California State Coastal Conservancy –Lead Agency

Eel River Estuary and Centerville Slough Enhancement Project

Recirculated Draft Environmental Impact Report

SCH # 2014122040

December 2016

Recirculated Draft Environmental Impact Report for the

Eel River Estuary and Centerville Slough Enhancement Project

SCH # 2014122040

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Acronyms and Abbreviations

AAI	all appropriate inquiries
AB	Assembly Bill
AE	Agriculture Exclusive
AG	Agriculture Grazing
AMP	Adaptive Management Program
APN	Assessor Parcel Number
ARG	Agricultural Supply
ASTM	American Society for Testing and Materials
ASTs	aboveground storage tanks
AUM	Animal Unit Months
BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
BMPs	Best Management Practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
Cal/EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDP	Coastal Development Permit
CE	Common Era
CERCLA	Comprehensive Environmental Response, Compensation and Liability
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFCPA	California Farmland Conservancy Program Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CGC	Centerville Gun Club
CGS	California Geological Survey
CH_4	methane
CHP	California Highway Patrol
CHRIS	California Historical Resources Information System
CHSC	California Health and Safety Code
CIFF	California Important Farmland Finder
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	carbon dioxide
$CO2_e$	carbon-dioxide-equivalent
COLD	Cold Freshwater Habitat
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank

CUP	Conditional Use Permit
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CY	cubic yard
dB	decibel
dBA	A-weighted sound level
DOC	California Department of Conservation
DOT	U.S. Department of Transportation
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EC	electrical conductivity
EDR	Environmental Data Resources
EIR	Environmental Impact Report
EO	Executive Order
EOC	County Emergency Operations Center
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
ERAP	Eel River Area Plan
EREP	Eel River Estuary Preserve
ERGC	Eel River Gun Club
ERWA	Eel River Waterfowl Association
ESA	Environmental Site Assessment
ESA	Federal Endangered Species Act
ESHA	Environmentally Sensitive Habitat Area
ESP	exchangeable sodium percentage
Fed/OSHA	Federal Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency
FFPD	Ferndale Fire Protection District
FMMP	Farmland Mapping and Monitoring Program
FPPA	Federal Farmland Protection Policy Act
FSZ	Farmland Security Zone
Ft/s	feet per second
FVFD	Ferndale Volunteer Fire Department
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	gallons per minute
GSA	groundwater sustainability agency
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBSLRAP	Humboldt Bay Sea Level Rise Adaption Planning
HCAOG	Humboldt County Association of Governments
HCGP	Humboldt County General Plan
HCRCD	Humboldt County Resource Conservation District
H_2O	water vapor
HTA	Humboldt Transit Authority
LCC	Land capability classification
LCP	Local Coastal Program
Ldn	Day/Night Average Sound Level
Leq	Equivalent Noise Level
LESA	Land Evaluation and Site Assessment
Lmax	maximum A-weighted noise level
Lmin	minimum A-weighted noise level
LOS	Level of Service
LRA	Local Responsibility Area
MAR	marine

MBTA	Migratory Bird Treaty Act
ml	milliliter
MMT	million metric tons
msl	mean sea level
MTR	muted tidegate regulator
MUN	municipal supply
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCRWQCB	North Coast Regional Water Quality Control Board
NCUAQMD	North Coast Unified Air Quality Management District
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
N_2O	nitrous oxide
NO_2	Nitrogen Dioxide
NOAA	National Oceanic Atmospheric Administration
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NR	Natural Resources
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWIC	Northwest Information Center
O^3	ozone
OES	Office of Emergency Services
OHV	Off-highway vehicle
OMR	Office of Mine Reclamation
ORF	O'Rourke Foundation
ORV	off road vehicle
PDM	Production of Dry Residual Matter
PEIR	Programmatic Environmental Impact Report
PGA	peak ground acceleration
PG&E	Pacific Gas & Electric
PM	Particulate Matter
PPM	parts per million
PPT	part per thousand
PPV	Peak Particle Velocity
PRC	Public Resources Code
RCAA	Russ Creek Avulsion Area
RCD	Resource Conservation District
REC-1	Contact Water Recreation
RECs	recognized environmental conditions
RMS	Root Mean Square
ROG	reactive organic gases
RR&T	Russ Ranch & Timber
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SAL	saline
SAR	sodium adsorption ratio
SARA	Superfund Amendment and Reauthorization Act
SCC	State Coastal Conservancy

