Castilleja ambigua (ssp. undetermined; salt marsh ecotypes) Salt marsh owl's-clover	SoC (CNPS 1B?)	Small erect or spreading annual forb, hemiparasitic, like bird's-beak. Distinct regional ecotypes are rare in high tidal marsh edges (salt or brackish). One population (Benicia) may be rare subspecies humboldtiensis (CNPS 1B). Extirpated in San Francisco Bay, where it was formerly widespread. Apparently limited seed dispersal, but likely able to persist as dormant seed. Not easily identified or detected.	**Low potential** to occur near along marsh shoreline of Point Pinole, Southhampton Bay, Suisun Marsh, Contra Costa shoreline.
Centromadia parryi ssp. ***congdonii*** Congdon's tarplant	CNPS 1B	Erect annual resinous forb of seasonal wetlands or alkaline clay soils. Population locations and sizes are likely to fluctuate. Recent populations have been reported from South San Francisco Bay localities in or in the vicinity of diked baylands (Newark to Sunnyvale). May potentially occur along high tidal marsh edges. Detection difficult because of similarity to common tarweed species.	**Low potentia**l for occurrence on levees, diked baylands, or high tidal marsh edges.
Cicuta maculata var. ***bolanderi*** Bolander's water-hemlock	SoC	Tall perennial forb, possibly extirpated in San Francisco Bay. Formerly endemic and abundant in Suisun Marsh. No recent reports known.	**Very low potential** to occur along brackish tidal marsh slough banks, Suisun Marsh and Contra Costa shoreline.
Cirsium hydrophilum var. ***hydrophilum*** Suisun thistle	CNPS 1B, FE, SE	Short-lived coarse perennial forb, endemic to high tidal brackish marsh plains of Suisun Marsh; most populations fluctuate among years. Known locations near Rush Ranch and Hill Slough. Apparently limited dispersal, confined to vicinity of known populations in recent decades.	**Very low potential** to occur near tidal brackish tidal marsh banks or on marsh plains, western Suisun Marsh.
Cordylanthus	CNPS	Annual forb, hemiparasitic; restricted to high	**Variable**: negligible chance of

TABLE 3.7.2-1. SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO BE AFFECTED BY WT PLAN

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence in Areas of WT Use
maritimus ssp. palustris **Northern salt marsh bird's-beak**	1B, SoC	tidal salt marsh. Populations usually in colonies that often persist but fluctuate significantly among years. Apparently limited seed dispersal, but likely able to persist as dormant seed. Recent populations are known from Richardson Bay, Corte Madera, Novato, and Petaluma Marsh. Extirpated in the rest of Central Bay, South Bay. Difficult to detect except in early summer (flowering) during years of abundance. Known recent populations occur near or along shoreline trails in Richardson Bay.	occurrence in San Francisco Bay area outside of Marin County shorelines, but moderate to low chance of occurrence in Marin County.
Cordylanthus mollis ssp. mollis **Soft bird's-beak**	CNPS 1B, FE, SE	Annual forb, hemiparasitic. Restricted to high brackish tidal marsh. Populations usually occur in colonies that often persist but fluctuate significantly among years. Recent populations are known from Napa Marsh, Southampton Marsh, east of Point Pinole, Contra Costa shoreline, Suisun Marsh. Difficult to detect except in summer (flowering) during years of abundance.	**Low potential** to occur along brackish marsh edges of northeast San Pablo Bay, Suisun Marsh, Contra Costa shoreline.
Lasthenia conjugens **Contra Costa goldfields**	CNPS 1B, FE	Small annual forb, usually colonial in alkali vernal pools and similar seasonal wetland habitats; historically also rare along bayshore. Known recent locations near Fremont, Napa River, and Fairfield (north of Suisun Marsh). Apparently limited dispersal, confined to vicinity of known populations in recent decades. Difficult to detect except in spring (flowering) during years of abundance.	**Very low potential** to occur along contemporary bay shorelines or adjacent diked baylands supporting seasonal wetlands.
Lasthenia glabrata **(tidal marsh populations only)**	SoC	Small annual forb associated statewide with vernal pools and seasonal wetlands, but San Francisco Bay populations in salt pan edges, high salt marsh and brackish marsh have become rare and localized to Petaluma Marsh, Point Pinole, Suisun Marsh.	**Low potential** to occur near trailheads or landings bordering sloughs or bay.
Lathyrus jepsonii var. jepsonii **Delta tule pea**	CNPS 1B, SoC	Tall climbing perennial forb, occurring along tidal marsh banks of sloughs in Napa-Sonoma Marsh and Suisun Marsh. Conspicuous when in bloom (summer), but may be difficult to detect during droughts (saline years) in Napa Marsh.	**Variable** potential to occur along contemporary bay shores, mostly along fringing tidal marshes of Napa River and its sloughs, and Suisun Marsh. Negligible potential to occur elsewhere in San Pablo or San Francisco Bays.
Lepidium oxycarpum **Small-fruited peppercress**	SoC - regional	Tiny annual forb associated with dry edges of alkali vernal pools and (historically) salt marsh edges of San Francisco Bay. Difficult to detect. Likely extirpated in most baylands. Not rare globally or statewide.	**Low potential.** Similar and related species occur in Newark, near existing boat launch facilites.
Lilaeopsis masonii **Mason's lilaeopsis**	CNPS 1B, SR	Creeping grass-like and diminutive perennial forb, typically restricted to brackish tidal marsh banks subject to slumping or wave	**Low to moderate potential** to occur along bay shores of contemporary northeastern San Pablo Bay, Suisun

TABLE 3.7.2-1. SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO BE AFFECTED BY WT PLAN

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence in Areas of WT Use
		erosion, or nearby tidal marsh; also occurs in mud on rip-rap or concrete. Known populations occur from northern San Pablo Bay (Tolay Creek mouth) east through Suisun Marsh and Contra Costa shoreline. Difficult to detect.	Marsh, or Contra Costa shorelines.
Navarretia prostrata **Prostrate navarretia**	CNPS 1B, SoC	Annual low-growing forb, restricted to vernal pools and similar seasonal wetlands. In San Francisco Bay, known only from Fremont, but not near Bay shore.	**Very low potential** to occur in diked baylands adjacent to San Francisco Bay. No potential to occur in tidelands.
Polygonum marinense **Marin knotweed**	CNPS 3	Formerly restricted in San Francisco Bay to tidal marshes near Larkspur (Marin County), but this species has spread widely across the North Bay and western Suisun Bay area; it is sometimes locally common. It may be a misidentified non-native (invasive) species.	**Moderate potential** to occur in tidal marshes of the North Bay, western Suisun Marsh, and Contra Costa shoreline.
Symphyotrichum lentum (*syn. *Aster lentus) **Suisun Marsh aster, Marsh aster** (This species includes the plant formerly treated as *Aster chilensis var. sonomensis* of northern San Pablo Bay)	CNPS 1B, SoC	Tall perennial forb, typically forming colonies along brackish or freshwater marsh banks or upland edges tidal marshes in northern San Pablo Bay eastward to Suisun Marsh and Contra Costa shoreline. Presumed extirpated in San Francisco Bay. Conspicuous in flower, but difficult to distinguish from common aster except in flower (fall).	**Low to moderate potential** to occur in tidal marshes of Napa Marshes east to Suisun Marsh and Contra Costa shoreline. Negligible potential to occur in San Francisco Bay.
Suaeda californica **California sea-blite**	CNPS 1B, FE	Conspicuous spreading subshrub of sandy salt marshes and estuarine beaches. Original San Francisco Bay population was extirpated, but reintroduced populations have been established since 2000 at several Central Bay localities: Crissy Marsh (Presidio), two San Francisco bayshore sites, Emeryville, and San Leandro. No spread from sites of reintroduction has been detected.	**Very low potential** to occur except at known sites of reintroduction.
Suaeda moquinii **Bush seepweed**	SoC - regional	Subshrub associated with alkali or subsaline clay soils in baylands locally in Fremont/Warm Springs. Not rare statewide.	**Low potential.** In San Francisco Bay, known populations are restricted to Fremont/Warm Springs area, but have spread locally in diked baylands.
Spartina foliosa **Pacific cordgrass, California cordgrass**	SoC - regional	Tall emergent perennial grass restricted to mid-intertidal marshes and mudflats (low marsh) in San Francisco Bay, San Pablo Bay, and western Suisun Marsh (rarely to eastern Suisun Marsh). In San Francisco Bay, rapidly replaced by invasive hybrids between this species and *S. alterniflora* since mid-1990s. Intact populations are abundant in San Pablo Bay.	**Very high potential** to occur along San Francisco Bay and San Pablo Bay marshes and tidal shores.
Trifolium depauperatum var.	CNPS	Small low-growing annual herb of seasonal wetlands, vernal pools, or brackish tidal	**Very low potential** to occur in diked or tidal marsh habitats of northern San

TABLE 3.7.2-1. SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO BE AFFECTED BY WT PLAN

Name	Status	Ecology and Bay Area Distribution	Potential Occurrence in Areas of WT Use
hydrophilum **Saline clover**	1B, SoC	marsh. Recently reported populations occur in northern San Pablo Bay between Sears Point and Sonoma Creek in diked baylands and adjacent lowlands. Difficult to detect and distinguish from common subspecies.	Pablo Bay and Suisun Marsh.

CNPS List 1B - rare, threatened, or endangered in CA and elsewhere

CNPS List 4 – plants of limited distribution; watch list

FE – Federally listed endangered

SE – California state listed endangered species

SR - California state rare species

SoC – species of concern (no legal protection, conservation concern at local, regional, or state level based on either valid and substantial scientific evidence, scientific publications, or resource agency policy)

Data sources: Baye et al. 2000, CNPS 2001, Hickman 1993, www.efloras.org, and P. Baye, unpublished data

public trails and potential boat launch sites near roads and other public access facilities (Table 3.7.2-1). In San Rafael Bay, Marin knotweed (*Polygonum marinense*) occurs in tidal salt marshes, but this species has become relatively widespread since it was first identified as a rare and sensitive plant. The taxonomic status, native status, and rarity of this plant are uncertain, as is its status as a sensitive species (Table 3.7.2-1).

One federally endangered plant, California sea-blite (*Suaeda californica*), has been reintroduced to several localities in the Central Bay, long after its original San Francisco Bay populations became regionally extinct. It has not spread from points of reintroduction in limited sandy high salt marsh and beach habitats, and none of its reintroduced localities are at feasible trailheads; they are generally within inaccessible, isolated, and protected marsh and beach habitats.

Pacific cordgrass (*Spartina foliosa*), a common species threatened only by hybridization with an introduced non-native cordgrass species, occurs in the Central Bay, but its hybrids (which are the object of a rapid regional eradication program; www.spartina.org) are currently more common. Thus, with the exception of northern salt marsh bird's-beak, the Central Bay generally has low potential for significant water trail impacts to sensitive plant species.

South San Francisco Bay

A few sensitive plant species have either persisted or regenerated in diked baylands and adjacent lowlands in South San Francisco Bay. A few large and important early historic or prehistoric ("old growth") tidal marsh remnant vegetation stands persist in the South Bay at upper Newark Slough and outer Dumbarton Marsh (Newark), and the Laumeister Tract (Palo Alto).

Some sensitive plant species associated with alkali clay soils or vernal pools (and similar seasonal wetlands) do occur in the South Bay, but with one exception, these are highly unlikely to occur in areas that would be frequented by WT users, because they are located in areas with distinctive and localized soil conditions, such as the vernal pools in and near the Warm Springs Unit of the Don Edwards San Francisco Bay National Wildlife Refuge. The one exception is

Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), a rare plant with weedy habits (abundant seed production, rapid dispersal, unstable populations capable of rapid increase or decrease, and affinity for sparse or disturbed vegetation). It may occur infrequently but unpredictably in disturbed clay soils, such as levees, some seasonal wetlands and weedy diked baylands. The federally endangered Contra Costa goldfields (*Lasthenia conjugens*), formerly reported from a San Francisco Bay shoreline locality, is now restricted to vernal pools in Fremont, remote from Bay shorelines.

San Pablo Bay

San Pablo Bay is richer in sensitive plant species in shoreline, marsh or Bay-edge habitats than the remainder of San Francisco Bay. It also has retained more early historic and prehistoric remnant tidal marshes than any other region of the Bay, including China Camp (San Rafael), Heerdt Marsh (Corte Madera), most of Petaluma Marsh, Whittell Marsh (Point Pinole) and Fagan Slough Ecological Reserve and other old marsh fragments in the Napa Marsh. Intact terrestrial soils and stream deltas also contact estuarine marshes in San Pablo Bay at multiple locations. These "old growth" and tidal marshes and their edges conserve important "hot spots" of high native plant diversity.

Two rare species of bird's-beak, northern salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *palustris*) and soft bird's-beak (*C. mollis* ssp. *Mollis)* occur in San Pablo Bay, in addition to owl's-clover (*Castilleja ambigua*, subspecies undetermined). San Pablo Bay also supports sensitive but non-endangered plants of tidal marsh habitats such as San Joachin spearscale (*Atriplex joaquiniana*), delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), and Mason's lilaeopsis (*Lilaeopsis masonii)*. Suisun Marsh aster (*Symphyotrichum lentum*) was historically widely distributed in the Napa-Sonoma marshes. It is reported from the vicinity of Fagan Slough, and it is likely to persist at other localities, where its detection may be masked by the related common aster (*Symphyotrichum chilense*). Some special-status plants, like Mason's lilaeopsis, may be locally common in San Pablo Bay, but are difficult to detect without careful surveys. The locations of some rare plants, like San Joaquin spearscale and Mason's lilaeopsis, are likely to change from year to year.

Suisun Marsh and Northern Contra Costa Shoreline

The brackish marshes of the eastern reaches of the Bay (Suisun Marsh, and the marsh and bay edge habitats along the northern Contra Costa shoreline, Martinez and east), support most of the rare plants found in San Pablo Bay, as well as additional special-status plants. Suisun Marsh retains a large fragment of relatively intact prehistoric tidal marsh around Rush Ranch and upper Hill Slough. The prehistoric tidal marshes around Rush Ranch support a high concentration of native plant species diversity, but substantial native plant species diversity is also widely distributed in the brackish tidal marshes of the eastern reaches of the Bay.

Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*) is locally present in a few localities around Rush Ranch tidal marshes in Suisun Marsh, south of Fairfield. Bolander's water-hemlock (*Cicuta maculata* var. *bolanderi*), historically abundant and associated with Suisun Marsh thistle, has not been accurately reported from Suisun Marsh in many years; it may be extirpated. Contra Costa goldfields also occurs near Suisun Marsh in alkali vernal pools, but is not known to occur adjacent to navigable sloughs or bay edges. Mason's lilaeopsis and Suisun Marsh aster, among other special-status tidal marsh plants, are widely distributed in Suisun Marsh to the delta.

INVASIVE PLANTS OF TIDAL MARSHES AND ADJACENT BAYLANDS

Many non-native species have established in the Bay Area, but some spread rapidly into natural vegetation and become either excessively abundant, or dominate whole plant communities – sometimes displacing them entirely. It is this subset of highly invasive non-native plants, or wildland weeds, that are the principal concern for conservation of plant resources.

Table 3.7.2-2 presents a selected list of non-native plants that have either proven to be highly invasive, or threaten to become so, and that are found in Bay habitats. A complete list of invasive non-native species that often become dominant in Bay habitats (particularly on levees) would include widespread and long-established terrestrial weeds found throughout central California, such as fennel (*Foeniculum vulgare*), radish (*Raphanus sativa*), oats (*Avena sativa*), poison-hemlock (*Conium maculatum*), star-thistles (*Centaurea* spp.) and a large number of annual Mediterannean grasses (*Bromus* spp., *Hordeum* spp., *Phalaris aquatica*).(Bossard and Randall 2007; Bossard et al. 2000).

Other non-native plant species have "naturalized" in the Bay without dominating wetland zones or whole plant communities. These long-established naturalized non-native species include some that have in the past been assumed to be native (e.g., spearscale or fat-hen, *Atriplex prostrata*), or have been selected for management to benefit certain wildlife species (e.g., brass-buttons, *Cotula coronopifolia*, and spearscale).

A suite of non-native plant species, many of which are highly invasive, has established abundantly in salt marsh vegetation, including hybrid cordgrass and Mediterranean saltwort (*Salsola soda*). Invasive non-native salt marsh plants sometimes displace native salt marsh vegetation or other tidal habitats, such as estuarine beaches or mudflats. Until the 1990s, Pacific cordgrass (*Spartina foliosa*) generally composed the low salt marsh vegetation throughout salt marshes of the San Francisco Estuary, but cordgrass marshes in San Francisco Bay have recently been widely dominated by an invasive non-native hybrid cordgrass, *Spartina alterniflora* x *foliosa*. Marshes in San Pablo and Suisun Bays have remained relatively free of hybrid cordgrass. More recently, Mediterranean sea-lavender (*Limonium ramosissimum*) and European goosegrass (*Puccinellia maritima*) have invaded the bayshore marshes of the San Francisco Peninsula (P. Baye, unpublished data; Gavin Archbald pers. comm. 2009; Katharyn Boyer, pers. comm. 2009).

Invasive non-native plants of San Francisco Estuary wetlands, and their adjacent terrestrial habitats, are among the most important influences on habitat quality and conservation of native plant species diversity. Invasive non-native plants of tidal marshes and estuarine shorelines are dispersed by different processes, and at variable rates. Most long-distance dispersal of seeds is relatively infrequent: most studies of seed dispersal in tidal marshes and shoreline habitats show that most seeds disperse close to the "parent" or source plants, decreasing exponentially with distance. This pattern tends to remain true even for wind-dispersed or water-dispersed seed. Most tidal marsh plants are dispersed naturally by wind and water (Huiskes et al. 1995), but some may be dispersed by ingestion and excretion by wildlife, attachment to wildlife fur or feathers (Vivian-Smith, and Stiles 1994). The same physical seed adhesion features that make some tidal marsh plants susceptible to dispersal by wildlife provide potential for attachment to people

TABLE 3.7.2-2. SELECTED INVASIVE PLANTS OF TIDAL MARSHES AND ADJACENT BAYLANDS

Species	Regional Invasive Status	Ecology and Regional Distribution
Agrostis avenacea Australian bentgrass	Highly invasive; early rapid stages, recent surge of old introduction	High tidal marsh edges, nontidal seasonal brackish pools and wetlands of San Pablo Bay, northwestern San Francisco Bay, Suisun Marsh
Carpobrotus edulis* x *chilensis Iceplant	Highly invasive; late stages, very old introduction	Disturbed edges of levees, beaches, high tidal marsh; throughout region, but mostly western Bay
Dittrichia graveolens Mediterranean tarweed	Highly invasive, early stages, recent introduction	High tidal marsh edges, levee trail edges, roadsides, nontidal ruderal diked baylands and seasonal brackish wetlands of San Pablo Bay, San Francisco Bay; extremely rapid invasion northward and eastward in progress
Ehrharta erecta Tall veldtgrass	Highly invasive, early stages, recent surge of older introduction	Levee trail edges, roadsides, riparian woodland, upland borders of tidal marshes; San Rafael Bay to San Francisco Peninsula, Berkeley-Albany; spreading.
Elytrigia pontica Russian wheatgrass	Moderately to highly invasive, early stages, old introduction	Levees, high tidal marsh edges, sporadic throughout SF Bay: Palo Alto, Newark, Mare Island are known centers of abundance.
Juncus gerardi Black rush	Locally highly invasive; early stages, old introduction	Brackish high marsh, Southampton Marsh only Benicia and north Richmond
Limonium ramosissimum Algerian sea-lavender (two subspecies)	Highly invasive, very early stage of invasion, likely recent introduction	High tidal marsh edges, adjacent beaches, San Francisco to Foster City; local Richardson Bay
Lepidium latifolium Broadleaf pepperweed	Highly invasive, late stage, recent surge of older introduction	Brackish high tidal or nontidal marshes, levees, high tidal marsh edges. Entire range of Bay.
Piptatherum mileaceum Smilo grass	Moderately to highly invasive, early stages, old introduction	Levees, high tidal marsh edges, brackish high marsh, beaches, riparian woodland edges, San Francisco Bay
Puccinellia maritima European goosegrass	Moderately (to possibly highly?) invasive, early stages, unknown date of introduction	High tidal marsh edges, high salt or brackish tidal marsh plains. Burlingame to Foster City (possibly Bair Island)
Salsola soda Mediterranean saltwort	Highly invasive, late stage, recent surge of older introduction	High tide zone of beaches and tidal marsh plains. Entire range of SF Bay; concentrated in western Bay
Spartina alterniflora* x *foliosa Hybrid cordgrass	Highly invasive, recent surge of older introduction; eradication program in progress	Tidal salt or brackish marsh, low to high zones, Central and South San Francisco Bay and upper Petaluma Marsh
Spartina densiflora Chilean cordgrass	Highly invasive, recent surge of older introduction; eradication program in progress	High tidal salt or brackish marsh, San Rafael Bay (residual at Point Pinole)
Spartina patens Salt meadow cordgrass	Highly invasive (local), older introduction; eradication program in progress	High tidal brackish marsh, Southampton Marsh only (Benicia)
Data sources: Invasive Spartina Project (ISP 2001), P. Baye, unpublished data.		

(footwear, clothing with mud, sand, or seed adhering), vehicles (equipment or tires), or watercraft.

Patterns suggestive of large "leaps" in the range of some wetland weeds associated with motorized vessels have recently been observed near marinas and offloading facilities where disturbed substrates are present. For example, hybrid cordgrass (*Spartina alterniflora* x *foliosa*) recently extended its northern limit from the Central Bay to a large infestation in the vicinity of the Petaluma Marina and a nearby sand processing plant, with no colonies in between. Similarly, the center of abundance of Mediterranean tarweed (*Dittrichia graveolens*) in the North Bay in 2006 was the immediate vicinity of Port Sonoma. That species had previously been concentrated in South San Francisco Bay. The intensive recent invasion of high tide shorelines (high marsh, sand, rubble) by Algerian sea-lavender (*Limonium ramosissimum*) in western San Francisco Bay is closely associated with public access points, including main infestations at Coyote Point Marina's shoreline, Burlingame Lagoon trail edges and adjacent marsh, and tidal marsh trail edges in Richardson Bay (Gavin Archibald, pers. comm. 2009; Katharyn Boyer, pers. comm. 2009).

3.7.3 LOCAL SETTING

The proximity of the 112 Backbone Sites to sensitive habitat and sensitive plant species varies, and would be evaluated carefully as part of the trailhead designation process. The distribution of sensitive habitats around the Bay is shown in Figure 3.7.2-1.

3.7.4 REGULATORY SETTING

Biological resources, including sensitive habitats and plants, are protected under several federal and state statutes. The regulatory setting information provided below addresses biological resources as a whole, and provides supplemental information pertaining to sensitive habitats and plants, where applicable. Local jurisdictions may impose additional protections; locally-applicable requirements would be evaluated during the trailhead designation process if a potential WT site is located in or near sensitive habitats or sensitive plants may be present in the vicinity of the site.

FEDERAL REGULATIONS AND PLANS

ENDANGERED SPECIES ACT

At least three Sections (Sections, 7, 9 and 10) of the Endangered Species Act of 1973, as amended (16 USC 1531; ESA), may be pertinent to the WT Plan. Section 7 of the ESA requires that federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) for ESA-listed plants if a federal action, such as a permit, license, or federal funding, may affect an ESA-listed threatened or endangered species. Federal agencies are prohibited from taking actions that would be likely to jeopardize a federally listed endangered or threatened species. USFWS concludes consultations with either a formal biological opinion or a written determination that a federal action that may affect a listed species would not be likely to adversely affect it. For actions around the San Francisco Bay's wetlands, Section 7 is often provided through the Corps permit process (see Federal Clean Water Act) or through the San Francisco Bay National Wildlife Refuges (USFWS) for actions within their jurisdictions.

Section 9 of the ESA concerns prohibited actions. For federally listed plants, Section 9 has limited prohibitions concerning malicious damage to listed plants under federal jurisdiction, or removal or damage of listed plants outside of federal jurisdiction when state laws regarding criminal trespass or plant protection are knowingly violated. Section 9 prohibitions are seldom triggered for plants.

Section 10 of the ESA provides for authorization of some "take" incidental to other actions. "Take" authorization may be provided in the form of a Habitat Conservation Plan (HCP), permits for research on recovery actions to benefit listed species, or "incidental take statements" that are included in many biological opinions prepared under Section 7.

CLEAN WATER ACT SECTION 404

Discharges of dredged or fill material into "waters of the United States," including jurisdictional wetlands and all tidal waters around the San Francisco Estuary, are regulated by the Corps with oversight of the EPA. The Corps has jurisdiction over tidal wetlands, navigable waterways, and most wetlands and other waters adjacent to them (i.e., jurisdictional wetlands and other waters of diked baylands) under Section 404 of the Clean Water Act. The Corps has Section 404 jurisdiction over tidal wetlands up to the "High Tide Line", and broader jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 up to the Mean High Water line.

The Corps may authorize fill in jurisdictional wetlands and other waters by issuance of standard individual permits (with public notice and interagency coordination), general permits for authorized categories of regulated activities, including Nationwide Permits (no public notice is required; interagency coordination may be required), or letters of permission for certain categories of activity (no public notice is required). Corps and EPA regulations pertaining to Section 404 jurisdiction generally discourage or prohibit discharges of fill that would degrade or destroy the quality of wetlands or other waters. Corps permits may trigger Section 7 ESA consultation if the Corps determines that a permit action "may affect" a federally listed species. Corps permits in the baylands of the San Francisco Estuary generally require some state authorizations or certifications, including Section 401 water quality certification from the Regional Water Quality Control Board – San Francisco Bay Area (RWQCB), and BCDC authorization for activities within their jurisdiction.

EXECUTIVE ORDER 11990–PROTECTION OF WETLANDS

As described in Section 3.2, this Executive Order protects wetlands and requires that all federal agencies minimize the destruction, loss or degradation of wetlands, and preserve and enhance the natural and beneficial values of wetlands. Corps permits are subject to the policies of Executive Order 11990, which applies to federal projects or actions such as leases affecting wetlands.

COMPREHENSIVE CONSERVATION PLANS

A Comprehensive Conservation Plan (CCP) is being prepared for the San Pablo Bay National Wildlife Refuge (NWR) and is expected to be finished in 2010. CCPs comply with standards outlined in NEPA and provide National Wildlife Refuges with guidance for management decisions. A CCP for Don Edwards NWR is expected to be finished in 2012.

STATE REGULATIONS

CALIFORNIA ENDANGERED SPECIES ACT (FISH AND GAME CODE SECTION 2050 ET SEQ.)

The state equivalent of the Federal ESA, CESA has similar but distinct requirements and goals. CESA requires state agencies to coordinate with the CDFG to ensure that state-authorized or state-funded actions do not jeopardize a state-listed species. The state list of species classified as rare, threatened, or endangered does not correspond identically with the federal list of threatened and endangered species. CESA prohibits unauthorized "take" of a state-listed species.

CALIFORNIA NATIVE PLANT PROTECTION ACT (FISH AND GAME CODE SECTION 1900 ET SEQ.)

In addition to CESA, the NPPA protects endangered and "rare" species, subspecies, and varieties of native California plants. The species listed under this law, which preceded CESA, now overlap with those of CESA. NPPA contains many exemptions for agriculture and forestry, and many exceptions, but it otherwise generally prohibits unauthorized "take" of listed plants. NPPA contains "notice and salvage" provisions that require landowners to notify CDFG to "salvage" (rescue by transplanting – a technique no longer generally scientifically supported) listed plants in the path of land-clearing or development activities. In other words, plants may be moved, but not destroyed.

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Biological "beneficial uses" of state waters are subject to regulation under the Porter-Cologne Water Quality Act through various means, including mandatory conditions attached to state water quality certification of Federal Clean Water Act (Sections 401, 404) authorizations and waste discharge permits. The Regional Water Quality Control Boards frequently provide Porter-Cologne compliance with wetland beneficial use policies by attaching mandatory conditions to Section 401 certifications for Corps permits for fill discharges in federal jurisdictional wetlands.

EXECUTIVE ORDER W-59-93, CALIFORNIA WETLANDS CONSERVATION POLICY

This state policy established by the Governor of California in 1993 provides substantive environmental goals to ensure no overall net loss of wetlands, to achieve a long-term net gain in the quantity, quality, and permanence of wetlands in California, with due concern for private property and stewardship.

LOCAL AND REGIONAL REGULATIONS AND PLANS

MCATEER-PETRIS ACT AND THE SAN FRANCISCO BAY PLAN

The McAteer-Petris Act (Act) requires that individuals and organizations obtain permits to fill, extract materials, and make substantial changes in use of land, water or existing structures in the Bay. In determining whether to issue permits, BCDC looks to policies set forth in the McAteer-Petris Act and in the *San Francisco Bay Plan*. In general, these policies authorize fill or excavation of wetlands only for water-dependent projects where no feasible upland alternatives exist, and only if wetlands impacts are mitigated.

The *San Francisco Bay Plan* includes policies to protect wetlands from poor water quality, dredging, and other activities (BCDC 2007a, as amended).

Three policies from the Bay Plan may be directly applicable to the WT. They are specific to tidal marsh and tidal flats, and are found in Part III: The Bay as Resource: Findings and Policies, in the subpart entitled "Tidal Marshes and Tidal Flats – Findings and Policies Concerning Tidal Marshes and Tidal Flats Around the Bay. Policies 1 through 3 from this subpart are as follows:

> 1. Tidal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking, and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative.
>
> 2. Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects.
>
> 3. Projects should be sited and designed to avoid, or if avoidance is infeasible, minimize adverse impacts on any transition zone present between tidal and upland habitats. Where a transition zone does not exist and it is feasible and ecologically appropriate, shoreline projects should be designed to provide a transition zone between tidal and upland habitats.

Several other policies govern restoration of tidal marshes and tidal flats, and would apply to any WT sites where habitat restoration is proposed as part of a trailhead plan. In addition, BCDC's policies also state that "The use of non-native plant species in public access landscape improvements should be avoided where a potential exists for non-native plants to spread into the Bay, other waterways, or transition zones between tidal and upland habitats." (Policy 6 of the Tidal Marshes and Tidal Flats Findings and Policies).

3.7.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The level of significance of biological impacts to vegetation is determined partly by regulatory requirements, and partly by the scientific literature on ecology, conservation biology, and related environmental sciences. Potential impacts to vegetation resources associated with implementation of the WT Plan would be considered significant if they would:

- Have a substantial adverse effect, either directly or indirectly through habitat modifications, on any plant species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, or U.S. Fish and Wildlife Service. A substantial adverse affect would occur if the project would:
    - Extirpate (cause local extinction of) a population
    - Cause or contribute to a substantial decrease in the distribution (range) or abundance of a sensitive or special status species, substantially diminish or degrade habitat for such a species, reduce a species' regeneration capacity in existing or historic range(s), or otherwise reduce the viability of a sensitive or special-status plant species
    - Cause or contribute to a substantial increase in the "invasion pressure" of suitable habitat of a sensitive plant species by invasive non-native plants

- Have a substantial adverse effect on any wetland or riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game, or U.S. Fish and Wildlife Service. A substantial adverse affect would occur if the project would:
    - Cause the loss or substantial reduction in area or distribution of a unique or rare plant community
    - Cause substantial loss of composition or structure in a plant community that is very old or mature, and very slow or uncertain to regenerate over many human generations
    - Lead to a major increase in the distribution, rate of spread, abundance, or impact of an invasive non-native species
    - Result in major, long-term reduction in diversity of native species and communities

METHODOLOGY

The evaluation of impacts to biological resources is based on a number of factors: potential proximity of a WT trailhead or WT users to a resource, the sensitivity of that resource to disturbance, and temporal/spatial patterns of both disturbance and resource sensitivity. Primary stressors to sensitive plants and sensitive habitats were first identified. These include actions that could degrade the habitat occupied by sensitive plants, and other direct and indirect damage to sensitive plants. The potential for implementation of the WT to lead to these effects was then evaluated.

REGIONAL IMPACTS AND MITIGATION MEASURES

IMPACT BIO-1: SPREAD OF NON-NATIVE INVASIVE PLANTS

Non-native invasive plants can adversely affect sensitive habitats and sensitive plant species by displacing (out-competing) the native plants. WT activities could potentially facilitate non-native plant invasions in several ways, including weed seed dispersal and habitat disturbances that would favor the establishment of new “outlier” populations of weeds.

Some patterns of estuary weed spread appear to track human activity, such as levee maintenance, localized dredging and grading, or shoreline access points with high traffic (marinas, boat launches, trail entrances, parking lot edges, etc.) (Baye 2000b). Long-distance dispersal events (the definition of “long-distance” depends on the species and the dispersal mechanism) are especially significant for weeds in early stages of regional spread. New “outposts,” or weed founder populations, could create new centers of spread remote from core populations or points of origin.

Generally, widespread wetland and terrestrial weeds have already “saturated” the Estuary as mature invasions. Low levels of additional seed dispersal would normally have little effect on invasion rates of common, widespread weeds in sensitive vegetation. While these weeds may locally erupt in abundance in response to localized disturbances, and may circumstantially cause adverse impacts to native plants, they are generally a less significant risk to biological diversity than recent, early-stage, aggressive invasions. These older, “naturalized” non-native species have

been considered in terms of WT activities or projects and their potential influence on weed invasions, but would not pose a potentially significant impact by themselves.

In contrast, the invasive species listed in Table 3.7.2-2 are in various stages of invasion in Bay habitats, and their regional invasions are likely to be limited by seed dispersal in many parts of the Bay. Thus, low levels of additional seed dispersal across geographic or ecological barriers may have significant effects on the geographic range (expansion), location, or rate of weed invasion of these species. Of the 14 species listed in Table 3.7.2-2, one (Mediterranean tarweed) has a very high potential for increased spread due to implementation of the WT; six others have a moderate-to-high or high potential (Australian bentgrass; tall veldtgrass, Algerian sea-lavender, Smilo grass, hybrid cordgrass, and Chilean cordgrass).

WT users visiting more than one WT site, either during one outing or successive outings, could become significant vectors for colonization by invasive plants in early stages of regional spread by creating new outposts of weeds beyond of the normal geographical range of wind- and water-driven seed dispersal patterns. Weed seed dispersal associated with the use of NMSBs may occur through mud or sand attached to footwear, boating equipment, or fabric (clothing or packs). NMSBs and NMSB users may come into frequent contact with sediment (mud, sand) that may contain seeds of wetland weeds. NMSBs can also navigate shallow sloughs in remote, inaccessible, sensitive tidal wetlands and therefore could facilitate the spread of invasive species to and from these areas. Seeds could also be transported in soils on tires or car bodies, and could colonize disturbed roadside substrate (weed seedling habitat) in or around parking lots.

The risk of significantly elevated impacts of weed seed dispersal and weed spread would depend on the frequency of NMSB use, trailhead location, and the regional setting. Any appreciable increase in the public use of multiple WT sites (increased probability of users visiting multiple individual sites because of the regional network of shoreline access within the WT system, and/or publicity about sites previously unknown to users) could increase the potential for the spread of invasive marsh or shoreline weeds. The potential impact of the WT on the spread of invasive plants would likely be less than significant for most trailheads in urbanized sites in the Central Bay (outside of Marin County). This impact could be **potentially significant but mitigable** in less urbanized parts of the Bay. Impact Bio-1 would be reduced to a less than significant level by implementation of the following measures.

MITIGATION MEASURE BIO-M1: CONDUCT EDUCATION AND SPREAD-REDUCTION EFFORTS

Educational materials shall be provided to educate all WT users about the potential for spread of invasive plant species through WT activities, and methods that WT users can employ to minimize this potential, such as cleaning NMSBs and associated equipment/clothing prior to leaving trailheads (removal of sediment or adhering debris potentially containing weed seeds), or, if not practical at the site, prior to using the equipment and other items at another location.

- The trailhead designation process for all WT sites near either sensitive or invasive plant species habitat shall include a determination of whether information about spread-reduction should be incorporated into signage for the site, and shall require the inclusion of such language if warranted.
- Site owners shall take steps to minimize boat and foot traffic trampling on vegetation (including local weed populations) at trailheads as described in Mitigation Bio-M3, below.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT BIO-2: WETLAND HABITAT IMPACTS DUE TO CONSTRUCTION, REPAIR, REHABILITATION, OR MAINTENANCE OF TRAILHEADS

WT activities may include construction, repair, rehabilitation, or maintenance of facilities in or adjacent to wetland habitats, including boat ramps or other WT improvement infrastructure (which does not typically require locations in wetland habitats). For HOSs, these activities would be minimal (i.e., construction would be limited to signage only).

WT strategies (Strategies 1, 3, and 4) would guide WT improvements away from sensitive wetland habitats to the greatest extent feasible. If site-specific constraints make wetland avoidance infeasible at a trailhead, trailhead improvements, rehabilitation, repair, or maintenance may result in unavoidable fill in wetland habitats. Any such fill would be permitted and constructed in accordance with all applicable regulations.

Ordinarily, small wetland fills or other wetland impacts associated with boat launching ramps and small trailhead facilities would not be expected to have significant impacts in most urban wetland settings. In addition, signage or other minor improvements to HOSs are unlikely to adversely affect wetlands. Nevertheless, in some potential non-HOS trailhead locations, depending on the environmental sensitivity of the wetland areas affected, and the environmental sensitivity of special-status wildlife and plants in the vicinity, small wetland fills could result in significant direct or indirect impacts to wetlands. This impact is considered **potentially significant but mitigable**. With implementation of mitigation measure Bio-M2 this impact would be reduced to a less than significant level.

MITIGATION MEASURE BIO-M2: CONDUCT SURVEYS, ADOPT AVOIDANCE MEASURES, AND INSTIGATE COMPENSATORY MITIGATION

Existing regulations and policies require consideration and protection of wetlands that may be affected by construction activities, and/or implementation of compensatory mitigation if impacts to wetlands are unavoidable. The WT will be implemented consistent with these regulations, by following the key steps below:

- Trailhead Plans for non-HOS WT sites shall assess whether wetlands or sensitive vegetation occur on the site.
- If areas are present that may be regulated as wetlands, and these areas cannot be avoided through proper staging of construction activities, owners/managers shall complete pre-construction surveys by qualified biologists to determine the distribution of wetlands and characterize the vegetation present within the vicinity of potential construction, repair, or maintenance footprints (effect areas).
- If surveys determine that wetlands habitat is present at or near a trailhead site, project plans for construction, repair, or rehabilitation of trailhead facilities, including configuration of facilities, shall be designed to avoid or minimize impacts to wetlands to the extent feasible.
- Biological surveys shall include special-status plant species surveys that comply with California Native Plant Society and CDFG guidelines or protocols for rare plant survey methodology.

- If wetland impact avoidance is not feasible, WT site owners/managers shall prepare and implement plans to compensate for unavoidable wetland impacts, consistent with regulatory requirements and technical advice from state and federal resource agencies.

IMPACT BIO-3: WETLAND HABITAT IMPACTS DUE TO INCREASED TRAMPLING OF WETLAND SHORELINE VEGETATION AND SOIL

Although most WT trailheads would be located in urbanized areas and in marinas or other developed facilities, some trailheads would be in relatively undeveloped open space areas in or adjacent to wetland shoreline vegetation. Well-designed boat launching ramps would reduce potential impacts to the environment. Nonetheless, in non-urbanized and undeveloped areas, facility modifications or increased use due to WT publicity could lead to locally increased trampling of vegetation that could gradually eliminate native vegetation, increase exposure to erosional forces, or create vegetation gaps.

Trampling could also occur as a result of informal trails, or boaters making unplanned or unauthorized landings outside of WT-designated trailheads or destination sites because they are experiencing distress during trips, or seeking views from levees. Trampled, matted vegetation, if visible, may be attractive for subsequent landings by other boaters.

Trampling effects on vegetation may in some cases be neutral or benign. At intermediate levels of trampling intensity, trampling may create small vegetation gaps that may provide habitat for seedlings of native marsh or beach plants, including some special-status plant species that specialize in colonizing gaps or sparse vegetation. However, vegetation gaps could also facilitate non-native plant invasions.

Salt marsh vegetation types affect the potential for landings and marsh access by small craft. Slough banks in salt marshes are usually lined with either moderate to gently sloped mud beds with cordgrass vegetation, or steep, nearly vertical, erosional banks (slumps and scarps). Different vegetation types vary in their sensitivity to trampling. Cordgrass vegetation is sensitive to trampling, and crushes easily. Pacific cordgrass roots and rhizomes (horizontal below-ground stems) only loosely bind soft mud. Pacific cordgrass roots and rhizome meshes are usually not strong enough to resist the shear forces of human trampling, which tends to gouge into underlying mud. In contrast, non-native hybrid cordgrass vegetation is usually dense and very tall (resisting visual access or boat landings), but it also provides better footing by binding salt marsh soil more strongly. Mature pickleweed marsh also forms firm ground and solid footing, and also maintains short vegetation. Steep slumped banks restrict landings by small boats at lower tidal stages, but may allow potential landings on firm pickleweed marsh at high tide. Because tule and bulrush marsh vegetation along sloughs of tidal brackish marshes is very tall and dense, it makes views of adjacent marsh plains and access to them from small craft (landings) difficult.

Trampling impacts associated with the WT would be due to NMSB users either trying to get more direct access to the shore, or to approach visually appealing areas from the water. Thus, any WT-related trample paths would all connect to the water, and paths that do not lead to the water would not be due to NMSB use. Most trampling impacts in vegetation around intensive urban shorelines would ordinarily be less than significant because sensitive habitat or plants

would not be present. Similarly, at most HOSs, which include already developed facilities and where the project is not expected to generate substantial new use, this impact would be less than significant. However, in areas with sensitive shoreline wetlands and a significant increase in use, this impact would be **potentially significant but mitigable**. With implementation of mitigation measure Bio-M3, this impact would be reduced to a less than significant level.

MITIGATION MEASURE BIO-M3: ESTABLISH TRAILHEAD RESTRICTIONS, PUBLIC EDUCATION, SURVEYS, AND SIGNAGE

As described in Mitigation Measure Bio-M2, Trailhead Plans for non-HOSs shall consider whether sensitive wetland vegetation occurs at or in the vicinity of proposed trailheads (the precise distance that is of potential concern will vary based on site-specific factors such as typical travel patterns, other features in the area, etc.). If sensitive wetland vegetation is present at or within the vicinity of a potential trailhead, the following measures shall be incorporated into the trailhead designation process.