SGMA	Sustainable Groundwater Management Act
SHELL	Shellfish Harvesting
SLR	Sea Level Rise
SMAO	Streamside Management Area Ordinance
SMARA	Surface Mining and Reclamation Act
SMGB	State Mining and Geology Board
SREP	Salt River Ecosystem Restoration Project
SRWC	Salt River Watershed Council
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TP	Timber Production
TDS	Total Dissolved Solids
THPO	Tribal Historic Preservation Officer
TMDL	total maximum daily loads
TWC	The Wildlands Conservancy
UBC	Uniform Building Code
USACE	U.S. Army Corps of Engineers
USDA	United State Department of Agriculture
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VdB	velocity decibels
WARM	Warm Freshwater Habitat
WBWG	Western Bat Working Group
WDD	Western Drainage Ditch
WLMP	Water Level Management Plan
WRE	Wetland Reserve Easement

December 5, 2016

To whom it may concern:

Enclosed is a Recirculated Draft Environmental Impact Report (RDEIR) for the Eel River Estuary and Centerville Slough Enhancement Project (Project), including Responses to Comments on the initial Draft EIR issued September 8, 2016 (DEIR). The RDEIR is intended to further inform the public about the Project and to provide supplemental materials discussed or requested in comments received on the DEIR. The following portions of the DEIR have been revised and are being recirculated in the RDEIR:

1. **Chapter 2, Project Description**

   Numerous comments were received on the DEIR pertaining to the Adaptive Management Plan (AMP) and the Water Level Management Plan (WLMP). Of particular concern to commenters was the manner in which infrastructure in the area would be managed ("operations"). The Coastal Conservancy determined that the public would be better informed by a more detailed description of these components in the Project Description chapter, as well as through the inclusion of the AMP and WLMP in the RDEIR Attachments. Thus the RDEIR includes a fully revised Project Description chapter. The AMP and WLMP, also included in the RDEIR, have been developed for the proposed Project. If the Coastal Conservancy approves one of the project alternatives instead, these documents would be updated and revised.

2. **Chapter 4, Alternatives Analysis**

   In comments on the September 2016 Draft EIR, a number of individuals and entities, including some project applicants, expressed reservations about the proposed Project. One comment expressed a preference for the "No Project" alternative, although this option would forego the environmental benefits of the proposed Project presented in the DEIR. Comments focused on three key areas: hydrology, infrastructure operations and public access.

After receiving these comments, the design team reviewed various project alternatives, particularly the 2014 Notice of Preparation Alternative which was the DEIR Environmentally Superior Alternative. The design team reaffirmed the 2014 NOP Alternative as the Environmentally Superior Alternative, and confirmed that it is fully capable of achieving the Project goals and objectives. However, more recent analysis and design work suggested ways to increase that alternative's environmental benefits while also reducing its impacts. In addition, and in response to the preference expressed for the "No Project" alternative, an alternative resembling the proposed Project, but limited geographically to land owned by The Wildlands Conservancy, was developed and analyzed. These two new alternatives –one a slightly modified version of the 2014 NOP Alternative, and the other a slightly revised version of the proposed Project – have been included in the RDEIR, in addition to the 2014 NOP alternative. The Alternatives Analysis Chapter has been revised accordingly.

In addition, the Appendices of the September 2016 Draft EIR have been augmented with the following documents:

a. Updated Adaptive Management Program (AMP) (Attachment A), which includes a revised and updated Water Level Management Plan (WLMP). The AMP is included to further inform the public about how the Project can be managed over time for best adherence to the Project goals and objectives.

b. September 2013 Draft Public Access Plan (Attachment C)
As discussed in the response to comments section, the Coastal Conservancy funded a series of facilitated meetings in 2013 between The Wildlands Conservancy and property owners adjacent to the Eel River Estuary Preserve. That effort culminated in the issuance of a draft Public Access Plan in September 2013. This was described in the DEIR, but the Public Access Plan was not included in the DEIR Appendices, due to the fact that it was never formally adopted. The plan is included in the interest of informing the public about prior discussions pertaining to public access in the Project area.

c. The RDEIR also includes Responses to Comments on the DEIR (Attachment A – Section 2). This early availability of the response to comments is intended to provide ample time for previous commenters and the public in general to review the responses. This section also includes minor revisions to other sections of the Draft EIR (Attachment A - Section 1) in strikethrough for deletions, and underline for additions.