1. WT staff shall prepare and effectively publicize guidance to discourage landings along vegetated wetland banks of sloughs or establishment of unauthorized landings.
2. Foot traffic and boat contact with wetland weeds or native wetland vegetation shall be minimized at trailheads through proper access route and boat launch area design, to make accessing the water along designated routes more attractive than entering sensitive habitat.
3. Trailhead owners/managers shall annually inspect trailhead locations for the development of new informal trail networks emanating from trailheads. If new informal trails extend into wetlands or other native shoreline vegetation, they shall be closed by placement of symbolic fencing and signage restricting access across vegetation.
4. Trailhead owner/operators shall track the use patterns at their location, and if there is a notable increase in use, they shall conduct periodic (annual or biennial) boat surveys to detect and locate trampling impacts in native or non-native wetland vegetation along sloughs or shoreline vegetation in the vicinity of trailheads. Surveys may be conducted by trailhead stewards, other volunteers, or the site owner/operator. If trampling impacts (incipient unauthorized landings) are detected in wetland vegetation along sloughs or shoreline vegetation in the immediate vicinity of trailheads, trailhead managers shall take feasible actions to close the incipient landings by placing signage or otherwise discouraging or prohibiting landings at trampling-impacted slough bank or shoreline locations.

IMPACT BIO-4: IMPACTS TO SPECIAL-STATUS WETLAND PLANT SPECIES

A large proportion of WT Plan Backbone trailheads would be located in urbanized settings such as waterfront parks, marinas, and developed access areas that are distant from locations of special status plant populations, particularly in South San Francisco Bay and most of the Central Bay outside of Marin County. The likelihood of significant impacts to sensitive plant species is expected to be low for the majority of urban-edge trailheads where armored, engineered shorelines with narrow, young, fringing marshes or no fringing vegetation are prevalent. Most NMSB trips from such sites would also be unlikely to contact sensitive plant populations or habitats.

At trailhead locations in Richardson Bay, San Rafael Bay, San Pablo Bay, Suisun Marsh, and the northern Contra Costa shoreline, however, impacts to special-status plant species could occur. Potentially significant impacts to special status plant species at sites in these locations could occur through increased use of trailheads, or through construction or maintenance of WT trailhead facilities. Activities that may directly or indirectly impact special-status plant species may include trampling, competition with non-native vegetation, erosion control activities, placement of fill, and management of nuisance vegetation.

Trampling of sensitive plant populations, or the habitats in which they regenerate (such as seedling habitats), is described in Impact Bio-3 above. Impacts to special-status plants could also occur away from WT trailheads, due to trampling by NMSB users making emergency landings or seeking to enter a habitat area on foot. Competition or other interference effects of non-native invasive plants may adversely impact special-status plants. Erosion control activities may impact sensitive plant species that typically occur in erosional sub-habitats (e.g., Mason's lilaeopsis). Placement of fill for construction of trailhead facilities in diked Bay vegetation could impact special-status plant species where they occur. Management of nuisance vegetation (such as brush removal, mowing, weed control, or vegetation clearing for improved public access) could potentially damage or destroy sensitive plant populations.

At most sites, including all sites meeting HOS criteria, application of WT Strategies 1, 3, and 4 as well as the educational and outreach provided for by Strategies 17, 18, 19, 21, and 22, would be expected to avoid or minimize potential impacts to special-status plant species. However, at sites at or near occurrences of special status plant species, this impact would be **potentially significant but mitigable**. With implementation of mitigation measure Bio-M4, this potential impact would be less than significant.

MITIGATION MEASURE BIO-M4: CONDUCT SURVEYS, ADOPT AVOIDANCE MEASURES, AND INSTIGATE COMPENSATORY MITIGATION

The trailhead designation process for sites that do not meet HOS criteria shall consider the potential for special status plant species to occur on or near the site. If special status plant species potentially occur at or adjacent to proposed trailheads, and these areas cannot be avoided through proper design and staging of construction activities, owners/managers shall complete pre-construction surveys by qualified biologists to determine if any special-status plant species are present within the vicinity of potential construction, repair, or maintenance footprints (effect areas). Biological surveys shall include special-status plant species surveys that comply with California Native Plant Society and CDFG guidelines or protocols for rare plant survey methodology.

If special status plant species impact avoidance is not feasible, trailhead owners/managers shall prepare and implement plans to compensate for unavoidable wetland impacts, consistent with regulatory requirements and technical advice from state and federal resource agencies as appropriate.

Mitigation Measures Bio-M1 and Bio-M3, above, also would apply to this impact.

3.8 BIOLOGICAL RESOURCES – BIRDS

This section discusses the existing sensitive avian resources of San Francisco Bay that could be affected by project-related construction and increased NMSB use resulting from implementation of the WT Plan, identifies potential impacts to those resources, and identifies mitigation measures to reduce or eliminate those impacts.

3.8.1 INITIAL STUDY FINDINGS

The Initial Study (IS) for this project identified potentially significant impacts on sensitive species. The IS also identified potential conflicts with Habitat Conservation Plans, other approved conservation plans, and local ordinances protecting biological resources. Migratory and resident birds were identified as sensitive species in the IS.

Two categories of birds are evaluated in this section: waterbirds and sensitive/special-status birds, including terrestrial species that occur near shorelines (e.g., burrowing owl [*Athene cunicularia*]). Potential impacts to birds were evaluated in the context of the San Francisco Bay area as a whole, and specific sensitive habitats.

3.8.2 REGIONAL SETTING

This section first describes the types of birds considered in this evaluation, and then discusses population trends, including potential factors contributing to the population trends.

WATERBIRDS

San Francisco Bay is an important local, national, and international resource for waterbirds. The term *waterbirds* refers to avian species that are primarily dependent upon aquatic or wetland habitats for their survival. Sensitive (also known as special-status) birds are a subgroup of waterbirds that have been listed or are proposed for listing as threatened or endangered under the federal or California Endangered Species Acts; that are listed as California Bird Species of Special Concern (BSSC) by the California Department of Fish and Game (CDFG); or that are otherwise included on the CDFG's list of special animals.

Open water, tidal marsh, tidal flats/mudflats, salt evaporation ponds, and diked wetlands are all habitat types that are important for waterbirds (Bollman et al. 1970, Takekawa et al. 2001). All of these habitats can be presently found within the Bay, although the modification of the Bay ecological conditions since European settlement has been extensive. Despite these changes, the Bay still provides the most important complex of wetland habitat for migratory and wintering waterbirds on the Pacific Coast (Goals Project 1999, 2000).

Ongoing surveys have shown that the Bay provides wintering habitat for more than 50 percent of the diving ducks on the Pacific Flyway (Takekawa et al. 2000, USFWS unpubl. data), and provides habitat for more than 500,000 individuals annually (Bildstein et al. 1991, Page et al. 1999). San Francisco Bay has been recognized as a Western Hemisphere Shorebird Reserve Network site of international importance (Bildstein et al. 1991, Harrington and Perry 1995).

WATERBIRD USE OF SAN FRANCISCO ESTUARY: SEASONALITY AND ABUNDANCE

The season of peak use for all waterbirds combined is November through mid-March (Takekawa et al. 2000, Avocet Research Associates 2009); however, timing is highly variable year-to-year

and some species may peak in abundance in early October or late March. The vast majority of rafting waterbirds occur in the Bay during their non-breeding season, arriving to spend the winter in mid-October and departing by the end of April. Small, long-distance migrant shorebirds (e.g., western sandpipers [*Calidris mauri*]) tend to reach peak numbers during migratory pulses in late April (Stenzel et al. 2002). The distribution of waterbirds within the Estuary's waters is well documented for most species that over-winter and for all local colonial nesters (e.g., cormorants, egrets and herons) or special-status species (e.g., western snowy plover [*Charadrius alexandrinus nivosus*]).

Although winter is the season of maximum waterbird abundance, the Estuary also provides habitat in spring and summer for breeding populations of herons and egrets (Kelly et al. 2006), gulls and terns (Goals Project 2000), cormorants (Ainley 2000, Stenzel et al. 1995), and waterfowl (especially in managed wetlands of Suisun marsh) (Goals Project 2000), as well as several threatened and endangered waterbird species: the federally endangered California clapper rail (*Rallus longirostris obsoletus*) and California least tern (*Sterna antillarum browni*), federally threatened western snowy plover, and the state threatened California black rail (*Laterallus jamaicensis coturniculus*). San Francisco Bay is the singular refuge of the California clapper rail (Albertson and Evens 2000) and supports an estimated 90 percent of the California black rail population (Trulio and Evens 2000).

Waterbirds can be broken down into different categories based on their habitat preferences and use patterns. These categories are often referred to as *guilds*. The habitat preferences and use patterns associated with the different guilds result in different potential impacts associated with the WT. The following guilds are discussed in this EIR:

- **Waterfowl.** This term is used to describe dabbling and diving ducks, geese, grebes, and their allies. Waterfowl primarily depend on open water habitats for foraging and roosting and wetland/upland habitats for breeding.
- **Shorebirds.** This guild includes sandpipers, plovers, and allies that primarily utilize beach, mudflat, salt pond, or shallow open-water habitats for foraging and roosting. This guild generally nests on beaches and upland areas.
- **Wading Birds.** This guild includes egrets, herons, and night herons that utilize emergent marsh, marsh edge, and shallow open water habitats. These birds generally do not breed inside marshes, instead forming nesting colonies in trees.
- **Gulls.** Although this guild includes many species of gulls, California gulls (*Larus californicus*) are the sole species discussed in this EIR.
- **Marsh birds.** For purposes of this EIR, this guild includes species in a wide range of genera, such as rails and certain passerines, that are dependent upon emergent marshes for most or all of their life stages.

Specific information for the birds making up each of these five major guilds is provided below.

WATERFOWL

Waterfowl are typically divided into two major subgroups: dabbling waterfowl (surface feeders) and diving waterfowl.

Dabblers

Dabblers accounted for less than four percent of open water birds in USFWS aerial surveys of San Francisco Bay over 17 years (1990-2007, USFWS unpublished data). Most dabblers are found on salt ponds (Takekawa et al. 2001, USFWS unpubl. data). Dabblers on open Bay waters are typically observed in shallow water less than one meter (m) deep and on tidal flats (Accurso 1992). Because they are sensitive to salinity values and water depth, large flocks of dabblers move onto the open Bay sporadically (e.g., when runoff from winter storms freshens the system). The most common dabblers in the Estuary are Northern pintail (*Anas acuta*), Northern shoveler (*Anas clypeata*), and American wigeon (*Anas americana*).

Diving Waterfowl

Diving waterfowl include diving ducks, double-crested cormorants (*Phalacrocorax auritus*), and pelicans. Percentages of each species vary widely based on seasonality and interannual fluctuations. For example, cormorants comprise a significant percentage during summer months when virtually all other divers are absent from the bay but a rather small percentage when wintering divers are present. Divers tend to gather in rather large flocks (rafts) and concentrate at the mouths of larger tributaries and in leeward bays and coves, especially during stormy conditions. Under calmer conditions, rafts may move out into deeper Bay waters. The common divers are distributed according to water depths, but because species often occur in mixed flocks, there is substantial overlap. Based on the cumulative results of the USFWS aerial surveys for all areas of the Bay (Table 3.8.2-1), overall 55 percent (33-72 percent) of waterfowl were on open water, and 45 percent were on salt ponds. Of the waterfowl on open water in the four regions of the Bay on USFWS aerial surveys, the vast majority were diving ducks. [33] Figure 3.8.2-1 shows the distribution of rafting birds on the Bay as reported in the Goals Project (Goals Project 2000).

Diving ducks are the most common of 20 species of open Bay waterbirds, comprising 78 percent of all waterfowl (USFWS unpubl. data). The open waters of San Francisco and San Pablo Bays are especially important to the most common waterfowl species groups—scaup (*Aythya marila* and *A. affinis*) and surf scoter (*Melanitta perspicillata*). Significant proportions of wintering populations of canvasback (*Anas valisineria*), ruddy duck (*Oxyura jamaicensis*), and bufflehead (*Bucephala albeola*) are also supported by Bay waters.

San Francisco Bay is one of the three largest wintering habitats for canvasback in North America with San Pablo and Suisun Bays providing especially important sub-regions for this species (Takekawa and Marn 2000). On average over a 45-year period (1955-1999), San Francisco and San Pablo Bays supported 46 percent of scaup, 44 percent of canvasback, and 24 percent of scoters on the Pacific Flyway (Kessel et al. 2002, Mowbray 2002, Savard et al. 1998, USFWS unpubl. data).

Scaup are most abundant in areas with water depths of 0.1 to 6 m, and scoter are evenly distributed across water depths, including deeper waters (more than 10 m), whereas canvasback and ruddy duck preferentially selected shallower waters less than two meters deep (Accurso 1992). Canvasback, ruddy duck, and bufflehead occur in much higher densities in diked baylands and salt ponds than on open Bay in winter and spring (Takekawa et al. 2001).

[33] http://www.sfbayjv.org/pdfs/strategy/095-096-ApxC.pdf

TABLE 3.8.2-1. RESULTS OF USFWS AERIAL MIDWINTER WATERFOWL SURVEYS, 1990-2007 (EXCLUDING 1996)

Year	Total Number	Percentage on Open Bay	Percentage North Bay	Percentage South Bay	Percentage Central Bay
1990	252,276	72%	55%	16%	29%
1991	264,155	63%	61%	14%	25%
1992	229,907	75%	34%	26%	40%
1993	117,947	55%	14%	57%	29%
1994	191,887	62%	11%	40%	49%
1995	89,863	34%	4%	14%	82%
1997	114,335	73%	59%	26%	15%
1998	207,884	60%	24%	47%	29%
1999	262,170	74%	38%	14%	49%
2000	169,950	64%	38%	36%	26%
2001	347,889	75%	20%	46%	34%
2002	175,292	33%	27%	30%	44%
2003	143,600	28%	25%	33%	42%
2004	176,428	47%	30%	33%	37%
2005	189,168	42%	17%	30%	54%
2006	132,529	36%	19%	40%	41%
2007	193,422	33%	52%	16%	32%
ALL YEARS	**3,258,702**	**55%**	**31%**	**31%**	**39%**

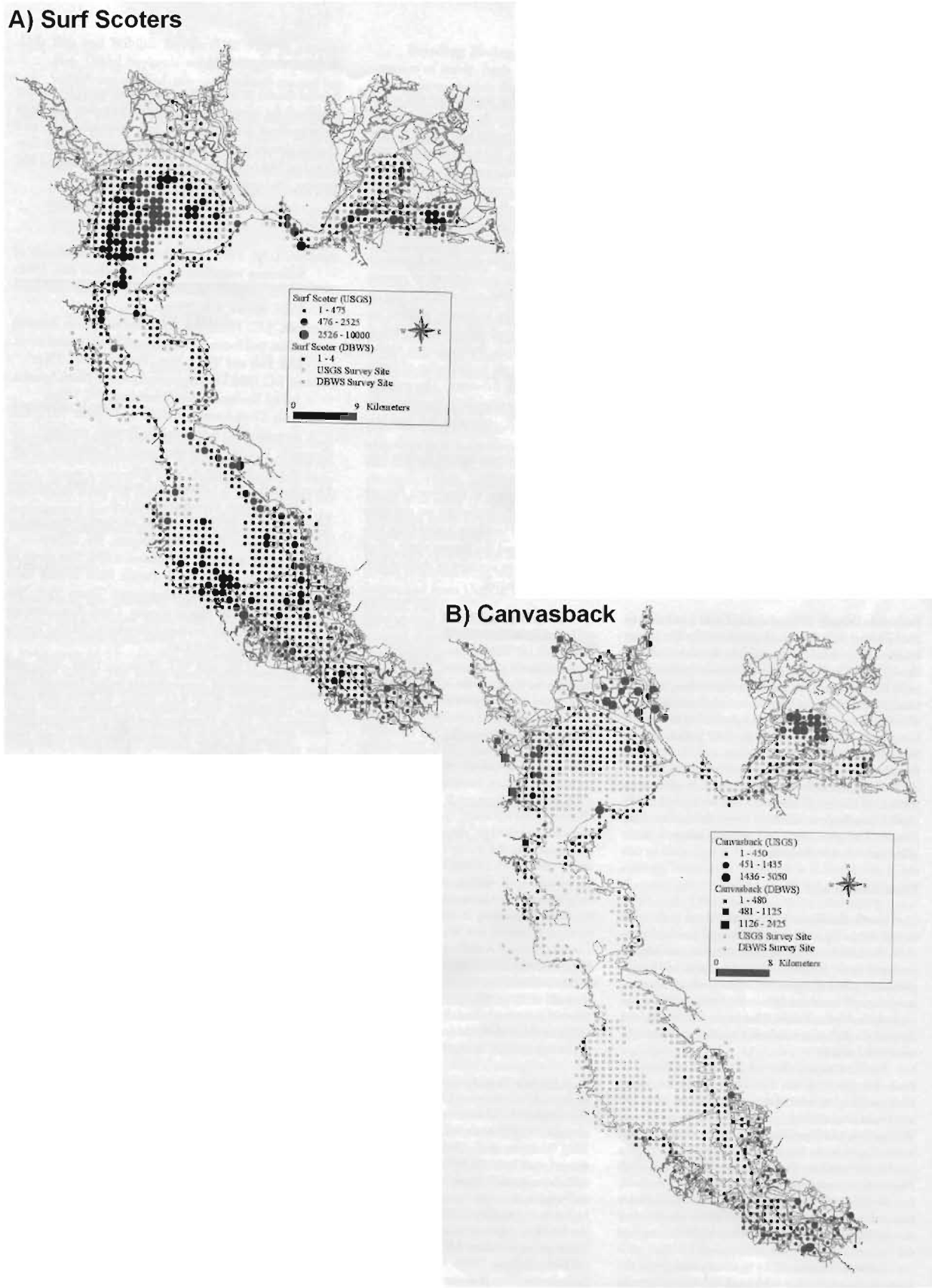


Figure 3.8.2-1: Maximum Counts of Rafting Birds

Images from Goals Report (2000)

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file: Rafting-birds_1134_2009-0820lee.mxd

Although winter is the period of maximum abundance, diving waterfowl occur in the Bay in the summer months as well. The double-crested cormorant (*Phalacrocorax auritus*) nests in San Francisco and San Pablo Bays and is a year-round resident. Cormorants gather in large flocks on the water to forage and also roost on off-shore rocks, jetties, and pilings. Large flocks of cormorants also feed on the mid-winter herring spawn in eelgrass (*Zostera marina*) beds. Double-crested cormorant is considered a sensitive species.

California brown pelicans (*Pelecanus occidentalis californicus*) also occur in summer, arriving here most commonly in April and May and remaining through fall, with most departing for the breeding grounds to the south by late December. California brown pelicans are considered a sensitive species, being listed as Fully Protected by the CDFG, although the species was removed from the federal endangered species list on December 17, 2009, and the California Fish and Game Commission voted to remove the species from the state endangered species list on February 5, 2009. Under the federal Endangered Species Act, monitoring of the species' populations will continue for a period of five years after the date of federal delisting to determine the stability of populations. Traditional roosting sites have important habitat value to both pelicans and cormorants, and are prone to disturbance because many roosting sites are man-made structures (pilings, docks, seawalls, etc.) that are frequently visited by humans and are often fairly close to human activity such as fishing and boating. Some roosting sites are free of disturbance (e.g., the north end of Alcatraz Island) because they are designated as such by USFWS and human intrusion is forbidden.

SHOREBIRDS

In all seasons, the San Francisco Bay Estuary holds more total shorebirds than any other wetland in the conterminous U.S. Pacific coast (Stenzel et al. 2002). Shorebirds forage primarily on tidal flats and roost in adjacent diked wetlands, tidal marshes, and on unvegetated levees and islands during periods of tidal flooding. Most species groups tend to concentrate in greater proportion, relative to the extent of tidal flats, either in the geographic center of the Estuary or in the southern regions of the Estuary (Stenzel et al. 2002). Of 38 species recorded in Stenzel et al. (2002), 23 species occurred in fall, winter, and spring surveys and eight species were considered abundant (10,000 - 500,000+ individuals). Numbers reach their peak during the migratory period, which is protracted in the fall (August-October), but rather abrupt in the spring (April). Locally abundant nesting shorebirds – American avocet (*Recurvirostra americana*) and black-necked stilt (*Himanotopus mexicanus*) – are primarily associated with salt ponds rather than tidal flats (Takekawa et al. 2001).

WADING BIRDS

Four species of wading birds nest in or around the Estuary shoreline: snowy egret (*Egretta thula*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), and black-crowned night heron (*Nycticorax nycticorax*). These birds nest in colonies that may consist of several hundred, just a few, or even a single nest (Kelly et al. 2006). They choose nesting sites for their isolation from intruders and their proximity to wetland feeding areas. Nesting sites are generally located in groves of trees or dense stands of shrubbery close to the Bay shore. On islands or other inaccessible sites, nests of night-herons, in particular, may be on the ground. Colony location provides efficient access to foraging habitat and prey availability (Kelly et al. 2006). Despite their colonial nesting habits, wading birds are solitary foragers, and feed in a wide variety of

wetland habitats ranging from tidal flats, to salt ponds, to densely vegetated tidal marsh and seasonal wetlands. Nesting wading birds usually feed within several kilometers of their nesting sites, primarily in wetlands.

CALIFORNIA GULLS

California gull nesting was recorded in the Estuary for the first time in 1980. Colonies are concentrated in the South Bay salt ponds and at the former Alameda Naval Air Station (NAS). There are no known colonies in the North Bay (Ryan 2000a). They are the most abundant colonial nesting waterbird in the Estuary with 22,718 nests counted in the South Bay in 2008 (Schacter et al. 2008) and an estimated total of 46,800 breeding gulls (Ackerman et al. 2009). Nests are clustered on salt pond levees and artificial islands in or near salt ponds and are vulnerable to mammalian predators in years when water levels recede before nesting is completed (Ryan 2000a). The nesting season is spring, with hatches in late May or early June. Roosting occurs on salt pond levees.

MARSH BIRDS

Although much reduced from their former extent, tidal marshlands that fringe the Bay shore are productive and sensitive habitats supporting a unique suite of plants and animals. Several bird species are entirely dependent on San Francisco Bay's tidal marsh habitats: the federally endangered California clapper rail and the state-threatened California black rail. The most valuable marshlands to rails are large and fully-tidal, and encompass dendritic networks of sloughs and channels. These natural drainage systems provide core habitat for nesting and foraging and therefore are of critical importance (USFWS 2010).

Also, three subspecies of song sparrow – Alameda song sparrow (*Melospiza melodia pusillula*), San Pablo (*M. m. samuelis*) song sparrow, and Suisun song sparrow (*M. m. maxillaris)* – are endemic to San Francisco Bay tidal marshes. Each taxon is resident in a distinct subregion of the Bay and all are California BSSC because of limited distribution and endemism (Shuford and Gardali 2008). The San Francisco (or "saltmarsh") common yellowthroat (*Geothlypis trichas sinuosa*) is another resident subspecies of the San Francisco Bay marshes; it also is a BSSC. Each of these bird taxa, along with the black rail, has been considered a "Species at Risk" under the Federal Endangered Species Act (i.e., candidates for protection as "threatened" or "endangered").

Several raptors use both saline and brackish marshlands for nesting, foraging, and roosting. Marshes are commonly used by northern harrier (*Circus cyaneus*) and white-tailed kite (*Elanus leucurus*), and occasionally by short-eared owl (*Asio flammeus*). The fresher or less saline portions of the Estuary, such as the upper reaches of Suisun Bay or the Napa and Petaluma Rivers, support several other marsh-adapted birds, including American bittern (*Botaurus lentiginosus*) and least bittern (*Ixobrychus exilis*). Each of these species resides in marshes that support dense stands of emergent monocots (e.g., tules and cattails).

SENSITIVE/SPECIAL-STATUS BIRDS

As described above in the discussion of waterbird guilds, San Francisco Bay is home to or an important migratory stopping point for a large number of avian species that have been listed or proposed for listing as threatened or endangered under the federal or California Endangered

Species Acts; that are listed as California Species of Special Concern by the California Department of Fish and Game (CDFG); or that are otherwise included on the CDFG's list of special animals. Sensitive/special-status birds that may occur in the WT Plan area and their existing potential for interaction with NMSBs in the Bay are described below and summarized in Table 3.8.2-2. In the context of the WT, "interaction" means that WT users are in close enough proximity to the birds that the birds become aware of their presence (i.e., that some level of response is triggered).

TABLE 3.8.2-2. SENSITIVE BIRDS AND EXISTING LEVELS OF POTENTIAL DISTURBANCE

Name	Listing Status	Ecology and Bay Area Distribution	Existing Potential for Interaction with NMSBs
American bittern (*Botaurus lentiginosus*)	CDFG: Special Animals	Sparsely distributed in low densities in large patches of emergent monocot vegetation. More common in the fresher portions of the Bay and the northern reaches.	**Low**. Habitat preference and patchy distribution isolates this species from frequent contact with NMSBs
American peregrine falcon (*Falco peregrinus anatum*)	Delisted (ESA [1999] and CESA [2009]); FP	Year-round resident widely distributed around the Bay. Nests on bridges, towers, and buildings, often at bay edge. Forages primarily on waterfowl, shorebirds, and pigeons.	**Low.** Nest sites tend to be located inaccessibly and distant enough from water to avoid disturbance from NMSBs
Black oystercatcher (*Haematopus bachmani*)	CDFG: Special Animals nest sites	Present in small numbers in San Francisco Bay year-round, and nests in small numbers on rocky outcrops, abandoned wharfs and barges, and jetties, usually in inaccessible locations. Known nesting locations in the Estuary include Red Rock in the Central Bay and Oyster Cove Pier in the South Bay.	**Low to moderate.** There are few nests and they are widely distributed around the Bay shore. Cryptic nests are typically located on substrate at the water's edge (rock jetties etc.), which places them close to probable travel routes of NMSBs.
California black rail (*Laterallus jamaicensis coturniculus*)	ST, FP	Resident population is confined almost entirely to San Pablo and Suisun Bays and restricted to the tidal and brackish marsh vegetation.	**Low**. Habitat tends to be away from the immediate edges of tidal channels; nest sites cryptic and obscured by dense vegetation.
California brown pelican (*Pelecanus occidentalis californicus*)	Delisted (ESA [2009] and CESA [2009]). Will require monitoring for five years. FP	Visitor to San Francisco Bay in non-breeding season, from May through November; forages in shallow nearshore waters. Flocks move throughout the more marine portions of the estuary system as the availability of prey shifts; however, there are some traditional roost sites in the vicinity of Fisherman's Wharf, Alcatraz Island, and Fort Cronkite, Sausalito.	**Moderate**. Some roost sites are located near high human activity centers including docks, piers, and breakwaters and sand spits. NMSBs are likely to flush roosting birds at ~50 m., especially from low-lying roost sites.
California clapper rail (*Rallus longirostris obsoletus*)	FE, SE, FP	Resident in SF Bay with entire population restricted to tidal marshlands of San Pablo, Central, and South Bays. Sloughs and channels along the Bay shore provide critical habitat with birds occupying vegetated marsh along the full range of tidal influence (see Figure 3.8.2-2).	**Moderate to high.** NMSBs may enter tidal sloughs and channels. Rails forage along channel slopes and nests tend to be associated with the headward extent of channels.
California least tern (*Sterna antillarum*	FE, SE, FP	Active nesting sites are located at Alameda Naval Air Station, Montezuma	**Low to moderate, depending on season.** Colonies are located away

TABLE 3.8.2-2. SENSITIVE BIRDS AND EXISTING LEVELS OF POTENTIAL DISTURBANCE

Name	Listing Status	Ecology and Bay Area Distribution	Existing Potential for Interaction with NMSBs
browni)		Slough (Solano County), Pittsburg power plant (Contra Costa Co.), Napa Plant Site (Napa Co.), and Montezuma Slough wetlands (Solano Co.); these locations are shown in Figure 3.8.2-3 They have also nested historically at Oakland Airport and Bair Island.	from expected watercraft thoroughfares and typically on protected properties where access is restricted. Overlap between NMSB routes and tern foraging habitat along the East Bay shoreline in summer (April-August) is likely.
Caspian tern (*Hydroprogne caspia*)	CDFG: Special Animals nesting colonies	Active nesting colonies of Caspian tern are located at Knight Island, Brooks Island, Coyote Hills, Alviso, Hayward Shoreline, former Alameda NAS, and Ravenswood Open Space Reserve.	**Low to moderate.** Most colonies are relatively inaccessible or remote. Colonies on islands could be accessible to NMSB users, such as at Brooks Island, which is protected only by signage.
Colonial nesting wading birds: snowy egret (*Egretta thula*), great egret (*Ardea alba*), great blue heron (*Ardea herodius*), and black-crowned night heron (*Nycticorax nycticorax*)	CDFG: Special Animals Rookery sites	Colonial wading birds choose nesting sites for their isolation from intruders and their proximity to wetland feeding areas. Nesting sites are generally located in groves of trees or dense stands of shrubbery close to the Bay shore. On islands or other inaccessible sites, nests of night-herons, in particular, may be on the ground. Distribution of nesting sites around the Bay has been thoroughly documented in Kelly et al. 2006 (see Figure 3.8.2-4).	**Moderate.** Many colonies are located in trees or other inaccessible structures. Colonies on islands could be accessible to NMSB users. Some sites are protected and patrolled (e.g., Alcatraz Island). Others are protected only by signage (e.g., Brooks Island).
Double-crested cormorant (*Phalacrocorax auritus*)	CDFG: Special Animals Rookery sites	A common colonial nesting waterbird in the Bay; major colonies are located at the Napa Sonoma Marshes Wildlife Area near Napa, in the Central Bay on the Richmond and Oakland-Bay bridges, and in the South Bay on the Dumbarton Bridge. Large foraging flocks move in and out of the Bay, often over deeper water, as prey availability shifts.	**Low to moderate.** Nesting colonies are mostly high, on man-made structures. Roosting sites and foraging area may overlap with NMSB use areas.
Elegant tern (*Thalasseus elegans*)	CDFG: Special Animals (nesting colony)	The elegant tern roosts in large flocks during migration (July-Sept) along sand spits, levees, breakwaters, islets, and other shoreline features. It does not yet nest in the Bay (but its distribution is expanding northward).	**Moderate.** Roosting flocks may occasionally be present in areas used by NMSBs, especially sandbars, jetties, islands, and low-lying flats.
Forster's tern (*Sterna forsteri*)	CDFG: Special Animals Nesting colonies	Forster's terns nest in many of the same locations as California least tern, snowy plover, and California gull, and often roost on undisturbed Bay beaches, jetties, etc. In the North Bay, Forster's tern nesting sites are associated with the Napa River salt ponds, notably at Russ Island, Knight Island, and White Slough. Numbers are higher in the South Bay where several dozen sites are associated with the Dumbarton (Ravenswood), Baumberg (Eden Landing), Coyote Hills, Hayward Shoreline, and Turk Island ponds (Ryan 2000b).	**Low to moderate.** Colony locations are mostly inaccessible and protected, though incipient colonies may be prone to inadvertent disturbance.

TABLE 3.8.2-2. SENSITIVE BIRDS AND EXISTING LEVELS OF POTENTIAL DISTURBANCE

Name	Listing Status	Ecology and Bay Area Distribution	Existing Potential for Interaction with NMSBs
Least bittern (*Ixobrychus exilis*)	BSSC	Very rare inhabitant of fresh to brackish marshes with dense emergent monocot vegetation. More likely to occur in Delta than San Francisco Bay proper.	**Low.** Rarity of species and habitat preference reduces the risk of interaction.
Western burrowing owl (*Athene cunicularia hypugaea*)	CDFG: BSSC	Burrowing owls occur in lowlands and at the edge of tidal wetlands, especially in the non-breeding season. Typical nesting habitat consists of sparsely vegetated levees, especially where cavities in rubble, debris, rip-rap, or mammal burrows occur. This species is largely extirpated from former breeding sites around the Bay. Nearly all of the remaining nesting burrowing owls in the Bay area are between Palo Alto and the Fremont-Newark area of the South Bay (Trulio 2000). The only sites that support viable breeding populations are the NASA Ames Research Center and the San Jose Airport (Townsend and Lenihan 2007).	**Low.** Nesting sites are located away from water's edge. Winter roost sites may be in rip-rap of seawalls or levee berms (e.g., Cesar Chavez Park, Berkeley) and could be encountered by watercraft that approach close to these features.
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT BSSC	SF Bay contains an estimated 5-10 percent of the nesting western snowy plovers in California (Page et al. 2000, USFWS 2007). Most nesting in San Francisco Bay is associated with emergent or dry salt pond beds, or sometimes levee roads. Breeding locations in the Estuary at Eden Landing Ecological Reserve/ Baumberg North, salt ponds at Oliver Salt Ponds, Dumbarton Salt Ponds, Warm Springs, Alviso, and Ravenswood. In the North Bay nesting occurs at Ponds 7 and 7A in the Napa Sonoma Marshes Wildlife Area and at the Montezuma Slough Wetland Restoration site (see Figure 3.8.2-3).	**Moderate**. Nest sites are mostly on access-limited sites or in pans away from watercourses. Nests on levees adjacent to sloughs and open baylands may be encountered by NMSB users. (See text for prescriptions in the 2007 Recovery Plan.)

FE —Federally listed endangered

FT —Federally listed threatened

SE —California state listed endangered species

ST—California state listed threatened

FP—State Fully Protected

CDFG Special Animals (July 2009)

BSSC — California Bird Species of Special Concern (2008)

References:

Shuford,W.D. and T. Gardali. Eds. 2008

CDFG Special Animals (July 2009)— http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf

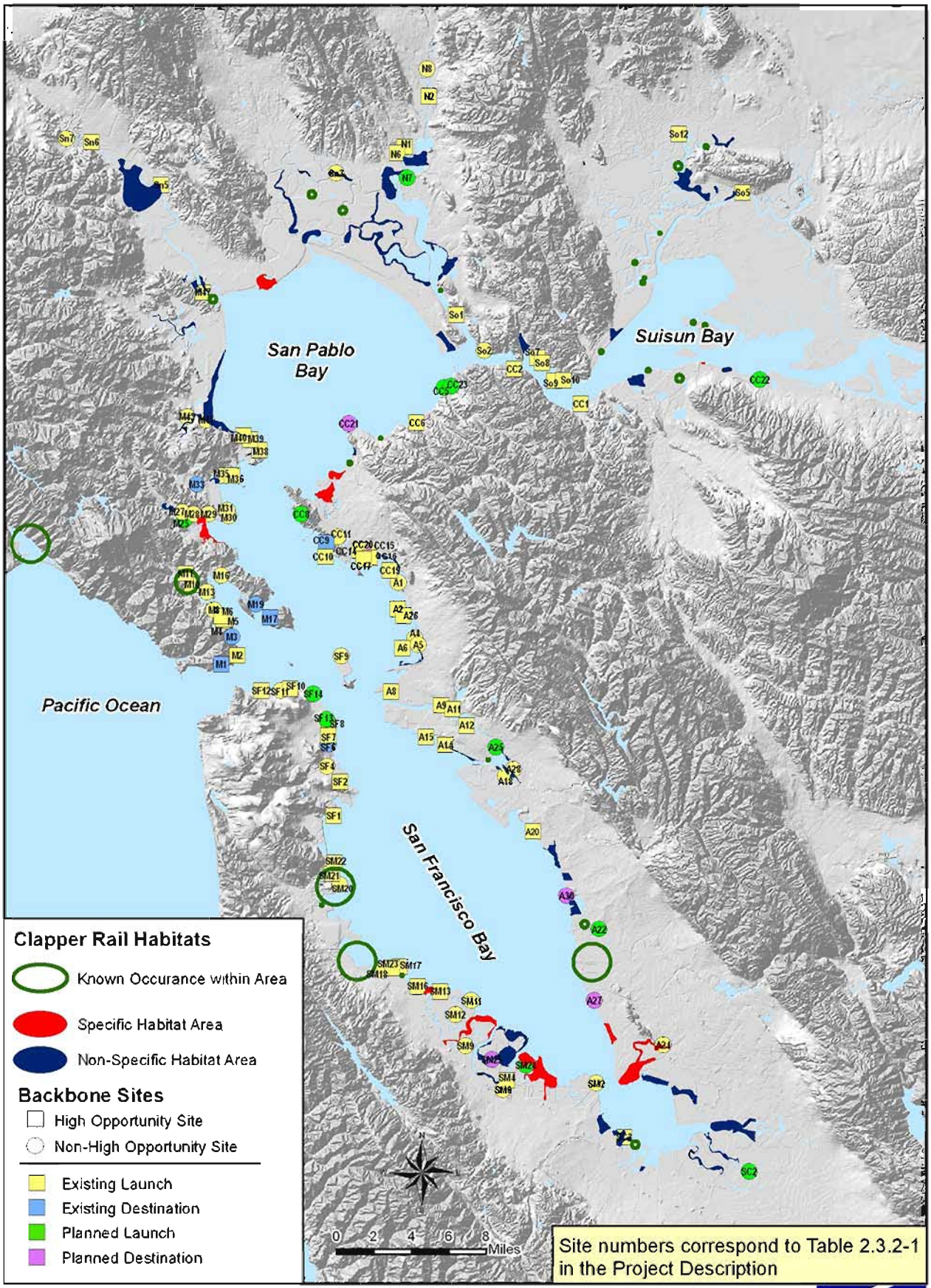


Figure 3.8.2-2
Clapper Rail Habitats

Bay Water Trail GIS data provided by BCDC
Clapper rail data from CNDDB, 2007

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file: Clapper-rail_1134_2010-0721lee.mxd

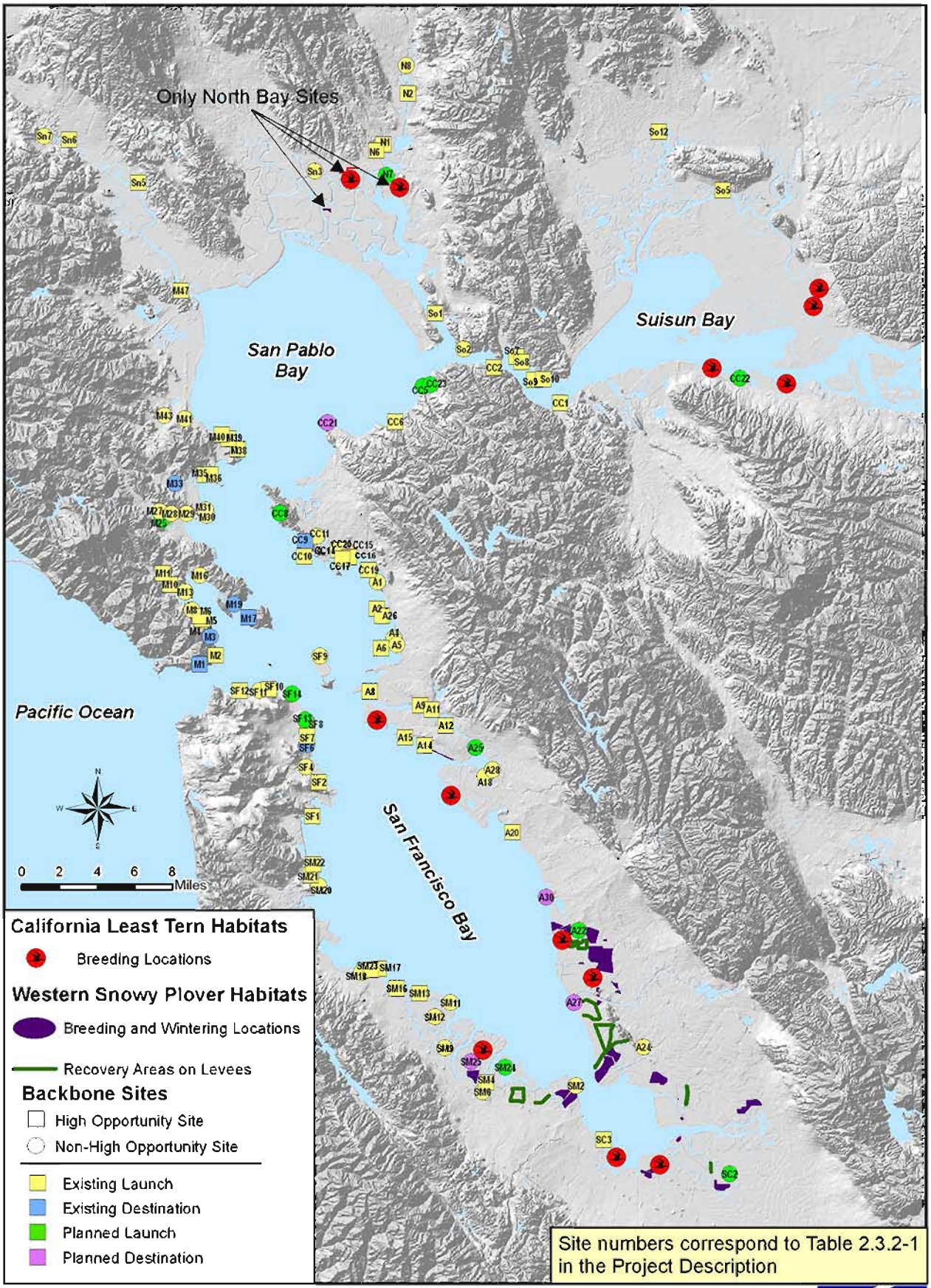


Figure 3.8.2-3
Western Snowy Plover and California Least Tern Habitats

Bay Water Trail GIS data provided by BCDC
Snowy plover data from USFWS, 2007

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file:\WSP-CLT-habitat_1134_2010-0721lee.mxd

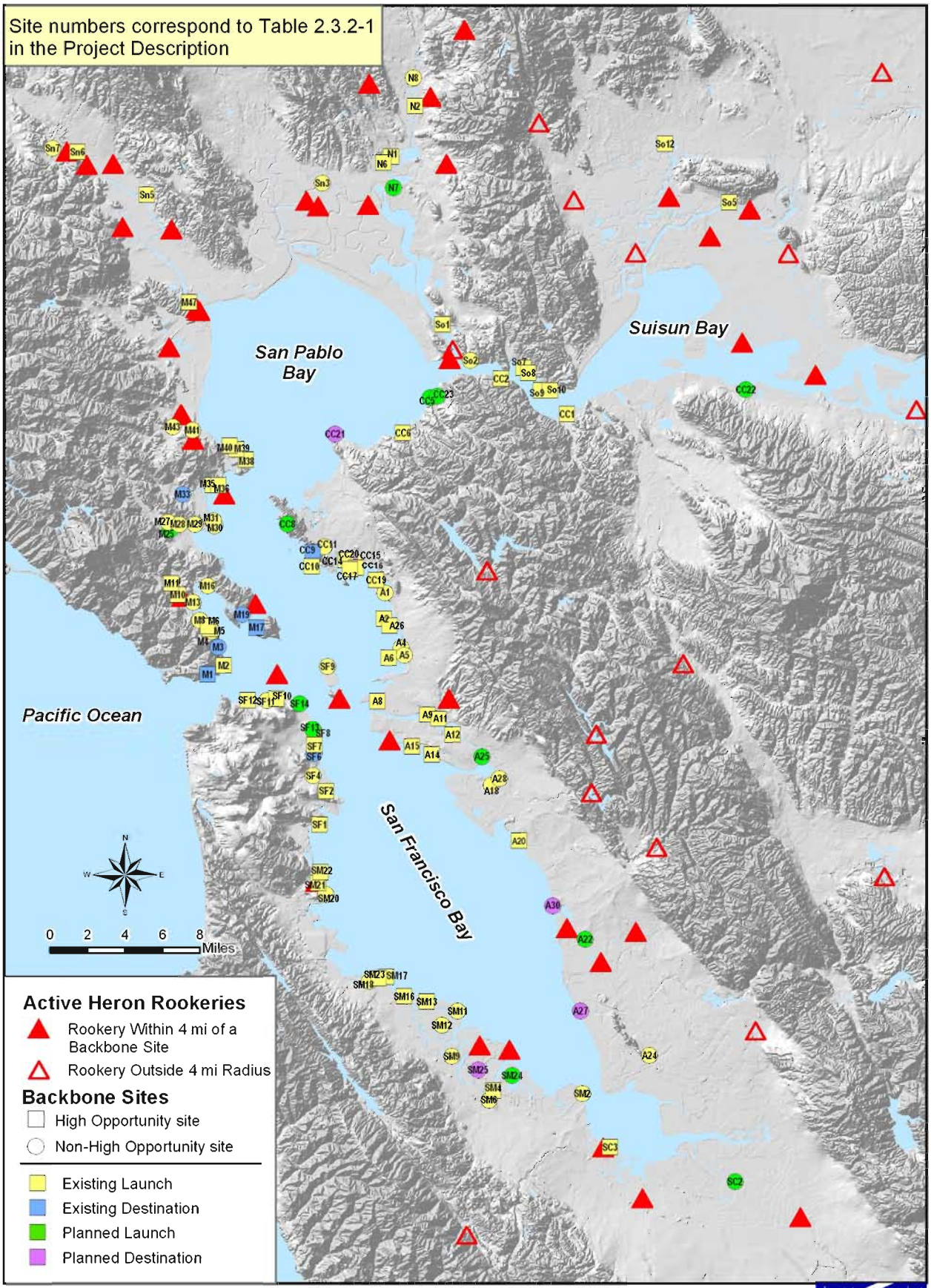


Figure 3.8.2-4
Heron and Egret Rookeries

Bay Water Trail GIS data provided by BCDC
Heron rookery data from Kelly et al. 2006

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file:heron-rookeries_1134_2009-0826lee.mxd

AMERICAN BITTERN AND LEAST BITTERN

The American bittern (*Botaurus lentiginosus*) is included in the CDFG list of Special Animals (2009), and the least bittern (*Ixobrychus exilis*) is a BSSC during the nesting season. Both are rare inhabitants of San Francisco Bay marshes and occur in brackish to freshwater environments with dense growth of relatively tall tule and cattail marsh vegetation (*Schoenoplectus* and *Typha*) characteristic of the inner reaches of Suisun Bay and, to a lesser extent, innermost San Pablo Bay. Both species forage on channel edges.