This RDEIR will be circulated for 45 days, from December 5, 2016 to January 19, 2017, to allow interested individuals and public agencies to review and comment on the recirculated Project Description and Alternatives chapters, as well as on the RDEIR Attachments, including the Responses to Comments..

In accordance with 14 California Code of Regulations Section 15088.5(f)(2), the Coastal Conservancy requests that commenters limit their comments to the revised portions of the DEIR included in this RDEIR. Comments will not be accepted on un-revised material or chapters not being re-circulated. However, comments will be accepted on the Response to Comments (Attachment A).

The documents are available for review at the following locations:

California State Coastal Conservancy
1515 Clay Street, 10th Floor
Oakland, CA 94612-1401

GHD, Inc.
718 3rd Street
Eureka, CA 95501

The DEIR and RDEIR are available online at:

http://scc.ca.gov/webmaster/ftp/eel_river/EelRiverCenterRecirculatedDEIR1216.pdf

All documents referenced in the DEIR and the RDEIR are available for public review at GHD 718 Third Street, Eureka, CA 95501. Written comments on this RDEIR will be accepted by the California State Coastal Conservancy (Lead Agency) until 5:00 P.M. January 19, 2017.

Public agencies, interested organizations and individuals are encouraged to submit comments on this RDEIR for consideration by the California State Coastal Conservancy. All written comments should be addressed to:

California State Coastal Conservancy
Attn: Michael Bowen, Project Manager
1515 Clay Street, 10th Floor
Oakland, CA 94612-1401

To facilitate understanding of the comments, please provide a separate sentence or paragraph for each comment, and note the page and chapter/section of the RDEIR to which the comment is directed. This approach to commenting will help the California State Coastal Conservancy provide a clear and meaningful response to each comment.

At the end of the public review period, written responses will be prepared for comments received on the RDEIR during the recirculation period. The comments and responses to both Draft EIRs (September 2016 and Recirculated Draft EIR) will then be included in the Final EIR and will be considered by the lead agency prior to consideration of the adequacy of the EIR. Prior to approval of the Project, the lead agency must certify that the EIR has been completed in compliance with the California Environmental Quality Act (CEQA).

Sincerely,

Michael Bowen
Project Manager

2. Project Description

2.1 Project Location and Setting

The Project area is approximately 1,850-acres and is located approximately four miles west of the City of Ferndale, in Humboldt County, California (Figure 2-1). Figure 2-2 shows existing components within the Project area. The Project area includes the Eel River Estuary Preserve (EREP) owned by The Wildlands Conservancy (TWC) and various parcels owned by Russ Ranch and Timber, L.L.C (RR&T), and Jack and Linda Russ (Figure 2-3). The Project area includes the following APN's: 10012105, 10013104, 10014201, 10013103, 10012104, 10012101, 10014209, 10014304, 10014303, 10014221, 10101114, 10014308, 10014208, 10014211, 10014302, 10014301, and 10101105.

The west side of the Project area encompasses the near shore dunes of Centerville Beach and extends to the Pacific Ocean. East of the dunes the Project area supports a system of sloughs and pastures that comprise a portion of the Salt River watershed, itself a tributary to the Eel River estuary. The north property line borders the Eel River. The southern half of the Project area includes several perennial tributary streams draining from the Wildcat Hills including: Russ Creek, Shaw Creek, a seasonal drainage referred to as Creamery Ditch, and an unnamed creek that flows off land adjacent to the Project.