AMERICAN PEREGRINE FALCON

The American peregrine falcon (*Falco peregrinus anatum*) is included on the CDFG list of Fully Protected Animals and is a USFWS bird of conservation concern. The peregrine falcon population is increasing in the Bay Area. The peregrine has recently been "delisted" from endangered status by the CDFG in part because of the strength of the population and increased reproductive success. Peregrines nest solitarily in the Bay Area on the larger bridges (e.g., Bay Bridge), PG&E power towers along the shoreline (e.g., Napa River), and occasionally on skyscrapers.

BLACK OYSTERCATCHER

The black oystercatcher (*Haematopus bachmani*) is on the CDFG list of Special Animals (2009) to protect nesting sites and is a USFWS bird of conservation concern. This highly territorial bird is present in small numbers in San Francisco Bay year-round, and nests in small numbers on rocky outcrops, abandoned wharfs and barges, and jetties, usually in inaccessible locations. Oystercatchers are extremely vigilant and scold intruders at a distance.

CALIFORNIA BLACK RAIL

The California black rail is state-threatened under the California Endangered Species Act and was formerly classified as a Category 1 taxon by USFWS, a candidate for federal listing as threatened. It is also included on the CDFG list of Fully Protected animals. The bulk of the western population (>90 percent) is confined to the remnant emergent tidal marshlands of the Bay (Evens et al. 1991, Evens and Nur 2002). The black rail is resident in the Bay. Vegetation at and above mean higher high water (MHHW) is a necessary habitat feature, providing refuge from predation for the birds during periods of extremely high tides (Evens and Page 1986, Trulio and Evens 2000). The breeding population in the Bay is confined almost entirely to San Pablo and Suisun Bays (Figure 3.8.2-2). Black rail populations are highly dynamic, and abundance estimates are somewhat theoretical. The most recent estimate is of a population size range from 4000-7200 individuals in each of the two subregions (Evens and Nur 2002). The most valuable marshlands to rails are fully tidal and encompass dendritic networks of sloughs and channels which provide core habitat for nesting and foraging and therefore are of critical importance to rails.

CALIFORNIA BROWN PELICAN

The California brown pelican was delisted under the federal Endangered Species Act effective December 17, 2009; the estimated nationwide population is now 650,000 individuals. However, the delisting requires continued monitoring for a period of five years and the California brown pelican continues to be subject to the MBTA (74FR59444). On the State level, this species was

delisted under the California Endangered Species Act in 2009, but it is still considered a California Fully Protected species. California brown pelicans tend to congregate adjacent to open Bay waters, rarely traveling up smaller sloughs and watercourses. This species' nesting and foraging locations and preferences are described on Table 3.8.2-2.

CALIFORNIA CLAPPER RAIL

The California clapper rail is a federally and California-listed endangered species, and it is included on the CDFG list of Fully Protected animals. Although more widely distributed along the central California Coast historically, this species is now wholly confined to Estuary marshes. Numbers of clapper rails were estimated at 300-500 individuals in 1990-91 (USFWS unpubl. data), followed by a rebound to 800 individuals by 1993 (Albertson and Evens 2000). More recent population estimates place the Baywide population at about 1,500 individuals evenly distributed between north and south Bay marshes (Albertson and Evens 2000, Avocet Research, CDFG, PRBO, and USFWS, unpubl. data). The increase and stabilization of the population is attributed, in part, to control of non-native predators such as red fox (*Vulpes vulpes*) and Norway rat (*Rattus norvegicus*) (Albertson and Evens 2000). The clapper rail occurs primarily in emergent salt and brackish tidal marshlands, subject to direct tidal circulation and with a predominant cover of pickleweed, extensive stands of cordgrass, and abundant high tide cover (Figure 3.8.2.-2). Many of the tidal marsh restoration projects underway and proposed in San Francisco Bay have a primary goal of increasing clapper rail habitat and serving the recovery goals of this species.

CALIFORNIA LEAST TERN

The California least tern is federally and state-listed as endangered, and it is included on the CDFG list of Fully Protected animals. Active nesting sites are located at Alameda Naval Air Station, Montezuma Slough (Solano County), Pittsburg power plant (Contra Costa Co.), and most recently the Napa Plant Site (Napa County); historically, terns also nested at Oakland Airport and Bair Island (Feeney 2000, Keane 1998). For nesting, least terns require sparsely vegetated nearshore tracts of open sand or gravel. They feed regularly during the breeding season (April through August) over shallow, open, nearshore waters of the Bay, especially along the east shore of the central Bay (e.g., Alameda shoreline) and the south shore of Suisun Bay (Pittsburg shoreline). The species responds favorably (increased number of pairs, improved productivity) to management and protection of nesting areas (Britton 1982). San Francisco Bay is also the northernmost breeding location for the California least tern, with the nearest colony 330 km to the south (at Pismo dunes). The Alameda colony was the State's fourth largest producer of fledglings (Feeney 2000) (Figure 3.8.2-3). Nesting status of the Alameda colony in 2009 included 344 nests (S. Euing, pers. comm. July 3, 2009).

CASPIAN TERN, ELEGANT TERN, AND FORSTER'S TERN

The Caspian tern (*Hydroprogne caspia*), elegant tern (*Thalasseus elegans*), and Forster's tern (*Sterna forsteri*) are all USFWS birds of conservation concern; the elegant tern is also classified as California BSSC (nesting colonies) by CDFG. These terns nest in many of the same locations as California least tern, western snowy plover, and California gull. Terns often roost on undisturbed Bay beaches. Various species are often intermingled within a colony or roosting flock. Elegant tern does not nest in the Bay (but its distribution is expanding northward), but Forster's and Caspian nest on dredge spoil islands and degraded, insular levees. Additional

information on these species' nesting and foraging locations and preferences is presented on Table 3.8.2-2.

COLONIAL NESTING WADING BIRDS

Colonial wading birds, such as herons and egrets, are listed on the CDFG list of Special Animals (2009) to protect nesting sites, and are most sensitive to disturbance during the nesting season. As large, colonial birds, they are more sensitive to disturbance than many other types of birds. Nests are subject to high predation pressure if the adult birds are flushed from the nests. Timing of nesting is an important management criterion. The early portion of the nesting cycle is when these birds are most prone to disturbance (abandonment, lowered reproductive success) (Carney and Sydeman 1999, Kelly et al. 2006). The only time period when colonies are not likely to be active is mid-September into mid-December. The availability of appropriate nest sites is a limiting factor on population size. Nesting wading birds usually feed within several kilometers of their nesting sites, primarily in wetlands, and access to these wetlands is an important component of nesting success and colony vigor (Kelly et al. 2005, McCrimmon et al. 2001). Distribution of nesting sites around the Estuary has been thoroughly documented in Kelly et al. 2006 (Figure 3.8.2-4). The protection of these nesting sites from human intrusion is a necessary component of population viability.

DOUBLE-CRESTED CORMORANT

CDFG removed the double-crested cormorant from its list of BSSC, but it is still on the CDFG's list of special animals out of concern for rookery sites. Since the 1970s, the double-crested cormorant has nested in small numbers around the Estuary, especially on transmission towers, bridges, snags and occasionally trees. It is a colonial nesting waterbird, now common in the Estuary, and major colonies are located at the Napa Sonoma Marshes Wildlife Area (Napa County), in the Central Bay on the Richmond and Oakland-Bay bridges, and in the South Bay on the Dumbarton Bridge (Ainley 2000). The double-crested cormorant forages in flocks on open water and is regularly in the Estuary year-round. It is more common, however, in winter.

WESTERN BURROWING OWL

The western burrowing owl is a California BSSC (burrows and some wintering sites) and a USFWS bird of conservation concern. While not a wetland species, per se, burrowing owls do occur in lowlands and at the edge of tidal wetlands, especially in the non-breeding season. Typical nesting habitat in the Estuary is associated with sparsely vegetated levees, especially where cavities in rubble, debris, rip-rap, or mammal burrows occur. This species is largely extirpated from former breeding sites around the Estuary. Nearly all of the remaining nesting burrowing owls in the Estuary area are between Palo Alto and the Fremont-Newark area of the South Bay (Trulio 2000). The only sites that support viable breeding populations are the NASA Ames Research Center and the San Jose Airport (Townsend and Lenihan 2007).

WESTERN SNOWY PLOVER

The Pacific coastal population of western snowy plover is federally threatened (03/05/1993), a California BSSC, and a federal bird of conservation concern. Critical habitat was designated on September 29, 2005; a recovery plan was published on September 24, 2007. The number of adult plovers in San Francisco Bay declined from a high of 351 in 1977/80 to 99 in 2006, approximately seven percent of the species' California population. San Francisco Bay contains

an estimated 5-10 percent of the nesting western snowy plovers in California (Page et al. 2000, USFWS 2007) (Figure 3.8.2-2). The goal of recovery is 500 breeding adults in San Francisco Bay (USFWS 2007). A Bay-wide survey in 2009 indicated the presence of approximately 147 adults[34].

Recent surveys locate the largest breeding populations in the Bay at Eden Landing Ecological Reserve/Baumberg North managed by CDFG. Other population centers are located in salt ponds at Oliver Salt Ponds, Dumbarton, Warm Springs, Alviso, and Ravenswood. In the North Bay, the only known locations are in Napa County at Napa Sonoma Wildlife Area Ponds 7 and 7A (USFWS 2007), and recently (2006/2007) at the Montezuma Slough Wetland Restoration site (R. Leong, pers. comm.). Most nesting in San Francisco Bay is associated with emergent or dry salt pond beds, or sometimes levee roads (Page et al. 1995). The distribution of nesting sites around the Estuary is depicted in Figure 3.8.2-3.

WATERBIRD POPULATION TRENDS

Waterbird population trends are difficult to determine, because there is substantial inter-annual variation in bird populations. In addition, for most waterbird species, standardized surveys of San Francisco Bay populations have not been conducted over a sufficient period to allow for population trends to be determined. The exception is provided by waterfowl, which have been surveyed by the USFWS via mid-winter aerial surveys since 1970 (Table 3.8.2-1). For waterfowl in San Francisco Bay, average waterfowl abundance during these mid-winter surveys has declined from 425,000 during the period 1970-1991 to 182,800 during the period 1992-2007 (excluding 1996) (Takekawa et al. 2008). Bay area waterfowl numbers decreased 25 percent from the 1950s to 1990 (Takekawa et al. 2000). This decline in abundance of waterfowl is likely the combined result of local, regional, continental, and even global influences. Many stressors on bird populations operate at these different scales simultaneously. Some of the primary stressors on waterbird populations within the San Francisco Estuary are described below.

HABITAT LOSS

The quantity and quality of habitat in San Francisco Bay has an influence on the fitness and survival of the species that migrate through, spend the winter, and nest in the Estuary. Anthropogenic changes to the Estuary have drastically changed the extent and nature of its open water and wetland habitats, reducing the amount of available habitat for both resident and migratory waterbirds. Habitat loss is not limited to San Francisco Bay, so for many migratory waterbirds, habitat loss in both breeding and wintering areas produces collective adverse impacts. While most habitat loss in the Bay has been a direct result of human activities such as diking and filling, habitat loss via global warming mechanisms (e.g., sea level rise, constriction of intertidal habitat, changes in local vegetation communities) may be an indirect yet significant means by which additional waterbird habitat is lost (Galbraith et al. 2002).

CLIMATE CHANGE

Warming temperatures associated with climate change are expected to result in an acceleration in current rates of sea level rise, inundating many low-lying coastal and intertidal areas. Rising sea

[34]http://www.fws.gov/arcata/es/birds/WSP/documents/2009%20Pacific%20Coast%20breeding%20SNPL%20survey.pdf

levels are expected to a have a huge impact on lowland coastal habitats around the world, and coastal bird and seabird species are likely to suffer as a result. Habitat changes associated with sea level rise will have important implications for organisms that depend on these habitats, including shorebirds that rely on intertidal flats for feeding habitat during their migrations and in winter (Galbraith et al. 2002) and resident tidal marsh birds that nest in inter- and supra-tidal habitats (Evens et al. 1991, Goals Project 1999). The effect of predicted climate change will not only reduce habitat availability for shorebirds and tidal marsh birds, but will disrupt ecological and behavioral synchronicity (i.e., phenology of migration and nesting). The effect of sea-level rise associated with climate change will affect those species that nest on low-lying nearshore substrates—terns, rails, waterfowl, wading birds, song sparrows—not only through direct habitat loss, but also through the increased incidences of storm surge and its impact on reproductive success (Wormsworth and Mallon 2008).

Birds that nest only in tidal marshes, like the California clapper rail, will be especially vulnerable to climate change. Climate change is expected to threaten these species by making marsh depths more variable, pushing water levels above or below the 5-12 cm range preferred by birds that nest in or adjacent to tidal marsh.

POLLUTION

Pollution within and around the Bay impairs ecosystem health and productivity, limiting the size of waterbird populations that the Bay is capable of supporting, and reducing nesting success (Ackerman et al. 2007). Acute pollution events such as oil spills are capable of killing large quantities of waterbirds in a short period of time; for example, the November 2007 Cosco Busan spill is thought to have killed over 20,000 waterbirds, many of them rafting waterfowl such as scoters and grebes (IBRRC 2008).

INVASIVE AND NON-NATIVE SPECIES

Invasive plants are changing the structure of many ecosystems around the Bay, which can potentially reduce the ability of these systems to support native waterbirds. For example, invasive smooth cordgrass chokes tidal channels and rapidly colonizes mudflats, reducing foraging habitat for rails and shorebirds, respectively (ISP 2001). Invasive wildlife such as clams, snails, crabs, and fish may also adversely impact waterbirds by changing food web dynamics throughout the Bay. Non-native species such as feral cats adversely impact certain waterbird communities (especially marsh birds such as rails) by directly preying on individuals (Avocet Research Associates 2008).

WATERCRAFT TRAFFIC

As a major port center on the West Coast of the U.S., San Francisco Bay has experienced heavy ship traffic since the earliest days of European settlement. This traffic increased progressively through the last 160 years as the Bay Area developed into a commercial hub. This activity has caused ongoing and increasing disturbance to waterbirds, but the cumulative extent of these impacts is unknown. Commercial and military traffic was and is largely confined to the deep-water channels and the vicinity of ports in the Central Bay. Public transportation (e.g., the Golden Gate ferry system) also follows relatively deep water channels and prescribed shipping lanes in the shallower areas of the Bay.

A recent U.S. Geological Survey (USGS) study on the effects of ferries on waterfowl in San Francisco Bay indicated that passing ferries create disturbances to waterbirds at distances ranging from 50 to 600 meters on both sides of the ferry, with most effects observed within a 300-m zone (for scoters) on both sides of the ferry (Takekawa et al. 2008). Scoters were determined to be more sensitive than scaup in terms of an alert response; however, other behaviors (swimming away, diving, flying away) were triggered at similar distances for both types of waterbirds. At a distance of approximately 225 meters, many birds flew out of the area; at greater distances, disturbance responses included swimming away, alerting, and diving. These birds are the most common waterbirds in the Estuary and provide a general understanding of the potential distribution patterns for waterbirds[35]. The study indicated that the existing ferry routes transect approximately 3 percent of the 315.13 km^2 in the Bay determined to be foraging zones for waterbirds, with a total effect zone that equals approximately 106 km^2, or 11 percent of San Francisco Bay. With the addition of the 10 ferry routes proposed by the WETA, the area of San Francisco Bay that would be subject to ferry traffic and effect zone for birds would increase by126.05 km^2 to 23 percent. Foraging zones affected by these additional routes would increase by 47.91 km^2 to 18 percent of existing foraging zones.

Recreational watercraft, both motorized and non-motorized, have also had an abiding presence in the Bay. Recreational use by NMSBs, especially kayaks, increased substantially beginning in the 1970s as described in Section 3.3. The shallow draft of these watercraft allow people to enter shallower water, including tidal sloughs and channels. In addition, sailboarders and windsurfers, biological research vessels, military training exercises, canoeists and small fishing vessels have used every navigable waterway in the Bay for many decades. There are few studies that quantify the effects of these ongoing disturbances on waterbird populations in the Estuary, and those that have been conducted are site specific (e.g., at North Basin on the Berkeley waterfront [Avocet Research Associates 2009]).

3.8.3 LOCAL SETTING

The proximity of the 112 Backbone Sites to sensitive habitat and sensitive species varies. Certain areas have been specifically identified as sensitive in a number of planning documents, as described below under Regulatory Setting. The distribution of sensitive habitats for key bird species around the Bay is shown in Figures 3.8.2-2 to 3.8.2-4. The potential for sensitive species to be present in the vicinity of a trailhead will be evaluated for each trailhead during the trailhead designation process.

3.8.4 REGULATORY SETTING

FEDERAL REGULATIONS AND PLANS

Federal regulations described in Section 3.7 of this document - Sections 7, 9, and 10 of the Endangered Species Act, Section 404 of the Clean Water Act, and Executive Order 11990 - also apply to the protection of birds. The Comprehensive Conservation Plans (CCPs) being prepared for the San Pablo Bay NWR and Don Edwards NWR will also address birds.

[35] Recent surveys show that scaup and scoter are the most common waterbirds in the Estuary, comprising 87% of the total waterbirds on open water during three recent winter counts (2004/2005, 2005/2006, and 2006/2007) (Takekawa, et al., in publication).

MIGRATORY BIRD TREATY ACT (MBTA)

In addition to the above, the provisions of the Migratory Bird Treaty Act (MBTA) of 1918[36] apply to non-resident birds using the Estuary. The MBTA states that: "Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not." The relevant provision as it applies to migratory waterfowl and watercraft is "pursue." Virtually all the waterbirds that occur in San Francisco Bay are included on the list of species covered by the MBTA.

TIDAL MARSH RECOVERY PLAN

The *Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (USFWS 2010) was released for public comment on February 10, 2010. For the California clapper rail and salt marsh harvest mouse (*Reithrodontomys raviventris*), the Draft Recovery Plan, when adopted, will replace the outdated 1984 recovery plan that covered these two species. The current Draft Recovery Plan also covers three federally listed tidal marsh-dependent plant species: the soft bird's beak, California sea-blite, and Suisun thistle. It also addresses 11 species of conservation concern that are not federally listed: the salt marsh wandering shrew (*Sorex vagrans halicoetes*), Suisun shrew (*Sorex ornatus sinuosus*), San Pablo vole (*Microtus californicus sanpabloensis*), California black rail, the three song sparrow subspecies inhabiting the San Francisco Bay, San Francisco common yellowthroat, old man tiger beetle (*Cicindela senilis senilis*), delta tule pea, and Pacific cordgrass.

The Draft Recovery Plan assesses the habitat and life cycle requirements of these species, the reasons these species are of conservation concern and potential threats to these species, and also identifies a recovery strategy for tidal marsh ecosystems in northern and central California and for the individual species. For each of the federally listed species covered by the draft Plan, recovery units are identified around core populations, and specific criteria for success of population recovery efforts are identified.

For the California clapper rail, recovery units are identified for core populations around San Francisco and San Pablo Bays. The recovery units for the California clapper rail identified in the draft plan are listed below.

Central/Southern San Francisco Bay Recovery Unit

- Corte Madera marsh
- Bair-Greco-Ravenswood
- East Palo Alto-Guadalupe Slough
- Guadalupe Slough-Warm Springs
- Mowry-Dumbarton,
- Hwy 84 to Hwy 92 (Coyote Hills/Baumberg)

[36] 16 U.S.C. §§ 715-715r, February 18, 1929, as amended 1935, 1961, 1962, 1966-1968, 1970, 1973, 1976, 1978, 1983, 1984, 1986, 1988 and 1989.

- Cogswell-Hayward Shoreline/Ora Loma/Robert's Landing

San Pablo Bay Recovery Unit

- China Camp to Petaluma River
- Petaluma River marshes
- Petaluma River to Sonoma Creek
- Napa marshes (Sonoma Creek to southern tip of Mare Island)
- Point Pinole marsh

Suisun Bay Area Recovery Unit

- Western Grizzly and Suisun Bays and marshes of Suisun, Hill and Cutoff Sloughs.

Specific criteria for downlisting and recovery of the California clapper rail focus on achievement of minimum population sizes within each of these three recovery units and a reduction in threats to the species' habitat and populations by achieving minimum acreages of high-quality tidal marsh habitat within each core population; controlling invasive smooth cordgrass and its hybrids; reducing the extent of broadleaf pepperweed; and reducing disturbance to rails. This latter criterion, which is most applicable to the WT Plan, includes "Implementation of site-specific management plans on lands owned by U.S. Fish and Wildlife Service, California Department of Fish and Game, East Bay Regional Park District, and Mid-Peninsula Open Space District to reduce recreation-based (human-caused) disturbance to rails, both by reduction of physical disturbance to rails from humans or dogs and by elimination of litter and feeding stations which serve to attract predators, thereby degrading habitat quality."

Also applicable to the WT Plan is one of the five ecosystem-level strategies for recovery of these tidal marsh ecosystems: "Improve coordination, participation, and outreach activities to achieve recovery of listed species and long-term conservation of species of concern." The educational efforts of the WT Plan, particularly with regard to educating boaters regarding the importance of avoiding, and ways to avoid, disturbance of clapper rails furthers this component of the Draft Recovery Plan's conservation strategy.

Among the Draft Recovery Plan's regional conservation strategies is a set of guidelines on public use. These guidelines acknowledge and encourage the importance of tidal marsh appreciation by the public but also encourage the design of public use with consideration of impacts to tidal marsh species. These guidelines recommend that public use be guided to a few low-impact locations, that trails within marsh habitat be minimized, and that terrestrial shoreline trails be located well away from the high tide edge and high tide refugia.

WESTERN SNOWY PLOVER RECOVERY PLAN

The Pacific coast population of the western snowy plover was listed as threatened on March 5, 1993 and the Recovery Plan was finalized and released on September 27, 2007 (USFWS 2007). The recovery strategy listed in the Recovery Plan includes three major components: increasing population numbers throughout the range of the Pacific coast population of the species, reducing or eliminating threats through habitat management, and monitoring plover populations and threats to determine recovery success and refine management actions. Among six recovery units

established in the Recovery Plan, San Francisco Bay was included with a goal of supporting 500 breeding adults. As noted earlier, a Bay-wide survey in 2009 indicated the presence of approximately 147 adults[37]. Recovery criteria focus on achieving targets for population size within sub-regions, meeting targets for reproductive success, and establishing management actions.

Pertinent to the WT Plan, boating is not specifically included in the long list of factors affecting the continued existence of the western snowy plover on pages 153-155 of the Recovery Plan, which indicates that "Recreational activities that occur in or over deep water (such as the beach- and water-oriented activities of surfing, kayaking, wind surfing, jet skiing, and boating…) may not directly affect western snowy plovers." However, the Plan does state that people accessing the shoreline in areas where plovers occur could potentially affect this species. In addition, specific recommendations regarding access by boaters to areas used by snowy plovers are included in one of the recovery actions in the Recovery Plan, as follows:

> **2.3.1.2 Locate new access points and trails well away from western snowy plover nesting and wintering habitat, and modify existing access and trails as necessary.** Recreational users such as campers, clammers, anglers, equestrians, collectors, etc., should be encouraged to consistently use designated access points and avoid restricted areas. Roads, trails, designated routes, and facilities should be located as far away from western snowy plover habitat as possible. Recreationists using boats should be restricted or prohibited from areas being used by the western snowy plover.

Appendix C, Table C-1 of the Recovery Plan identifies six locations within San Francisco Bay where boat use is currently prohibited or restricted to protect snowy plovers. These are the levee of Salt Pond 7A along the Napa River, the Alameda South Shore, the salt ponds north of Highway 92 in Hayward, the Mowry salt ponds in Fremont, the Knapp salt pond (Pond A6) near Alviso, and Crittenden Marsh in Mountain View. This table also lists one location, Crissy Field in San Francisco, where restrictions on boat access are recommended in the future to protect plovers.

One of the conservation efforts on public lands listed as important in the Recovery Plan is public outreach and education. The educational efforts of the WT Plan, particularly with regard to educating boaters regarding the importance of avoiding, and ways to avoid, disturbance of sensitive species such as the western snowy plover furthers this component of the Recovery Plan's conservation strategy.

STATE REGULATIONS

As described in Section 3.7, the Porter-Cologne Water Quality Act protects the beneficial uses of California's waters including wetland habitat. Executive Order W-59-93, California Wetlands Conservation Policy, stresses no overall net loss of wetlands and the restoration of wetlands with the purpose of protecting habitat for bird and other wetland dependent species.

CALIFORNIA ENDANGERED SPECIES ACT/CALIFORNIA FISH AND GAME CODE

[37] http://www.fws.gov/arcata/es/birds/WSP/documents/2009%20Pacific%20Coast%20breeding%20SNPL%20survey.pdf

The California Endangered Species Act, described in Section 3.7, also applies to birds. In addition, certain provisions of the California Fish and Game Code, Section 1600 et seq. (Streambed Alteration Agreements) apply to wildlife. This section of the Fish and Game Code is designed to protect the state's fish and wildlife resources from harmful impacts of activities that occur near any rivers, streams, lakes and other water bodies in the state, regardless of the amount or duration of flow. Prior to undertaking stream-altering activities that may adversely affect fish or wildlife, applicants must notify the CDFG, pay fees, and enter into an agreement with CDFG for authorization. CDFG may authorize (for up to five years) alteration of streams with scientifically sound, reasonable conditions to avoid or minimize harm (substantial adverse effects) and protect fish and wildlife resources. CDFG has discretionary authority to modify the conditions of a Section 1600 Stream Alteration Agreement.

Other sections of the California Fish and Game Code protect various species and habitats. Birds are specifically addressed in Sections 3500-3864 of the Code.

"FULLY PROTECTED" SPECIES

The Fish and Game Code also includes a less familiar special legal status for some species as "fully protected," which is a category developed before CESA was authorized.[38] Most "fully protected" species have been placed on the state list of rare, threatened, or endangered species, but some have not. Prohibitions against take of "fully protected" species are more stringent and inflexible than those of CESA, generally prohibiting nearly all "take," and provide no instrument to authorize "take" except for recovery and research actions. Among the species that are considered fully protected are five birds that occur within the San Francisco Bay area: the California clapper rail, California black rail, California brown pelican, California least tern, and American peregrine falcon.

LOCAL AND REGIONAL REGULATIONS AND PLANS AND POLICIES

MCATEER-PETRIS ACT

The McAteer-Petris Act, described in Section 3.7, promotes the protection of existing tidal water habitats and restoration of wetlands that would provide habitat for the species described above. The public access and recreation policies of the Bay Plan recognize the potential for adverse impacts to wildlife from recreational activities, and support proper location, improvement, and management of recreational uses as tools for reconciling habitat and wildlife conservation with recreation (BCDC 2007a). These policies also call for public access to be sited, designed and managed to prevent significant adverse effects on wildlife.

3.8.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The potential significance of impacts to avian resources is determined partly by regulatory requirements, and partly by the scientific literature on ecology, conservation biology, and related environmental sciences. The following criteria are considered in this EIR as thresholds of significance for adverse environmental impacts to avian resources. Potential impacts to habitats were addressed in Section 3.7. Potential impacts were considered significant if they would:

[38] Fish and Game Code CCR Title 14, Division , subdivision 1, Chapter 2, Article 4, Section 5.93

- Have a substantial adverse effect, either directly or indirectly through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, or U.S. Fish and Wildlife Service. A substantial adverse effect would occur if the project would:
    - Extirpate (cause local extinction of) a population
    - Cause or contribute to a substantial decrease in the distribution (range) or abundance of a special status or sensitive bird species, substantially diminish or degrade habitat for such a species, reduce such a species' regeneration capacity in existing or historic range, or otherwise reduce the viability of a sensitive or special-status bird species
    - "Take" one or more individuals of a threatened or endangered species
- Interfere substantially with the movement of any native resident or migratory bird species or conflict with established native resident or migratory corridors, or impede the use of native nesting sites.
- Disturb nesting, roosting, rafting, or foraging such that the project results in, or contributes substantially to, a substantial decline in regional (i.e., San Francisco Bay area) abundance of a waterbird community.
- Disturb nesting, roosting, rafting, or foraging such that the project results in, or contributes substantially to, a substantial decline in regional (i.e., San Francisco Bay area) waterbird species diversity.

METHODOLOGY

In general, potential impacts to waterbirds were evaluated based on the likelihood that the various species of birds could be disturbed due to implementation of the WT Plan and the predicted magnitude of such disturbance resulting specifically from the WT Plan implementation relative to the potential reduction in disturbance resulting from improved education of all boaters expected to result from the Plan's educational efforts. Disturbances could occur if WT users approached nesting, foraging, or roosting birds closely enough to elicit an alert or flight response. The impact assessment for waterbirds also evaluated the potential for incidental take. Incidental take could occur if WT users made a planned or unplanned landing and directly damaged a nest, injured a chick or adult, or elicited a predator response that impacted nesting success. However, an important component of the WT Plan is improved education of NMSB users of the WT and WT-related facilities concerning boating practices that avoid and minimize impacts to sensitive ecological resources. As a result, overall education of boaters (including those who would use the Bay specifically due to the WT Plan and the even greater number of boaters who would use the Bay even without the WT Plan) concerning boating practices that would avoid and minimize disturbance of waterbirds or take of sensitive species would increase substantially as a result of the Plan.

As described in Chapter 2, development of the WT is not expected to substantially increase overall use of NMSBs on the Bay, and population growth is likely to be a much stronger driver of increased NMSB use. However, there is some potential for local increases in boating in sensitive areas of the Bay (e.g., areas where waterbirds congregate), or for the boaters who use the Bay solely due to the WT Plan's outreach efforts to disturb waterbirds to some degree.

Increases in NMSB use in such areas could increase energetic costs to waterbirds. At the same time, improved education of all NMSB users would counteract such disturbance by reducing the likelihood that any particular boater would disturb waterbirds. The factors influencing disturbance response, sensitive distances that could be applied to buffer recommendations for WT users, and consideration of site-specific sensitivity of waterbirds to impacts from the WT Plan are described below, followed by a discussion of specific potential impacts of the WT Plan on waterbirds.

DISTURBANCE RESPONSE

In the context of waterbirds and for the purposes of this analysis, "disturbance" includes any human activity that is an intrusion or interruption in the natural, daily activity of an animal (i.e., "normal behaviors") or that disrupts the abundance, distribution, and function of a waterbird community. Normal behaviors primarily involve foraging or roosting and nesting, though most waterbirds occurring in San Francisco Bay do not breed in San Francisco Bay. In addition, social interaction and community dynamics may be affected. A number of factors contribute to the overall potential for disturbance: potential proximity of a WT trailhead or WT users to a resource, the sensitivity of that resource to disturbance, and temporal/spatial patterns of both disturbance and resource sensitivity.

Waterbird response to intrusion may be similar to anti-predator behavior. The most observable response of waterbirds to disturbance (Ydenberg and Dill 1986, Blumstein 2003) is "flushing," in which a bird or a group of birds moves away from or flees from an approaching threat. In waterbirds, flushing responses include swimming, diving, or flying and are usually preceded by an alert response (e.g., "head alert"). Because birds may concentrate their activities where there is the best opportunity to maximize energy gain (Davidson and Rothwell 1993), flushing may reduce the time waterbirds spend feeding or resting and cause them to be displaced to less-than-optimal feeding and resting areas (Knapton et al. 2000) or, under increased levels of disturbance, cause complete abandonment of foraging habitat. Repeated flushing increases energy costs to waterbirds, and may have cumulative effects on migratory energy budget and, ultimately, reproductive success (Riffel et al. 1996, Cywinski 2004).

A number of factors contribute to disturbance response by waterbirds, including the following:

- **The size of the area available to the species.** The larger the habitat "patch," the more refugia are available. Thus, birds foraging in extensive habitat areas such as open waters or mudflats of the Bay are less likely to have to flush long distances when disturbed than birds using small coves.
- **Flock size and diversity.** Mori et al. (2001) found that flight distances (a measure of disturbance response) increase with flock size and species diversity.
- **The "shyness" factor of the species.** Some species are more nervous than others and different species respond differently to disturbances (Burger and Gochfeld 1991, Fitzpatrick and Bouchez 1998). Scaup, scoters, and canvasback, the most abundant waterfowl in the Estuary, are also among the most sensitive (Korschgen and Dalhgren 1992). The shorter the disturbance distance that triggers flight response, the lower the impact of disturbance events, since the birds will tend not to flush unless approached very closely.

- **Size of the species.** Larger animals tend to have greater response distances than smaller animals (i.e., the larger the bird, the greater the distance from the source of disturbance when it takes flight).
- **Behavior of the birds.** Mori et al. (2001) found that flight distances tended to be longer for waterfowl that used open water for feeding than those that used it primarily for resting.
- **Season.** Animals behave differently in the breeding season than in the non-breeding season. Annual periods of high-energy cost (e.g., molting, nesting) put animals at greater risk and may elicit more expensive responses.
- **Daily disturbance patterns and habituation.** In a study of shorebirds on southern California beaches, Lafferty (2001) found that "The average distance that birds reacted to humans increased with the proportion of birds that were disturbed on a particular day, suggesting disturbance sensitized birds." Waterbird responses to repeated disturbance may be highly variable. In some studies, repeated disturbance caused a proportion of waterbirds to abandon areas previously occupied (Burger and Gochfeld 1991, Klein et al. 1995), and abundance of sensitive species may be reduced by 50 percent at high disturbance levels (Pfister et al. 1992).

  On the other hand, some individuals may be tolerant of disturbance; such birds appear to habituate to conditions in areas where human disturbance is ongoing (Cooke 1980, Burger and Gochfeld 1991). Habituation occurs when organisms are exposed to repeated stimuli and cease to respond, or the response level is reduced, thereby preventing needless energy expenditure. Advantages of habituation to wintering waterfowl are "accrued by maximizing time available for maintenance, energy intake (foraging), and energy-conservation (roosting) activity" (Conomy et al. 1998.) or using the available time to preen, forage, and roost rather than flee. Ability of birds to habituate varies by species, social organization, environment and season (Burger 1981, Conomy et al. 1998). Conomy et al. found that "time required to habituate may depend on the frequency and intensity of the disturbance." In San Francisco Bay, there are a number of sites where high abundance and diversity of waterbirds occurs despite the presence of high levels of disturbance in the form of pedestrian traffic, pets, vehicular traffic, and noise, as birds in these areas have habituated to that disturbance. Examples of such locations include the Palo Alto Baylands, South Bayside System Authority Treatment Plant in Redwood Shores, Shoreline Park in Mountain View, and the San Jose-Santa Clara Water Pollution Control Plant (Steve Rottenborn, H.T. Harvey, pers. obs. June 22, 2010).
- **Direction and speed of approach.** A seminal shorebird study found that birds flushed more frequently when exposed to fast movement or when humans were in close proximity, while birds were able to habituate to human activity (birders or clammers) when they were not being approached directly (Burger 1981). Other studies have found that birds flush more readily when approached directly rather than obliquely (Burger 1981, Burger and Gochfeld 1991, Kramer and Bonenfant 1997, Rodgers and Schweikert 2003). In general, approaches of birds along a shoreline from the water seem to disturb birds more than from the land (Smit and Visser 1993 in Davidson and Rothwell 1993).

Responses of waterbirds to human intrusion can be extremely nuanced. For example, one study found a "chromotropic response" (color-sensitive reaction) to observer clothing: birds flushed more readily, or were harder for the observer to detect, when orange vests were worn by

observers (Gutzwiller and Macum 1993). Therefore, brightly colored watercraft, lifejackets, or clothing may cause greater disturbance levels than intruders of more muted colors.

Several studies have documented a reduction in feeding time due to disturbance by motorized watercraft (Korschgen et al. 1985, Kahl 1991) or experimentally examined flush distances of waterbirds by watercraft (Rodgers and Smith 1997, Peters and Otis 2006). The literature contains fewer studies of disturbance response of waterbirds to non-motorized vessels; however, Rodgers and Schwikert (2003) and Avocet Research Associates (2009) studied responses of waterbirds to approach by NMSBs, identifying varying flush distances depending on the species. Peters and Otis (2006), in a South Carolina study of a tidal creek refuge, found that canoe intrusion caused approximately one-half of individuals of all waterbird species except snowy egret to "immediately abandon" the site, but only two species (yellow-crowned night heron [*Nyctanassa violacea*] and great egret) avoided high-use creeks.

The effects of human disturbance on waterbirds can range from insignificant to lethal for different species and different individuals (Boyle and Sampson 1985, Riffell et al. 1996). Human disturbance may have cumulative impacts that reach population levels, affecting habitat use, reproduction, and survival (Burger 1983, Riffell et al. 1996), and may reduce species diversity and abundance at both the landscape and regional level (Rodgers and Smith 1997). Increasing human use of natural areas increases the incidence of disturbance and tends to disrupt foraging and social behavior of waterbirds (Burger 1981, Klein et al. 1995). It is reasonable to infer that the cumulative impacts of numerous or serial disturbances may have deleterious effects on waterbird populations within a given area; such frequent disturbance may adversely affect the health or productivity of birds that remain in an area where disturbance results in substantial impacts to energy budgets, or may cause birds to leave an area altogether to seek out areas where their energy budgets can be balanced. In either case, the end result may be a decline in local abundance. Compounding impacts may result when the periods between successive intrusions are too short for birds to recover and return to their normal, pre-disturbance behavior. In this way, numerous small disturbances can be more damaging than fewer, larger disturbances (West et al. 2002).

SENSITIVE DISTANCE

Several studies have been conducted to determine the "sensitive distance" of waterbirds (i.e., the distance from a source of disturbance at which the birds flush or show other behavior indicating that they are being disturbed). A study of the impacts of sailboats on waterfowl measured distances at which flocks of ducks moved from an oncoming dinghy; this study found the sensitive distance for the tufted duck (*Aythya fulgula*), a congener and useful surrogate for scaup that use San Francisco Bay, to be 275 m (Batten 1977).

Rodgers and Schwikert (2003) developed a formula for determining sensitive distances that accounts for 95 percent of all flush observations and adds 40 m to account for unmeasured responses that are not observable in the field (e.g., increased heart rate). The addition of 40 m as a safety margin to the calculation of buffer distances is a conservative strategy to minimize adverse disturbance responses by birds before they flush, taking into account variables such as flock size and mixed species assemblages that may increase the sensitive distance (Rodgers and Schwikert 2003).

Following the example provided by studies such as that of Rodgers and Schwikert (2003), Avocet Research Associates (2009) conducted an experimental study of sensitive distances with waterbirds in the North Basin, an enclosed embayment located along the Berkeley shoreline in San Francisco Bay. In this study, the researchers paddled kayaks along transects and measured the flush distances (i.e., the distances at which birds first began to swim, dive, or fly away from the kayaker) of waterbirds, predominantly wintering waterfowl. They then determined the sensitive distances of various species using the conservative formula developed by Rodgers and Schwikert (2003). The sensitive distances in the North Basin study varied considerably among the 15 species for which an adequate sample size was achieved, ranging from 78 m for Clark's grebe (*Aechmophorus clarkii*) to 252 m for lesser scaup (*Aythya affinis*). According to Rodgers and Schwikert (2003), when dealing with mixed species, buffer zones should be based on the largest flush distance of the species most sensitive to human disturbance. Following this principle, Avocet Research Associates (2009) concluded that a buffer zone of 250 m represented a conservative recommendation for a buffer width suitable for minimizing the effects of NMSB activity on rafting waterbirds in the North Basin.

MINIMIZATION OF DISTURBANCE IMPACTS ASSOCIATED WITH WATER TRAIL SITES

The guiding principle of managing human activities in areas that support important waterbird populations is to avoid or limit overlap of human activity with those populations. Avoidance can be accomplished by restricting access (closure) or by implementing buffers (i.e., maintaining appropriate distances from birds). Physical means of designating appropriate buffer distances, such as buoys, would only be applicable in limited instances and may not be feasible. Educating boaters about the need to maintain a certain buffer distance and to not enter sensitive habitat (except if dictated by an emergency) would be more effective at limiting human overlap with important waterbird populations. In cases where NMSB users may not be able to see birds on the water from a distance that would minimize the potential to cause disturbance (e.g., 250 m for rafting waterbirds), those boaters will need to avoid the birds as soon as they are aware of them.

The potential for waterbird disturbance associated with the use of a specific WT site depends on a suite of variables that will differ from site to site and that would be evaluated during the trailhead designation process. By definition, sites that meet HOS criteria would have no or only a very minor potential to cause any additional disturbance to sensitive species compared to the existing baseline.

Measures to minimize potential disturbance of waterbirds at non-HOSs will depend on the specific potential concerns identified. The WT has no direct authority to close sites or restrict access. As recommended in Strategy 24, periodic closure and/or controls on site use may be employed by the site owner/manager if warranted at a specific trailhead. Recommendations for periodic or seasonal site closure could be included in the trailhead plan for a specific site if site-specific analysis indicated that this would be needed to avoid significant impacts.

In addition, the WT would recommend against funding site improvements that could result in added disturbance to waterbirds if no feasible measures are identified to minimize the potential incremental disturbance. Strategy 3 requires that improvements be consistent with site characteristics, in part to prevent uses that are incompatible with wildlife protection. The WT

may also choose not to designate certain sites as WT trailheads. However, any sites not included in the WT would not benefit from the educational and outreach efforts provided through the WT.

REGIONAL IMPACTS AND MITIGATION MEASURES

IMPACT BIO-5: DISTURBANCE OF RAFTING WATERFOWL FROM ROOSTING AND FORAGING HABITAT

Of the diverse waterbird community that depends on San Francisco Bay, rafting waterfowl comprise one of the groups most susceptible to disturbance by watercraft because rafting waterfowl are widespread in the Bay, occur over a range of water depths (including areas fairly close to shore where much NMSB activity is expected to take place), and tend to have relatively high sensitive distances (e.g., 250 m for lesser scaup [Avocet Research Associates 2009]). This impact could be regional in nature, as WT users initiating outings from a variety of trailheads could affect rafting waterfowl.

As described above, movement patterns and foraging behavior of waterfowl represent a balance between costs and benefits of wintering in a human-influenced environment (Reed and Flint 2007). Rafting in dense flocks serves an anti-predator function, a "safety in numbers" strategy for waterfowl and the energetic costs of such disturbance are equivalent whether flocks are flushed by predators or boats. Flush responses can affect waterbirds by resulting in a loss of access to favored feeding areas, loss of feeding time, and additional energetic cost of flight. Mathews (1982) studied water-based recreation in Britain and ranked "sailing, wind-surfing, rowing, and canoeing" as the second greatest cause of disturbance, after power-boating, to wintering waterfowl.

Two primary factors may help to minimize impacts of NMSBs on San Francisco Bay to rafting birds:

- The seasons of least use by wintering waterbirds (May-September) are the time periods when NMSB use is likely to be highest (Cal Boating 2009). Rafting waterfowl abundance peaks in winter, when NMSB use would be lowest.
- Waterbird flocks tend to coalesce (raft) and hug the shore in leeward bays (i.e., in areas close to shore where NMSB use may be highest) when weather conditions are most severe (high winds, choppy water, winter storm surges). These are the periods least likely to be favored by NMSB users.

Nevertheless, if WT site improvements, outreach, or educational activities result in increased use of a site within or near areas of high waterfowl use, that increased use could result in disturbance of waterfowl, possibly in large numbers. Given the number of potential WT sites from which areas frequented by rafting waterbirds are accessible on a day trip, and the relatively large distance required to maintain a buffer against disturbance to species that are more easily disturbed, increased NMSB use could lead to an increase in disturbance of rafting waterfowl. With repeated disturbance in a particularly sensitive area frequented by large numbers of waterfowl, it is possible that the project could result in a substantial decline in regional (i.e., San Francisco Bay area) abundance of these waterfowl, resulting in a potentially significant impact.

However, it is likely that the educational benefits of the WT Plan would counteract potential impacts to rafting waterfowl resulting from implementation of the Plan by also resulting in

boaters who are more aware of the potential impacts of their boating activities on sensitive resources such as rafting waterfowl and who are educated about ways in which such impacts should be avoided or minimized. Education has been shown to be effective at reducing the potential for disturbance to sensitive species. At a southern California beach, erecting signage increased the percentage of the public that could identify snowy plovers from 3 percent to 15 percent; once docents were employed recognition increased to over 80 percent (Lafferty 2001, Lafferty et al. 2006). After implementation of the educational signage and a docent program, disturbance was reduced by more than 50 percent and successful breeding was reestablished. The docent program included reminding people about leash laws and not trespassing into the roped-off plover breeding area, and scaring crows from nests.

Currently, in the absence of the WT Plan, education regarding appropriate boating behavior in sensitive areas may be accomplished by boating organizations on a small scale, but no Bay-wide, comprehensive educational program targeted at NMSB users, and focusing on key issues of greatest ecological importance, exists. Through signage at WT trailheads, brochures, and other materials, the WT would not only educate the small incremental increase in boaters who would begin using the Bay as a result of the WT Plan, but also extend that education to all WT users, even if only at the trailhead(s) that those boaters currently use.

For purposes of impact assessment, only the incremental increase in NMSB users on the Bay, or the increase in use of sensitive areas (such as areas of high waterfowl use), resulting from the WT Plan itself is considered. This incremental increase can then be weighed against the potential reduction in disturbance due to improved education of boaters regarding avoidance of sensitive biological resources to determine whether the WT plan will have a net adverse or beneficial effect. The way in which a reduction in the percentage of NMSB excursions leading to disturbance of waterfowl, as a result of improved education, can offset an increase in Bay users can be demonstrated mathematically. For example:

- Assume that 100 excursions per winter occur in a particular part of the Bay, and that 20 percent of those excursions result in disturbance of rafting waterfowl; waterfowl would then be disturbed by NMSBs 20 times during the winter:

  $$(100 \text{ excursions}) \times (0.2) = 20 \text{ disturbances}$$

- If the number of excursions increases by 5 percent as a result of the WT Plan, the disturbance rate (i.e., the percentage of excursions resulting in disturbance of waterfowl) would have to decline by approximately 4.8 percent to maintain the same number of disturbance events:

  $$(105 \text{ excursions}) \times [0.2 - (0.048)(0.2)] = 20 \text{ disturbances}$$

The degree to which the disturbance rate would have to decline as a result of improved boater education, in order to offset an increase in excursions, is related to the rate of increase in number of excursions. Therefore, as the number of new users of the Bay increases, the effectiveness of education in reducing the likelihood of waterbird disturbance has to improve as well.

The example above uses a percent increase in boaters that may be above that which would actually occur as a result of implementation of the WT Plan, although the WT Plan does not

provide a specific growth prediction. As discussed in Section 2.2.2 of this EIR, the annual growth rate (in terms of NMSB users on the Bay) of 3.84 percent per year predicted without the WT (Cal Boating 2009) is likely considerably higher than the incremental increase in NMSB users on the Bay that would result from implementation of the WT Plan. Therefore, the five percent increase in excursions used in the example above is an exaggeration of the expected increase in NMSB use of the Bay resulting from the WT Plan. However, it is certainly possible that improved education of all NMSB users (including those who would use the Bay in the absence of the WT Plan) would result in a reduction in the probability of waterbird disturbance far exceeding the percent increase in disturbances due to the WT. Therefore, it is possible that the WT Plan could actually result in a net benefit to waterbirds if educational efforts regarding avoidance and minimization of impacts to sensitive biological resources are appropriate and effective.

Education and public outreach are important components of the WT Plan. Strategies 12, 17, 18, 19, 21, and 22 describe proposed education, outreach, and stewardship programs. Implementation of these strategies would reduce the potential impacts to all waterbird species by educating WT users about the WT ethic. None of the strategies, however, specifically calls for education regarding the need to maintain appropriate buffer zones around rafting waterfowl or regarding the dimensions of those buffers. Therefore, in the absence of such specific information in the educational materials, the potential for increases in disturbance of rafting waterfowl is considered a **potentially significant but mitigable impact**. In addition to siting and design measures that would be implemented during the site-specific evaluation that would be performed during consideration of trailhead designation for a non-HOS site, implementation of mitigation measure Bio-M5 described below would reduce this impact to a less than significant level.

MITIGATION MEASURE BIO-M5: AVOID DISTURBANCE OF RAFTING WATERFOWL FROM ROOSTING OR FORAGING HABITAT

Measures aimed at protecting the two most common open Bay waterfowl groups, scaup (*Aythya* spp.) and scoters (*Melanitta* spp.), from disturbance by watercraft will serve to protect other open water birds. Protection of those species groups provides an umbrella for other rafting waterfowl because grouped together: (1) they tend to occur most abundantly on open Bay waters; (2) they are distributed across both shallow Bay (scaup) and deeper Bay (scoter) habitat; (3) they are among the most sensitive species to disturbance (Takekawa et al. 2008, Avocet Research Associates 2009); (4) their seasonality in San Francisco and San Pablo Bays encompasses that of all other winter rafting waterbirds, and (5) in disturbance trials at the North Basin shoreline near Berkeley, lesser scaup showed the greatest mean response distance of 15 waterbird species flushed by kayaks. Although Takekawa et al. (2008) determined that the species showing a maximum sensitive distance was the surf scoter, and that that distance was 300 m, their study examined the effects of ferry traffic on rafting ducks. Large, noisy, motorized watercraft such as ferries are expected to cause greater disturbance than NMSBs, and therefore the maximum sensitive distance of 300 m identified by Takekawa et al. (2008) may not be pertinent to the issue of disturbance by NMSBs. In contrast, the study by Avocet Research Associates (2009) determined sensitive distances in response to flushing by a kayak, which is more relevant to the WT Plan than the study of ferry disturbance . Therefore, for the purpose of Mitigation Measure Bio-M5, a sensitive distance (i.e., buffer) of 250 m, based on the greatest sensitive distance

identified by Avocet Research Associates (2009), would be adequate to minimize impacts of WT users to all rafting birds.

Educational materials prepared by the WT in accordance with WT Strategy 17, including brochures, signage, and the WT website, shall inform WT users about the importance of the San Francisco Bay Estuary to populations of rafting waterfowl, the sensitivity of waterbirds (and other wildlife) to disturbance, the potential effects of repeated disturbances to such birds, the need to avoid approaching rafting waterbirds, and the need to maintain a 250-m non-disturbance zone (buffer) around congregations of waterbirds. Exceptions to this buffer distance shall be considered in cases where NMSBs may be directed into shipping channels or other navigational dangers, or where unfavorable natural conditions, such as dense fog or wave chop, obstruct the line of sight of a NMSB user. In such cases, a reduced buffer may be acceptable, but NMSB users would be encouraged to move steadily through, parallel to, or away from such an area, as would be safest and most appropriate to the circumstances, to reduce any disturbance to rafting waterfowl as soon as would be practicable. Educational materials shall identify areas where rafting birds are likely to congregate seasonally.

The WT shall develop a set of training materials that can be used to train staff of kayak rental companies and other NMSB outfitters, as well as docents, park staff, and others who may be working at trailhead locations about sensitive bird species and appropriate measures to minimize disturbance. Training sessions provided by kayak rental companies and other NMSB outfitters working in association with designated trailheads and the WT program shall include this educational component. Strategies 17, 18, 19, and 21 shall be modified to include this training and education component.

IMPACT BIO-6: DISTURBANCE OF WADING BIRD, SHOREBIRD, AND BROWN PELICAN ROOSTING AND FORAGING HABITAT

The project may result in increased boating activity at WT sites that could result in disturbance to roosting and foraging activities of wading birds (including egrets, herons, and night-herons), shorebirds (including western snowy plovers and black oystercatchers), California least terns, elegant terns, Caspian terns, Forster's terns, California gulls, and California brown pelicans. Direct flushing responses to disturbance may affect over-wintering fitness by altering site use. As discussed earlier, Peters and Otis (2006), in a South Carolina study of a tidal creek refuge, found that canoe intrusion caused approximately one-half of individuals of all waterbird species except snowy egret to "immediately abandon" the site, but only two species (yellow-crowned night heron [*Nyctanassa violacea*] and great egret) avoided high-use creeks.

For the most part, wading birds and shorebirds would be protected from NMSB disturbance because of their habitat preference for tidal flats or very shallow (less than 10 cm) water, which are undesirable use areas for NMSBs. High tide roosts, however, may be susceptible to disturbance during periods of high water. Small numbers of long-legged waders (e.g., egrets and herons) that forage in shallow water may be flushed by shallow-draft watercraft, but this is likely to be a limited occurrence. In addition, WT education and public outreach strategies are expected to sensitize users to disturbance issues and further buffer flocks from close approach by watercraft. Therefore, this impact would be **less than significant** for shorebirds and wading birds and no mitigation is required.

During the non-breeding season, pelicans can flush at significantly greater disturbance distances than during the breeding season; these distances have been measured to be over 27 m for approaching walking humans and over 34 m for approaching motor boats (Rodgers and Smith 1997). Pelicans roosting in shallow inland ponds at Elkhorn Slough flushed at a mean distance of 220 m when approached by humans on foot whereas approaches within 50 m were tolerated at roosts on Año Nuevo Island surrounded by deep water (Jaques and Anderson 1994), implying that the pelicans perceived protection afforded by the island. Nevertheless, there is potential for NMSB users on San Francisco Bay to adversely affect brown pelican use of the Bay. While occasional disturbance of a roost is not likely to cause changes in Bay-wide numbers, repeated disturbances of major roost sites could possibly lead to declines in regional abundance in an area (USFWS 1983). Although the California brown pelican is no longer listed under the federal or state Endangered Species Acts, continued protection of this species' roosts will be important to sustaining this species' recovery in the long term. Therefore, the potential impact to roosting brown pelicans from the WT Plan is **potentially significant but mitigable.**

For the same reasons described in Impact BIO-5 and the Methodology section above, education of NMSB users regarding the need to avoid, and ways of avoiding, impacts to roosting pelicans is expected to minimize or completely offset any adverse effect resulting from the very small incremental increase in Bay users resulting from the WT Plan. However, WT strategies pertaining to education do not yet specifically require inclusion of California brown pelican avoidance measures. Implementation of mitigation measure Bio-M6 described below would reduce this impact to a less than significant level.

MITIGATION MEASURE BIO-M6: AVOID DISTURBANCE OF CALIFORNIA BROWN PELICANS FROM ROOSTING AND FORAGING HABITAT

The educational materials to be developed for the WT, described in Mitigation Measure BIO-M5 above, shall also alert WT users to the sensitivity of roosting California brown pelicans and appropriate buffer zones. Buffer zones necessary to protect brown pelicans from disturbance have not been well established. However, educational materials for the WT Plan shall recommend a buffer of 50 m between boaters and pelican roosts; this buffer distance may be varied (either increased or decreased) if more information on sensitive distances of roosting pelicans in San Francisco Bay becomes available. Exceptions to this buffer distance shall be considered in cases where NMSBs may be directed into shipping channels or other navigational dangers; in such areas, a reduced buffer may be acceptable, but NMSB users would be encouraged to move steadily through such an area rather than lingering where they could disturb roosting brown pelicans. Strategies 17, 18, 19, and 21 shall be modified to include this training and education component.

In addition, siting and design measures that would be implemented during the site-specific evaluation that would be performed during consideration of trailhead designation for a non-HOS site shall include California brown pelican roosting sites as a potential sensitive resource requiring further evaluation if present.

IMPACT BIO-7: DISTURBANCE OF BIRD NESTING HABITAT

Increased watercraft traffic along the margins of the Bay may impact nesting birds by disturbing or displacing individuals or groups from nesting habitat. Nesting birds, especially those in colonies, can be more sensitive to disturbance than resting and foraging birds. There is considerable variation in the response to disturbance among colonies depending on site characteristics, colony size, species composition, and time of year. Inadvertent disturbance of nest sites could occur if NMSB users landed onshore and disembarked on a levee, salt flat, or island that supported nest sites. For example, a single person disembarking in summer on an island where night-herons were nesting (e.g., Red Rock) could flush incubating adults and subject the colony to predation of eggs by gulls. Various studies have recommended buffer zones around wader colonies ranging from 100 to 300 m (Erwin 1989, Butler 1992). Kelly et al. (2006) recommend buffer zones of 100 to 200 m around colonies of large waders based on responses of nesting birds to a single person approaching on foot, but with a caveat that larger groups of people (or boats) are likely to disturb colonies at greater distances.

Western snowy plovers are not expected to nest in areas where they can be disturbed by boaters on the Bay or in tidal channels. However, if boaters disembark near salt ponds or levees used by nesting snowy plovers, disturbance of nests may result. If adults leave a nest due to disturbance by NMSB users, predation by California gulls, common ravens (*Corvus corax*), northern harriers, or red-tailed hawks (*Buteo jamaicensis*), species that have been documented predating snowy plover nests and young in the San Francisco Bay area (http://vimeo.com/11724291), could result. The USFWS (2008) recommends buffers of approximately 100 m between pedestrians walking on levees and snowy plover nesting habitat, and 200 m between areas of longer-term human activity (i.e., staging areas or vista points) and nesting habitat.

Burrowing owls are terrestrial, and are not expected to nest in wetlands near waters used by boaters. However, as described for western snowy plovers, it is possible that boaters disembarking near upland areas supporting nesting burrowing owls could result in disturbance of active nests. While occasional disturbance may be tolerated by individual owls (i.e., would not likely cause the abandonment of a nest or roost site), repeated disturbance in an area may cause an owl to abandon that site. The CDFG (1995) recommends a buffer of at least 75 m around active burrowing owl nests.

Specific travel patterns and distances traveled by NMSB users will vary, depending on the particular location of a launch or destination site, tides, weather, and other factors. Thus, the determination of whether NMSB users associated with a particular WT Backbone Site may disturb nesting habitat has to be made on a site-specific basis. The trailhead designation process that would be used for all sites would identify sites that are located in close proximity to known nesting sites and nesting habitat.

The trailhead designation process preliminary CEQA checklist includes nesting habitat for wading birds, shorebirds, and burrowing owls as a potential sensitive resource requiring further evaluation if present. For the same reasons described for Impact BIO-5 above and the Methodology description, education of NMSB users regarding the need to avoid, and ways of avoiding, impacts to nesting birds is expected to minimize or completely offset any adverse effect resulting from the very small incremental increase in Bay users resulting from the WT Plan. As discussed above for Impact Bio-M5, various WT strategies call for education of NMSB

users; however, the strategies do not specifically recommend education pertaining to avoidance and appropriate buffer zones for nesting birds. Therefore, this impact is **potentially significant but mitigable.** Implementation of Mitigation Measure BIO-M7 will reduce this impact to less than significant levels.

MITIGATION MEASURE BIO-M7: AVOID DISTURBANCE OF BIRD NESTING HABITAT

Educational materials prepared by the WT in accordance with WT Strategy 17, 18, 19 and 21, as modified per Mitigation Measure BIO-M5 above, shall include discussion of nesting wading birds, western snowy plovers, and burrowing owls, including appropriate buffer distances for these birds. In these educational materials, buffer distances of 200 m for nesting waders and western snowy plovers and 75 m for nesting burrowing owls shall be recommended. These buffers may be modified if new information on appropriate buffer distances becomes available. Exceptions to these buffer zones shall be considered in cases where NMSBs may be directed into shipping channels or other navigational dangers; in such areas, a reduced buffer may be acceptable, but NMSB users shall be encouraged to move steadily through such an area rather than lingering where they could disturb these sensitive species. These educational materials shall generally identify areas where nesting waterbirds are known to occur and shall stress that boaters should not disembark in those areas. These materials shall be developed in a manner that will minimize the likelihood of inadvertently draw NMSB users to these areas.

In addition, where wader colonies, snowy plover nesting areas, or burrowing owl nesting areas are particularly susceptible to disturbance by users of a given WT trailhead, appropriate signage at the trailhead shall discuss the importance of avoiding, and ways for boaters to avoid, impacting these species, including appropriate buffer zones. At a minimum, appropriate signage and educational materials shall be required at WT sites within four miles of wader nesting colonies at West Marin Island, Red Rock, and any colonies to be established or recolonized (e.g., on Bair Island) in the future.

IMPACT BIO-8: DISTURBANCE OF CALIFORNIA CLAPPER RAILS AND CALIFORNIA BLACK RAILS

Small watercraft entering a channel system are likely to flush or otherwise disturb marsh birds and adversely affect nesting success. This impact applies especially to the California clapper rail. The clapper rail is the largest of the special-status marsh birds, the most endangered, and the most sensitive to disturbance. Clapper rails flushed from vegetative cover are susceptible to increased exposure and predation (Evens and Page 1986, Albertson and Evens 2000).

Clapper rails have territories that encompass the dendritic channel systems that develop in a large marsh. The intertidal portions of the channels provide foraging opportunities, but the nest sites are located at or above mean high tide elevations, often at the headward extent of the channel system, or on the upper marsh plain, under dense vegetation (e.g., gumplant bushes). These nest sites are most often immediately adjacent to a channel, many of which are navigable by shallow-draft NMSBs. Human intrusion into tidal marsh habitat where clapper rails are actively nesting would likely disturb incubating or brooding birds, potentially reducing reproductive success. If NMSB users disembarked in a marsh occupied by clapper rails, they could disturb breeding pairs (possibly to the point of abandonment of nests, eggs, or young) and possibly destroy active nests, which are often located along the edges of channels that may be used by boaters. A lost nesting

effort, even by a single pair, may have population-level implications for this critically-endangered species.

California black rails, which are limited primarily to Suisun Bay and San Pablo Bay marshes, are much smaller than California clapper rails and do not flush nearly as frequently in response to human approach or disturbance. However, disturbance by NMSB users, especially if they disembarked in a marsh occupied by black rails, could disturb breeding pairs (possibly to the point of abandonment of nests, eggs, or young) and possibly destroy active nests.

NMSB users may also impact these two listed species during the nonbreeding season. During very high winter tides, clapper and black rails are often concentrated in limited high-tide refugia or narrow upland transition zones just above the water line in or at the edges of marshes. During such events, these species are particularly vulnerable to predation by mammals and raptors (and, in the case of the black rail, by gulls, corvids, and large wading birds). If NMSB users approach high-tide refugia during such extreme tides, they may flush rails into areas where the likelihood of predation would increase.

Specific NMSB travel patterns vary depending on site-specific factors, as discussed previously. Thus, the determination of whether NMSB users may disturb California clapper rails, California black rails, or their nesting habitat has to be made on a site-specific basis. The trailhead designation process that would be used for all sites would identify sites that are located in close proximity to known or potential clapper rail or black rail habitat.

As described in the Methodology section, and for the same reasons discussed for Impact BIO-5 above, education of NMSB users regarding the need to avoid, and ways of avoiding, impacts to California clapper rails and California black rails is expected to minimize or completely offset any adverse effect resulting from the very small incremental increase in Bay users resulting from the WT Plan. As discussed above, WT Strategies 17, 18, 19 and 21 call for education of NMSB users; however, the strategies do not specifically recommend education pertaining to avoidance and appropriate buffer zones for these two listed species. Therefore, this impact is **potentially significant but mitigable.** Implementation of Mitigation Measure BIO-M8 will reduce this impact to less than significant levels.

MITIGATION MEASURE BIO-M8: AVOID DISTURBANCE OF CALIFORNIA CLAPPER RAILS AND CALIFORNIA BLACK RAILS

Educational materials prepared by the WT in accordance with WT Strategy 17, as described for Mitigation Measure BIO-M5 above, shall include discussion of California clapper rails and California black rails. This discussion shall include the laws protecting these listed species, habitat used by these species, the importance of avoiding both nesting habitat and high-tide refugia (during extremely high tides), the importance of not physically entering any vegetated marsh supporting these species, and appropriate buffer distances for these birds. There is no universally recognized buffer distance that has been identified for avoiding disturbance of these two species. For the South Bay Salt Ponds Restoration Project, the USFWS (2008) recommended a 700-foot buffer between construction activities and clapper rail habitat during the breeding season (January through August [USFWS 2000]). Although noise and activity associated with NMSB users is substantially less than that associated with construction activities,

NMSB users have the potential to approach very close to the marsh habitat along tidal channels that is most important to clapper rails, or even enter marshes that support rails via smaller channels. Therefore, the WT's educational materials shall indicate that a 50-ft buffer from clapper rail and black rail habitat should be maintained during the breeding season, and that a 50-ft buffer from high-tide refugia during extremely high winter tides should be maintained by NMSB users. During other periods of the year and non-high-tide events, boaters should not land on or disembark into vegetated marshes that could support rails.

This distance is based in part on the average widths of interior channels within high-quality marshes known to support clapper rails (e.g., at Greco Island); such channels are typically 100 ft wide or less, and thus maintaining a 50-ft buffer from marshes that support rails would preclude NMSB users from entering such marshes, and disturbing rails, during the breeding season. This distance also takes into account the average width of channels at which boat launches are located, which are usually more than 100 ft wide (and would thus allow NMSB users traveling down the center of the channel to remain at least 50 ft from rail habitat at the marsh edge). During extremely high winter tides, when much of the marsh plain is inundated and determining the locations of channels, or even the marsh edge, may be difficult, NMSB users should remain at least 50 ft from the edge of the marsh, as demarcated by either emergent or inundated vegetation or other features that may be visible, and they should not approach vegetation that is not inundated during those times. Exceptions to these buffer zones shall be considered in cases where a launch is located within a channel that is less than 100 ft wide, or when NMSBs adhering to such buffers would be directed into shipping channels or other navigational danger; in such areas, a reduced buffer may be acceptable, but NMSB users would be encouraged to move steadily through such an area rather than lingering where they could disturb these two listed rails.

In addition, if WT trail segments occur in areas where clapper or black rails are particularly susceptible to disturbance by users of a given WT trailhead, appropriate signage at the trailhead shall discuss the importance of avoiding, and ways for boaters to avoid, impacting these species. Federal and state laws prohibiting "take" of these species shall be included in this signage. In cases of anticipated increased use during the prescribed nesting season, which is generally February through August, feasible methods by which watercraft traffic shall avoid channel systems used by nesting rails shall be specifically identified during the trailhead designation process; these methods shall be included in educational materials and signage for these trailhead locations.

IMPACT BIO-9: DISTURBANCE OF NON-LISTED MARSH BIRDS

In addition to the federally listed California clapper rail and state listed California black rail, a number of other, non-listed bird species use tidal marshes where NMSB activities may occur. These include common breeding species such as marsh wrens (*Cistothorus palustris*) and red-winged blackbirds (*Agelaius phoeniceus*) as well as special-status species such as Suisun, San Pablo, and Alameda song sparrows, San Francisco common yellowthroats, and northern harriers, all of which are considered California BSSC. Boating activities during the breeding season that occur adjacent to, or in channels within, tidal marshes could result in disturbance of nesting pairs of these species, possibly leading to nest abandonment. Boaters who disembark within tidal

marsh habitat could also physically disturb or destroy active nests or degrade habitat used by these species.

Because the incremental increase in NMSB use expected to result from implementation of the WT Plan is expected to be very low, the effects of implementation of the WT Plan on these non-listed species and their habitats are also expected to be fairly low. Although the list of marsh bird species above includes several BSSC, these species are much more abundant and/or widespread than the California clapper rail and California black rail considered in Impact BIO-8. As a result, any adverse effects of NMSB use resulting from implementation of the WT Plan would impact only a very small proportion of the regional populations of these BSSC, and such impacts would be **less than significant**. In addition, the educational outreach components of the WT Plan, and specifically implementation of Mitigation Measure BIO-M8 for the two listed rail species, will further reduce the potential for the WT Plan to impact these non-listed marsh birds.

IMPACT BIO-10: POTENTIAL INCIDENTAL TAKE OF SENSITIVE SPECIES

As described in Section 3.2, take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct," and includes significant habitat alteration where such alteration kills or injures a listed species through impairment of essential behavior." Harass means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering."[39] Incidental take could occur if WT users damage nests; step on eggs or chicks or small animals such as a salt marsh harvest mouse; disturb adults of any species so that predators can gain access to the young; or flush birds to such a degree that fitness is impaired. Incidental take could also result from habitat damage, as discussed and addressed in Section 3.7. Increased NMSB use could lead to an increase in incidental take. This impact is **potentially significant but mitigable**. The potential forms of incidental take are addressed individually in Impacts Bio-5 through Bio-8. Implementation of Mitigation Measures Bio-M5, Bio-M6, Bio-M7, and Bio-M8 would reduce this potential impact to a **less than significant** level.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT BIO-11: DISTURBANCE OF CALIFORNIA CLAPPER RAILS AND CALIFORNIA BLACK RAILS DUE TO CONSTRUCTION ACTIVITIES AT LAUNCH SITES

Percussive noise, night lighting, and physical alteration of tidal marsh or adjacent upland habitats are all potential construction activities that could disrupt marsh bird nesting behavior. For non-listed species, construction activity at any particular site could impact at most only a very small proportion of the regional population of the species, and such an impact would therefore be less than significant. However, for state and federally listed species, including the California clapper rail and California black rail, any impact that could result in a loss of reproductive effort due to construction disturbance at a trailhead could have more substantial effects given the very low sizes of these species' regional populations. This impact applies to non-HOSs; HOS site construction would be minimal (signage only) and not anticipated to have significant construction-related impacts to marsh birds.

[39] 50 C.F.R 17.3

As determined by the USFWS, construction activities that occur from February 1 through August 31 within 700 feet of the center of a clapper rail territory may have adverse impacts on nesting success (James Browning, USFWS, pers. comm. May 27, 2008). Clapper rail protection requirements, when implemented, would also avoid potential construction-related disturbance of California black rails and other marsh birds.

WT site sensitivity to potential construction-related disturbances of marsh birds will vary greatly from site to site. The trailhead designation process will identify the potential presence of sensitive species and/or habitats near trailheads. This impact is **potentially significant but mitigable.**

MITIGATION MEASURE BIO-M11: AVOID DISTURBANCE OF CALIFORNIA CLAPPER RAILS AND CALIFORNIA BLACK RAILS DUE TO CONSTRUCTION ACTIVITIES AT LAUNCH SITES

The trailhead designation process shall include evaluation of the potential for construction to adversely affect sensitive marsh bird habitat. If presence of nesting California clapper rails or California black rails is possible, either protocol-level surveys shall be conducted during the appropriate season (i.e., between January 15 and April 15 for the clapper rail [USFWS 2000] and between March 15 and May 31 for the black rail [PRBO undated]), or it may be assumed that rails are present. If either species is determined or assumed to be present within 700 feet of the construction area, construction shall be scheduled to occur only from September 1 through January 31 (or as otherwise modified with approval of the USFWS and CDFG) to avoid the nesting season.

3.9 BIOLOGICAL RESOURCES – OTHER SPECIES

This section discusses the existing sensitive biological resources of San Francisco Bay, other than birds and vegetation, that could be affected by project-related construction and increases in NMSB use, identifies potential impacts to those resources, and recommends mitigation strategies to reduce or eliminate those impacts. Two categories of sensitive species are addressed in this section: aquatic mammals and non-avian marsh wildlife.

3.9.1 INITIAL STUDY FINDINGS

The Initial Study for this project identified potentially significant impacts on harbor seals and wetland habitats. Impacts to wetland habitats could impact sensitive non-avian marsh wildlife present in the wetlands. Potential impacts to other biological resources that were identified in the Initial Study were discussed in Sections 3.7 and 3.8, above.

3.9.2 REGIONAL SETTING

REGIONAL HABITATS

As discussed in Section 3.7, the vegetation and wildlife of bayland environments vary among geographic subregions in the Bay (Figure 3.7.2-1). Potential impacts to other species, including aquatic mammals, and other (non-avian) marsh species, were evaluated in the context of the four major subregions, and specific sensitive habitats. Aquatic mammals are discussed first, followed by other marsh species.

SENSITIVE SPECIES

AQUATIC MAMMALS (HARBOR SEALS)

Pacific harbor seals (*Phoca vitulina*) are the only marine mammals resident in San Francisco Bay year-round. Harbor seals are federally protected under the Marine Mammal Protection Act and are present throughout San Francisco Bay. California sea lions (*Zalophus californianus*) use the Bay seasonally for foraging, and some individuals (primarily males) use one haul-out site located on floating docks at Pier 39 on the San Francisco city shoreline. This haul-out site is currently located in a busy, urban area, surrounded by active boat docks and high levels of tourist activity. The site is monitored by staff and volunteers of The Marine Mammal Center (Sausalito, CA). Other marine mammals are occasionally and briefly seen in San Francisco Bay waters, including harbor porpoise (*Phocoena phocoena*), gray whales (*Eschrichtius robustus*), humpback whales (*Megaptera novaeangliae*), northern elephant seals (*Mirounga angustirostris*), and sea otters (*Enhydra lutris*). These individuals do not reside in the Bay (Thompson et al. 2007).

Based on bone evidence from archaeological sites along the Bay shoreline (Nelson 1909), harbor seals have been using the Bay for thousands of years, and it still supports a year-round population of more than 600 harbor seals[40] (Green et al. 2006). Harbor seals regularly move onto offshore or intertidal rocks, sand bars, sandy beaches, or tidal mudflats in order to rest between foraging trips, molt, thermoregulate, or nurse their young (Bigg 1981). Seals tend to congregate on the same terrestrial sites, called "haul-out sites," year after year (Yochem *et al.* 1987,

[40] This incorporates Green et al.'s (2006) uncorrected figure of >500 seals, multiplied by a standard correction factor for California harbor seal counts of 1.3 (Hanan 1996, Forney et al. 2001).

Harkonen 1987). Such areas are characterized by ease of access to the water, proximity to food resources, and minimal disturbance levels (Allen 1991, Nordstrom 2002).

Although some haul-out sites are used year-round by seals, others are used seasonally, for pupping, molting, or because of proximity to a seasonally abundant prey resource. Estuarine sites such as those in San Francisco Bay may be particularly important to seals during the pupping and molting seasons, as these areas provide sites sheltered from storms (Brown and Mate 1983, Kopec and Harvey 1995). Depending on season, harbor seals spend up to 60% of their time on the haul-out site, with more time spent on land during the pupping and molting seasons (Thompson et al. 1989, Thompson et al. 1998).

Harbor seals exhibit strong site fidelity within season and across years, and are essentially central-place foragers, usually foraging close to haul-out sites and repeatedly visiting specific foraging areas (Thompson et al. 1998). Based on radiotelemetry studies, seals in San Francisco Bay forage mainly within one to five kilometers (km) of a haul-out site (Torok 1994, Nickel 2003; Grigg 2008). Disturbance by humans, both inadvertent and deliberate, has been shown to cause declines in numbers of seals using terrestrial haul-out sites (Orr 1965, Terhune and Almon 1983, Allen et al. 1984, Hanan 1996). If it is sufficiently disruptive, disturbance may cause seals to abandon traditional haul-out sites (Newby 1973, Paulbitski 1975, Allen 1991).

Harbor seals consistently use 16 haul-out sites in the Bay (Kopec and Harvey 1995, Green et al. 2006), hereafter referred to as "primary" sites. There are indications, based on anecdotal reports, documentation of radio-tracked animals, and aerial surveys (Torok 1994, Kopec and Harvey 1995, Nickel 2003, Green et al. 2006) that seals use an additional 11 sites in San Francisco Bay with some consistency (hereafter referred to as "secondary" sites). The primary and secondary haul-out sites are listed in Table 3.9.2-1 and displayed in Figure 3.9.2-1. Most haul-out sites are in the Central and South Bay subregions. Of the 16 primary sites, three (Castro Rocks, Yerba Buena Island, and Mowry Slough) support the highest consistent numbers of seals, often exceeding 100 seals onsite (Kopec and Harvey 1995, Green et al. 2006).

Although most haul-out sites in San Francisco Bay are used to some degree year-round, numbers of seals at some sites are highest during the pupping (March – May) and molting (June-July) seasons (Kopec and Harvey 1995, Green et al. 2006). Sites used by seals for pupping are identified in Table 3.9.2-1. Two of these sites, Castro Rocks and Mowry Slough, are the largest pupping sites in San Francisco Bay. In recent years, small numbers of pups have been born each year at Yerba Buena Island (maximum of 14 pups in 2009) and Coyote Creek (maximum of 20 pups in 2010), but at this time these are not considered primary pupping sites for San Francisco Bay (Green et al. 2006; S. Allen, D. Greig and J. Ryan, pers. comm.). Count surveys are often conducted at times of year when the number of seals on the haul-out site is expected to be at a maximum; in San Francisco Bay, this is generally during the pupping or molting seasons.

Quantitative baseline information on current levels of disturbance are available for four haul-out sites: Castro Rocks, Yerba Buena Island, Mowry Slough and Newark Slough (Table 3.9.2-2). Haul-out disturbance surveys are generally conducted at tide heights/time of day when the maximum numbers of seals are expected to be onsite. Over a period of days or weeks, observers record the number of seals present, all potential disturbance events (e.g., loud construction

TABLE 3.9.2-1. HARBOR SEAL HAUL-OUT SITES BY SAN FRANCISCO BAY SUBREGION AND SEGMENT

Goals Project Subregion*	Primary Haul-Out Sites	Secondary Haul-Out Sites	Known Pupping Sites
Suisun	Ryer Island (RI)	--	--
North Bay	--	Tubbs Island (TI)--	--
Central Bay	Corte Madera (CM) Bluff Point (BP) Point Ione (PI) Point Blunt (PBL) Sausalito Boatworks (SB) Castro Rocks (CR) Yerba Buena Island (YBI) Brook's Island (BI)	Peninsula Point (PP) Alcatraz (AL) Alameda Breakwater (AB) Red Rock (RR) Treasure Island (TR)	Corte Madera (CM) Castro Rocks (CR)
South Bay	Bair Island (BA) Corkscrew Slough (CS) Greco Island (GI) Guadalupe Slough (GS) Newark Slough (NS) Mowry Slough (MS) Coyote Creek (CC)	Coyote Point (CO) Belmont Slough (BS) Drawbridge (DR) Calaveras Point (CP) Union City Shoreline (UC)	Bair Island (BA) Corkscrew Slough (CS) Greco Island (GI) Newark Slough (NS) Mowry Slough (MS)

TABLE 3.9.2-2. RECENT MAXIMUM COUNTS AT FOUR PRIMARY SAN FRANCISCO BAY HAUL-OUT SITES, BY SEASON

Haul-Out Site	Season	2001[1]	2002[1]	2003[1]	2004[1]	2005[1]	2006[2]	2007[3]	2008[4]	Mean ± sd
Castro Rocks	Pupping	172	166	248	271	268	339	213	262	242 ± 57
	Molting	172	187	248	238	219	nd	109	145	188 ± 51
	Fall	205	180	213	336	nd[5]	nd	nd	nd	234 ± 70
	Winter	225	296	388	594	nd	nd	nd	nd	376 ± 160
Yerba Buena Island	Pupping	156	163	180	129	172	81	nd	161	149 ± 34
	Molting	184	226	214	177	194	190	nd	199	198 ± 17
	Fall	135	98	208	164	nd	nd	nd	nd	151 ± 46
	Winter	238	206	343	217	nd	nd	nd	nd	251 ± 63
Mowry Slough	Pupping	270	367	295	290	212	229	50	101	227 ± 105
	Molting	213	221	257	236	210	161	15	85	175 ± 84
	Fall	53	60	49	55	nd	nd	nd	nd	54 ± 5
	Winter	112	106	90	139	nd	nd	nd	nd	112 ± 20
Newark Slough	Pupping	59	77	29	23	20	38	17	43	38 ± 21
	Molting	34	26	28	24	10	9	0	20	19 ± 11
	Fall	31	14	20	16	nd	nd	nd	nd	20 ± 8
	Winter	22	22	30	13	nd	nd	nd	nd	22 ± 7

[1]Source: Green, D.E., Grigg, E.K., Allen, S.G. and Markowitz, H. (2006) Monitoring the potential impact of the seismic retrofit construction activities at the Richmond San Rafael Bridge on harbor seals (*Phoca vitulina*): May 1, 1998 – September 15, 2005. Final Report to the California Department of Transportation, Contract 04A0628. 100 p.

[2]Source: Manna, J, Roberts, D., Press, D. and Allen, S. (2006) Harbor seal monitoring. San Francisco Bay Area. National Park Service Annual Report. Point Reyes National Seashore, Point Reyes, CA. 22 p.

[3]Source: Truchinski, K, Flynn, E., Press, D., Roberts, D. and Allen, S. (2008) Pacific harbor seal (*Phoca vitulina richardii*) monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area: 2007 Annual Report. National Park Service Natural Resource Technical Report NPS/SFAN/NRTR-2008/118. 26 p.

[4]Source: Flynn, E., Press, D., Codde, S., Roberts, D. and Allen, S. (2009) Pacific harbor seal (*Phoca vitulina richardii*) monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area: 2008 Annual Report. National Park Service Natural Resource Technical Report NPS/SFAN/NRTR-2009/267. 24 p.

[5]nd = no data available for this site during this season/year

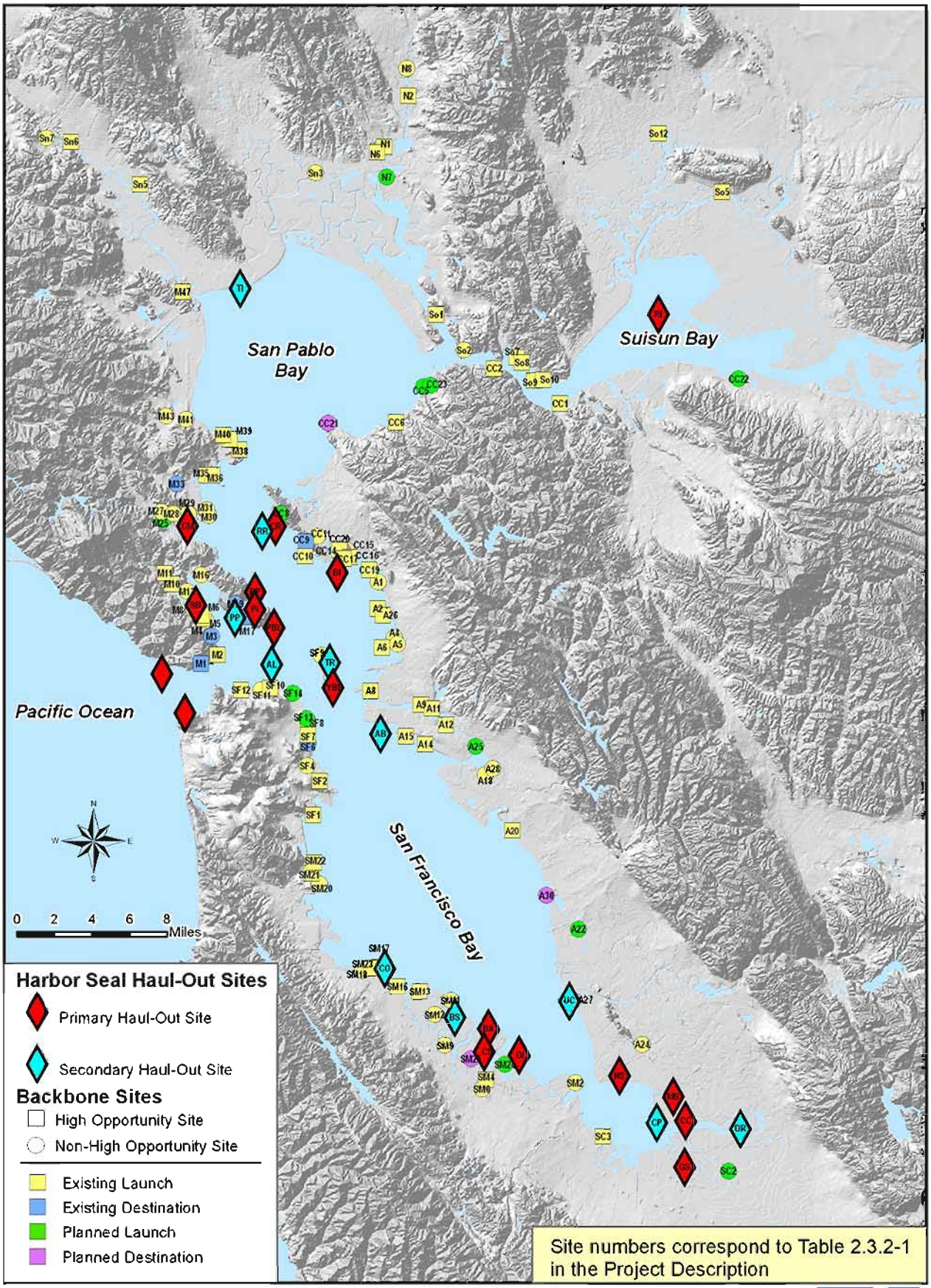


Figure 3.9.2-1
Harbor Seal Haul-Out Sites

Bay Water Trail GIS data provided by BCDC
Harbor seal data from Green et al. 2006

GECo Environmental Consulting

WETLANDS AND WATER RESOURCES, INC.