Much of the Project area east of and including former Centerville Slough was reclaimed and has been converted to pasture for cattle grazing. Some of this land represents diked former tidelands separated from the estuarine wetlands by a series of dikes and the Cut-Off Slough tidegates. The Project area along with three neighboring landholdings comprise an historic reclamation district that operated with a largely unified vision of managing tidal inundation, as well as the Eel River and Wildcat Hills stream floodwaters.[1]

A partially developed upland area occupies the eastern portion of the Project area, where vehicular access is gained from Russ Lane. Few structures occur on site, but there are two residences: one at the southwestern edge of the Project and another at the eastern edge; two barns within the upland area near Russ Lane (referred to as the Potato Barn and Quonset Hut); a third barn (North Barn) located between Cut-Off Slough and the near shore dunes, approximately midway between the north and south property lines of the EREP; and a fourth barn (South Barn) located in the southwest corner of the EREP. The North and South barns are connected by unimproved roads to the Potato Barn at the Project area entrance. The Potato Barn includes a ranch office, and storage for agricultural equipment. Watering troughs and extensive fencing occur throughout the central and southern portion of the Project area.

EREP includes agricultural (grazing) land, tidal salt marsh, brackish marsh, riparian scrub, sloughs/open water channels, freshwater ponds and ditches, and nearshore dune ridges and swales. Russ Ranch and Timber, LLC, and Jack and Linda Russ, own the parcels immediately south of EREP; this area includes grazing land with managed ditches, open water channels and mixed freshwater and brackish marsh.

[1]This delicate balancing of conflicting forces was achieved by storing floodwaters from the Wildcat Hills to the south behind a system of levees and tidegates, and then draining that stored water northward (primarily through the Cut-Off Slough tidegate) when low tide conditions in the Eel River estuary permitted. The proposed Project adheres to this approach. Therefore, ensuring that the proposed Project does not diminish the flood storage capacity within the system of dikes is a fundamental design criterion for the Project.

The climate is Mediterranean with precipitation most abundant in the winter months. The average annual rainfall is approximately 48.5 inches. Approximately two thirds of the year, the area is influenced by coastal fog. Prominent water features within the Project area include Russ Creek, remnant Centerville Slough, Cut-Off Slough, and the Western Drainage Ditch (which in turn conveys the flow of Shaw Creek and Creamery Ditch), as well as smaller (seasonal) slough channels and drainage ditches. The northern end of the Project area borders the mouth of the Eel River. The Project area ranges in elevation from below sea level to an approximate elevation of 30 feet. Unless noted otherwise, all elevations presented in this Project description are referenced to North American Vertical Datum 1988 (NAVD-88).

Humboldt County General Plan Land Use designation for the Project area is Agriculture Exclusive (AE). Primary uses in AE designated lands include the production of food, fiber, plants, timber, timber agriculturally related uses, and agriculture related recreational uses. Zoning for the Project area is AE-60/W, F, R, T, which means parcel sizes with a minimum of 60 acres and combining zones of coastal wetlands, flood hazard areas, streams and riparian corridor protection, and transitional agricultural lands.

The Project area is enrolled in Williamson Act contracts. The EREP portion of the Project is enrolled in a Williamson Act contract entitled “Wildlands Conservancy Agricultural Preserve No. 09-05.” Approximately 648 acres are identified in that contract as being “Areas In Grazing.” The contract includes several parcels (APN’s 100-121-01, 100-121-03, 100-121-04, 100-121-05, 100-131-03, 100-131-04, 100-142-01). The parcels south of the EREP are also enrolled in a Williamson Act contract entitled “Centerville Ranch Agricultural Preserve No. 87-28”, originally recorded on February 27, 1987, and amended in 2008. It originally included eight parcels, filed under APN 100-142-010. A lot line adjustment was completed in 2008 and 45 acres were added to the contract. APN 100-142-010 was part of the lot line adjustment, and part of the lands added to the contract. After completion of the lot line adjustment, a new APN (100-142-021) was created for the newly adjusted 100-142-010. Parcels now included in that contract are APNs 100-142-008, 100-142-009, 100-142-011,100-142-021, 100-143-002, 100-143-003, 100-143-004, 101-011-005 and 101-011-014. The contract does not specify which portions of the property under contract are “Areas In Grazing.”