Map file.Harbor-seal-sites_1134_2010-0712lee.mxd

noises, or approaches by watercraft, including distance of approach), reaction of the seals, and number of seals to re-haul following a flush (i.e., seals moving away from resting spots into the water) off the haul-out site.

The San Francisco Bay harbor seal population is currently considered stable (in contrast to increasing seal populations along the outer California coast) at about 600 seals, although increases have been seen at some sites (e.g., Castro Rocks, Yerba Buena Island, and Ryer Island in Suisun Bay) and decreases at others (e.g., Strawberry Spit in Richardson Bay, now abandoned by seals; Allen 1991, Green et al. 2006). Recent (2001 – 2009) seasonal maximum counts at four important harbor seal haul-out and pupping sites are shown in Table 3.9.2-2. The 2006 through 2008 data are based on fewer surveys and are not completely comparable to the 2001 through 2005 data (E. Grigg, pers. comm. January 27, 2010).

Disturbance to haul-out sites is often cited as one potential reason for the lack of overall population increase in San Francisco Bay, in contrast with the increases seen on the outer coast (Allen 1991, Kopec and Harvey 1995, Lidicker and Ainley 2000, Grigg et al. 2004, Green et al. 2006). The Castro Rocks, Yerba Buena Island, Mowry Slough and Newark Slough primary haul-out sites were part of recent (1998 – 2005) monitoring by San Francisco State University and Caltrans (Green et al. 2006). Mean numbers of disturbances and flushes per hour of field time (1998 – 2005) from all disturbance sources were as follows:

- Castro Rocks (daytime)[41]: 3.22 disturbances/hr, 0.44 flushes/hr
- Yerba Buena Island: 6.21 disturbances/hr, 0.38 flushes/hr
- Mowry Slough (includes disturbances at Newark Slough): 0.33 disturbances/hr, 0.10 flushes/hr

As can be seen in the rates of disturbance at these three index sites, average rates of disturbance could be expected to be higher in areas nearest urban centers (such as Castro Rocks and Yerba Buena Island), and markedly lower in remote sites such as Mowry and Newark Sloughs, which are located on wildlife refuge land. In some populated areas, harbor seals may habituate to consistent levels and types of disturbance in the area (Bonner et al. 1973, Osborn 1985, Barad et al. 1998). As a result, seals at more remote sites will be less tolerant of disturbance than at sites in more heavily populated areas.

Seals on a haul-out site may be particularly sensitive to disturbance from paddled boats, and frequencies of flushing and disturbance distances from seal haul-out sites for kayaks and canoes are comparable to or even greater than those observed for powered vessels (Suryan and Harvey 1999, Henry and Hammill 2001, Green et al. 2006). For example, in one study conducted in coastal Maine, 55% of paddled boats traveling past (and within approximately 200 m of) a harbor seal haul-out site caused seals to flush, vs. 11% of motorboats approaching within the same distance (Lelli and Harris 2001). The authors concluded that paddled boats were significantly more likely than motor boats to flush seals ($p < 0.05$). Lelli and Harris (2001) noted that the seals commonly left the haul-out site in response to paddled boats over 300 m away, while this was virtually never the case with motorboats. Similarly, another study conducted in

[41] Note that the Castro Rocks figure includes rate of disturbance during seismic retrofit construction work on the Richmond-San Rafael Bridge, adjacent to the haul-out site. Average rates of disturbance after the end of construction (i.e., after 2005) are probably lower than those cited.

the San Juan Islands, Washington, recorded that 55% of kayakers (n=11) that came within 1 km of the haul-out site caused seals to flush, compared to 9% of motorized watercraft (n=436) (Suryan and Harvey 1999). In that study, most disturbances occurred when watercraft were within 300 m of a haul-out site. After detection by seals, motorized boats were able to approach the sites more closely than nonmotorized watercraft (Suryan and Harvey 1999). In Bolinas Lagoon, California, Allen et al. (1984) reported that most disturbances to seal haul-out sites were caused by nonmotorized boats, primarily canoes.

Paddle boats tend to travel closer to shore, potentially increasing the likelihood of disturbances (Suryan and Harvey 1999, Green et al. 2006). Harbor seal haul-out sites may in fact attract paddled boats, as boaters move closer to observe the seals. The behavior of paddled boats vs. motorboats is also a factor in seals' increased sensitivity; motorboats tend to maintain a constant heading and speed when moving past the haul-out site, whereas paddled boats often approach the site directly, changing speed and direction frequently (Kopec and Harvey 1995, Green et al. 2006). Furthermore, the ability to approach very quietly allows kayakers to get quite close to a haul-out site before detection, increasing the "surprise factor" and possibly eliciting a higher "startle response" in the seals (Borhorquez et al. 2000, Henry and Hammill 2001). Henry and Hammill (2001) suggest that the approach of paddled boats (slow, quiet and low to the water) may appear more like a predator than other types of watercraft.

A recently completed monitoring study of the three largest San Francisco Bay haul-out sites (Castro Rocks, Yerba Buena Island, and Mowry Slough) supports these findings; at two of the sites, kayaks within 200 m of the seals caused a higher proportion of flushes than other types of watercraft (Bohorquez et al. 2000), caused 15% and 20% of all watercraft-related disturbances, and usually approached closer to the haul-out sites (Green et al. 2006).

In addition to increased sensitivity to non-motorized watercraft, seals may be less likely to re-haul after a flush by kayaks and canoes, as these paddled boats tend to stay in the area longer than motorized watercraft (Henry and Hammill 2001). Seals are more sensitive to disturbance during pupping and molting seasons (mid-March through July) (Green et al. 2006, Suryan and Harvey 1999), and boating activities near haul-out sites during those months could affect reproductive activities. Disturbance-related mortality to pups can result from the stampeding nature of flushes, and the separation of mother-pup pairs during the early bonding period that can occur during these events (Johnson 1977, Calambokidis et al. 1991). Even small increases in levels of disturbance near haul-out sites during the pupping season could therefore result in reductions in pup survival at San Francisco Bay haul-out sites.

These studies and others have concluded that human activity can cause seals to flush off of haul-out sites, and that after a flush, numbers of seals on the haul-out site often do not recover fully (i.e., some seals did not return to the haul-out site immediately following the disturbance) (Allen et al. 1984, Calambokidis et al. 1991, Suryan and Harvey 1999). Thus, disturbance by humans, both inadvertent and deliberate, can cause declines in numbers of seals using terrestrial haul-out sites (Orr 1965, Terhune and Almon 1983, Allen et al. 1984, Hanan 1996). If sufficiently disruptive, disturbance may cause seals to abandon traditional haul-out sites (Newby 1973, Paulbitski 1975, Allen 1991). Following a flush, seals may remain in the water near the haul-out site, or move to another nearby haul-out site. In populated areas where haul-out space is limited,

such as San Francisco Bay, disturbance to existing haul-out sites can reduce the number of suitable haul-out sites in an area to a few, relatively remote sites (Terhune and Almon 1983), and may therefore have a considerable negative impact on seal populations in the area (Allen et al. 1984, Suryan and Harvey 1999, Lelli and Harris 1991). Harbor seals in San Francisco Bay generally forage within 3.2 miles of haul-out sites (Nickel 2003, Grigg 2008), and rely on these sites for resting between foraging trips. Studies on captive animals suggest that seals need haul-out time year round (Brasseur et. al., 1996).

The distance at which watercraft will cause seals to flush off of a site varies with a number of factors, including location, type of watercraft and watercraft behavior, number of seals on the site, and sensitivity of seals using the site. Most researchers studying disturbance to seals attempt to assess effects of any potential disturbance within 1 km of the site, but recommended distances for buffer zones (based on distances at which watercraft caused seals to flush) are generally in the 100 m range: at minimum, 91 m from the haul-out site, and preferably at least 150 m from the site when feasible (Allen et al. 1984, Calambokidis et al. 1991, Green et al. 2006, Johnson and Acevedo-Gutierrez 2007). A "boat exclusion zone" was set up at the Castro Rocks haul-out site during the seismic retrofit work on the adjacent Richmond-San Rafael Bridge, and appeared to be effective at minimizing disturbance to seals at this site (Green et al. 2006). The buoys marking the "boat exclusion zone" at Castro Rocks were located 91 m from the site on all sides except the eastern edge, where the nature of the site and adjacent bridge work necessitated a smaller distance (31 m).

OTHER MARSH SPECIES

As discussed in Section 3.7, WT-related activities could potentially impact existing wetlands. Disturbance of these habitats could affect the species resident in the wetlands. Three sensitive species of terrestrial mammals may be present in tidal salt marshes around the Bay: salt marsh harvest mouse, salt marsh wandering shrew, and Suisun ornate shrew. In addition, Northwestern pond turtles may be present in fresh to brackish marshes in parts of the project area, and vernal pool tadpole shrimp have the potential to occur in the project area. These marsh species are described below.

Salt Marsh Harvest Mouse

The salt marsh harvest mouse (*Reithrodontomys raviventris*) is endemic to the Bay Area, where its two subspecies inhabit the southern and northern reaches of the San Francisco Estuary (*R. r. raviventris* – San Francisco Bay; *R. r. halicoetes* – San Pablo Bay and Suisun Marsh, Contra Costa shoreline marshes; Shellhammer 2000a). It is federally- and state-listed as endangered.

The salt marsh harvest mouse is narrowly adapted to salt-influenced emergent marsh vegetation that is infrequently flooded. It has high affinity for pickleweed and associated vegetation, but it also occurs in adjacent grasslands, particularly in spring. Survival of its populations often depends on adequate cover (dense, tall vegetation or debris along terrestrial edges or levees of salt marshes, or along high tidal creek banks) when primary marsh habitats are flooded by extreme high tides. The salt marsh harvest mouse is also found in diked salt or brackish marshes, where it is often more abundant than in adjacent tidal marshes.

The distribution or abundance of the salt marsh harvest mouse in any particular marsh location is subject to annual and seasonal variation. It is likely that suitable habitats or populations of the

salt marsh harvest mouse would occur near some potential WT trailheads, and NMSBs may make intentional or emergency landings in or near salt marsh harvest mouse habitat.

Salt Marsh Wandering Shrew

The salt marsh wandering shrew (*Sorex vagrans halicoetes*) is a species of concern to federal and state resource agencies, but has no special legal protective status. Very little is known about its contemporary distribution or abundance in its geographic range in San Francisco Bay, but in the mid-20th century, shrews may have represented about 10% of small mammals occupying San Francisco Bay tidal marshes (Shellhammer 2000b). The salt marsh wandering shrew inhabits moist high or middle marsh plains with ample invertebrate prey, and ample cover provided by driftwood, litter, and debris. It is also probably dependent on flood refuge cover near or within marsh habitats it occupies, like the salt marsh harvest mouse. It is likely that suitable habitats or populations of the salt marsh wandering shrew would occur near some potential WT trailheads, and NMSBs may make planned or emergency landings in or near suitable habitat for this species.

Suisun Ornate Shrew

Like the salt marsh wandering shrew, the Suisun ornate shrew (*Sorex ornatus sinuosus*) is also a species of concern to federal and state resource agencies, and also has no special legal protective status. The Suisun shrew probably occurs in scattered populations in tidal brackish or salt marshes between the Petaluma River mouth and eastern Montezuma Slough, where it was formerly documented. Recent populations have been confirmed at few locations (MacKay 2000). Its habitat requirements appear to be similar to those of the salt marsh wandering shrew. It is likely that some, but relatively few, suitable habitats or populations of the Suisun shrew would occur near potential WT trailheads, and NMSBs may make intentional or emergency landings in or near habitat suitable for the Suisun ornate shrew.

Vernal pool tadpole shrimp

The vernal pool tadpole shrimp (*Lepidurus packardi*) is a federally listed endangered species that inhabits vernal pools and similar isolated seasonal pools that support prolonged, submerged, bare, muddy substrate during winter rainfall months. It occurs in seasonal wetlands near the Bay near Warm Springs, Fremont. While it has not been documented in the immediate vicinity of the Bay, it has the potential to occur in the project area. It is possible that NMSB users could make landings in or near habitat occupied by or suitable for this species. Potential impacts to the habitat of the vernal pool tadpole shrimp are addressed in Section 3.7.

Northwestern pond turtle

Northwestern pond turtles (*Clemmys marmorata marmorata*) are a species of concern for state and federal resource agencies because of widespread population declines and habitat losses, but they are not listed as threatened or endangered, and lack special legal protective status. They inhabit freshwater to fresh-brackish marshes, ponds, and tidal sloughs in the San Francisco Estuary and adjacent wetlands. Northwestern pond turtles occur rarely in the South Bay but at least one population is known from a portion of South Bay Salt Ponds pond A3W (EDAW et al. 2007), but none has been reported from brackish tidal sloughs (although these are considered potentially suitable habitat).

Northwestern pond turtles are widespread in the fresh to brackish tidal sloughs and non-tidal ponds (areas with seasonally and annually variable salinity) in Suisun Marsh. They may potentially occur in the fresher reaches of the Napa-Sonoma Marshes, but no information is

available on their distribution there. In Suisun Marsh, northwestern pond turtles bask on cohesive peat or mud banks of tidal creeks and sloughs, and large debris along banks, such as driftwood. It is possible that some populations or suitable habitats of the western pond turtle could occur near potential WT trailheads in Suisun Marsh or the northern Contra Costa shoreline, and that NMSB users could make landings in or near habitat occupied by or suitable for this species.

3.9.3 LOCAL SETTING

The proximity of the 112 Backbone Sites to haul-out sites, and marsh habitat and associated sensitive species varies. The distribution of sensitive habitats around the Bay is shown in Figures 3.7.2-1 and 3.9.2-1. Certain areas have also been specifically identified as sensitive in various planning documents, as described below. A Recovery Plan for the California clapper rail and salt marsh harvest mouse was released by USFWS in 1984. The 1984 plan still applies in principle, but it is outdated in terms of specific geographic areas targeted for conservation. It is being replaced with the Tidal Marsh Recovery Plan, which was issued in draft form on February 10, 2010 (USFWS 2010). The 1984 plan was based on trapping studies, some of which were completed in the 1970s. When issuing permits, USFWS no longer relies on trapping studies to determine whether salt marsh harvest mice may be present. It makes a call on "likely occupied" based on recent habitat suitability conditions and distribution of known past recurrent population localities.

3.9.4 REGULATORY SETTING

FEDERAL REGULATIONS AND PLANS

Federal regulations described in Section 3.7 -- Sections 7, 9, and 10 of the Endangered Species Act, Section 404 of the Clean Water Act, and Executive Order 11990 -- also apply to the protection of harbor seals and other marsh species. In addition, like other marine mammals in the U.S., harbor seals are protected under the Marine Mammal Protection Act (MMPA).

MARINE MAMMAL PROTECTION ACT (MMPA)

The MMPA prohibits the take of marine mammals in U.S. waters and the importation of marine mammals and marine mammal products into the U.S. The term "take" is defined as harassing, hunting, capturing, killing, or attempting to harass, hunt, capture, or kill any marine mammal. "Harassment" is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild; or the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. The NOAA Fisheries Service administers the MMPA in San Francisco Bay. The NOAA Fisheries Service policy on human interactions with wild marine mammals notes that

> "the MMPA does not provide for a permit or other authorization to view or interact with wild marine mammals, except for specific purposes such as scientific research. Therefore, interacting with wild marine mammals should not be attempted and viewing marine mammals must be conducted in a manner that does not harass the animals. NOAA Fisheries does not support, condone, approve, or authorize activities that involve closely approaching, interacting, or attempting to interact with whales, dolphins, porpoises, seals, or sea lions in the wild. This includes attempting to swim with, pet, touch, or elicit a reaction from the animals." (NMFS 2008)

In the context of the WT, "harassment" would be any action by a NMSB user that causes a change in the behavior of harbor seals on the haul-out site (e.g., causing seals to "flush" off the haul-out site into the water).

MAGNUSSON-STEVENS FISHERIES CONSERVATION ACT OF 2007

The Magnusson-Stevens Fisheries Conservation Act (MSRA), a national program administered by NOAA for the conservation and management of the fishery resources of the United States, is necessary to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of Essential Fish Habitat (EFH), and to realize the full potential of the nation's fishery resources. Under this Act, EFH has been identified to protect specific species of fish primarily from over fishing but also from non-fishing related activities such as dredging, filling, excavation, actions that contribute to non-point source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the functions of the EFH. This is achieved by Fish Management Plans (FMP) and designating EFH. EFH can include open waters, wetlands and eelgrass. Activities within EFH require consultation with NOAA.

EFH is determined by the habitat that a specific fish uses. All of San Francisco Bay is considered EFH for some species, and all wetlands along the Bay shore are also considered EFH. For Coho and chinook salmon and steelhead, EFH includes San Francisco Bay and any wetland areas within the Bay (NMFS 2009a). The EFH for groundfish is the San Francisco Bay estuary, including wetlands and eelgrass areas (NMFS 2009a). The EFH for pelagic fish (e.g., certain life stages of the northern anchovy and Pacific sardine among others) is also San Francisco Bay (NMFS 2009b).

COMPREHENSIVE CONSERVATION PLANS

A Comprehensive Conservation Plan (CCP) is being prepared for the San Pablo Bay NWR and is expected to be finished in 2010. A CCP for Don Edwards NWR is expected to be finished in 2012. Several haul-out sites for harbor seals are located in these NWRs.

STATE REGULATIONS

The California Endangered Species Act, described in Section 3.7, also applies to other types of wildlife, including certain marsh wildlife species. In addition, as discussed in Section 3.8, certain provisions of the California Fish and Game Code, Section 1600 et seq. (Streambed Alteration Agreements) also apply to wildlife. Finally, Executive Order W-59-93, the California Wetlands

Conservation Policy described in Section 3.7 applies to wetlands, and would protect the habitat of marsh-dependent species. Harbor seals are not listed as endangered, threatened or of special concern by the California Department of Fish and Game.

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Under the Porter-Cologne Water Quality Control Act, biological "beneficial uses" of state waters are subject to regulation through various means, including mandatory conditions attached to state water quality certification of Clean Water Act (Sections 401, 404) authorizations. Water and sediment quality are important factors in the health of marine mammals; these two factors are also regulated under the Porter-Cologne Water Quality Control Act. Finally, certain provisions of the Porter-Cologne Water Quality Control Act apply to wetlands, and would protect the habitat of marsh-dependent species. The Regional Water Quality Control Boards frequently provide Porter Cologne compliance with wetland beneficial use policies by attaching mandatory conditions to Section 401 certification for Corps permits for fill discharges in federal jurisdictional wetlands.

CALIFORNIA MARINE LIFE PROTECTION ACT OF 1999

The goal of the MLPA is to develop a cohesive network of protected marine areas to benefit marine dependent wildlife (refer to section 3.2 for further information). The MLPA has six goals for enhancing and developing the MPAs:

1. Protect the natural diversity and abundance of marine life, and the structure, function and integrity of marine ecosystems.
2. Help sustain, conserve and protect marine life populations, including those of economic value, and rebuild those that are depleted.
3. Improve recreational, educational and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and manage these uses in a manner consistent with protecting biodiversity.
4. Protect marine natural heritage, including protection of representative and unique marine life habitats in CA waters for their intrinsic values.
5. Ensure California's MPAs have clearly defined objectives, effective management measures and adequate enforcement and are based on sound scientific guidelines.
6. Ensure the State's MPAs are designed and managed, to the extent possible, as a network (CDFG 2009b).

LOCAL AND REGIONAL REGULATIONS

The provisions of the McAteer-Petris Act described in Section 3.7 would also apply to marsh-dependent wildlife species. The Bay Plan has policies to preserve and protect fish, other aquatic organisms, and wildlife for future generations. It states that tidal wetlands and subtidal habitat should be conserved, restored, and increased. Specific habitat that would protect or restore native and special status species is to be protected whether in the Bay or behind dikes.

3.9.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The significance of potential biological impacts to harbor seals and marsh-dependent wildlife is determined by regulatory requirements and by the scientific literature on ecology, conservation

biology, and related environmental sciences. Potential impacts to habitats for these species were addressed in Section 3.7. Potential impacts were considered significant if they would:

- Have a substantial adverse effect, either directly or indirectly through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, NOAA Fisheries, or U.S. Fish and Wildlife Service. A substantial adverse effect would occur if the project would:
    - Extirpate (cause local extinction of) a population
    - Cause or contribute to a substantial decrease in the distribution (range) or abundance of a sensitive or special status wildlife species, substantially diminish or degrade habitat of these species, reduce such a species' regeneration capacity in its existing or historic range, or otherwise reduce the viability of a sensitive or special-status wildlife species or community to the point at which a local population declines or becomes unstable
    - "Take" of one or more individuals of a threatened or endangered species
    - Disturb reproduction or foraging such that the project results in, or contributes to, a major, long-term reduction in diversity of native animal species due to a project-related substantial decrease in habitat use, optimal foraging, or reproductive success
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Cause a major, long-term reduction in diversity of native species and communities

METHODOLOGY

In most cases, impacts to biological resources were evaluated based on a number of factors: potential proximity of a potential WT trailhead or WT users to a resource, the sensitivity of that resource to disturbance, and temporal/spatial patterns of both disturbance and resource sensitivity.

HARBOR SEALS

The harbor seal impact assessment focuses on possible effects to primary haul out sites. The level of consistent use of the secondary haul-out sites is not known, as these sites have not been consistently surveyed. Secondary haul-out sites are identified when a potential impact may necessitate the collection of additional data on that haul-out site (e.g., number of seals using the site, timing and seasonality of use). As noted above, a single disturbance to hauled-out harbor seals during pupping/nursing could have significant impacts to those seals, although repeated disturbance is generally considered more likely to have serious impacts than isolated incidents. Not enough is known about the effects of non-powered watercraft on foraging (i.e., in water) seals to make predictions about potential impacts of increased use of seal foraging areas by WT users. Marine mammals have been shown to avoid water areas of increased noise from ships, etc. (e.g., Richardson et al. 1995). Where data were limited or missing regarding the potential for seals to respond to disturbances, a conservative (greater) distance was chosen as a potential disturbance distance, and mitigation measures were based on this conservative distance.

OTHER MARSH SPECIES

Potential impacts to marsh-dependent sensitive species were evaluated by considering the potential for WT-related construction activities and increased NMSB use to lead to habitat impacts and/or incidental take.

REGIONAL IMPACTS AND MITIGATION MEASURES

Impacts to harbor seals and marsh-dependent wildlife could occur both at the site-specific and regional levels. Potential regional impacts are described first, followed by site-specific impacts.

IMPACT BIO-12: REGIONAL IMPACTS ON SPECIAL-STATUS SMALL MAMMALS OF BAYLAND MARSHES

Regional impacts to marsh-dependent wildlife could result from damage to wetland habitat (trampling, see impact Bio-3), disturbance, and/or incidental take of one or more salt marsh harvest mice. Absent prevention efforts, the likelihood of trampling impacts would theoretically increase with increases in NMSB use, but the relative amount of increase is unknown. Increased WT use and particularly use of multiple locations could facilitate the spread of invasive plant species in wetland environments as discussed for Impact Bio-1. The spread of invasive plants may degrade salt marsh and brackish marsh habitats occupied by the salt marsh harvest mouse, Suisun ornate shrew, or salt marsh wandering shrew.

Take of a salt marsh harvest mouse could occur if a NMSB user landed their craft in a wetland area (e.g., as a result of an emergency, due to poor trailhead planning, or to sight-see). The boater(s) could inadvertently step on a nest and/or an individual mouse while landing or entering the habitat area. While the frequency of this type of entry into sensitive habitat by NMSB users is thought to be very small, it could increase with increased NMSB use due to implementation of the WT unless appropriate preventive measures are taken. WT Strategies 17, 18,19, 21 and 22 call for education of WT users through signage, brochures, the WT website, tour operators, boating clubs and other organizations, and use of trailhead stewards. Protection of environmental resources would be an integral part of the education and outreach efforts implemented as part of the WT. However, none of the strategies call for specific information pertaining to prevention of habitat damage resulting from trampling of wetland vegetation or spread of invasive species, or incidental take resulting from NMSB landings. Consequently, this impact is considered **potentially significant but mitigable**. With implementation of Mitigation Measure Bio-M12 and Mitigation Measures Bio-M2 and Bio-M3, both described in Section 3.7, this potential impact would be less than significant.

MITIGATION MEASURE BIO-M12: UNDERTAKE AVOIDANCE MEASURES

The best way to prevent potential impacts to marsh-dependent sensitive species is to ensure that NMSB users avoid areas that could potentially harbor these animals. The WT educational, outreach, and signage programs shall include general information on marsh-dependent sensitive species and their habitats, and shall encourage boaters to avoid entering the habitat. Educational materials shall include general information to help NMSB users recognize sensitive habitat, and, where applicable, include specific information about other nearby trailhead locations, to allow boaters to plan their routes and avoid landing in or entering sensitive habitat. To further discourage landings in sensitive habitat, educational materials shall also remind boaters about the possibility of becoming stuck at low tide if they pull out in the marsh.

Educational efforts will be phased, depending on the level of concern posed by a particular site. Signage and general educational materials would comprise the basic level of education. The educational materials provided by the WT will be available to all NMSB users, not just the small fraction of new users potentially attributable to implementation of the WT Plan. Education will therefore be an effective means of reducing the potential impacts to marsh-dependent sensitive species resulting from the implementation of the WT Plan.

At sites where there is a significant level of concern regarding potential NMSB user impacts to wetlands, as determined during the Trailhead Designation process or later, the WT shall work with the site owners/managers to encourage the implementation of docent programs at the trailhead to enhance the effectiveness of signage and related materials. The most extensive docent programs would include on-the-water docents to help direct boaters away from sensitive habitat and wildlife. Such on-the-water management of sensitive areas is the highest level of education and an effective means of preventing adverse human-wildlife interaction.

Mitigations Bio-M2 and Bio-M3, which would reduce trampling and help reduce the spread of invasive species, also will apply to this impact. Provided these mitigations are implemented, this impact would be less than significant.

IMPACT BIO-13: REGIONAL IMPACTS ON NORTHWEST POND TURTLES

In Suisun Marsh, boating at mid-to low tide along tidal sloughs may disturb Northwestern pond turtles, causing them to leave basking sites. If increased boating disturbances occur frequently enough, Northwest pond turtles may abandon scarce basking sites.

WT Strategies 17, 18,19, 21 and 22 call for education of WT users through signage, brochures, the WT website, tour operators, boating clubs and other organizations, and use of trailhead stewards. Protection of environmental resources would be an integral part of the education and outreach efforts implemented as part of the WT. However, none of the strategies call for specific information pertaining to boating in areas frequented by the Northwestern pond turtle. Consequently, this impact is considered **potentially significant but mitigable**. With implementation of Mitigation Measure Bio-M12, described above, this potential impact would be less than significant.

IMPACT BIO-14: DISTURBANCE TO HARBOR SEALS DUE TO INCREASED NMSB PRESENCE NEAR HAUL-OUT SITES

Most WT Backbone Sites would not be located near known or suspected harbor seal haul-out sites. Only two WT sites are located within 500 m of a known primary haul-out site: site M18 (Angel Island State Park: Ayala Cove) is located approximately 150 m from the Point Ione haul-out site, and site M8 (Clipper Yacht Harbor) is located approximately 280 m from the Sausalito Boatworks haul-out site (Figure 3.9.2-1). Both of these haul-out sites are located in populated areas currently exposed to high levels of use by watercraft, meaning that seals may already be habituated to relatively high levels of activity near the site. However, WT users could potentially travel near other, more distant and remote haul-out sites. Increases in NMSB activity due to the WT near known harbor seal haul-out sites could potentially impact populations of harbor seals by increasing their alertness/vigilance or causing them to move away from resting

spots towards or flush into the water. Increased levels of disturbance by NMSBs near haul-out sites could result in "take" due to disruption of normal behavioral and reproductive patterns.

In populated areas such as San Francisco Bay, disturbance caused by NMSBs could reduce the number of suitable haul-out sites in an area to a few, relatively remote sites (Terhune and Almon 1983), effectively reducing available terrestrial habitat for seals in the project area. A sudden decrease in use by seals (outside of normal seasonal patterns of site use) or the abandonment of any primary haul-out site (see Impact Bio-14, below) would represent a significant disruption of seal behavioral patterns. An increase in disturbance may be a particularly serious problem for pupping sites, which tend to be located in less disturbed areas; harbor seals may be slow to colonize new pupping sites (BCDC 2001). As described earlier, kayaks and canoes present a particular risk for disturbance to seals. The months of highest use by kayaks and canoes, May – October, overlap with the most sensitive seasons for San Francisco Bay seals: pupping (March – May) and molting (June-July).

The physical characteristics of some San Francisco Bay haul-out sites (gently sloping, unvegetated beaches, such as at Yerba Buena Island, or firm marsh peat shelves, such as at Mowry Slough) could actually attract boat landings by NMSBs. Human-powered watercraft, such as kayaks, have been seen landing on the Yerba Buena Island and Castro Rocks haul-out sites (E. Grigg, personal observation, 2008).

Haul-out sites within four miles of a WT site would be potentially reachable by kayakers,[42] although tides, currents, winds, and individual abilities will together determine how far NMSB users actually travel on the Bay in any particular instance (see discussion of kayaking distance under Section 2.2.4). The potential Backbone Sites that are within four miles of the primary and secondary haul-out sites are listed in Table 3.9.5-1. Although using these potential WT sites does not mean that a NMSB will travel to one of the haul-out sites and try to land there, it does mean that the NMSB could travel within the disturbance zone (100-150 meters) of the haul-out sites, and in particular could do so at a time of year that would be particularly harmful to harbor seals, as discussed above. This impact is considered **potentially significant but mitigable.**

MITIGATION MEASURE BIO-M14: REVIEW IMPROVEMENTS AT CERTAIN SITES AND IMPLEMENT EDUCATION AND OUTREACH

Protecting haul-out sites is an essential part of protecting harbor seal populations. Implementation of the following mitigation measures would reduce project-related disturbance to a less than significant level.

Mitigation Measure Bio-M14A: Educate NMSB Users in Vicinity of Pupping Sites
As part of the trailhead designation process and preparation of Trailhead Plans, WT sites that are within four miles of a harbor seal pupping site (see Table 3.9.5-2) shall be reviewed for their potential to increase NMSB use as a result of designation and/or any improvements that are being considered. If such a potential is found to exist and the CEQA review determines that the potential increased use could adversely affect the pupping site, the Trailhead Plan shall include

[42] This estimate is based on an informal survey of local individuals knowledgeable about kayak use in San Francisco Bay and is consistent with the kayaking range described in Section 5.1 of the WT Plan under "Launches." See Section 2.2.4 for a more detailed discussion.

TABLE 3.9.5-1. PROPOSED WT BACKBONE SITES LOCATED WITHIN 4 MILES OF KNOWN HARBOR SEAL HAUL-OUT SITES[1]

Site Map Key[43]	Water Trail Site Name	HOS?	Primary Haul-Out Sites within 4 miles[2]	Secondary Haul-Out Sites within 4 miles[2]
A1	Albany Beach	No	BI	
A2	Berkeley Marina, Ramp	Yes	BI	TR
A4	Point Emery	No		TR
A5	Shorebird Park	No		TR
A6	Emeryville City Marina	Yes	YBI	TR
A8	Middle Harbor Park	Yes	YBI	AB, TR
A9	Jack London Square/CCK	Yes		AB
A11	Estuary Park/ Jack London Aquatic Center	Yes		AB
A12	Grand Avenue Boat Ramp	Yes		AB
A14	Robert Crown Memorial State Beach	Yes		AB
A15	Encinal Launching and Fishing Facility	Yes		AB
A24	Jarvis Landing	No	NS, MS	
A26	Berkeley Marina, Small Boat Launch	Yes	BI	TR
A27	Coyote Hills	No		UC
CC8	Point Molate Beach Park	No	CR	RR
CC9	Keller Beach	Yes	CR, BI, BP	RR
CC10	Ferry Point	Yes	BI, CR, BP, PI	RR
CC11	Boat Ramp Street Launch Area	No	CR, BI	RR
CC14	Richmond Municipal Marina	Yes	BI, CR	
CC15	Marina Bay Park/Rosie the Riveter	No	BI, CR	
CC16	Shimada Friendship Park	Yes	BI	
CC17	Barbara & Jay Vincent Park	Yes	BI, CR	
CC19	Point Isabel Regional Shoreline	Yes	BI	
CC20	SS Red Oak Victory	No	BI, CR	
M1	Kirby Cove	Yes	PBO, SB	PP, AL
M2	Horseshoe Cove	Yes	SB, PI, PBO, PBL, BP	PP, AL
M3	Swede's Beach	No	SB, PI, BP, PBL, PBO	PP, AL
M4	Turney Street Public Boat Ramp	No	SB, PI, BP, PBL, PBO	PP
M5	Dunphy Park	Yes	SB, PI, BP, PBO, PBL	PP
M6	Schoonmaker Point	Yes	SB, PI, BP, PBO, PBL	PP
M8	Clipper Yacht Harbor	No	SB, PI, BP, PBO	PP
M10	Shelter Point Business Park	Yes	SB, CM	PP

[43] Site locations are shown on Figure 3.9.2-1

TABLE 3.9.5-1. PROPOSED WT BACKBONE SITES LOCATED WITHIN 4 MILES OF KNOWN HARBOR SEAL HAUL-OUT SITES[1]

Site Map Key[43]	Water Trail Site Name	HOS?	Primary Haul-Out Sites within 4 miles[2]	Secondary Haul-Out Sites within 4 miles[2]
M11	Bayfront Park	Yes	SB, CM	
M13	Brickyard Park	No	SB, CM, BP, PI	PP
M16	Richardson Bay Park/Blackies Pasture	No	SB, CM, BP, PI	PP, RR
M17	Angel Island State Park (Kayak Camp)	Yes	PI, BP, PBL, SB	PP, AL
M18	Angel Island State Park (Ayala Cove)	Yes	PI, BP, PBL, SB	PP, AL
M19	Sam's Anchor Cafe,	No	PI, BP, SB, PBL	PP, AL, RR
M25	Higgins Dock	No	CM	
M27	Bon Aire Landing	No	CM	
M28	Marin Rowing Association Boathouse	No	CM	
M29	Ramillard Park	No	CM	
M30	San Quentin	No	CM, CR	RR
M31	Jean & John Starkweather Shoreline Park	No	CM, CR	RR
M33	Harbor 15 Restaurant	No	CM	
M35	Loch Lomond Marina: Ramp	Yes	CM	
M36	Loch Lomond Marina: Beach	Yes	CM	
SC2	Alviso Marina	No	GS, CC	DR
SC3	Palo Alto Baylands Launching Dock	Yes	NS	CP
SF2	India Basin Shoreline Park	Yes		AB
SF6	The Ramp	No	YBI	AB
SF7	Pier 52 Boat Launch	Yes	YBI	AB, TR
SF8	South Beach Harbor (AKA Pier 40)	No	YBI	TR, AL, AB
SF9	Treasure Island	No	YBI, PBL	TR, AL
SF10	Aquatic Park	Yes	PBL, YBI	AL, TR
SF11	Gas House Cove (aka Marina Green)	No	PBL, YBI	AL, TR, PP
SF12	Crissy Field	Yes	PBL	AL, PP
SF13	Brannan St Wharf	No	YBI	TR, AL
SF14	Northeast Wharf Park	No	YBI, PBL	AL, TR
SM2	Ravenswood Open Space Preserve	No	NS, GI	
SM4	Redwood City Municipal Marina	Yes	CS, GI, BA	BS
SM6	Docktown Marina	No	CS, GI, BA	BS
SM9	Redwood Shores Lagoon	No	CS, BA, GI	BS
SM11	Beaches on the Bay	No	BA, CS	BS, CO
SM12	Foster City Lagoon Boat Park	No	BA, CS	BS, CO

TABLE 3.9.5-1. PROPOSED WT BACKBONE SITES LOCATED WITHIN 4 MILES OF KNOWN HARBOR SEAL HAUL-OUT SITES[1]

Site Map Key[43]	Water Trail Site Name	HOS?	Primary Haul-Out Sites within 4 miles[2]	Secondary Haul-Out Sites within 4 miles[2]
SM13	East 3rd Ave	Yes		CO, BS
SM16	Seal Point Park	Yes		CO, BS
SM17	Coyote Point, Marina	Yes		CO
SM18	Old Bayshore Highway	No		CO
SM23	Coyote Point, Beach	Yes		CO
SM24	Westpoint Marina	No	GI, CS, BA	BS
SM25	Corkscrew Slough Viewing Platform	No	CS, BA, GI	BS

[1]Cells in the table left blank indicate that no primary (or secondary, depending on column) haul-out site is located within 4 miles of that particular WT site.

[2]Haul-out sites are listed in order of increasing distance from the Bay Water Trail site; abbreviations are as follows:

Alameda Breakwater (AB), Alcatraz (AL), Bair Island (BA), Belmont Slough (BS), Bluff Point (BP), Brook's Island (BI), Calaveras Point (CP), Castro Rocks (CR), Corkscrew Slough (CS), Corte Madera (CM), Coyote Creek (CC), Coyote Point (CO), Drawbridge (DR), Greco Island (GI), Guadalupe Slough (GS), Mowry Slough (MS), Newark Slough (NS), Peninsula Point (PP), Point Blunt (PBL), Point Ione (PI), Red Rock (RR), Ryer Island (RI),
Sausalito Boatworks (SB), , Treasure Island (TR), Tubbs Island (TI), Union City Shoreline (UC), Yerba Buena Island (YBI)

TABLE 3.9.5-2. PROPOSED WT BACKBONE SITES LOCATED WITHIN 4 MILES OF KNOWN HARBOR SEAL PUPPING SITES[1]

Site ID	Water Trail Site Name	HOS?	Pupping sites within 4 miles[1]
A24	Jarvis Landing	No	NS, MS
CC8	Point Molate Beach Park	No	CR
CC9	Keller Beach	Yes	CR,
CC10	Ferry Point	Yes	CR,
CC11	Boat Ramp Street Launch Area	No	CR
CC14	Richmond Municipal Marina	Yes	CR
CC15	Marina Bay Park/Rosie the Riveter	No	CR
CC17	Barbara & Jay Vincent Park	Yes	CR
CC20	SS Red Oak Victory	No	CR
M10	Shelter Point Business Park	Yes	CM
M11	Bayfront Park	Yes	CM
M13	Brickyard Park	No	CM
M16	Richardson Bay Park/Blackies Pasture	No	CM
M25	Higgins Dock	No	CM
M27	Bon Aire Landing	No	CM
M28	Marin Rowing Association Boathouse	No	CM
M29	Ramillard Park	No	CM
M30	San Quentin	No	CM, CR
M31	Jean & John Starkweather Shoreline Park	No	CM, CR
M33	Harbor 15 Restaurant	No	CM
M35	Loch Lomond Marina: Ramp	Yes	CM
M36	Loch Lomond Marina: Beach	Yes	CM
SC3	Palo Alto Baylands Launching Dock	Yes	NS
SM2	Ravenswood Open Space Preserve	No	NS, GI
SM4	Redwood City Municipal Marina	Yes	CS, GI, BA
SM6	Docktown Marina	No	CS, GI, BA
SM9	Redwood Shores Lagoon	No	CS, BA, GI
SM11	Beaches on the Bay	No	BA, CS
SM12	Foster City Lagoon Boat Park	No	BA, CS
SM24	Westpoint Marina	No	GI, CS, BA
SM25	Corkscrew Slough Viewing Platform	No	CS, BA, GI

[1]Haul-out sites are listed in order of increasing distance from the Water Trail site; abbreviations are as follows: Bair Island (BA), Castro Rocks (CR), Corkscrew Slough (CS), Corte Madera (CM), Greco Island (GI), Mowry Slough (MS), Newark Slough (NS),

provisions for educating NMSB users regarding appropriate buffer distances for pupping sites, and the Trailhead Plan may be revised to modify or eliminate proposed site improvements.

Mitigation Measure Bio-M14B: Buffer Zone Signage and Other Markers
The following measures apply to all proposed WT site Trailhead and Signage Plans of sites within four miles of a primary or secondary seal haul-out site:

- Signage shall be used to notify boaters not to land their watercraft on seal haul-out sites. Signage shall also educate users about appropriate buffer zones. Although the practical size of a buffer zone will vary based on the nature of the haul-out site and navigational hazards in the area, buffer zones shall aim to keep boaters at least 100 meters from the haul-out site, and at least 150 meters from the site when feasible from March through July (during pupping and molting seasons). Whenever feasible, watercraft buffers should be marked by buoys placed near the haul-out site, as was done at the Castro Rocks haul-out site during construction near that site (see Green et al. 2006), and in Elkhorn Slough, California. Buoys should be clearly marked to indicate their purpose to WT users.

- Information on ways for WT users to view seals without causing disturbance shall be included in WT promotional materials, signage, training, on the website, and onsite educational and interpretive panels. . Such information is available through a number of organizations, including the NOAA Fisheries Office of Protected Resources (online at http://www.nmfs.noaa.gov/pr/education/viewing.htm). Information to be provided shall include:
  - Maintaining a minimum distance (approximately 100 meters) from the haul-out site at all times and at least 150 meters from March through July.
  - Maintaining a constant heading and speed while passing a haul-out site; avoiding stopping or sudden changes in heading or speed; avoiding paddling directly at resting seals
  - If seals show signs of disturbance (e.g., all seals on the haul-out are watching the NMSB, or seals begin to approach the water), the NMSB shall move further away from the haul-out site
  - Additional information on the importance of responsible wildlife viewing practices shall be included in WT promotional materials and signage.
  - Educational materials, outreach and signage shall include information on what boaters shall do in the event that they see an injured, sick, or dead seal, or an (apparently) abandoned seal pup (e.g., recommendations to not approach wildlife, contact information for the local marine mammal stranding and rehabilitation organization[44]). The recommendations for what to do in these circumstances shall be consistent with those available from The Marine Mammal Center[45].

[44] For the San Francisco Bay area, this is The Marine Mammal Center, Sausalito, 415.289.SEAL (7325).

[45] Available online at http://www.marinemammalcenter.org/what_we_do/rescue/whattodo.asp

IMPACT BIO-15: AVOIDANCE OR ABANDONMENT OF TRADITIONAL HARBOR SEAL HAUL-OUT SITES DUE TO INCREASED NMSB USE

Regional development and increased use of the various WT sites could result in potentially significant adverse impacts to harbor seals, due to increased bay-wide presence of NMSBs, or presence of such watercraft in "new" areas promoted by the WT. Repeated disturbance from locally increased use could cause stress and health impacts to harbor seals unable to rest and eventually could cause seals to abandon haul-out sites altogether (Calambokidis et al. 1991, Newby 1973, Paulbitski 1975, Allen 1991). Long-term impacts to harbor seals, including decreased numbers of seals using traditional sites, or abandonment of these sites, are generally monitored using site surveys, as described above, and/or aerial surveys of haul-out sites such as those conducted by the CDFG and NOAA Fisheries (e.g., Grigg et al. 2004, Green et al. 2006).

A number of haul-out sites in the South San Francisco Bay are located on Don Edwards San Francisco Bay NWR land. Access to these sites is therefore covered by NWR regulations. Mowry Slough, the largest pupping site in San Francisco Bay, is located within the Don Edwards San Francisco Bay NWR, and access to Mowry Slough is closed to boats during the pupping season (March 15th to June 15th). A similar seasonal closure is being considered for Corkscrew Slough. The Yerba Buena Island haul-out site is located on USCG land, and boats are not permitted to land on this site, although the topography of the site makes this difficult for USCG personnel to monitor.

Based on the levels of WT use described in Chapter 2, increases in disturbances to haul-out sites due to implementation and promotion of the WT are unlikely to be dramatic. However, any increase in levels of disturbance to haul-out sites by NMSBs, particularly during sensitive seasons such as pupping, has the potential to result in a reduction in numbers of seals using that site. In populated areas such as San Francisco Bay, where availability of alternate haul-out sites is limited, this could reduce available suitable terrestrial habitat for seals.

Several WT sites are located within kayaking distance of pupping sites. Movement between Point Molate Beach Park (CC8), Keller Beach (CC9), and Ferry Point (CC10), or between CC8 and the Richmond Marina sites (CC14-17, and CC20) could increase disturbance to the Castro Rocks haul-out and pupping site during the pupping and molting seasons. Westpoint Marina (SM24) and Corkscrew Slough (SM25) are located in kayaking distance of harbor seal haul-out and pupping sites on Corkscrew Slough, Bair Island and Greco Island, and increased NMSB use originating from Westpoint Marina and Corkscrew Slough could increase disturbance to these haul-out sites during the pupping and molting seasons. Jarvis Landing (A24) and Alviso Marina (SC2) are in kayaking distance of the haul-out and pupping sites Mowry Slough and Newark Slough, and increased NMSB use originating from Jarvis Landing and Alviso Marina could increase disturbance to these haul-out sites during the pupping and molting seasons.

This impact is considered **potentially significant but mitigable**.

MITIGATION MEASURE BIO-M15: SEASONAL CLOSURES, MONITORING AND ADAPTIVE MANAGEMENT

The WT will work with USFWS and CDFG and NOAA to evaluate which WT sites present a potential concern for impacts to pupping or molting seals. These agencies would determine whether any WT site would require a seasonal closure. WT sites closest to harbor seal pupping sites (i.e., sites from which users would be most likely to come in proximity to a pupping site) may be closed during the pupping and molting season, in accordance with WT Plan Strategy 24 (Limitations on Trail Head Use), if DFG or USFWS make the determination that it is appropriate to do so, and the site owner/manager agrees to the closure. The WT sites near the largest pupping sites, Mowry Slough and Castro Rocks, are of particular concern. Mowry Slough is already seasonally closed by the USFWS from March 15 through June 15.

The need for seasonal restrictions on use of waters near harbor seal haul-out sites during sensitive seasons (primarily pupping, but also molting due to high numbers of seals present during this season) will also be determined by DFG, NOAA and USFWS. Any such recommended seasonal closures will be publicized via WT literature, web site, paddling groups, etc.

Information provided by resource agencies about the numbers of seals using haul-out sites in the project area (i.e., in the vicinity of trailheads) shall be assessed by WT staff on a yearly basis, to ensure that seal use of these sites is not declining. This is particularly important for the listed primary haul-out sites (Table 3.9.2-1). This monitoring is consistent with WT Plan Strategy 16 (Monitoring Impacts). Survey data may be obtained from ongoing monitoring projects, such as the monthly seal surveys conducted by the Don Edwards San Francisco Bay NWR, which encompasses Mowry and Newark Sloughs, the regional surveys coordinated by the National Park Service, or from agencies that monitor seal numbers at various haul-out sites (NOAA, DFG). Maximum counts collected during these surveys shall be compared to available counts data for these sites for previous years (e.g., Kopec and Harvey 1995, Green et al. 2006). In the absence of available baseline ground counts data for a given haul-out site, yearly aerial survey data collected by the CDFG and NOAA Fisheries shall be examined for evidence of declining numbers. In the event that numbers at a given haul-out or pupping site are found to be declining, the WT shall consult with the resource agencies and implement the agencies' recommendations in any future Trailhead Plans or revised Trailhead Plans for sites that may be contributing to this decline.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT BIO-16: CONSTRUCTION AND TRAILHEAD IMPACTS ON SPECIAL-STATUS ANIMALS OF BAYLAND MARSHES

At sites where WT implementation may lead to increased use and/or construction of new facilities, both direct and indirect impacts to marsh-dependent special status species could occur. Direct impacts could occur from "take" of a salt marsh harvest mouse if one or more individuals are injured or killed as a result of construction or recreational activities at a WT trailhead. Increased use and construction could also lead to trampling of sensitive wetland vegetation at the trailhead (Impact Bio-3). This could displace salt marsh harvest mice and other sensitive marsh species from existing habitat, and therefore lead to loss of individuals or population declines. Northwestern pond turtle basking sites in Suisun Marsh could be subject to increased disturbance if WT outreach or WT-funded construction of new facilities leads to increased NMSB presence

in sloughs where turtle basking sites are present, or if WT-related construction creates a direct disturbance to basking sites.

In addition, food waste associated with increased WT-related use of trailheads could attract and/or increase local populations of non-native terrestrial predators such as feral cats, red fox, or Norway rats. At trailheads in the vicinity of marsh habitats occupied by special-status small mammals, these predators may contribute to population declines of special-status small mammals. This impact is **potentially significant but mitigable**.

MITIGATION MEASURE BIO-M16: UNDERTAKE WASTE MANAGEMENT, PREDATOR CONTROL, AND BASKING IMPACT MINIMIZATION

The trailhead designation process shall include evaluation of the potential for special status animal species to occur on or near the site. If special status animal species potentially occur at or adjacent to proposed trailheads and the Trailhead Plan involves facility development or other WT activities that may substantially increase site use, the following mitigation measures shall be incorporated into the Trailhead Plan:

- Trailhead owners/managers shall provide adequate waste disposal containers, and shall ensure that waste disposal containers are inaccessible to non-native predators (Norway rats, feral cats, red fox) to the greatest extent feasible.
- State and federal wildlife agencies shall be consulted during the preparation of the Trailhead Plan to determine the need for predator control measures to control any potential increases in predator populations resulting from implementation of the WT. Trailhead sponsors shall implement non-native predator control if state or federal wildlife agencies conclude that it is warranted to protect special-status mammal populations in local marshes from potential increased predator presence attributable to implementation of the WT.
- For trailheads within Suisun Marsh, state and federal wildlife agencies will be consulted during the preparation of the Trailhead Plan to determine whether significant basking sites for Northwestern pond turtles occur along sloughs in the vicinity of trailheads. If significant basking sites are present where NMSB use may increase as a result of the WT, trailhead owners/managers shall consult with state and federal wildlife agencies to prepare and implement feasible plans to avoid or minimize boater disturbance of Northwestern pond turtle basking sites. Mitigation measures may include seasonal closures, signage to discourage boater approach of basking sites, or placement of alternative basking structures (large woody debris) in reaches of sloughs where CDFG surveys have shown that turtles are present, and that are subject to less frequent disturbance by boaters.
- Prior to any construction at a WT trailhead, sponsors shall evaluate the potential for sensitive habitat to occur at or in the immediate vicinity of the construction area, and shall avoid any construction measures in potentially sensitive habitat, if feasible. If avoidance of the habitat is infeasible, then the site sponsor shall coordinate with USFWS regarding data collection needs and implement buffers, best management practices, or avoidance measures as recommended by USFWS.

Mitigations Bio-M2 and Bio-M3 also would apply to this impact.

IMPACT BIO-17: DISTURBANCE TO HARBOR SEALS DUE TO CONSTRUCTION

Based on the range of distances at which construction-related disturbance sources caused seals to flush off a haul-out site as reported elsewhere (Green et al. 2006), short-term disturbances to seals due to construction of new facilities and improvements (including signage) at new or existing WT sites would most likely only impact seals on haul-out sites located within 500 m of a WT site. This distance is greater than the recommended buffer distance for watercraft, as construction work tends to be associated with sudden increases in novel disturbance sources, noise and vibration. As discussed earlier, only two WT sites are located within 500 m of a known primary haul-out site: site M17 (Angel Island State Park) is located approximately 150 m from the Point Ione haul-out site, and site M8 (Clipper Yacht Harbor) is located approximately 280 m from the Sausalito Boatworks haul-out site (Figure 3.9.2-1). Both of these haul-out sites are located in populated areas currently exposed to high levels of use by boaters, etc., meaning that seals may already be habituated to relatively high levels of activity near the site. In addition, WT site M17 is an HOS, meaning that construction work there would be minimal. The potential impact from site M8 and any future WT sites that may be located within 500 m of a haul-out is considered **potentially significant but mitigable.**

MITIGATION MEASURE BIO-M17: PROVIDE MITIGATION FOR DISTURBANCE TO HARBOR SEALS DUE TO CONSTRUCTION/IMPROVEMENTS AT WT SITES

The Trailhead Plan for any WT sites located within 500 m of a primary haul-out site shall require pre-construction ground-based haul-out site surveys. The surveys shall be conducted by qualified seal biologists, and shall encompass a complete tidal cycle (i.e., both the low and high tides) for 1-3 days prior to construction work to provide information on the tide and timing of site use by seals. In bays and estuaries such as the San Francisco Bay, tide height is a primary factor influencing number of seals ashore (Thompson et al. 1997). If feasible based on other constraints, construction and improvements to the affected WT site shall be conducted at a time/tide height when seals are not likely to be present on the site, thereby avoiding potential disturbance to resting seals. Alternately, again following Green et al. (2006), workers shall remain a minimum of 150 m from the seal haul-out site (the average distance at which a terrestrial construction activity caused seals to flush was 173 m). Visual barriers such as tarps shall be placed between the WT site and the seal haul-out site, if the work would be visible to seals on the haul-out site.

None of the proposed Backbone Sites are located within 500 meters of a pupping site. If in the future a new WT trailhead is proposed within 500 meters of a pupping site, in addition to the requirements outlined above, any construction at these future sites shall be conducted outside the pupping and molting seasons.

3.10 CULTURAL RESOURCES

This section identifies potential cultural resources impacts that could result from the proposed project. Cultural resources include historical and archaeological resources. This section is based on a cultural resources overview report prepared by Holman & Associates (2007).

3.10.1 INITIAL STUDY FINDINGS

The Initial Study found that potentially significant impacts to historical and archaeological resources, or buried human remains may occur from implementation of the Water Trail. The IS found that the project would not have the potential for significant impacts on paleontological resources.

3.10.2 REGIONAL SETTING

Archaeological research has documented continuous occupation and/or use of the Bay margin beginning as much as six thousand years ago, building in intensity over the past three thousand years, ending with the arrival of the Spanish in the late 18th century. The earliest occupation sites of the Native Americans, dating back as much as 9,000 years before the present, were clustered around the banks of the rivers which drained into what is now San Francisco Bay. Rising water levels have flooded these site locations under many feet of water. Several locations in the Bay counties have yielded archaeological materials dating back 6,000 years that are right at or above the current Bay shoreline.

The earliest occupation layers at these sites were created by Native Americans who had immigrated into the Bay Area from the Great Basin east of the Sierras. These people were big game hunters with little experience in collecting the principal food source (shellfish) found along the Bay margin. Within a very short time period these new arrivals learned when it was safe to eat shellfish, the remains of which began to appear in visible quantities at their villages and smaller procurement sites.

Over the past two to three thousand years, this enhanced food resource base and an increase in immigration from outside the Bay Area led to a huge population jump in the Bay counties along the Bay margin: villages comprised of cultural soils (midden) containing large amounts of shellfish were up to 40 feet high, covering several acres in locations in Alameda and Contra Costa Counties. Population concentrations grew so dense that Native American villages containing shellfish remains and other foods taken from the Bay margins were established at locations several miles from the actual food collection areas. The archaeological record suggests that population density was still on the rise at the time of the arrival of the Spanish in the late 18th century. By 1805, there were no Native peoples practicing their former food gathering activities anywhere near San Francisco Bay.

3.10.3 LOCAL SETTING

As described in Table 3.10.3-1, based on the literature review, 37 WT Backbone Sites were identified as potentially containing or overlapping with recorded archaeological sites and 75 others did not show any archaeological sites present. Of the 75 WT site locations for which the literature search showed no archaeological sites present, 32 had been subject to site-specific

TABLE 3.10.3-1. WT SITES AND ARCHAEOLOGICAL SITES

Site Map Key[46]	USGS Quad	Overlap Known Archaeological Sites?	Site-Specific Surveys/ Evaluations Conducted?	Comments
A1	Richmond	Yes	No	Note 1
A2	Oakland West	No	No	
A4	Oakland West	No	Yes	
A5	Oakland West	Yes	Yes	
A6	Oakland West	No	No	
A8	Oakland West	No	Yes	
A9	Oakland West	No	Yes	
A11	Oakland West	No	Yes	
A12	Oakland West	No	No	Adjacent to border of Oakland East
A14	Oakland West	No	No	
A15	Oakland West	No	No	
A18	San Leandro	Yes	Yes	East side of channel has survey, no site
A20	San Leandro	No	Yes	
A22	Redwood Point	Yes	No	Note 1
A24	Newark	No	No	
A25	Oakland East	No	No	
A26	Oakland West	No	No	
A27	Redwood Point	No	No	
A28	San Leandro	No	Yes	N322 & N323 ½ mile to NE
A30	San Leandro	No	Yes	
CC1	Benicia	No	No	
CC2	Benicia	No	No	
CC5	Mare Island	Yes	No	Note 1

[46] See figures 2.1.4-1A and 2.1.4-1B

TABLE 3.10.3-1. WT SITES AND ARCHAEOLOGICAL SITES

Site Map Key[46]	USGS Quad	Overlap Known Archaeological Sites?	Site-Specific Surveys/ Evaluations Conducted?	Comments
CC6	Mare Island	No	No	
CC8	San Quentin	Yes	Yes	
CC9	San Quentin	No	No	
CC10	San Quentin	Yes	No	Note 1
CC11	Richmond	No	No	
CC14	Richmond	No	Yes	
CC15	Richmond	Yes	Yes	
CC16	Richmond	No	Yes	
CC17	Richmond	No	Yes	
CC19	Richmond	Yes	Yes	
CC20	Richmond	Yes	Yes	
CC21	Mare Island	No	Yes	
CC22	Honker Bay	No	Yes	
CC23	Mare Island	No	No	
M1	San Francisco North	No	No	
M2	San Francisco North	No	No	
M3	San Francisco North	Yes	No	Note 1
M4	San Francisco North	Yes	No	Note 1
M5	San Francisco North	No	No	
M6	San Francisco North	No	Yes	
M8	San Francisco North	Yes	No	Note 1
M10	San Rafael	No	No	
M11	San Rafael	No	No	
M13	San Rafael	No	No	Near edge for San Quentin
M16	San Quentin	Yes	Yes	

TABLE 3.10.3-1. WT SITES AND ARCHAEOLOGICAL SITES

Site Map Key[46]	USGS Quad	Overlap Known Archaeological Sites?	Site-Specific Surveys/ Evaluations Conducted?	Comments
M17	San Francisco North	Yes	Yes	
M19	San Francisco North	No	No	
M25	San Rafael	No	Yes	
M27	San Rafael	Yes	No	Note 1
M28	San Rafael	No	No	
M29	San Quentin	No	Yes	Adjacent to border of San Rafael
M30	San Quentin	No	Yes	
M31	San Quentin	No	Yes	
M33	San Rafael	No	Yes	
M35	San Quentin	Yes	Yes	
M36	San Quentin	Yes	Yes	
M38	San Quentin	Yes	Yes	
M39	Petaluma Point	Yes	Yes	
M40	Petaluma Point	Yes	Yes	
M41	Novato	No	Yes	
M43	Novato	Yes	Yes	
M47	Novato	Yes	No	Note 1
N1	Cuttings Wharf	No	Yes	
N2	Napa	Yes	Yes	Sites NSD-3, 4
N6	Cuttings Wharf	No	No	
N7	Cuttings Wharf	Yes	No	Note 1
N8	Napa	No	No	
SC2	Milpitas	Yes	Yes	
SC3	Mountain View	No	Yes	
SF1	San Francisco South	No	Yes	

TABLE 3.10.3-1. WT SITES AND ARCHAEOLOGICAL SITES

Site Map Key[46]	USGS Quad	Overlap Known Archaeological Sites?	Site-Specific Surveys/ Evaluations Conducted?	Comments
SF2	Hunters Point	Yes	No	Note 1
SF4	San Francisco South	No	Yes	
SF6	San Francisco North	No	Yes	
SF7	San Francisco North	No	Yes	
SF8	San Francisco North	No	Yes	
SF9	Oakland West	Yes	Yes	
SF10	San Francisco North	Yes	Yes	
SF11	San Francisco North	Yes	Yes	
SF12	San Francisco North	Yes	Yes	
SF13	San Francisco North	No	Yes	
SF14	San Francisco North	No	No	
SM2	Palo Alto	No	No	Assumed to be Palo Alto based on landform Redwood Pt., Newark, Mountain View
SM4	Redwood Point	No	No	
SM6	Palo Alto	No	No	
SM9	San Mateo	No	Yes	
SM11	San Mateo	No	No	
SM12	San Mateo	No	No	
SM13	San Mateo	No	Yes	
SM16	San Mateo	No	No	
SM17	San Mateo	Yes	No	Note 1
SM18	San Mateo	Yes	Yes	
SM20	San Francisco South	No	No	
SM21	San Francisco South	No	No	
SM22	San Francisco South	No	No	
SM23	San Mateo	Yes	No	Note 1

TABLE 3.10.3-1. WT SITES AND ARCHAEOLOGICAL SITES

Site Map Key[46]	USGS Quad	Overlap Known Archaeological Sites?	Site-Specific Surveys/ Evaluations Conducted?	Comments
SM24	Redwood Point	No	Yes	
SM25	Redwood Point	No	No	
SN3	Cuttings Wharf	No	No	Adjacent to border of Sears Point
SN5	Petaluma River	Yes	No	Note 1
SN6	Petaluma River	No	No	
SN7	Petaluma	No	No	
SO1	Mare Island	No	No	
SO2	Benicia	Yes	No	P-81 probably historic bldg; Note 1
SO5	Denverton	No	Yes	
SO7	Benicia	No	No	
SO8	Benicia	No	No	
SO9	Benicia	Yes	Yes	
SO10	Benicia	No	Yes	
SO12	Fairfield South	No	No	

Note:
1. Certain Backbone sites are located in areas where historic research indicates the presence of an archeological site, but no site-specific surveys and/or follow-up evaluation are known to have been conducted.

cultural resources investigations as part of past CEQA reviews and 43 had not. In addition to these 75 sites, 15 other WT locations overlap archaeological sites that were recorded either informally or in studies by academic institutions before CEQA regulations required such studies.

The high number of WT sites that contain or are near recorded archaeological sites should be considered a reliable gauge of the likelihood that additional archaeological sites would be found if formal surveys were undertaken in areas not previously surveyed. When N.C. Nelson undertook his survey of the Bay margins at the beginning of the 20th century, he focused on the larger and most easily accessible of the shell mounds. His research strategy at the time clearly did not compel him to complete a thorough search of the Bay margins and adjacent lands for signs of occupation.

Subsequent formal archaeological studies driven by CEQA and the National Historic Preservation Act have led to the discovery of numerous additional shell mounds in Bay margin

settings as development has opened up formerly restricted areas for research. Actual development activities have led to the discovery of numerous additional archaeological deposits, buried under fill and buildings (in particular, the World War II ship building locations) which took advantage of the Bay shoreline beginning in the mid 20th century and extending up to the present.

In summary, the original premise that Native American villages were located in restricted locations at the beginning of the 20th century has changed to an understanding that seasonal villages and procurement sites have been found and will be found at almost any location along the Bay shoreline. Population densities in late prehistoric times were such that very little of the shoreline was not utilized for living or food procurement over the past 2000 years.

3.10.4 REGULATORY SETTING

Numerous laws and regulations require federal, state, and local agencies to consider the effects a project may have on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the various agencies proposing the action, and prescribe the relationship among other involved agencies (e.g., State Office of Historic Preservation [OHP] and the Advisory Council on Historic Preservation).

FEDERAL REGULATIONS

The National Historic Preservation Act (NHPA) of 1966, as amended, is the primary federal law governing and affecting preservation of cultural resources of national significance. The NHPA defines the nation's policy for the protection and preservation of the country's most significant cultural resources, which are those resources identified as eligible for listing in the National Register of Historic Places (National Register). Cultural resources eligible for the National Register are referred to as historic properties. Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and give the Advisory Council on Historic Preservation a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in "Protection of Historic Properties" (36 CFR Part 800), effective January 11, 2001. Section 106 consultation could be triggered for work done on a site located on federal land, managed by a federal agency, or requiring a federal permit.

To be eligible for listing in the National Register, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures and objects of potential significance must meet one or more of the following four established criteria, as defined under Title 36 Code of Federal Regulations (CFR) Part 60.4:

1. Are associated with events that have made a significant contribution to the broad patterns of our history
2. Are associated with the lives of persons significant in our past
3. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
4. Have yielded, or may be likely to yield, information important in prehistory or history

In addition to meeting these four criteria, a historic property must also possess integrity. The various aspects of integrity include location, design, setting, materials, workmanship, feeling, and association. Furthermore, unless the resource possesses exceptional significance, it must be at least 50 years old to be considered for National Register listing.

The implementing regulations for the protection of historic properties are defined under Title 36 Code of Federal Regulations (CFR) Part 800. The regulation defines effect and adverse effect on historic properties as follows:

1. Section 800.9(a) Criterion of Effect: An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify it for inclusion in the National Register. For the purpose of determining effect, alteration to features of a property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.
2. Section 800.9(b) Criteria of Adverse Effect: An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:
    - Physical destruction, damage, or alteration of all or part of the property
    - Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
    - Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting
    - Neglect of a property resulting in its deterioration or destruction, and/or
    - Transfer, lease, or sale of the property without adequate provisions to protect historic integrity

STATE REGULATIONS

The California Environmental Quality Act and the California Register of Historical Resources, Public Resources Code (PRC) 5024, are the primary State laws governing and affecting preservation of cultural resources of national, state, regional, and local significance. Policy for the protection and preservation of the State's most significant cultural resources is found in various sections of CEQA, the State CEQA Guidelines, and in statutes of the PRC.

Under CEQA, a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. For purposes of this section, an historical resource is a resource listed in, or determined eligible for listing in, the California Register of Historical Resources (California Register) (PRC 1992).

Consequently, under Section 21084.1 of the PRC, an historic resource eligible for the California Register would by definition be an historic resource for purposes of CEQA compliance. The regulations for nominating resources to the California Register were published January 1, 1998. Under the regulations, a number of historic resources are automatically eligible for the California Register if they have been listed under various state, national or local historic resource criteria.

California historic resources listed in, or formally determined eligible for, the National Register are automatically listed on the California Register (PRC 5024.1).

In order for a resource to be eligible for the California Register, it must satisfy all of the following three criteria:

1. A property must be significant at the local, state or national level, under one or more of the following four criteria of significance (these are essentially the same as National Register criteria with more emphasis on California history):
   - The resource is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history and cultural heritage of California or the United States
   - The resource is associated with the lives of persons important to the nation or to California's past
   - The resource embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values
   - The resource has the potential to yield information important to the prehistory or history of the state or the nation
2. The resource retains historic integrity (defined below), and
3. It is 50 years old or older (except for certain cases described in the California Register regulations).

The California Register regulations define "integrity" as "… the authenticity of a property's physical identity, evidenced by the survival of characteristics that existed during the property's period of significance." That is, it must retain enough of its historic character or appearance to be recognizable as an historical resource. Following the National Register integrity criteria, California Register regulations specify that integrity is a quality that applies to historic resources in seven ways: location, design, setting, materials, workmanship, feeling and association. A property must retain most of these qualities to possess integrity.

The use of the phrase "...appears potentially eligible or not eligible" for the California Register, which is used in the impact discussion below, is standard practice in an evaluation discussion. Only the State Office of Historic Preservation can make an actual determination of eligibility for the California Register.

3.10.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Improvements associated with the development of the WT could cause direct and indirect impacts to both historic and prehistoric cultural resources. Of these two categories, impacts could occur with greater frequency to prehistoric sites, which are anticipated to be found all along the San Francisco Bay margin and only some of which have been discovered and recorded already.

Impacts would be considered significant if they:

- Cause a substantial adverse change in the significance of, or loss of, a historic resource
- Cause a substantial adverse change in the significance of, or loss of, an archaeological resource
- Disturb any human remains

METHODOLOGY

The significance of project impacts on cultural resources is related to the following factors: the presence, nature, and importance of any cultural resources that may be present in the treatment area (i.e., the work area); the location, size, and access requirements of the treatment areas; and the need for heavy equipment. The location of the WT sites and the potential types and extent of improvements associated with implementation of the WT were evaluated to assess potential impacts to cultural resources.

REGIONAL IMPACTS AND MITIGATION MEASURES

IMPACT CULT-1: DISTURBANCE TO PREHISTORIC ARCHAEOLOGICAL DEPOSITS DURING USE OF THE WATER TRAIL

Improvement of access to points along the Bay margin and/or the incremental growth in NMSB use associated with implementation of the WT could result in an increase in boat landing and pedestrian traffic to areas not designated as trailheads. Casual damage to, and removal of, identifiable historic resources and archaeological deposits may result from NMSB users accessing various shoreline areas away from trailheads, as well as areas in the vicinity of trailheads. Although the WT would include a significant educational and signage component, which could increase awareness of and sensitivity to cultural resources, the WT strategies do not specifically address protection of cultural resources (Strategy 2 indicates that known cultural resources are an item that would potentially be of interest to WT users). Artifacts that could be damaged or removed from these locations may include human bone (almost all of the Bay margin shell middens are also cemeteries) as well as other cultural materials. These direct and indirect effects could result in **potentially significant but mitigable** regional impacts to Bay-shore cultural resources. With implementation of mitigation measure Cult-M1, this impact would be less than significant.

MITIGATION MEASURE CULT-M1: INCLUDE PROTECTION OF CULTURAL RESOURCES IN EDUCATION AND OUTREACH EFFORTS

The WT education and outreach program shall inform WT users about the potential or actual cultural resource that may be present at or in the vicinity of a WT site, and shall educate users about protection of cultural resources, including the fact that disturbance or removal of any artifact is illegal, and the potential penalties associated with such actions. Information collected as part of mitigation measure Cult-M1 and/or other means shall be included in educational and outreach materials as appropriate.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT CULT-2: DISTURBANCE TO PREHISTORIC ARCHAEOLOGICAL DEPOSITS DURING FACILITY IMPROVEMENTS AND/OR USE OF THE WATER TRAIL

Implementation of the WT could impact known or suspected prehistoric archaeological deposits directly through various types of facility improvements at WT trailheads. In addition, increased use of certain sites due to WT publicity and/or site improvements could lead to increased use of adjacent areas, which could result in casual damage or removal of artifacts. Artifacts that could be damaged or removed from these locations may include human bone (almost all of the Bay margin shell middens are also cemeteries) as well as other cultural materials. These direct and indirect effects could result in **potentially significant but mitigable** impacts to cultural resources at individual sites. With implementation of mitigation measures Cult-M2A and Cult-M2B, this impact would be less than significant. Mitigation measure Cult-M1 also applies to this potential impact.

MITIGATION MEASURE CULT-M2A: UNDERTAKE EXPANDED ARCHIVAL RESEARCH AND FIELD INVESTIGATIONS TO PROVIDE INFORMATION ABOUT POTENTIAL PREHISTORIC ARCHAEOLOGICAL DEPOSITS

As part of the trailhead designation process, expanded archival research and/or field inspections shall be undertaken for all those WT locations where project-related earthmoving or excavation is planned, whether or not previous archaeological sites have been recorded in the immediate area. As noted above, 19th and 20th century alterations of the Bay margins have buried or obscured prehistoric sites in numerous locations. Archaeological sites could exist directly underneath existing buildings, pavement and historic fill materials.

In those areas where archaeological sites have been recorded at or in close proximity to the proposed WT facilities, during the evaluation of Trailhead Plans that would involve excavation, an archaeologist shall determine if it is necessary to conduct limited programs of mechanical subsurface presence/absence testing to search for deposits which may be damaged by actual earthmoving activities. If deemed necessary by an archaeologist, mapping of the spatial extent of the archaeological deposits found during field inspections or mechanical subsurface testing shall be done in advance of final construction designs so that preservation of the deposits can be achieved through avoidance of impacts.

MITIGATION MEASURE CULT-M2B: PROTECT PREHISTORIC ARCHAEOLOGICAL REMAINS IN ADJACENT AREAS

In those areas where archaeological sites have been recorded at, or in close proximity to, the proposed WT facilities, and archival or archeological review indicates a potential for damage to the site from trailhead use or improvements, Trailhead Plans shall avoid features or facilities that could lead to disturbance of these sites, and, if deemed necessary and appropriate, these sites and resources shall be protected by covering with fill and/or landscaping or parking lots, or by fencing. Signage shall be provided to advise boaters to respect and avoid historic resources at such sites.

3.11 HAZARDS AND HAZARDOUS MATERIALS

This section of the EIR discusses potential hazards and hazardous materials impacts that could result from implementation of the WT.

3.11.1 INITIAL STUDY FINDINGS

Eight potential impacts related to hazards and hazardous materials are considered in the Initial Study checklist. The Initial Study concluded that only one of the impacts was potentially significant: One or more of the WT Backbone Sites could be on the Cortese List, a list of hazardous materials sites compiled pursuant to Government Code 65962.5, and as a result could create a significant health hazard to the public or the environment.

3.11.2 REGIONAL SETTING

The Backbone Sites are located in a variety of settings around the Bay, and include sites that are located in current or former industrial areas. Some future sites that may be designated as trailheads under the WT Plan may similarly be located in current or former industrial areas. Some of these sites could have contaminated soil and/or groundwater that has resulted from past or current land uses on, or near, the access site. Because access sites are adjacent to the Bay (and groundwater typically flows towards the Bay) potential WT sites may also be downgradient from sources of groundwater contamination. Potential sources of groundwater contamination include leaks from underground fuel tanks.

3.11.3 LOCAL SETTING

The potential for contamination to be present at a WT site is highly site-specific, and would be evaluated during the trailhead designation process. For most existing sites (i.e., sites constructed since hazardous materials regulations were implemented), site owners will have considered and evaluated the potential for hazardous materials to be present. Similarly, planned sites would also have been evaluated as part of the planning process. Thus, the only potential uncertainty with regard to the potential presence of hazardous substances in the subsurface at a given WT is associated with potential future sites and expansion of existing sites onto new or existing property that has not previously been evaluated.

3.11.4 REGULATORY SETTING

FEDERAL REGULATIONS

At the federal level, storage, management, treatment, and remediation of hazardous waste and sites impacted by hazardous waste is governed by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In California, the State has responsibility for implementing RCRA. Other laws and regulations pertain to specific categories of hazardous substances, such as pesticides (the Federal Insecticide, Fungicide and Rodenticide Act). The Clean Water Act regulates discharges of petroleum and other hazardous substances into the waters of the U.S.

STATE REGULATIONS

The State of California has promulgated its own laws and regulations pertaining to the storage, management, treatment, and remediation of hazardous waste and sites impacted by hazardous

waste. The regulations build on the federal statutes, and are typically more stringent than the corresponding federal requirements, as described in Section 3.2. As noted above, California has been authorized to implement the provisions of RCRA within the state. The Hazardous Substances Account Act of 1981 (reauthorized in 1999)[47] describes site remediation requirements.

The Water Board may also promulgate site cleanup requirements (Cleanup and Abatement Orders) if there is a known or potential discharge to the waters of the state. Contaminated sites and known sources of contamination are documented in the Hazardous Waste and Substance Sites List (the Cortese List). The list contains a list of known or potentially contaminated sites provided to the California EPA by the California Department of Toxic Substances Control (DTSC), Department of Health Services, California State Water Resources Control Board (SWRCB), and the Integrated Waste Management Board. The list represents data collected by different agencies. It includes sites that represent a wide range of potential concerns with respect to their potential to cause harm to humans and wildlife if disturbed and contaminants released. Information on most Cortese List sites is available from the Department of Toxic Substances Control (DTSC) Envirostor database.[48] The Water Board maintains a list of "active" Cease and Desist (CDO) and Cleanup and Abatement Order (CAO) cases from Water Board that are also included on the Cortese List. DTSC also maintains a list of properties with land use restrictions that were entered into with DTSC to control potential health hazards at sites with residual contamination. No solid waste disposal sites or hazardous waste facilities subject to corrective action are located near the Backbone Sites.

LOCAL AND REGIONAL REGULATIONS

Local jurisdictions may have additional requirements pertaining to the handling, management, and storage of hazardous substances. Any such regulations would be more stringent than applicable state and federal regulations, and as such would serve to reduce the potential for impacts, if any. Sites representing a low level of concern, including certain leaking underground storage tank sites, may be addressed at the local level.

3.11.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Impacts would be considered significant a portion of the project:

- Is located on a site that contains contaminated soil and/or groundwater, and site-related activities could cause a disturbance of the contamination leading to significant health hazards to the public or the environment

METHODOLOGY

Potential human or wildlife impacts from contaminated soil and groundwater can occur only if there is contact with the affected soil or groundwater. To evaluate potential impacts associated with contaminated soil and/or groundwater at potential WT sites, potential WT activities that could release contaminated soil and/or groundwater were identified. These include excavation

[47] Health & Safety Code, Division 20, Chapter 6.8 (HSC § 25300 et seq.

[48] http://www.envirostor.dtsc.ca.gov/public/

(which could result in the release of contaminated soil, and groundwater if the excavation is sufficiently deep to encounter groundwater) and disturbance of shallow soil through grading.

REGIONAL IMPACTS AND MITIGATION MEASURES

Potential impacts from hazardous materials and corresponding mitigation measures are site-specific and present no regional impacts.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT HAZ-1: EXPOSURE OF WORKERS, THE PUBLIC, OR WILDLIFE TO CONTAMINATED SOIL OR GROUNDWATER FROM SOIL EXCAVATION

Sites that are located in areas that have previously had industrial activities, or are located downgradient of current or former industrial areas could potentially have contaminated soil and/or groundwater. Humans or wildlife could be exposed to contaminants contained in soil or groundwater if that soil or groundwater is disturbed by excavation, grading, or other intrusive activities. Potential exposures of concern would occur if chemical concentrations in soil or groundwater exceed applicable risk thresholds or screening standards. DTSC has developed the California Human Health Screening Levels (CHHSLs) that provide acceptable concentrations of contaminants in soil for residential and commercial/industrial uses. The Water Board has developed similar screening levels for contaminated soil and groundwater called Environmental Screening Levels (ESLs) (RWQCB 2008). NOAA has published screening levels for wildlife (ecological receptors). Typical conservative screening levels used to assess potential impacts to wildlife include the No Observed Adverse Effects Levels (NOAELs) and Lowest Observed Adverse Effects Levels (LOAELs). Human health screening levels are also available from USEPA Region 9 (Regional Screening Levels, or RSLs (USEPA 2009)).

The Water Board also provides screening criteria for reuse of dredged material in wetland creation (RWQCB 2000). These criteria provide an assessment of sediments that may be safely used to construct wetlands, and provide a guide for levels of chemicals in sediments that could cause an adverse effect on the environment. These criteria are based on the NOAA criteria, but reflect ambient (existing) background concentrations of certain compounds in San Francisco Bay.

High Opportunity Sites would require only signage, and therefore would not require activities that could disturb contaminated soil or groundwater. Development of the remaining Backbone Sites and potentially new sites not included in the WT Plan may disturb soil or groundwater that was contaminated due to past site uses. In addition, dewatering of contaminated groundwater during construction could result in contaminated groundwater being discharged to the Bay or other nearby waterways.

Proper implementation of construction activities in accordance with existing laws and regulations would require an evaluation of the potential presence of contaminated soil, sediment, and groundwater, and implementation of appropriate protective measures, including a site-specific health and safety plan, if contamination is present. The existing regulations mandate a strict level of protection for potential human and ecological receptors. This impact is **less than significant** and no mitigation is required.

3.12 HYDROLOGY AND WATER QUALITY

This section identifies potential hydrological and water quality impacts that could result from the proposed project.

3.12.1 INITIAL STUDY FINDINGS

The Initial Study determined that potential run-off from trailheads and placement of structures into the 100-year flood plain were potentially significant impacts associated with the WT. The placement of structures into the 100-year flood plain was considered in the context of sea level rise. All other potential hydrological and water quality impacts were determined to be less than significant in the Initial Study.

3.12.2 REGIONAL SETTING

HYDROLOGY

The San Francisco Bay is the largest estuary on the West Coast of the United States. The estuary, comprised of Central San Francisco Bay, the South Bay, San Pablo Bay, Suisun Bay, and the Sacramento-San Joaquin Delta, drains over 40 percent of California including the Sierra Nevada and Central Valley. The Sacramento and San Joaquin rivers collectively contribute roughly 95 percent of the total freshwater input to the estuary; the other five percent is provided by creeks and streams that drain directly into the Bay. Approximately 25 percent of the water that would otherwise flow through the Delta and into the Bay is instead diverted from the Delta and sent to the Central Valley and Southern California for use as irrigation and drinking water. Water that does make it through the Delta then flows through Suisun Bay, the Carquinez Strait, and San Pablo Bay before entering San Francisco Bay. From there, water either flows into the South Bay or exits the Estuary into the Pacific Ocean through the Golden Gate. The Bay Area has a Mediterranean climate with highly seasonal precipitation and runoff with more than 90 percent of annual runoff occurring during the October-April rainy season.

The Estuary is a "mixed-diurnal" tidal system of two high tides and two low tides of unequal magnitude each day. During each tidal cycle (approximately 24.5 hours) there is a higher-high, high, low, and lower-low tide. The heights of each high and low tide are different every day, reflecting the spring-neap[49] tidal cycle (alternating approximately every 2 weeks due to the moon's cycle) and seasonal effects. This tidal exchange is a fundamental determinant of water surface levels, direction, volume of flow and salinity and thereby exerts a fundamental influence on the biological, chemical, and physical conditions of the Estuary.

Freshwater inflows, tidal flows, and their interactions largely determine variations in the hydrology of the estuary. Hydrology has profound effects on all the species that live in the Bay/Delta because it determines the salinity in different portions of the estuary and controls the

[49] During spring tidal cycles the tidal range (difference between higher high tides and lower low tides) is greater than during neap cycles. Spring tides occur at the time of a new moon or full moon; at these times the high tides are higher and the low tides are lower than the corresponding tides during neap tide because of the gravitational effects of the straight-line alignment of the moon, earth, and sun. Neap tides occur after the first and third quarters of the lunar month; at these times the high tides are lower and the low tides are higher than the corresponding tides during spring tides because of the gravitational effects of the right-angled alignment of the moon, earth, and sun.

circulation of water through the channels and bays. Circulation patterns within the Bay are influenced by Delta inflows, gravitational currents, and tide- and wind-induced horizontal circulation. The cumulative effects on net circulation within the estuary of the latter three factors tend to dominate that of freshwater inflows except during short periods after large storm events (Smith 1987). Exchanges between individual embayments (the South Bay, Central Bay, San Pablo Bay, and Suisun Bay) are influenced both by mixing patterns within embayments and by the magnitude of freshwater inflows (Smith 1987).

EMBAYMENT CHARACTERISTICS

South Bay

The South Bay is geographically and hydrologically distinct from the northern reach of the San Francisco Bay. The South Bay is a tidally oscillating, lagoon-type estuary, where circulation is limited and variations are determined by water exchange between the northern reach and the ocean. The greatest tidal range in SF Bay is found in the South Bay, where the spring tidal range (mean lower low water [MLLW] to mean higher high water [MHHW]) is approximately nine feet (the spring range is approximately six feet at the Golden Gate).

Direct freshwater inflows are severely limited due to the construction of dams and reservoirs in the watershed and in the summer months the dominant source of freshwater is sewage effluent from the San Jose/Santa Clara Wastewater Treatment Plant (Conomos *et al.* 1979), which is authorized to discharge up to 120 million gallons per day. The South Bay also shows the least amount of salinity stratification due to its greater isolation from freshwater sources (Conomos *et al.* 1985). Water residence times are much longer in the South Bay than in the North Bay. During the summer months when there is little freshwater input, the residence times of water can be on the order of several months. In the winter, when density-driven exchanges occur, the residence time can be less than a month (Walters *et al.* 1985).