In addition, The Natural Resources Conservation Service (NRCS) is crafting two Wetland Reserve Easements (WRE) in conjunction with both RR&T (APN 100-143-008) and TWC (APN 100-121-004). The former is expected to be completed in 2016 and the latter in 2017.

A formal drainage easement burdening the EREP with TWC and the Bertha Russ Lytel Foundation (now O’Rourke Foundation, or “ORF”) as grantors also influences land management options in the Project area. Within the Project area, a complex system of dikes, tidegates and drainage ditches enable multiple land managers to operate successful agricultural operations on what was historically tidal marsh. Since the area generally declines in elevation as one moves from south to north, drainage moves roughly northward across numerous properties. The mutual inter-dependence of landowners in the Project area upon this infrastructure is formally expressed in a drainage easement. The drainage easement was recorded October 20, 2008, shortly after the purchase of the Connick Ranch by TWC. In general, this easement allows the grantees (various Russ property owners, collectively “Russ”) to enter and perform certain drainage maintenance functions on the EREP and ORF property, to the extent that these are legally permissible. Key actions include removal of sand and sediment from the Western Drainage Ditch when it becomes clogged, and maintenance of the Cut-Off Slough tidegate and perimeter dike in order to facilitate drainage when conditions in the Eel River estuary permit and as environmental regulations allow.

The easement is restrictive and dictates maintenance conditions for a hydraulic system that is overwhelmed by the dynamic nature of the Project area, located as it is at the mouth of California's third largest river system. Sand and silt may be removed from the Western Drainage Ditch from time to time based on wave over-wash or avulsion events, respectively, but sand must be placed to the west of the easement, and silt to the east. Grantees are not allowed to increase the width of the 5-10 foot wide ditch (once historic Centerville Slough) through the course of these maintenance activities. In effect, the easement preserves the ability to exercise a minimal level of emergency maintenance.

2.2 Project Goals and Objectives

The goal of the Project is to improve geomorphic and ecosystem functions that would enhance habitat for native fisheries and aquatic species, support waterfowl and wildlife species, and benefit agricultural land management by more effectively managing onsite flooding and sedimentation.

Project objectives also include designing and planning for future climate scenarios and sea level rise in relation to agricultural land management, capacity and uses, dune enhancement, and vegetative communities. Specific objectives of the Project include:

- Improve access to restored aquatic habitats for salmonids and other aquatic dependent species by increasing or creating migratory access between estuarine and inland waters and by restoring overwintering and rearing habitat for juvenile salmonids
- Improve drainage efficiency and manage sediment loads more effectively using both passive natural processes and active management approaches, while enhancing tidal influences by re-establishing connectivity of Russ Creek, Shaw Creek and Creamery Ditch to a rehabilitated Centerville Slough
- Increasing resiliency to sea level rise and reducing salt water influences to pastures, enhancing drainage and establishing avulsion management areas for Russ Creek and Shaw Creek
- Enhance tidal processes by restoring tidal prism and improve reliability of tidegate infrastructure to provide adaptability for sea level rise and varied land management
- Enhance dune formation to increase resiliency to sea level rise
- Enhance freshwater pond habitat for waterbirds and other native aquatic dependent species
- Facilitate access for continued passive and active agricultural land management, and nature study opportunities consistent with existing conditions
- Suppress invasive species
- Establish long-term Adaptive Management Program.

2.3 Project Overview

The proposed activities would enhance the Project area by transitioning it from a landscape of mostly diked pasture land to a system of pastures and natural habitats including estuarine and tidal slough channels, freshwater streams, freshwater waterfowl ponds, and agricultural pastures. Critical to achieving this are: an enhancement in tidal exchange to reactivate wetland functions within the Inner Marsh and Centerville Slough; establishment of active sediment management areas; dune enhancement; and the creation of setback berms.

New muted-tidegates would be designed and installed in existing levees to re-introduce tidal prism into the Inner Marsh and Centerville Slough, enabling tidewaters to re-occupy historic tidal slough channels that have persisted despite former reclamation efforts, floods and significant tectonic activity. This would enhance aquatic organism passage from the Eel River to Centerville Slough, Shaw Creek and Russ Creek, while improving drainage efficiency. Additionally, repairing the existing tidegate structure on Cut-Off Slough through modification of the existing gates would increase infrastructural reliability and drainage efficiency, and provide an opportunity to restore fish passage into Cut-Off Slough.