North Bay

The northern reach of the Bay, composed of the Central Bay and San Pablo Bay, is a partially to well mixed estuary (depending on the season) that is dominated by seasonally varying river inflow primarily from the Sacramento-San Joaquin Delta and tidal influence through the Golden Gate. Due to its location immediately east of the Golden Gate, tides and currents within the Central Bay are relatively more strongly influenced by the Golden Gate than by Delta outflow, especially during the dryer months of the year. The tidal amplitude increases somewhat in the North Bay from the Golden Gate to the eastern shores of San Pablo Bay, where it is the highest. The tides are then attenuated when passing through the Carquinez Strait so that the tidal range is diminished in Suisun Bay (Walters *et al.* 1985). A deep relict river channel running approximately 47 miles from the Golden Gate to the confluence of the Sacramento and San Joaquin Rivers enhances estuarine circulation; this relict channel is used today as a shipping lane.

The salinity in the North Bay decreases somewhat relative to the Golden Gate with salinities being reduced by Delta outflow and in the winter by additional local stream and river inflows. The timing and magnitude of the highly seasonal river inflow alters the circulation of the North Bay, which is largely maintained by salinity-controlled density differences between river and ocean waters. Residence times of water in the North Bay can be as low as days during periods of high river discharge, or months in drier periods.

Suisun Bay

Suisun Bay is the most complex of the embayments in the Estuary. It is a system made up of several open water areas, sloughs, and the adjacent Suisun Marsh. The Sacramento and San Joaquin Rivers enter the estuary at the eastern end of Suisun Bay and as a result, the salinity gradient in Suisun Bay is the greatest found in the estuary. The salinity of Suisun Bay varies greatly depending on Delta outflow.

Tidal wave energy is dramatically reduced as it travels across Suisun Bay and through the sloughs in Suisun Marsh. The western end of Suisun Marsh is strongly influenced by the tides as they propagate into the Marsh through Grizzly Bay, while the tides in the eastern Marsh are significantly less energetic due to a strong dissipation of the tidal wave as it passes through Suisun Bay (Walters *et al.* 1985). The tides also dissipate as they propagate through the narrow, sinuous network of channels in the Marsh, leading to a general reduction in tidal forcing from south to north. The residence time in Suisun Bay is similar to that in the North Bay, varying from days during periods of high river discharge to months during drier periods.

SEA LEVEL RISE

A variety of estimates quantify the range of potential sea level rise, report observed trends and offer predictions of global warming and the potential impacts (Watson 2001, CCCC 2006, IPCC 2007). The most recent report from the Intergovernmental Panel on Climate Change (IPCC 2007) contains a midrange projection of sea level rise this century of 8-17 inches (0.7-1.4 ft), with a full range of variability of 7-23 inches (0.6-1.9 ft). The IPCC estimate conservatively assumes no "speculative" critical threshold changes in Greenland or Antarctic ice sheet wasting, a process that would substantially accelerate and amplify projected rise in sea level (Overpeck *et al.* 2006). Empirical estimates of sea level rise produced by other researchers project a mid-range rise this century of 28-39 inches (2.3–3.3 ft) with a full range of variability of 20-55 inches (1.7-4.6 ft), substantially higher than IPCC 2007 projections (Rahmstorf 2007). The CALFED Bay-Delta Program recommends using the higher estimates for all planning efforts in the Delta (Mount 2007). Other recent estimates by the California Climate Change Center[50] report sea level rise in California over the past century to be approximately 7 inches (0.6 ft), and project increases of 22 to 35 inches (1.8 to 2.9 ft) by 2100 (CCCC 2006).

The projected changes in climate will change the frequency and patterns of storms compared to historical conditions. The projected increase in storms, coupled with the projected increase in sea levels will increase the vulnerability of coastal regions to flooding (CCCC 2006). An increase in sea level of one foot means that storm surge-induced floods that formerly occurred on average at 100-year intervals would more likely occur at 10-year intervals (CCCC 2006). Local sea-level rise depends upon a number of physical factors including local land vertical movement (uplift/subsidence) and hydrodynamic responses.

WATER QUALITY

The primary water quality parameters of concern in the Bay are salinity, dissolved oxygen (DO), pH, total suspended solids (TSS)/turbidity, and chemical and biological pollutants. Because the

[50] The California Climate Change Center report is a multi-institution collaboration among the California Air Resources Board, DWR, California Energy Commission, CalEPA, and the Union of Concerned Scientists.

project has no, or minimal, potential to affect salinity, pH, or DO, those items are not discussed further. Suspended solids/turbidity, and chemical and biological pollutants are addressed below.

TOTAL SUSPENDED SOLIDS AND TURBIDITY

Turbidity and total suspended solids (TSS) are generally used as measures of the quantity of suspended particles, which can comprise a mineral component (silts, clays, etc.) and a biological component (plankton). Particles can become suspended in a water body by multiple actions including direct inputs from rivers and surface runoff, wind-driven re-suspension of sediment by waves, tidal currents, mining and dredging activities, disturbance by boats or wildlife, and algae growth in the water column.

Shallow areas and channels adjacent to shallow areas have the highest suspended sediment concentrations. TSS levels vary throughout the Bay depending upon season, tidal stage, and depth. The Central Bay generally has the lowest TSS concentrations; however, spatial variations in the processes influencing re-suspension can cause highly variable differences in local TSS values. San Pablo Bay and the South Bay generally have higher concentrations due to their shallow depths that facilitate local sediment resuspension by the many processes mentioned above.

CHEMICAL POLLUTANTS

The pollutant loading to San Francisco Bay has long been recognized as one of many factors that have historically stressed aquatic resources. Pollutants enter the aquatic system through atmospheric deposition, runoff from agricultural and urbanized land, and direct discharge of municipal and industrial wastewater. Common pollutants in the Bay include nutrients (especially nitrogen and phosphate), metals (such as copper and lead), and organic/inorganic chemicals from industrial and municipal sources. For the WT, the pollutants of greatest concern are petroleum products (oil and grease) that are common in runoff from impervious surfaces in developed areas. These pollutants would be found on the parking lots and roads servicing WT launch sites and could be washed into the Bay in stormwater runoff.

The Bay's sediment can be both a source of and a sink for pollutants in the overlying water column. The overall influx of pollutants from the surrounding land and waste discharges can cause increases in sediment pollutant levels. Natural resuspension processes, biological processes, dredging and other mechanical disturbances, and sediment disposal can remobilize particulate-bound pollutants.

BIOLOGICAL POLLUTANTS

Biological pollutants include bacteria and viruses that could pose health hazards to humans contacting the water, and various organic compounds that can lead to biological oxygen demand within sediments and the water column. Bacterial and viral biological pollutants (e.g., enterococci and fecal coliforms) could pose a health hazard to NMSB users. Potential sources of harmful bacteria and viruses to the Bay include runoff, combined sewer outflows, boat discharges, and tidal flows from areas that receive heavy use by wildlife, especially birds (i.e., salt ponds). Levels of harmful bacteria in the Bay are generally higher during the rainy season, when runoff transports bacteria, viruses and other pollutants into the Bay from fringing urban and agricultural areas. The spatial distribution and composition of bacteria and viruses within the

Bay are highly localized, as they are generally dependent upon surrounding land uses and the nature of hydrologic connections between the Bay and its many watersheds.

SEDIMENT QUALITY

Sediment quality in the Bay varies greatly according to the physical characteristics of the sediment, proximity to historical waste discharges, physical/chemical condition of the sediment, and sediment dynamics that change with location and season. Generally the level of sediment contamination at a given location will vary depending on the rate of sediment deposition, which varies with seasons and tides. Chemical contaminant dynamics in an estuary are closely associated with the behavior of suspended and deposited sediments and estuarine circulation patterns and processes. Overall, the physical and chemical characteristics of sediments, and the bioavailability and toxicity of sediment-associated chemicals to aquatic organisms, are particularly important in determining their potential impact on environmental quality. Potential sediment disturbance associated with the implementation of the WT would be due to in-water construction activities at a trailhead.

3.12.3 LOCAL SETTING

Existing water quality is expected to vary from trailhead to trailhead, depending on the types and quantities of discharges potentially present in the vicinity of the trailhead. Water quality can also be affected by accidental releases from sewage treatment facilities. For example, on January 31, 2008, the Sewage Authority of Southern Marin accidentally released an estimated 2.7 million gallons of partially treated sewage and stormwater (City of Sausalito 2008).

Similarly, sediment quality may vary from trailhead to trailhead, depending on the types and quantities of discharges present or historically present in the vicinity of the trailhead, as well as the local and regional sediment deposition patterns (i.e., sources of sediments to a specific trailhead location).

3.12.4 REGULATORY SETTING

FEDERAL REGULATIONS

Actions that may affect surface and groundwater quality or that may impact the hydrology of San Francisco Bay are subject to regulation by the CWA and to requirements established by the USEPA (Section 3.2.1). The State Water Resource Control Board (SWRCB) and the RWQCB, the agencies that implement the CWA, have developed Basin Plans, which provide policies and additional standards regarding water discharges, dredging, filling, storm water runoff, and a site's contaminant cleanup if they have the potential to affect the Bay waters. In addition the RWQCBs issue waste discharge permits with specific discharge requirements for activities such as the construction and operation of trailheads where the construction would affect the Bay waters during construction, maintenance or use of the site.

STATE AND LOCAL REGULATIONS

Project-related activities that may impact the hydrology of the Estuary would be regulated under the Porter-Cologne Water Quality Act and the McAteer-Petris Act.

PORTER-COLOGNE WATER QUALITY ACT

Actions that may affect surface and groundwater quality are subject to regulation by the Porter Cologne Water Quality Act and to requirements established by the SWRCB, the RWQCB, and the local municipalities where the activities will occur. Any project activities occurring within flood zones will be subject to regulation by the local flood control agencies. The San Francisco Bay RWQCB is the primary agency responsible for protecting water quality in natural waters ("Waters of the State") within the Bay.

The RWQCB's *San Francisco Bay Basin Water Quality Control Plan* (Basin Plan) (RWQCB 2007) designates existing and potential beneficial uses for each water body within its geographic region, sets numeric and narrative water quality objectives to protect the beneficial uses, and describes strategies and time schedules for achieving these water quality objectives. The following beneficial uses have been identified for the shoreline waters of the Bay and are discussed in detail in the Basin Plan:

- Estuarine Habitat
- Industrial Service Supply
- Marine Habitat
- Fish Migration
- Navigation
- Industrial Process Supply
- Preservation of Rare and Endangered Species
- Water Contact Recreation
- Non-contact Water Recreation
- Shellfish Harvesting
- Wildlife Habitat

Generally speaking, uses associated with human consumption, water contact recreation, and biological/ecological resources are associated with more stringent water quality objectives than non-contact recreational activities. While the RWQCB performs a number of educational, advisory, and planning roles related to improving water quality throughout the Bay, its primary mechanisms to protect ground and surface waters are through adopting, monitoring compliance with, and enforcing waste discharge requirements and water quality certification permits. Such permits may be required for new facilities constructed as part of the WT.

The Basin Plan includes specific goals for TSS/turbidity; oils and greases, and petroleum products; and biological contaminants, as outlined below.

Turbidity

The Basin Plan requires that the suspended sediment load and suspended sediment discharge rate of surface waters not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. The goals also state that waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. TSS is measured in Nephelometric Turbidity Units (NTU), a measure of light penetration. Increases in suspended sediment reduce light penetration.

Increases in TSS related to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50.NTU.

Oils, Greases, and Petroleum Products

The Basin Plan states that Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses (RWQCB 2007). The Basin Plan also prohibits the discharge of oil or any residuary product of petroleum to the waters of the state. It specifically regulates the discharge of petroleum products from sources such as treated groundwater or petroleum contaminated soil as well as any other discharge to surface waters. The RWQCB also has programs to control and reduce stormwater runoff during construction and from parking lots, roadways and other infrastructure.

Biological Contaminants

Biological contaminants are also regulated in the Basin Plan, although unlike many other water quality criteria, the criteria for bacteria are dependent upon the use of the water in question. Table 3.12.4-1 presents water quality objectives for fecal and total coliform bacteria as outlined by the RWQCB for various beneficial uses. Table 3.12.4-2 presents the EPA's water quality criteria for enterococci and *E. coli* for various levels of water contact recreation.

MCATEER-PETRIS ACT

The Bay Plan prepared by BCDC addresses several water quality issues. It states that the water quality in the Bay should be maintained and support the beneficial uses of the Bay as described in the RWQCB's Basin Plan. The Bay Plan also states that shoreline projects should be designed in a way that reduces erosion and protects the Bay from sedimentation. BCDC also requires that polluted runoff be controlled by the use of best management practices to protect the water quality and beneficial uses, including placing runoff discharge points at areas that will have the least impact.

The Bay Plan has specific policies for dredging and filling the Bay. Fill will only be allowed when it is demonstrated that it is the minimum amount necessary to achieve the purpose for the fill (Section 66605). The Act does allow for limited "minor fill for improving shoreline appearance or public access" (Section 66605). Any fill must minimize the harmful effects of the fill. The extent, nature, and location of any fill must be designed to avoid reducing the surface area of the Bay, or impacts to water quality, the quality of habitat or fish resources, and/or the environment as described in Section 21060.5 of the Public Resource Code. Dredging must meet criteria including that the applicant demonstrated that dredging is for water oriented uses, the material meets water quality standards, important fish and Bay resources would be protected, the project design will minimize the volume necessary, and the sediment will be reused or otherwise disposed outside the BCDC jurisdiction where feasible.

TABLE 3.12.4-1. WATER QUALITY OBJECTIVES FOR COLIFORM BACTERIA

Beneficial Use	Fecal Coliform (MPN/100ml)	Total Coliform (MPN/100ml)
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 Water [e] Groundwater	geometric mean < 20	geometric mean < 100 < 1.1 [f]

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.
f. Based on multiple tube fermentation technique; equivalent test results based on other analytical techniques, as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21(f), revised June 10, 1992, are acceptable.

TABLE 3.12.4-2. US EPA BACTERIOLOGICAL CRITERIA FOR WATER CONTACT RECREATION

(in colonies per 100 ML)	Fresh Water		Salt Water
	Enterococci	*E. Coli*	Enterococci
Steady State (all areas)	33	1226	35
Maximum at:			
designated beach	61	235	104
moderately used area	89	298	124
lightly used area	108	406	276
infrequently used area	151	576	500

NOTES:
1. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986/8012-8016. The criteria are based on:
   (a) Cabelli, V.J. 1983. Health Effects Criteria for Marine Recreational Waters. U.S. EPA, EPA 600/1-80-031, Cincinnati, Ohio, and
   (b) Dufour, A.P. 1984. Health Effects Criteria for Fresh Recreational Waters. U.S. EPA, EPA 600/1-84-004, Cincinnati, Ohio.
2. The U.S. EPA criteria apply to water contact recreation only. The criteria provide for a level of production based on the frequency of usage of a given water contact recreation area. The criteria may be employed in special studies within this region to differentiate between pollution sources or to supplement the current coliform objectives for water contact recreation.

BCDC has also developed a draft climate change strategy (April 2009) and is currently reviewing amendments to the Bay Plan to address climate change (BCDC 2009a,b). In addition, BCDC has also developed regional mid-century sea level rise maps (based on a 16-inch rise in sea level) and end of the century maps (based on a 55-inch rise in sea level) as well as a composite of both of these maps (BCDC 2009c).

The proposed amendments would add a new climate change policy section to the Bay Plan that includes:

- Using the predicted sea level rise scenarios to guide planning and the permit process
- Developing a strategy to protect the shoreline from sea level rise, storm inundation, flooding, and other related impacts
- Working with other state, local, and federal agencies to evaluate and integrate regional mitigation, ongoing adaptive management strategies, environmental justice issues, research, and other related climate change tools
- Promote wetland protection, enhancement, and creation, and
- Discourage development in undeveloped areas that are not currently protected from erosion and flooding but would be at risk for these hazards if allowed to develop

The proposed amendments would also change existing sections of the Bay Plan. The revisions would:

- Amend the policies on protection of the shoreline to address protection from future flooding
- Amend the policies on safety of fills by updating the findings and policies on sea level rise and moving some policies to the new climate change section of the Bay Plan
- Amend findings and policies on tidal marshes and tidal flats to ensure that buffer zones are incorporated into restoration projects where feasible and sediment issues related to sustaining tidal marshes are addressed, and
- Amend findings and policies on public access to provide public access that is sited, designed and managed to avoid significant adverse impacts from sea level rise and ensure long-term maintenance of public access areas

3.12.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Criteria for determining significant impacts to hydrology and water quality were based on the State CEQA Guidelines and professional judgment. Impacts would be considered significant if the project would:

- Create or contribute runoff water that would provide substantial additional sources of polluted runoff
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows (discussed below in the broader context of sea level rise).

METHODOLOGY

Impacts to hydrology and water quality were assessed by evaluating all potential direct, indirect, temporary, and permanent sources of run-off associated with implementation of the WT, and the

potential effect of facility improvements on flood flows in the 100-year flood plain. Potential impacts could occur through the following mechanisms:

- Changes in water quality due to short-term construction activities
- Changes in water quality due to long-term use of facilities, and
- Placement of structures within 100-year flood areas

REGIONAL IMPACTS AND MITIGATION MEASURES

The regional impacts of the WT project on the hydrology and water quality of the Bay would be limited to impacts related to increased impermeable surfaces in the watershed. The proposed increase in impermeable areas due to the WT and the cumulative regional projects would be *de minimis* within the scope of development in the Bay Area, and would not substantially increase pollution in the Bay. In addition, new or expanded WT facilities and parking would be highly dispersed around the Bay, and impacts would be further mitigated by measures HYD-M1 and HYD-M2 described below to address potential site-specific impacts. For these reasons, the WT project is not expected to have a regional effect on water quality in the Bay.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT HYD-1: LOCAL DEGRADATION OF WATER QUALITY DUE TO CONSTRUCTION ACTIVITIES

This impact could occur as a result of the construction of new launch/destination facilities and the upgrading of existing facilities consistent with the WT Plan. Specific activities could include the construction and improvement of boat launching ramps at the water's edge, parking facilities, boat storage facilities, camping facilities, restroom facilities, and other features. During these activities it is possible that local water quality could be impacted in a number of ways. Construction activities at the water's edge could cause a localized increase in suspended sediments in the adjacent water body and pollutants such as petroleum products from construction equipment could be introduced directly to the water. The construction of adjacent parking and boat storage facilities and structures, or the development of a camping area could result in sediments and pollutants from construction activities entering the water via runoff. This impact could be **potentially significant but mitigable.** With implementation of mitigation measures Hyd-M1, this impact would be less than significant.

MITIGATION MEASURE HYD-M1: EMPLOY CONSTRUCTION BEST MANAGEMENT PRACTICES

Prior to construction activities involving grading, excavation, or in-water construction at any trailhead, the party responsible for construction shall develop a construction plan that will employ best management practices (BMPs) to reduce environmental impacts. As a part of this process the applicant shall develop a Stormwater Pollution Prevention Plan (SWPPP) through the RWQCB for controlling soil erosion and the discharge of construction-related contaminants. Construction practices shall also minimize the disturbance of sediment during any in-water facility improvements, consistent with the site-specific levels of natural turbidity and level of chemical pollutants present in the sediment that could be disturbed.

IMPACT HYD-2: DEGRADATION OF WATER QUALITY DUE TO RUNOFF FROM TRAILHEADS

The primary potential sources of additional runoff resulting from project implementation are new impervious surfaces from the construction of new or expanded/improved launch facilities and associated parking areas. The runoff from parking areas may contain petroleum compounds from

automobiles and the pavement material itself. The parking facilities would be relatively small and the amount of runoff generated by them should be small. Run-off from boat washing areas and launch/rigging areas would not be expected to be of concern, as boat washing is performed using only water. This impact could be **potentially significant but mitigable**. With implementation of mitigation measures Hyd-M2, this impact would be less than significant.

MITIGATION MEASURE HYD-M2: IMPLEMENT STORMWATER BEST MANAGEMENT PRACTICES

All new parking areas and any other paved areas developed as part of WT trailhead improvements shall be designed and operated using BMPs to minimize, eliminate, or treat runoff, and reduce pollutant levels in the runoff. Such BMPs can include the construction/use of oil and grease traps, vegetated swales, raingardens, stormwater wetlands, or other similar structures that would immobilize and/or biogeochemically treat pollutants before they would be discharged to surface waters. All BMPs shall comply with Clean Water Act Section c.3 requirements for stormwater detention and treatment. In addition, signs shall be posted at all boat washing facilities asking that only water be used to wash boats.

IMPACT HYD-3: DEGRADATION OF WATER QUALITY DUE TO IMPROPER SANITATION

Where restrooms are lacking, biological waste from NMSB users may be released to the waters of the Bay. While the total quantity of such waste would be minimal, local degradation of water quality could occur. The potential number of new users attributable solely to implementation of the WT, however, would be quite small. In addition, WT Strategy 9 recognizes the value of providing restrooms, and calls for restrooms at the majority of WT trailheads. Implementation of Strategy 9 would increase the number of restrooms compared to current conditions, and would reduce the potential impacts associated with new WT users, as well as reducing any potential effects from existing use. Consequently, this potential impact is considered **less than significant**.

IMPACT HYD-4: INCREASED LITTERING IN THE BAY

With the potential increase in NMSB use on the Bay due to the implementation of the WT, there is the potential for an increase in both intentional and unintentional littering. The WT Plan includes measures to decrease the amount of littering by NMSB users through outreach programs and increased signage at launch and destination locations, as well as the overall development of the WT ethic. These actions would inform WT users about proper waste/trash storage and disposal practices. In addition, the improved launch/destination sites would be equipped with facilities for convenient waste/trash disposal and recycling. As recreational users are one of the main groups threatened by poor water quality, WT users would be expected to advocate for better water quality for their own protection. This impact would be **less than significant.**

IMPACT HYD-5: PLACEMENT OF STRUCTURES WITHIN 100-YEAR FLOOD ZONES THAT COULD IMPEDE OR REDIRECT FLOWS

Any new boat launching ramps constructed as part of the project would, out of necessity, be within a 100-year flood zone since they would be on the immediate Bay shore. Restrooms and parking lots also may be within the 100-year flood zone, depending on specific access site elevations and local building code requirements (most of which require raising land surfaces above the 100-year floodplain level). Most of these facilities would not be in the path of flood flows; they would instead be subject to tidal flooding hazards. The parking lots and permanent

structures associated with the WT Plan would be small enough in size and area that their impacts on impeding flood flows would be less than significant.

There is a potential that newly developed/improved trailheads may require adaptation over time for rising sea level (see detailed discussion of sea level rise in Section, 3.15.3, below). This could affect virtually all WT facilities. Depending on elevation, and the extent of sea level rise, any immediate shoreline facility could be under water. Unless boarding float anchorage systems (e.g., pilings) are sufficiently tall, the boarding floats could come loose from anchoring systems during storm surges. Depending on the gradient conditions of the shoreline, boat launching ramps may also need to be modified to remain consistent with pending ABA-ADA Accessibility Guidelines. This impact would be **potentially significant, but mitigable**.

MITIGATION MEASURE HYD-M5: DESIGN ALL NEW PERMANENT STRUCTURES TO ADDRESS POTENTIAL FLOOD HAZARDS

All new permanent facilities (restroom, information kiosks, etc.) proposed as part of the WT access improvement shall be designed and constructed such that the interior floors would be above the 100-year tide/wave heights, including expected sea level rise for the reasonable useful life of the structure. Anchorage piers and other features of boarding floats and floating boat launching ramps, including components pertaining to ADA accessibility, shall be designed to remain functional with anticipated sea level rise for the reasonable useful life of the structure.

3.13 LAND USE PLANNING

This section of the EIR assesses the potential impacts on land uses from the implementation of the WT Plan. Impacts are assessed at the program level only, by comparing the consistency of the WT Plan with land use plans of the federal, state, and regional agencies in whose jurisdictions the 112 WT Backbone Sites fall. Site-specific compliance with local agency land use plans would be evaluated during the trailhead designation process.

Consistency with the federal, state and regional environmental goals and policies that pertain to the protection of plants, birds and other wildlife are addressed in Sections 3.7 through 3.9. Issues associated with parks, land trails, and navigational safety are discussed in Sections 3.3 and 3.4, respectively.

3.13.1 INITIAL STUDY FINDINGS

The project Initial Study found that implementation of the Water Trail may have potentially significant impacts associated with possible conflicts with applicable land use plans, existing nearby land uses, and/or applicable habitat conservation plans (HCPs).

3.13.2 REGIONAL SETTING

The project area includes San Francisco Bay and, in particular, the water and land areas at the edge of the Bay that include existing access points and NMSB use. The land uses surrounding the Bay vary widely, encompassing existing marinas, open space (including parklands, salt ponds and wildlife refuges), ports, residential areas, commercial areas (including hotels and restaurants), and industrial areas. These general areas are summarized as Urbanized Shorelines, Urban/Wildland Interface, and Rural Open Space/Agricultural in Section 3.6, Aesthetics. Typical land uses surrounding the proposed Backbone Sites are summarized below.

3.13.3 LOCAL SETTING

The WT Plan analyzed existing access onto the Bay and concluded that at present there are over 135 formal and informal launch and landing sites suitable for human-powered boats and beachable sail craft. Of those, the general land use categories include:

- Waterfront park (50%)
- Marina/harbor (17%)
- Public boat launching ramp/boarding float (13%)
- Public access area (12%)
- Wildlife refuge/reserve (1%)
- Privately owned business (7%).

Not all existing sites are considered suitable for inclusion in the WT; the WT includes 112 access sites, including 17 planned sites. The project area includes WT access sites that are in heavily industrialized parts of Alameda County, such as around the Port of Oakland (e.g., A8, Middle Harbor Shoreline Park) and Oakland airport (A18, Doolittle Drive, Airport Channel), as well as sites in remote parts of Sonoma (Sn3, Hudeman Slough), Napa (N1, Cutting's Wharf) and Solano Counties (So5, Belden's Landing, Fairfield)

Sites in the North Bay are typically in marinas, parks, and wildlife refuges. Sites located along the East Bay range from parks (e.g., A5, Shorebird Park, Emeryville) and marinas (e.g., A2, Berkeley Marina Ramp) to commercial areas (A9, Jack London Square/CCK) and salt ponds (A24 Jarvis Landing, Newark). A large portion of the southern Bay margin falls within the San Francisco Bay National Wildlife Refuge (including SM25, Corkscrew Slough Viewing Platform, Redwood City and A24 Jarvis Landing, Newark). On the western shore of the Bay, sites are located adjacent to parks (SF2, India Basin Shoreline Park, San Francisco), marinas (SM6, Docktown Marina, Redwood City), commercial areas (SF10, Aquatic Park, San Francisco), and industrialized areas (SF1, Candlestick Point State Recreation Area).

3.13.4 REGULATORY SETTING

Over 50 government agencies have jurisdiction over the 112 Backbone Sites, and any other potential future WT sites around the Bay. These include federal, state, regional, and local agencies with regulations and plans that control development on the margins of the Bay as well as the Bay's open waters. Because land use plans and policies are promulgated by specific agencies, the regulatory setting discussion for this land use and planning discussion is organized by agency rather than by the specific law or regulation, as in other sections. All trailhead designation decisions and any potential construction proposed for trailheads on federal property will require compliance with NEPA as well as CEQA.

FEDERAL AGENCIES AND REGULATIONS

NATIONAL PARK SERVICE AND GOLDEN GATE NATIONAL RECREATION AREA

The National Park Service (NPS) has jurisdiction over several bayfront National Parks. At Golden Gate National Recreation Area (GGNRA), managers balance the preservation of significant historic resources and important natural areas with provision of recreation opportunities for 16 million visitors per year. The NPS Management Policies stipulate that park managers only allow uses that are "(1) appropriate to the purpose for which the park was established, and (2) can be sustained without causing unacceptable impacts to a park's resources or values. Recreational activities and other uses that would impair a park's resources, values, or purposes cannot be allowed." (NPS 2001). NMSB launching and overnight camping are existing activities in the GGNRA. NMSB launching is also an existing activity in San Francisco Maritime National Historic Park, and Rosie the Riveter/World War II Home Front National Historical Park.

NPS manages one San Francisco GGNRA site: SF12, Crissy Field; and two Sausalito GGNRA sites: M1, Kirby Cove and M2, Horseshoe Cove. General Management strategies for the park can be found in *Management Policies 2006* (NPS 2006). The GGNRA *General Management Plan* (NPS 1980) is in the process of being updated, but is not anticipated to represent a significant change in direction of park management (pers. comm. Brian Aviles, January 10, 2008) with regard to access to these sites by NMSBs.

Management of SF12, Crissy Field, is described in the 1996 *Crissy Field Plan Environmental Assessment* (NPS 1996). Plans for Kirby Cove will be included in the updated *General Management Plan*, and public use is supported in the current plan. Plans for Horseshoe Cove are contained in the *Fort Baker Plan and Final Environmental Impact Statement* (NPS, 2000)

(which is currently being revised) and Crissy Field in the *Final General Management Plan Amendment: Creating a Park for the 21st Century, from Military Post to National Park, Presidio of San Francisco, Golden Gate National Recreation Area, California* (NPS 1994). NMSB use is consistent with these NPS land management plans.

Site CC15, Marina Bay Park (managed by the City of Richmond), is located in Rosie the Riveter/World War II Home Front National Historical Park, which is owned by NPS. The management plan for the park was finalized in July 2009. The plan supports public-private efforts to plan for and provide land/water access for recreational boating, including both day-use and overnight facilities (NPS 2009).

U.S. FISH AND WILDLIFE SERVICE/SAN FRANCISCO BAY REFUGE COMPLEX

In the Bay Area, the USFWS owns and manages National Wildlife Refuges (NWR) and Bay waters totaling 30,000 acres. The National Wildlife Refuge System Improvement Act of 1997 designates wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as "priority general public uses." When these activities are compatible with species protection goals (as determined by USFWS), they are welcome on refuges and receive priority over other uses. Additionally, the law states, in part, that "compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System and the purposes of many refuges, and which generally fosters refuge management and through which the American public can develop an appreciation for fish and wildlife…" NMSB access to Refuge waters and shorelines in the San Francisco Bay National Wildlife Refuge Complex is regulated by the Refuge managers.

USFWS manages areas proposed for three Backbone Sites in National Wildlife Refuges. Two of these (SM25, Corkscrew Slough Viewing Platform, Redwood City; and A24, Jarvis Landing, Newark) are part of Don Edwards San Francisco Bay National Wildlife Refuge, which encompasses land both north and south of the Dumbarton Bridge and around the shoreline of the South Bay (USFWS 2003). The Jarvis Landing site is co-managed with the salt producer, Cargill. Site A27, Coyote Hills, is on an Alameda County Flood Control District levee, outside of the Don Edwards National Wildlife Refuge. It is managed by the East Bay Regional Park District (EBRPD). An additional site is planned for the San Pablo Bay NWR at the southwest corner of the Cullinan Ranch site, immediately north of Highway 37, but due to the timing of the planning process, this site was not included in the WT Plan.

A Comprehensive Conservation Plan (CCP) is being prepared for the San Pablo Bay NWR and is expected to be finished in 2010. A CCP for Don Edwards NWR is expected to be finished in 2012. Designated land uses in the CCPs are expected to be compatible with possible designation of the USFWS owned or managed WT Backbone Sites (Winnie Chan, USFWS, pers. comm. January 22, 2008).

STATE AGENCIES AND REGULATIONS

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

As with other resource management agencies, State Parks has a dual mission to protect the State's "most valued natural and cultural resources," and offer "opportunities for high-quality

outdoor recreation" (State Parks 2004). The California State Parks System Plan (State Parks 2002b,c) outlines five core programs for the Park system: resource protection, education/interpretation, provision of facilities (including camping and restrooms) at parks, public safety, and recreation.

State Parks manages four Bay shoreline parks on which five Backbone Sites would be located: China Camp State Park, San Rafael (Backbone Sites M39, China Camp State Park and M40, Bull Head Flat); Angel Island State Park, Angel Island (M17); Candlestick Point State Recreation Area, San Francisco (SF1); and Eastshore State Park, Albany Beach (A1).

The China Camp General Plan (State Parks, 1979); Angel Island General Development Plan (State Parks, 1978); Angel Island State Park, General Development Plan, Expanded Tram Service Amendment, Preliminary (State Parks, 1996); Candlestick Point State Recreation Area General Plan (State Parks, 1978, amended 1987); and Eastshore State Park General Plan (State Parks 2002a) describe the plans for each of these four areas respectively and include policies that relate to wildlife habitat and water quality. Compliance of any specific WT site improvements with these plans needs to be assessed at the project level.

CALIFORNIA DEPARTMENT OF FISH AND GAME

DFG "maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The Department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses" (CDFG 2009c). DFG owns and/or manages seven wildlife areas, eight ecological reserves, five state marine parks and one state marine conservation area around the Bay. Wildlife areas are managed to protect and enhance habitat for wildlife species, and to provide the public with wildlife-related recreational uses such as hunting, fishing and wildlife observation (Blankinship 1999). Ecological reserves are designed to conserve areas for the protection of rare plants, animals and habitats, and to provide areas for education, scientific research and recreation where these activities do not have adverse effects on wildlife and habitats (Lewis 2001).

Inclusion of any WT launch sites within wildlife areas or ecological reserves is subject to the compatibility of NMSB activities with the management objectives for these areas. Existing state marine parks, marine reserves, and marine conservation areas were originally established as ecological reserves, but these reserves have been included in Marine Protected Areas (MPAs) as part of the California Marine Life Protection Act (CDFG 2006a). These non-terrestrial marine or estuarine areas are specially managed for natural, historic or cultural resource preservation. DFG has discretion to establish restrictions on certain recreation activities in these areas on a case-by-case basis.

One Backbone Site would be located in a DFG Ecological Reserve: A22, Eden Landing Ecological Reserve (Hayward). Eden Landing Ecological Reserve is governed by an existing management plan (RMI 1999). Planned launch site N7, Green Island in American Canyon is within the Green Island Unit of the Napa Sonoma Marshes Wildlife Area. Restoration is in progress in this area, and the site will be opened to the public after construction is completed.

CALIFORNIA STATE UNIVERSITY (CSU)

One proposed Backbone Site, So2 in Vallejo, is located on the grounds of the California Maritime Academy, one of the campuses of the California State University (CSU) system. There is no management plan for access site So2 because the access is informal, and the California Maritime Academy does not anticipate creating a plan. The site consists of an asphalt pathway that runs along the waterfront and was constructed as a permit condition of a BCDC permit (Roger Jaeckel, California Maritime Academy, pers. comm. December 1, 2009).

LOCAL AND REGIONAL AGENCIES AND REGULATIONS

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

BCDC's actions are governed by the *San Francisco Bay Plan*, adopted in 1968 and subsequently revised. The *Bay Plan* guides protection and use of San Francisco Bay and its shoreline. The shoreline is defined as being located at mean high tide line, except in marsh areas, where the shoreline is located at five feet above mean sea level. BCDC has jurisdiction over a 100-foot shoreline band that is the area that lies within 100 feet upland of the shoreline. The *Suisun Marsh Protection Plan* (BCDC 1976) covers parts of Solano County south of Suisun City and includes site So5, Belden's Landing. BCDC's objectives are:

- Objective 1: Protect the Bay as a great natural resource for the benefit of present and future generations.
- Objective 2: Develop the Bay and its shoreline to their highest potential with a minimum of Bay filling.

Bay Plan

Policies relevant to the construction of the WT can be found in several sections of the Bay Plan. The Bay Plan designates shoreline priority use areas. Priority uses include: Wildlife Refuge, Waterfront Park/Beach, Water-related Industry, Port, and Airport. Bay Plan Policies applicable to the various Priority Use Areas are identified on the Bay Plan maps.

Described below are relevant policies related to Recreation and Public Access excerpted from the Bay Plan (as amended through January 2008). Policies relating to Appearance, Design and Scenic Views are discussed in Section 3.6 Aesthetics; policies applying to Fish, Other Aquatic Organisms, and Wildlife, in Sections 3.7 – 3.9; and policies relating to Sea Level Rise are in Section 3.12, Hydrology and Water Quality.

Recreation

1. *Diverse and accessible water-oriented recreational facilities, such as marinas, launch ramps, beaches, and fishing piers should be provided to meet the needs of a growing and diversifying population, and should be well distributed around the Bay and improved...*
3. *Recreational facilities such as waterfront parks, trails, marinas, live-aboard boats, NMSB access, fishing piers, launching lanes, and beaches, should be encouraged and allowed by the Commission, provided that they are located, improved and managed consistent with the following standards:*

   a. ***General**. Recreational facilities should:*

      (1) Be well distributed around the shores of the Bay... Any concentrations of facilities should be as close to major population centers as is feasible;

(2) Not pre-empt land or water area needed for other priority uses, but efforts should be made to integrate recreation into such facilities to the extent that they are compatible;

(4) Be consistent with the public access policies that address wildlife compatibility and disturbance. In addition:

(5) Compatible public and commercial recreation facilities should be clustered to the extent feasible to permit joint use of ancillary facilities...

(6) Sites, features or facilities within designated waterfront parks that provide optimal conditions for specific water-orientated recreational uses should be preserved and, where appropriate, enhanced for those uses...

(7) Access to marinas, launch ramps, beaches, fishing piers, and other recreational facilities should be clearly posted with signs and easily available from parking reserved for the public or from public streets or trails…

b. ***Marinas****.*

(1) Marinas should be allowed at any suitable site on the Bay….At suitable sites, the Commission should encourage new marinas.

(2) Fill should be permitted for marina facilities that must be in or over the Bay…

(4) Marinas should include public amenities, such as viewing areas, restrooms, public mooring docks or floats and moorages for transient recreational boaters, NMSB launching facilities, public parking, substantial physical and visual access; and maintenance for all facilities.

e. ***NMSBs****.*

(1) Where practicable, access facilities for NMSBs should be incorporated into waterfront parks, marinas, launching ramps and beaches, especially near popular waterfront destinations.

(2) Access points should be located, improved and managed to avoid significant adverse affects on wildlife and their habitats, should not interfere with commercial navigation, or security and exclusion zones or pose a danger to recreational boaters from commercial shipping operations, and should provide for diverse, water-accessible overnight accommodations, including camping, where acceptable to park operations.

(3) Sufficient, convenient parking …should be provided at sites improved for launching NMSBs. Where feasible overnight parking should be provided.

(4) Site improvements, such as landing and launching facilities, restrooms, rigging areas, equipment storage and concessions, and educational programs that address navigational safety, security, and wildlife compatibility and disturbance should be provided, consistent with the use of the site.

(5) Facilities for boating organizations that provide training and stewardship, operate concessions, provide storage or boathouses should be allowed in recreational facilities where appropriate.

(6) Design standards for NMSB launching access should be developed to guide the improvement of these facilities…

4. *To assure optimum use of the Bay for recreation, the following facilities should be encouraged in waterfront parks and wildlife refuges:*

   a. ***In waterfront parks**.*

      (1) Where possible, parks should provide some camping facilities accessible only by boat, and docking and picnic facilities for boaters.

      (4) Public launching facilities for a variety of boats and other water-oriented recreational craft…should be provided in waterfront parks where feasible.

      (9) In waterfront parks that serve as gateways to wildlife refuges, interpretative materials and programs that inform visitors about the wildlife and habitat values present in the park and wildlife refuges should be provided.

7. *Because of the need to increase the recreational opportunities available to Bay Area residents, small amounts of Bay fill may be allowed…*
8. *Signs and other information regarding shipping lanes, ferry routes, U.S. Coast Guard rules for navigation…weather, tide, current and wind hazards, the location of habitat and wildlife areas that should be avoided, and safety guidelines for smaller recreational craft, should be provided at …recreational watercraft use areas.*
9. *Ferry terminals may be allowed in waterfront park priority use areas and marinas and near fishing piers and launching lanes, provided the development and operations of the ferry facilities do not interfere with current or future park and recreational uses, and navigational safety can be assured...*

Public Access

2. *In addition to the public access to the Bay provided by waterfront parks, beaches, marinas and fishing piers, maximum feasible access to and along the waterfront …should be provided in and through every new development in the Bay…*
3. *Public access to some natural areas should be provided to permit study and enjoyment of these areas. However some wildlife are sensitive to human intrusion. For this reasons, projects in such areas should be carefully evaluated in consultation with the appropriate agencies...*

Specific land use policies applicable to WT Backbone Sites would be addressed during review of any specific access improvements at the time such improvements are proposed.

Suisun Marsh Protection Plan

The Suisun Marsh Protection Plan (SMPP) was adopted in 1976 to preserve and restore:
(1) a primary management area encompassing the 89,000 acres of tidal marsh, managed wetlands, adjacent grasslands, and waterways in Suisun Marsh over most of which BCDC now has jurisdiction; and
(2) a secondary management area of approximately 22,500 acres of significant buffer lands (BCDC 1976).

The SMPP is intended to be a more specific application of the general, regional policies of the San Francisco Bay Plan and to supplement those policies where appropriate because of the unique characteristics of the Suisun Marsh. Solano County is responsible for preparing and administering a local protection program required by the SMPP, consistent with the specific guidelines set forth in the SMPP. BCDC is the land use permitting agency for major projects in

the primary management area, and acts as an appellate body with limited functions in the secondary management area. The primary management area consists of tidal marshes, managed wetlands, seasonal marshes and lowland grasslands and represents an area of critical importance to marsh wildlife. The secondary management area consists of upland grasslands and cultivated lands and is intended to act as a buffer area to insulate the habitats within the primary management area.

Backbone Site So5, Belden's Landing, is located in Suisun Marsh and governed by the SMPP. The policies of both the Bay Plan and the SMPP would apply to this site. Belden's Landing is a County Park at the boundary of the primary and secondary management areas. The SMPP allows for passive recreation compatible with marsh protection.

The SMPP has the following policies in the Environment section related to wetland and upland protection:

- The diversity of habitats in the Suisun Marsh and surrounding upland areas should be preserved and enhanced wherever possible to maintain the unique wildlife resource.
- The Marsh waterways, managed wetlands, tidal marshes, seasonal marshes, and lowland grasslands are critical habitats for marsh-related wildlife and are essential to the integrity of the Suisun Marsh. Therefore, these habitats deserve special protection.
- Existing uses should continue in the upland grasslands and cultivated areas surrounding the critical habitats of the Suisun Marsh in order to protect the Marsh and preserve valuable marsh-related wildlife habitats. Where feasible, the value of the upland grasslands and cultivated lands as habitat for marsh-related wildlife should be enhanced.

It also has two "Recreation and Access" policies relevant to So5:

- Agencies administering land acquired for public access and recreational use should be responsible for maintaining the areas and controlling their use. Signing on roads leading into the Marsh and maintained litter receptacles at major public use areas should be provided by the appropriate local or State agency to prevent littering and vandalism to public and private property.
- Recreational activities that could result in adverse impacts on the environmental or aesthetic qualities of the Suisun Marsh should not be permitted. Levels of use should also be monitored to insure that their intensity is compatible with other recreation activities and with protection of the Marsh environment. For example, boat speeds and excessive noise should be controlled and activities such as water skiing and naval training exercises should be kept at an acceptable level.