Realignment and geomorphic restoration of Centerville Slough, Russ Creek and Shaw Creek is expected to support the introduction of overwintering juvenile salmonids, waterbird habitat and drainage from the landscape, and maintain an existing drainage easement. Improved drainage and habitat conditions would be established along Russ Creek.

It is acknowledged that the formal establishment of sediment management areas presumes future passive and active management, maintenance and long-term commitment to land management goals. This is particularly true in the absence of full historic tidal and floodplain functions, which historically maintained the area in equilibrium. Just as it was necessary and actively pursued prior to the development of the proposed Project, so, too, would such work be necessary in the future. The key difference is that the work would be geographically prescribed, permitted, and, presumably, more predictable and cost effective and consistent with long-term goals of naturally elevating low lying floodplain areas in advance of sea level rise. This effort is necessary to maintain agricultural viability, agricultural land management, capacity and uses, and ecological function. Similarly, management of the flattened (breached) dune regions would include actions to protect an existing drainage ditch and agricultural resources, agricultural land management, capacity and uses, while furthering science and projects relating to passive and active dune enhancement and climate change vulnerability. As a retreat strategy to reduce agricultural land vulnerability from sea level rise, the proposed placement of set-back berms would provide increased resiliency.

The longevity of Project benefits depends upon the successful restoration of some natural ecological processes and the frequency and nature of maintenance activities. As a result, this Project would include an Adaptive Management Plan (AMP) to provide a feedback mechanism for management responses based on scientific monitoring. Figure 2-4 illustrates the proposed Project components and Figure 2-5 provides typical Project cross sections.

2.4 Proposed Project Components

The primary Project components are discussed below.

2.4.1 Retrofit Existing Cut-Off Slough Tidegates

The existing tidal control structure in Cut-Off Slough provides the only anthropogenic conduit of drainage from the Project area into the Eel River. The structure is equipped with six top-hinge tidegates that leak and limit aquatic organism passage to/from the Eel River. The existing tidal control structure in Cut-Off Slough is a tidegate structure first built in the late 1800's and replaced in 1979. The accompanying dikes are approximately two miles in length and include the aforementioned tidegate. This system protects an estimated 2,000 acres of productive agricultural lands. The system was built and has been maintained collectively primarily by the following entities or individuals: 1) Fern Cottage, Inc., 2) Russ Ranch and Timber Co., LLC, 3) The L.D. O'Rourke Foundation, 4) L and K Russ; 5) Connick Ranch, and; 6) The Wildlands Conservancy. An existing drainage easement, described above, provides surrounding landowners with a right of access over

the EREP for the purposes of maintaining drainage for the EREP and surrounding properties, to the extent allowed by law. The Project will necessitate the concurrent development of a Water Level Management Plan (WLMP) by all owners of the drainage and tidegate structure and may result in the revision of the current drainage easement. The WLMP is further described in the AMP section of this Project description. The WLMP has been provided as Section 3 and AMP has been provided as Section 5 in the EREP Management Plan (Attachment B).

During summer months, the average water surface elevation on the landward side of the tidegates is approximately 2.5 feet (NAVD-88) and sustained by groundwater influences, occasional dune over-wash, and tidegate leakage. During winter months periods of prolonged inundation and flooding occur upstream of the tidegate as the backwater influence from the Eel River estuary prevents the gates from opening during low tide cycles and for extended periods of time. The salt tolerant vegetative communities that have established along the banks of Cut-Off Slough upstream of the tidegate structure corroborate the brackish conditions. Overland drainage from adjoining properties is collected in Western Drainage Ditch and Cut-Off Slough and ultimately drains through the existing Cut-Off Slough tidegates.

Three iterations of the Cut-Off Slough tidegate have blocked tidal exchange into the Project area and facilitated overland drainage from the Project area since the late nineteenth century. The existing concrete Cut-Off Slough tidegate structure was constructed in 1978 on the landward side of the existing earthen dike immediately west of the former tidegate structure. The construction included excavating new connector sloughs, re-contouring the existing dike with the spoil material and demolishing/burying the former tidegate built circa 1916, which in turn replaced a structure built in the 1870s. Based on review of the current tidegate construction plans and current visual observations during low tides, the exterior wall upon which the gates are attached appears in good condition with no apparent distress or visual cracking, apart from the seaward side wingwalls, which are cracked, with a major crack on the western wall. The wingwall crack has no impact on the proposed gate modifications and continued failure of the wall does not impose a threat to the overall structure, though it could result in localized dike erosion. The wood gates appeared degraded and leakage between the weathered concrete and wood is apparent through each of the six gates.

Proposed Work – EREP

The Cut-Off Slough tidegate structure would be repaired to serve its original purpose with modified gates that would improve fish passage without significantly altering water quality and water level relative to existing conditions. The Project does not propose to increase capacity at this structure, however proposed repairs there will likely improve gate efficiency. The Project proposes to improve aquatic passage, and not adversely impact existing hydraulic conditions upstream. Repaired tidegates and/or fish passage doors inserted into the existing structure would allow for improved, but managed, tidal function and improved drainage efficiency in Cut-Off Slough and adjoining properties, while also providing fish passage and complying with state and federal law.

The repaired or replaced gates would be steel or aluminum, side- and/or top hinged designed to meet specific hydraulic performance and installed by a gate manufacturer to the existing concrete wall with a new thimble seal. To reduce costs and minimize abrupt hydraulic changes gates may be installed or replaced individually. These changes would be reflected in the WLMP.

Proposed Work – Russ Property

No work is proposed on Russ Property for this component.

2.4.2 Expand Seasonal Tidal Prism to Inner Marsh and Re-established Centerville Slough through the installation of New Muted Tidegates

Referred to as the Inner Marsh, this 150-acre area is surrounded on its northern, eastern, and southern boundaries by a dike of varying elevations. Natural dunes form the western boundary. The area is hydraulically connected with culverts to Centerville Slough and Cut-Off Slough on the landward side of the Cut-Off Slough tidegate. The perimeter dike provides a setting for expanding tidal wetland habitat without threatening adjacent land uses. To achieve this, tidal access would be modified to reintroduce tidal exchange at a muted level.

Proposed Work – EREP

To increase and improve tidal wetland and salmonid rearing habitat, tidal exchange would be reintroduced to the Inner Marsh and re-established Centerville Slough. A new tidegate structure connecting the Inner Marsh to Cutoff Slough would be installed through the existing dike immediately west (outboard) and separate from the existing Cut-Off Slough tidegate structure. This new tidegate will likely have multiple gates including a muted tidegate regulator (MTR). Strategic design and sizing of these new tidegates would restrict tidal exchange to the Inner Marsh such that tidally-controlled water levels would not rise above 2.5 feet in elevation during the winter months and 5 feet during the summer months. The new tidegate structure would be approximately 75 feet long by 100 feet wide and 20 feet tall. The WLMP ~~would~~ includes specific tidegate settings and seasonal operation guidelines to meet the desired hydraulic conditions for the area. The existing interior Inner Marsh dike would be raised to a minimum 8.0 foot elevation, widened in discrete areas and resurfaced with gravel to improve access reliability for operation and maintenance needs. Existing failed culverts that connect the Inner Marsh to Cut-Off Slough would be removed and the dike repaired in these locations. Additionally, a re-established Centerville Slough would be realigned into the Inner Marsh to prevent tidal flooding into Cut-Off Slough and adjoining properties.