ASSOCIATION OF BAY AREA GOVERNMENTS (ABAG) BAY TRAIL

The San Francisco Bay Trail is a planned 500-mile network of bicycling and hiking trails around the Bay, of which approximately half has been completed. The Bay Trail Plan was adopted by ABAG in 1989 (ABAG 1989). More than 70 of the Backbone Sites are on or near the San Francisco Bay Trail. The WT Plan encourages links between the land and water trails. The Bay Trail Plan (and its overlap with WT access points) is described in Section 3.3, Recreation.

CITIES AND COUNTIES

Counties and cities around the Bay also control land uses (either directly or through county and city government agencies) of shoreline areas and wetlands as waterfront parks and open space. Local land use planning jurisdiction applies to lands not under state, federal, or tribal jurisdiction. Each city and county has a General Plan, which includes land use, conservation, and open space elements; and a zoning ordinance that controls development and land uses in areas under local jurisdiction (i.e., non-state, federal, or tribal lands). General Plan land use designations and zoning ordinances that implement those designations control and restrict land uses within local agency jurisdiction, and may preclude certain land uses, such as overnight camping. New developments or land use changes are reviewed by local agencies for compliance with their applicable General Plan and zoning regulations.

Recreational boating rules in Section 660 of the State Harbors and Navigation Code empower local governments to establish ordinances that regulate navigation in waters within their jurisdiction through time-of-day restrictions, speed zones, special-use areas, and sanitation and pollution controls.

SPECIAL DISTRICTS/AGENCIES

Some Backbone Sites are owned and managed by one entity, while others have more complex arrangements involving multiple entities, all whom play different roles in the management of the sites. Several representative land-owning or -managing districts and agencies are described below. During the trailhead designation process, all appropriate managing agencies will be contacted for involvement in the planning process.

San Francisco Bay Water Emergency Transportation Authority

WETA has adopted an Implementation and Operations Plan (WTA 2003), and a Final Transition Plan (WETA 2009). These plans are described in Section 3.4: Navigational Safety. New ferry terminals may be located in: Antioch, Berkeley/Albany, Hercules/Rodeo, Martinez, Mission Bay (San Francisco), South San Francisco, Redwood City, Richmond, and Treasure Island (San Francisco).

East Bay Regional Park District

The East Bay Regional Park District's (EBRPD) management priorities range from a focus on recreation to emphasizing habitat preservation, depending on the park resources. Land uses in EBRPD are described in *Master Plan 1997* (EBRPD, 1997) and an accompanying map (EBRPD, 2007). EBRPD manages 15 Backbone Site locations in Oakland, Alameda, San Leandro, Hayward, Fremont, Point Richmond, El Cerrito, Martinez, Pinole and Rodeo in the following regional parks: Middle Harbor Shoreline Park, Crown Memorial State Beach, Martin Luther King, Jr. Regional Shoreline, Coyote Hills Regional Park, Oyster Bay Regional Shoreline, Hayward Regional Shoreline, Point Isabel Regional Shoreline, Point Pinole Regional Shoreline, Miller/Knox Regional Shoreline, Carquinez Strait Regional Shoreline, Bay Point Wetlands and Lone Tree Point.

Midpeninsula Regional Open Space District

The Midpeninsula Regional Open Space District (MROSD) manages its preserves under a dual mission to preserve and protect natural resources and to provide low intensity recreation and environmental education opportunities (MROSD 2009). The District's goals are governed by the

Midpeninsula Open Space Resource Management Five-Year Strategic Plan (MROSD 2003). Backbone Site SM2 is located in Ravenswood Preserve, a shoreline preserve managed by MSROD. There is an ongoing series of *Use and Management Plan Amendments* (MROSD 1982-2006) that pertain to the management of Ravenswood.

Flood Control Districts

Alameda County Flood Control District owns the channel of Alameda Creek and the levee to the south on which site A27, Coyote Hills, is located. The levee and channel have been leased to the EBRPD for recreational use. As part of the plan for salt pond restoration, it is possible that the northern levee will be breached and access will only be available from the south (EDAW 2007).

Ports

One site, SM4 located at Redwood City Municipal Marina, is under the jurisdiction of the Port of Redwood City. Two sites, SF4, Islais Creek, and SF7, Pier 52 Boat Launch, are managed by the Port of San Francisco. Site A8, Middle Harbor Shoreline Park, is operated by EBRPD but owned by the Port of Oakland. Ports are public entities generally run by autonomous commissions appointed by the city government. In general, port lands are subject to city and county general plans and zoning ordinances.

3.13.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Impacts to land use planning are considered significant if they would:

- Conflict with an established plan by a regulatory or management agency (such as those listed above) with jurisdiction over a proposed WT site
- Conflict with the zoning or General Plan land use designation for the city or county in which the proposed site is located, or
- Result in an incompatibility with adjacent or nearby land uses

REGIONAL IMPACTS AND MITIGATION MEASURES

IMPACT LUP-1: CONFLICT WITH FEDERAL, STATE, OR LOCAL LAND USE PLANS AND POLICIES

Of the 112 Backbone Sites, 95 are existing launch or destination sites and 17 are planned. It is possible that a few of these sites have grown "organically" in response to user pressure and their use is not in accordance with all plans and policies of the land owners and managers. Such discrepancies would emerge during the trailhead designation process. The HOSs are already developed, but the non-HOS sites may require various additional amenities, including structures such as bathrooms and more parking.

The minimal improvements associated with HOSs would be unlikely to result in land use conflicts or conflicts with land use management plans and implementing regulations. Signage may be subject to local design review, depending on the size of signage and specifics of local zoning ordinances.

As each site is unique, and the extent/type/location of any proposed facility improvements at non-HOSs are unknown at this time, it is not possible or appropriate for this Programmatic EIR to assess the potential compliance of any such development with local plans and policies,

including HCPs. Such an assessment would be conducted as part of the trailhead designation process for each site.

The designation and use of a particular site as part of the WT may conflict with a management plan established by the federal, state, regional or local land use planning agencies. Consultation with applicable federal, state, and regional agencies was conducted during the planning stages of the WT, so such conflicts would be unlikely. Conflicts with local land use plans and policies also are possible, though unlikely.

WT Plan Strategy 4 requires that the WT "Coordinate plans for trailhead development, management and use to be consistent with existing policies, plans and priorities of land and resource managers at and around trail heads…This coordination should be done by launch site managers during site assessment and planning for trailhead designation." This strategy, as implemented in the trailhead planning and designation process outlined in the WT Plan, would reduce conflicts between trailhead designation and applicable federal, state, regional, and local plans, policies, and strategies, to a **less than significant** level.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT LUP-2: INCOMPATIBILITY WITH ADJACENT OR NEARBY LAND USES

Even if a WT site is compatible with existing federal, state, or local land use plans and policies, operation of specific WT sites could still be incompatible with adjacent or nearby land uses, sensitive biological resources, and/or navigational hazards. Potential land use conflicts resulting from nearby marina activities, ferry terminals, or shipping traffic, are addressed in Section 3.3 Recreation and Section 3.4 Navigation Safety. Incompatibilities with wildlife habitat and sensitive wildlife are discussed in Sections 3.7 – 3.9 (Biological Resources). New campgrounds or other significant shore-side facilities such as boat storage, instructional facilities, or cafes and restaurants may also result in noise, public service demands, or other incompatibilities with nearby land uses. However, as noted earlier, WT Strategy 4 requires consistency with existing plans, policies and priorities to ensure that WT sites are compatible with adjacent land uses. In addition, Strategy 3 requires that improvements at WT sites be consistent with site characteristics, to ensure that recreational uses are protected, navigational safety hazards are addressed, and biological resources are appropriately protected. Because all trailhead plans will be reviewed to assure compliance with the WT strategies, this impact would be **less than significant**.

3.14 TRANSPORTATION, CIRCULATION, AND PARKING

This section of the Draft EIR identifies potential transportation, circulation and parking impacts that could result from the WT. In general, these include the potential for increased traffic levels to local streets and intersections that provide access to proposed project trailheads, and potential increases in parking needs at trailhead locations.

3.14.1 INITIAL STUDY FINDINGS

Lack of adequate parking was identified as the one potentially significant impact associated with the transportation resource area. No conflicts with existing alternative transportation programs or plans or changes to air traffic patterns were identified, and other potential traffic impacts were determined to be less than significant. Due to CalTrans and Contra Costa County comments on the Notice of Preparation for the EIR, however, traffic impacts that were determined to be less than significant in the IS are analyzed in this EIR.

3.14.2 REGIONAL SETTING

Existing transportation, circulation and parking conditions in and around the existing and planned launch areas vary widely. In general, existing sites are sized to accommodate their existing use, with some instances of overflow occurring during peak use seasons and weekends. As all sites are located on the San Francisco Bay shoreline, they typically do not occur at locations where heavy traffic volumes and severe levels of peak hour congestion occur. (Most commute corridors do not front on San Francisco Bay.) Observations of existing conditions[51] have also identified that the periods of peak roadway use do not coincide with the periods of peak project facility use. In the Bay Area, the peak period for transportation facilities typically occurs during the weekday morning peak commute hour (7 to 9 AM) and the weekday evening peak hour (4 to 6 PM). Roadway segments, intersections and transportation infrastructure are generally designed to serve traffic levels that prevail during these peak periods. Normally, traffic levels are substantially lower during other hours of the day and on weekends. During these non-peak periods, good levels of service and relatively low levels of congestion occur.

3.14.3 LOCAL SETTING

The project envisions the potential use of a number of existing access sites in and around San Francisco Bay, as well as the potential for the use of a number of new sites. Potential use of existing sites is proposed in the jurisdictions shown in the table below. In addition, the development of new access sites is anticipated in the following communities: Bay Point, Rodeo, Martinez, Richmond, Oakland, Hayward, San Jose, Redwood City, San Francisco and Corte Madera. The types and levels of activities, and the site-specific demand for parking from all activities potentially occurring at a given trailhead location relative to available parking varies greatly from location to location.

[51] Observations by Bill Burton, DMJM Harris Engineering, 2008

Alameda	Martinez	Rodeo (unincorporated; part of Contra Costa County)
Albany	Mill Valley	San Francisco
American Canyon	Napa	San Francisco County
Benicia	Napa County	San Leandro
Berkeley	Newark	San Mateo
Brisbane	Novato	San Rafael
Burlingame	Oakland	Sausalito
Corte Madera	Palo Alto	Sonoma County
Emeryville	Petaluma	South San Francisco
Fairfield	Pinole	Suisun City
Foster City	Point Richmond (unincorporated, part of Contra Costa County)	Tiburon
Hayward	Redwood City	Vallejo
Larkspur	Redwood Shores	
Marin County	Richmond	

3.14.4 REGULATORY SETTING

FEDERAL REGULATIONS

There are no federal regulations that would affect traffic or parking at the local level.

STATE AGENCIES AND REGULATIONS

The California Department of Transportation (Caltrans) is responsible for conditions on all State Highways. Within the area of the project, the Caltrans District 4 Intergovernmental Review/California Environmental Quality Act (IGR/CEQA) Branch is responsible for the review of Traffic Impact Studies for projects affecting State Highways (e.g., studies prepared as part of CEQA reviews).

LOCAL AND REGIONAL AGENCIES AND REGULATIONS

As described above, the project would potentially affect conditions on local roadways within more than 50 different local jurisdictions. The regulatory setting within each local jurisdiction is unique, and each has its own general plan policies, plans and requirements with respect to transportation facilities within their area of influence. Cities and counties also establish parking requirements for many types of land uses in their zoning ordinances.

Each of the nine Bay Area counties has a designated Congestion Management Agency (CMA), responsible for the monitoring of traffic conditions on regionally specific facilities within their sphere of influence and development, and prioritization and funding of improvement projects for regionally significant improvements. County CMAs affected by the project include: Alameda (ACCMA), Contra Costa (CCTA), Marin (TAM), Napa (NCTPA), Santa Clara (VTA) San Francisco (SFCTA), San Mateo (SMCTA), Solano (STA), and Sonoma (SCTA). For those portions of the proposed project that may impact regionally significant transportation facilities, the guidelines of these agencies must be followed.

3.14.5 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The significance criteria from the checklist in the CEQA guidelines were chosen as the significance criteria for transportation, circulation, and parking. In general, the project would result in a significant adverse impact if it were to:

- Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency access, or
- Result in inadequate parking capacity

METHODOLOGY

Transportation, circulation and parking impacts were evaluated by identifying possible conflicts and impacts that could occur in association with the types of facilities that would be part of and/or constructed through the WT, and evaluating the likelihood that these types of conflicts would occur as a result of the implementation of the WT.

REGIONAL IMPACTS AND MITIGATION MEASURES

Potential impacts to traffic and parking and corresponding mitigation measures are site-specific. The regional increases in traffic and parking needs potentially associated with implementation of the WT are negligible and present no regional impact.

SITE-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT TPC-1: DEGRADATION IN LEVELS OF SERVICE ON ACCESS ROADWAYS

At the program level, it is not possible to precisely predict any specific changes (increases or decreases) in use levels by location. Growth driven by population growth and demographics, and potential shifts in site use in response to facility improvements, nearby site closures or restrictions, and similar factors, however, could lead to site-specific increases in use. Installation of signage at HOSs would not be expected to have the potential for increased traffic or parking impacts. Facility improvements at Backbone Sites could, however, potentially generate new traffic impacts in proportion to the level and kind of increased usage they attract. Neither the increased level of use nor the associated traffic increases can be predicted at the current programmatic level of review.

The generation of additional traffic at new trailheads or facility improvements that could attract substantial new use of the site could result in unacceptable degradations in Levels of Service on

roadways and intersections that provide access to the sites. This impact is considered **potentially significant but mitigable**.

MITIGATION MEASURE TPC-M1: UNDERTAKE TRAFFIC ASSESSMENT PRIOR TO DESIGNATION OF NEW OR ENHANCED WT SITES

During the trailhead designation process at sites including development of substantial WT-related improvements at an existing facility or for new access sites, an analysis of potential traffic impacts for the trailhead under consideration shall be conducted in accordance with the methodology and guidelines of the subject jurisdiction within which it is located. If roadways of regional influence are found to be adversely affected by increased traffic levels, the access to the proposed new facilities shall comply with the requirements of the local jurisdiction, applicable Congestion Management Agency, and/or Caltrans, as appropriate.

IMPACT TPC-2: INADEQUATE PARKING AT NEW OR IMPROVED WT TRAILHEADS

Parking demands at existing access facilities may change with increased usage of a trailhead location, for example, due to substantial new infrastructure or if other factors (e.g., closure or restrictions on use of another site) lead to increased use of a trailhead. Signage improvements at HOSs are not expected to result in significant increased use, and therefore would not result in significant parking impacts. New or substantially expanded access facilities could generate new parking need in proportion to the level of usage they attract. Implementation of Strategy 8 (Parking) calls for site planners to ensure that new trailhead or facility improvements at existing trailheads take parking needs into consideration. The strategy, however, focuses primarily on the needs of NMSB users, rather than a potential trailhead as a whole, and parking conflicts could still occur even if appropriate parking for NMSB use is available. This impact is considered **potentially significant but mitigable**.

MITIGATION MEASURE TPC-M2: UNDERTAKE PARKING STUDY PRIOR TO DEVELOPMENT OF NEW OR ENHANCED WT SITES

Strategy 8 shall be modified to require analysis to estimate the amount of use associated with a new trailhead or changes at an existing site proposed as a trailhead, and the parking demand likely to result from the changes or new trailhead. Parking shall be provided in accordance with the anticipated need and the jurisdiction in which the site lies. Trailhead Plans shall address the potential need for additional parking.

IMPACT TPC-3: INADEQUATE EMERGENCY VEHICLE ACCESS

Trailheads will require an appropriate level of emergency vehicle access to support the types and levels of NMSB activities that could occur there, as well as other uses. Trailhead designation and associated improvements could be proposed at some existing access sites with inadequate emergency vehicle access, or proposed new sites could be located in areas with inadequate emergency vehicle access. This impact is considered **potentially significant but mitigable**.

MITIGATION MEASURE TPC-M3: EVALUATE EMERGENCY VEHICLE ACCESS AT NEW WT SITES AND SITES WITH SUBSTANTIAL IMPROVEMENTS

The trailhead designation process for each new access site or development of substantial new infrastructure that could potentially substantially increase usage at an existing facility shall consider whether adequate emergency vehicle access is available. If applicable, this shall include

an evaluation of truck turning radii on access roadways and intersections to ensure that emergency vehicles will be able to access the facilities. Potential delays to emergency vehicle access due to railroad crossing blockages also should be taken into consideration.

IMPACT TPC-4: HAZARDS DUE TO UNSAFE ACCESS ROADWAYS

Some potential trailhead locations may lack safe vehicle access, or increased use at an existing location could lead to unsafe conditions. Unsafe conditions could include conflicts with other roadway movements or railroad crossings, inadequate roadway geometry for vehicles with trailers, or inadequate sight distances. This impact is considered **potentially significant but mitigable**.

MITIGATION MEASURE TPC-M4: EVALUATE PLANS FOR NEW WT SITES TO DETERMINE SAFETY FOR VEHICLE ACCESS

The trailhead designation process for each new trailhead site or existing facility with development of substantial new infrastructure that could potentially substantially increase usage shall include analysis to determine if safe vehicular access is available. This shall include an evaluation of the geometry on roadways that provide access to launch sites. If unsafe geometry is suspected, the evaluation shall include a further review of historical access records to determine if safety hazards exist, and develop appropriate mitigations, as necessary. All at-grade roadway/railroad crossings on access roadways shall be reviewed in detail to determine if they meet modern safety standards and California Public Utilities Commission requirements.

3.15 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

3.15.1 INITIAL STUDY FINDINGS

Greenhouse Gas (GHG) emissions and climate change were not evaluated as a resource in the Initial Study, when it was developed in 2007. At that time, although GHG emissions and associated climate change were recognized as increasingly important concerns, there was no consensus that project impacts in these areas should be assessed as part of the CEQA process. In August 2007, Senate Bill 97 was enacted. That legislation specifically directed the Office of Planning and Research (OPR) to propose CEQA Guidelines related to assessment and mitigation of the effects of GHG emissions. However, as discussed in section 3.15.4 Regulatory Setting, below, it was not until early 2010 that OPR completed the process of preparation and adoption of revisions to the CEQA Guidelines to incorporate the evaluation of climate change effects. Likewise, it was only in 2007 that the California Attorney General's Office filed the first of a number of subsequent lawsuits that have been based on a public entity's failure to analyze under CEQA the increased GHG emissions that would result from a proposed project. These and additional legal developments since then (see section 3.15.4 Regulatory Setting, below) have made it clear that such an analysis must be included within CEQA environmental documentation. Accordingly, this section incorporates a discussion and evaluation of the GHG emissions associated with the WT project.

3.15.2 CLIMATE CHANGE BACKGROUND

Gases that trap heat in the atmosphere are referred to as greenhouse gases because they capture heat radiated from the sun as it is reflected back into the atmosphere, similar to a greenhouse. Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). These six GHGs are known as the Kyoto Gases because they were identified as the six gases included in the Kyoto Protocol, the first international agreement regarding the reduction of GHG emissions. These six gases are also included in the California Global Warming Solutions Act of 2006[52](AB 32) and the CEQA Guidelines, both of which are described in Section 3.15.4 below. The accumulation of GHGs in the atmosphere has been implicated as a driving force for global climate change and the related impacts of climate change. To account for the differences in the warming effect of various GHGs, emissions of various gases are often expressed in units of CO_2 equivalents (CO_2e). This represents the amount of CO_2 that would have the same relative warming effect as the actual combination of GHGs emitted.

Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and the impact of human activities that alter the composition of the global atmosphere. Global climate change is associated with long-term change in overall weather patterns such as temperature, wind patterns, precipitation levels, and the severity and frequency of storms. In global climate change, these shifts occur both regionally and around the globe. Both natural processes and human activities emit GHGs. It is extremely unlikely that global climate change of the past 50 years can be explained without the contribution from human

[52] Assembly Bill No. 32; California Health and Safety Code, Division 25.5, Sections 38500, et seq.

activities (United Nations Intergovernmental Panel on Climate Change (IPCC) 2007). Some of the human activities that contribute to global climate change are: burning fossil fuels, deforestation, and emission of certain gases from industrial activities. According to Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC), "Avoiding Dangerous Climate Change" means: "stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." Dangerous climate change defined in the UNFCCC is based on several key indicators including the potential for severe degradation of coral reef systems, disintegration of the West Antarctic Ice Sheet, and shut down of the large-scale, salinity- and thermally-driven circulation of the oceans (UNFCCC 2009). The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 parts per million (ppm) to 379 ppm in 2005 (IPCC 2007a). "Avoiding dangerous climate change" is generally understood to be achieved by stabilizing global average temperatures between 2 and 2.4°C above pre-industrial levels.

In order to limit temperature increases to this level, ambient global CO_2 concentrations must stabilize between 350 and 400 ppm (IPCC 2007b). Mitigating or reducing GHG emissions is critical to slowing climate change.

3.15.3 REGIONAL SETTING

REGIONAL GREENHOUSE GAS EMISSIONS

In 2004, the most recent year for which data are available, GHG emissions in the State of California were about 493,600,000 metric tons of CO_2e (CalEPA, 2006). California GHG emissions for 2004 were generated from the following activities (CARB, 2010).

TABLE 3.15-1. CALIFORNIA 2004 EMISSIONS BREAKDOWN

Emission Source	Percentage of Statewide GHG Emissions (2004)
Agriculture, Forestry, and Other Land Use	5%
Electricity and Heat Production	25%
Fugitive Emissions from Fuels	1%
Industrial Processes and Product Use	6%
Manufacture of Solid Fuels and Other Energy Industries	3%
Manufacturing and Construction	4%
Other Emissions	10%
Petroleum Refining	6%
Transportation	38%
Waste	2%

REGIONAL CONSEQUENCES OF CLIMATE CHANGE

Some of the impacts caused by climate change in California could include longer growing seasons, migration of some plant and animal species to higher latitudes, a reduction in the annual

snowpack in the Sierra Nevada Mountains, which may affect drinking water availability throughout California, and higher sea levels that could result in coastal flooding.

3.15.4 LOCAL SETTING

LOCAL GREENHOUSE GAS EMISSIONS

A GHG emissions inventory is available for the San Francisco Bay Area Region (Bay Area Air Quality Management District, 2010). In 2007, 95,800,000 metric tons of CO_2e were attributable to the San Francisco Bay Area (88,700,000 metric tons CO_2e were emitted within the Bay Area Air District and 7,100,000 metric tons CO_2e were indirect emissions from imported electricity). A summary of GHG emissions in the Bay Area by sector is provided in Table 3.15-2 below.

TABLE 3.15-2. BAY AREA 2007 EMISSIONS BREAKDOWN

Emission Source	Percentage of Regional GHG Emissions (2007)	CO_2e (Million Metric Tons/Year)
Industrial/Commercial	36.4%	34.86
Residential Fuel Usage	7.12%	6.82
Electricity/Co-Generation	15.87%	15.2
Off-Road Equipment	3.05%	2.92
Transportation	36.41%	34.87
Agriculture/Farming	1.16%	1.11
Total	100%	95.8

LOCAL CONSEQUENCES OF CLIMATE CHANGE: SEA LEVEL RISE

Sea level rise is the most significant consequence of GHG emissions within the project area. BCDC has recently completed a broad and thorough analysis of the effects of anticipated climate change within the San Francisco Bay: BCDC, Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline, April 7, 2009 ("BCDC Climate Change Report"). The information in this subsection is derived primarily from that source.
The BCDC Climate Change Report uses two sea level rise estimates for its analysis: a 16-inch (40 cm) sea level rise by mid-century and a 55-inch rise in sea level by the end of the century. Although the State of California is still in the process of formulating statewide policy direction for adapting to sea level rise, these estimates are generally consistent with other state planning efforts.

Sea level rise will have numerous consequences in the Bay Area. An estimated 270,000 people in the Bay Area will be at risk of flooding by the end of the century, which is 98 percent more than are currently at risk from flooding. The economic value of Bay Area shoreline development estimated to be at risk by the end of the century is $62 billion. In those areas where lives and property are not directly vulnerable, the secondary and cumulative impacts of sea level rise will affect public health, economic security, and quality of life.

Particularly relevant to the WT sites is the BCDC Climate Change Report's conclusion that there are 23,000 acres of waterfront parks within San Francisco Bay, of which 14 percent would be

vulnerable by mid-century and 18 percent would be vulnerable by the end of the century. In addition, 57 percent of the public access required by BCDC would be vulnerable by mid-century and 87 percent would be vulnerable by the end of the century. The decline of waterfront recreational opportunities will impact the quality of life in the Bay Area.

3.15.5 REGULATORY SETTING

FEDERAL REGULATIONS

On April 10, 2009, the EPA published a Draft Rule for Mandatory Reporting of GHG Emissions in the *Federal Register*. In general, this rule will require the following entities to annually track and report GHG emissions: suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more of GHG emissions per year. The Final Rule was signed by the EPA Administrator on September 30, 2009 and published in the *Federal Register* on October 30, 2009. The Rule became effective on December 29, 2009. Due to the high emission threshold for reporting, the Federal Rule will not affect the WT project or the SCC.

In June 2009, the U.S. House of Representatives passed HR 2454, a bill pertaining to climate change that would regulate GHG emissions through a "cap and trade" mechanism. However, action in the near future by the Senate on a similar proposed "cap and trade" bill now appears unlikely.

On December 7, 2009, the U.S. Environmental Protection Agency Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- An "endangerment finding" that current and projected concentrations of GHGs in the atmosphere threaten the public health and welfare of current and future generations.
- A "cause or contribute finding" that the combined GHG emissions from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

These findings do not themselves impose any requirements. However, this action is a prerequisite to any regulation by EPA of GHG emissions, including the new fuel economy standards (described below).

On April 1, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a new National Program to reduce GHG emissions from new cars and light trucks sold in the U.S. The standards that make up this National Program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon (MPG). Together, these standards will cut greenhouse gas emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

STATE AGENCIES AND REGULATIONS

EXECUTIVE ORDER S-3-05

Executive Order S-3-05, signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In 2006, California adopted AB 32. As described in Section 3.2, AB 32 establishes regulatory, reporting, voluntary, and market mechanisms to achieve quantifiable reductions in GHG emissions to meet the statewide goal of reducing CO_2e emissions to 1990 levels by 2020. To accomplish this goal, AB 32 directed the California Air Resources Board (CARB) to design and implement emission limits, regulations, and other measures. AB 32 will also require mandatory reporting and verification of GHG emissions for some emitters, as well as development of a statewide Scoping Plan for reaching emission reductions. Similar to the federal mandatory reporting rule for GHG emissions, mandatory reporting of GHGs in California will not affect the WT project or the SCC due to high emission thresholds for reporting.[53]

CARB approved the 2020 emission limit of 427 million metric tons of CO_2e in December 2007. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e . The total reduction for the recommended measures is 174 million metric tons/year of CO_2e. CARB's Climate Change Proposed Scoping Plan was approved on December 11, 2008 and includes the following key elements:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

The measures in the Proposed Scoping Plan will be in place by 2012. The Climate Change Proposed Scoping Plan also includes recommended measures to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable

[53] The emission threshold in California is 25,000 metric tons of CO2/year for most emitters. (Some emitters, such as cement plants, are required to report, regardless of their annual emissions.)

and do not disproportionately impact low-income and minority communities. The measures also put the state on a path to meet the long term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels.

Some of the measures included in the Scoping Plan will affect the WT improvements and will address any potential associated increases in GHG emissions. For example, clean car standards and goods movement measures would likely apply to vehicles in use for the WT project and emissions would be reduced once those measures are implemented.

One of the most recent measures to be enacted in California is development of a mandatory Green Building Standards Code. This Code was the first of its kind in the nation, and was adopted by the California Building Standards Commission on January 12, 2010. The Code takes effect on January 1, 2011 and includes requirements for energy efficiency, water use reduction, and diversion of construction and demolition waste for recycling, among other requirements.

SENATE BILL 97AND CEQA GHG GUIDELINES

As described in Section 3.2, in August 2007, California adopted Senate Bill 97[54] (SB 97). Under this legislation, on December 30, 2009, the Resources Agency adopted amendments to the CEQA Guidelines, which describe the process and methodology for assessing the effects of GHG emissions under CEQA. The Resources Agency then transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law (OAL) on December 31, 2009. The final amendments took effect on March 18, 2010. The Office of Planning and Research (OPR) and the Resources Agency are also required to periodically review the guidelines to incorporate new information or criteria adopted by CARB pursuant to the Global Warming Solutions Act (criteria are due by 2012).

The amended Guidelines do not establish any bright-line threshold for determining significance of GHG emissions, whether as an individual effect or a cumulative one. Likewise, CARB has not yet established any specific criteria or thresholds.

The CEQA GHG Guidelines do provide general guidance on determining the significance of impacts from GHG emissions. The Guidelines state that the lead agency "should make a good faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project." The lead agency should also consider the following factors, among others, when assessing the significance of impacts from GHG emissions on the environment:

1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;

[54] Chapter 185, Statutes 2007

3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions. (Section 15064.4)

LOCAL AND REGIONAL AGENCIES AND REGULATIONS

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

The Bay Area Air Quality Management District (BAAQMD) is the public agency entrusted with regulating sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. In this capacity, BAAQMD is directly engaged in the statewide effort to reduce GHG emissions.

On December 7, 2009, BAAQMD published a "California Environmental Quality Act Guidelines Update: Proposed Thresholds of Significance" (BAAQMD 2009). On June 2, 2010, the BAAQMD Board of Directors unanimously adopted these guidelines. The updated guidelines include CEQA thresholds of significance for GHG emissions, all of which are effective June 2, 2010. Minor revisions that reflect clarifications and typographical errors only were released on June 17, 2010 (BAAQMD 2010), and do not affect the thresholds. The BAAQMD GHG thresholds are shown in Table 3.15-3.

TABLE 3.15-3. BAAQMD GHG THRESHOLDS OF SIGNIFICANCE

Project Type	Construction-Related Emissions	Operation-Related Emissions
Projects other than Stationary Sources	None	Compliance with Qualified Climate Action Plan OR 1,100 metric tons of CO2e/yr OR 4.6 metric tons CO2e/service population/yr* (residents + employees)
Stationary Sources	None	10,000 MT of CO2e/yr
Plans	None	Compliance with Qualified Climate Action Plan (or similar criteria included in a General Plan) OR 6.6 metric tons CO2e/service population/yr (residents + employees)*

* BAAQMD staff notes that the efficiency-based thresholds should be applied to individual projects with caution. As explained in the Thresholds of Significance Report, lead agencies may determine that the efficiency-based GHG thresholds for individual land use projects may not be appropriate for very large projects. If there is a fair argument that the project's emissions on a mass level will have a cumulatively considerable impact on the region's GHG emissions, the insignificance presumption afforded to a project that meets an efficiency-based GHG threshold would be overcome.

The WT will not create any stationary sources, but is expected to generate mobile sources of GHG emissions. Also, the WT is not a general plan or other long-range plan, but is a specific project. The category "Projects other than Stationary Sources" is intended to apply to land use development projects including residential, commercial, industrial, and public land uses and facilities. Thus, the category "Projects other than Stationary Sources" is the applicable project type with which to compare WT Project.

Also, the WT will not include a "service population," which normally includes both residents and employees, since not all residents will use WT facilities. (Usually, the concept of a service population is applied to land use and major development projects, such as new residential developments or new commercial or retail developments.) For these reasons, the threshold of 1,100 metric tons CO_2e/year is the most appropriate point of comparison for the WT project. As indicated in the BAAQMD CEQA Air Quality Guidelines (2010), the GHG thresholds are intended to provide interim threshold levels during the implementation of the AB 32 Scoping Plan and until CARB adopts a recommended threshold. As stated in Appendix D of the Air Quality Guidelines:

> "GHG CEQA significance thresholds recommended herein are intended to serve as interim levels during the implementation of the AB 32 Scoping Plan and SB 375, which will occur over time. Until AB 32 has been fully implemented in terms of adopted regulations, incentives, and programs and until SB 375 required plans have been fully adopted, or the California Air Resources Board (ARB) adopts a recommended threshold, the BAAQMD recommends that local agencies in the Bay Area apply the GHG thresholds recommended herein."

The fundamental purpose of the BAAQMD GHG thresholds is to provide a temporary standard for local and other agencies to use to determine the significance of GHG emissions so that new local development and other projects in the Bay Area Air Basin do not result in a cumulatively considerable amount of GHG emissions and a substantial conflict with the State's ability to meet the goals of AB 32.

LOCAL REGULATIONS

A multitude of local jurisdictions on the shoreline of the San Francisco Bay have adopted "green building codes," the purpose of which is to encourage or to require building practices that will have the effect, among others, of reducing or avoiding GHG emissions related to construction and the future use of buildings. Jurisdictions which have adopted green building codes and in which there are potential WT sites include Albany, Hayward, Marin County, Napa, Novato, San Francisco and San Rafael. These codes will be applicable to any construction related to the improvement of WT sites that occurs in jurisdictions in which such codes have been adopted. Numerous local cities and counties have also developed or are in the process of developing and adopting climate action plans (CAPs). Some of these plans address only the GHG emissions directly controlled by the city or county operations, while others include strategies and policies for reducing community-wide GHG emissions. The following cities and counties have adopted community-wide CAPs: City of Alameda, City of Benicia, City of Berkeley, City of San Rafael, City and County of San Francisco, Marin County, and Sonoma County.

A summary of some CAPs and the included local actions that may be relevant to WT sites is provided in Appendix F. Future CEQA analysis will consider development of each WT site and will consider the GHG emissions from each site in the context of the appropriate local county or city Climate Action Plan.

3.15.6 IMPACTS AND BEST PERFORMANCE STANDARDS

SIGNIFICANCE CRITERIA

As noted in the discussion of Senate Bill 97 and the GHG CEQA Guidelines above, under the revised CEQA Guidelines, two essential questions must be answered in assessing the environmental effect of a project's GHG emissions:

- Does the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Does the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

As discussed previously, at this time there are no adopted Statewide guidelines for GHG emission impacts, although this will be addressed through the requirements of SB 97. BAAQMD has adopted guidelines applicable to the Bay Area. However, although these guideline are persuasive, having been adopted by the agency responsible for regulating air resources in the Bay Area, the guidelines have not been adopted by the Conservancy. Consequently, for the purposes of this EIR, the project would be considered to have a significant impact if:

- Implementation of the project would conflict with the AB 32 State goals for reducing GHG emissions.

METHODOLOGY

As recently amended, the CEQA Guidelines prescribe the process and methodology for determining and evaluating the significance of GHG emissions that are associated with a project. Section 15064.4 calls for the lead agency to make "a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project." In doing so, the agency may either:

- Select a model or methodology to quantify GHG emissions resulting from the project, so long as it explains the limitations of the particular model or methodology selected for use, or
- Rely on a qualitative analysis or performance-based standards.

A methodology was developed specific to the WT project to quantify emissions (described in Appendix G). The resulting quantitative analysis of GHG emissions attributable to the WT project is provided below.

- Section 15064 also requires a lead agency to consider the factors described in detail above under "Senate Bill 97 and CEQA GHG Guidelines" when assessing the significance of impacts from GHG emissions on the environment.

Each of these factors is considered below. As noted above, the threshold of significance used in this EIR is whether the implementation of the project would conflict with the AB 32 State goals for reducing GHG emissions. In this regard, BAAQMD's adopted thresholds of significance and its rationale are an important source of pertinent information and guidance.

The Guidelines specifically require that an EIR discuss any inconsistencies between the proposed project and any state, local or regional plans for the reduction of GHG emissions. Section 15126.4 of the Guidelines also provides direction on development of appropriate feasible measures to mitigate or avoid any potentially significant GHG effects. Feasible mitigation measures as defined by the CEQA Guidelines may include:

- Measures in an existing, applicable plan or mitigation program for the reduction of emissions.
- Reductions in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F of the Guidelines.
- Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions.'
- Measures that sequester greenhouse gases.
- In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

IMPACTS AND MITIGATION MEASURES

IMPACT GHG-1: INCREASE IN GREENHOUSE GAS EMISSIONS ATTRIBUTABLE TO THE IMPLEMENTATION OF THE WATER TRAIL

This discussion first presents a summary of the estimated increases and decreases in GHG emissions potentially associated with implementation of the WT, and then evaluates the significance of the estimated change in emissions.

Quantification of GHG Emissions

The methodology presented in Appendix G was used to quantify 1) GHG emissions from SCC-funded WT construction activities and from ongoing operation of WT sites, and 2) operational emissions of additional vehicle trips to and from WT sites in response to SCC-funded WT-related media and outreach and trailhead facility improvements.

In addition, emissions are divided into Scope 1, Scope 2, and Scope 3 categories, as defined by *The GHG Protocol: A Corporate Accounting and Reporting Standard, Revised Version* from the World Business Council on Sustainable Development (WBCSD) and the World Resources Institute (WRI) (WBCSD and WRI, 2004). Scope 1 emissions are defined as direct GHG emissions from sources that are owned or controlled by the entity, such as emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc. Scope 2 emissions are from the generation of purchased electricity. Scope 3 emissions are typically considered optional for reporting, and include all other indirect emissions. Scope 3 emissions are defined as a

consequence of the activities of the entity, but occur from sources not owned or controlled by the entity.

Most GHG inventory protocols, such as the California Climate Action Registry *General Reporting Protocol* require reporting of Scope 1 and 2 emissions. This project is expected to generate Scope 1 emissions from construction activities, but no or only extremely minor Scope 2 emissions, since very few of the facilities that will be constructed at Water Trail sites are likely to use electricity. Scope 2 emissions, if any, attributable to the WT were not quantified because the precise nature of any facilities constructed solely due to the implementation of the WT cannot be determined, and the amount of electricity used by any such facilities also cannot be determined. Scope 3 emissions from additional travel to and from WT sites are included in this analysis because these emissions were quantifiable, and because these emissions are expected to be a large portion of the emissions generated by the WT project. Additional Scope 3 emissions (such as "upstream" emissions from harvesting and processing lumber) are not included because they are extremely difficult to quantify. In order to estimate these emissions, data from suppliers of products are needed, as well as data on the actual products that will be purchased for each construction project.

A summary of GHG emissions attributable to the WT is provided in Table 3.15-4. The methodology for quantifying these emissions is provided in Appendix G. The potential magnitude and significance of changes in GHG emissions potentially attributable to the implementation of the WT are discussed below.

TABLE 3.15-4. SUMMARY OF GHG EMISSIONS ATTRIBUTABLE TO THE WATER TRAIL

Source of Emissions			**GHG Emissions in Metric Tons of Carbon Dioxide Equivalents (metric tons CO_2e)**	
			Total Emissions	Annual Emissions
Scope 1	Construction Emissions	Mobile Emissions from Construction of New Facilities (10-year time frame)	465	46.5/year
Scope 3	Operational Emissions	Mobile Emissions from Additional Traffic due to WT Implementation (20-year time frame)	2,482	124/year
Totals:			2,947 (over 20-year time frame)	170.5/year

Emission Reductions

A small number of new trips to WT sites are likely to replace current trips that are taken by non-motorized boat owners in the Bay Area to destinations outside of the region. Unpublished raw data (n=52) from survey respondents in the Bay Area (personal communication, Wendy Pratt, March 2010),collected for *Non-Motorized Boating in California* (Cal Boating 2009), indicate that about 70% of non-motorized boat owners in the San Francisco Bay Area travel to other destinations outside of the region to participate in non-motorized boating. ("Local" is defined in this methodology, based on these survey results, as taking 1.5 hour or less, one-way, to reach the destination.) In comparison, 78% of non-motorized boaters in Oregon reported that their most frequent destination is local (Carter, 2004), and only 22% travel to non-local destinations on a regular basis. ("Local" is defined in this methodology from survey results as being 75 miles or less, one-way, from their starting location.) Thus, it appears that non-motorized boat owners in the Bay Area tend to travel farther to participate in non-motorized boating than owners in at least one other location.

Emission reductions would occur from replacing longer trips to a non-local destination with a shorter local trip to the San Francisco Bay, once the WT project is implemented. The methodology for calculating the emission reductions is included in Appendix G. A summary of GHG emission reductions that would result from implementation of the Water Trail is provided in Table 3.15-5.

TABLE 3.15-5. SUMMARY OF GHG EMISSION REDUCTIONS EXPECTED FROM IMPLEMENTATION OF THE WATER TRAIL PROJECT

Source of Emissions			**GHG Emission Reductions in Metric Tons of Carbon Dioxide Equivalents (metric tons CO_2e)**	
			Total Emission Reductions	Annual Emission Reductions
Scope 3	Operational Emissions	Mobile Emission Reductions from Replacing Non-Local Trips with Local Trips to the San Francisco Bay (20-year time frame)	1,046	52/year

Significance of GHG Emission Changes

The expected emissions rate attributable to the project is 171 metric tons CO_2e/year. When expected emission reductions are included, the annual emissions rate is 119 metric tons CO_2e/year.

The WT Project will be implemented throughout the Bay Area, and thus the project is not subject to meeting the requirements of any city or county Climate Action Plan (although the

requirements of a given plan may apply to construction of WT facilitates within a city or county). Currently, there is not a regional Bay Area Climate Action Plan. In the future, CARB will be developing regional targets for reduction of GHG emissions from the automobile and light truck sectors in compliance with Senate Bill 375;[55] however, these targets have not yet been developed, and these targets are tied to land use planning strategies and housing plans, and will not be highly relevant for the WT Project. The WT Project will be in compliance with the requirements of AB 32, which, as noted above, will include numerous measures in the coming years to reduce GHG emissions, including the forthcoming California Green Building Standards Code, which becomes effective on January 1, 2011.

As discussed in Sections 3.15.3 and 3.15.4 above, regional GHG emissions in the Bay Area are 95.8 million metric tons per year (based on 2007 data) and GHG emissions in the State of California are 493.6 million metric tons per year (based on 2004 data). Thus, emissions over the next 20 years from implementation of the WT are expected to be only 0.0002 % of the annual emissions in the Bay Area, and 0.00003% of annual emissions in California.

As with other individual projects, the specific emissions from this project would not be expected to individually have an impact on Global Climate Change.[56] Recent guidance indicates that GHG-related impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective.[57] Accordingly, the project's cumulative impacts are evaluated in Chapter 4 (Cumulative Impacts and Other CEQA Sections) rather than here. The potential impacts of the WT project alone are **less than significant.**

[55] Senate Bill 375 also requires each metropolitan planning organization (MPO) in California to prepare a "sustainable communities strategy" to reduce the amount of vehicle miles traveled (VMT) in their respective regions and demonstrate the ability for the region to attain CARB's targets.

[56] Association of Environmental Professionals (AEP), *Alternative Approaches to Analyzing GHG Emissions and Global Climate Change in CEQA Documents*, 2007.

[57] California Air Pollution Control Officers Association (CAPCOA), *CEQA and Climate Change: Evaluating and Addressing GHG Emissions from Projects Subject to the California Environmental Quality Act*, 2008.