A significant constraint associated with introduction of the muted tide above the existing groundwater surface elevation of 2.5 feet to the Inner Marsh and re-established Centerville Slough is the loss of flood storage capacity of the surrounding and interconnected Project area. Avoiding diminished storage capacity is a design constraint for the Project. Any reduction of flood storage above an elevation of 2.5 feet would be ameliorated through excavation of an equivalent or greater volume of sediment above 2.5 foot elevation in the re-established Centerville Slough and implementing a seasonal operation regime for the MTR. The seasonal operation approach would involve managing tidal exchange differently based primarily on precipitation patterns. During the summer dry season, when management of floodwaters is irrelevant, the MTR would allow for a tidal amplitude up to 5.0 foot elevation. During the winter wet season, and in advance of anticipated storm events, the MTR would be adjusted to reduce tidal inflow to a maximum of 2.5 foot elevation. This reduction in tidal inflow would retain the Inner Marsh and re-established Centerville Slough capacity to provide freshwater storage from Russ Creek runoff similar to how it now functions. The combined balance of the excavation volume and/or seasonal operation flexibility is intended to result in no net loss of available freshwater runoff storage volume during winter months relative to existing conditions, while also improving the overall hydraulic function and drainage within the Project area. A water elevation versus available storage volume graph for pre- and post-Project is presented in Chapter 3.

The MTR would be seasonally operated based on biologic, geomorphic, hydrologic and land use objectives with routine monitoring to inform operational scenarios. Chapter 3 provides a discussion on the hydrology of the Project and an analysis of a broader range of tidal elevation options in addition to those recommended for the proposed Project. A WLMP that explains floodwater

management strategies, and details the proposed operations of the proposed infrastructure, ~~will be~~ has been developed and is included in the AMP (Attachment B). ~~concurrent with development of the EIR~~.

Existing culverts connecting the Inner Marsh with Cut-Off Slough and Centerville Slough would be retrofitted with flap gates to allow one-way flow into the Inner Marsh, equipped with seasonally operated gates, or be removed and any remaining holes within the berm would be repaired. This would maintain the existing level of variation in tide flow elevations between the Inner Marsh and Cut-Off Slough.

The existing network of sloughs and terminal ponds within the Inner Marsh would provide sub- and inter-tidal habitats. A number of new small terminal ponds, earthen weirs, side channels and wood structures would be integrated into the final design to improve upon and diversify the existing channel network complexity providing low energy perennial ponding areas that emulate desirable habitat structure for the tidewater goby and juvenile salmonids. The majority of the internal slough channels will be constructed to provide adequate water depths and conditions for expansion by native eelgrass, which currently occurs in low abundance in existing channels.

Proposed Work – Russ Property

While no physical work is proposed for this component on Russ Property, the installation of the MTR would allow the expanded tidal prism to extend to Angels Camp through the re-established Centerville Slough, which is further described below.

2.4.3 Re-establish and Enhance Centerville Slough and Reconnect Russ and Shaw Creek with the Estuary

Historically, Centerville Slough extended from its confluence with the Salt River, through present day O'Rourke Foundation property, south from Cut-Off Slough, parallel to the dune network all the way to the community of Centerville at the base of the Wildcat Hills. Tidegate installation and the associated reduction in the tidal prism, coupled with reclamation and actively directed Russ Creek avulsions, infilled much of this historically navigable slough. The Western Drainage Ditch and Cut-Off Slough are all that remains as remnant drainage features. The Western Drainage Ditch lies in the path of disturbed dunes and is vulnerable to continued dune over-wash and sedimentation. Western Drainage Ditch collects dune over-wash, Creamery Ditch flow, Shaw Creek flow, and unnamed creek flow originating from the Halley property. Russ Creek once flowed into the Centerville Slough system, and was then directed to Western Drainage Ditch, but now terminates with avulsion and overland sheet flows over existing pastures on the EREP.

Proposed Work – EREP

Re-establish Centerville Slough and Restore Connectivity to Russ and Shaw Creeks

In order to increase aquatic habitat and enhance the movement of water and fish/wildlife to the north and south, the Project proposes to re-establish Centerville Slough by excavating a channel along its historic alignment. The south end of the proposed Centerville Slough alignment would reconnect to Shaw Creek in the existing Angels Camp area. The northern end would be re-aligned into the Inner Marsh immediately upstream of the existing bridge crossing and become disconnected from Cut-Off Slough. The connectivity with the Inner Marsh would allow for an increase in summer tidal amplitude within Centerville Slough without impacting the neighboring ORF property whose levees have deteriorated to fairly low elevations. A new water control structure and/or earthen berm at or near the existing bridge would prevent high tides during the dry season regime from entering Cut-Off Slough downstream of the existing bridge; however, during

high winter flows from Russ Creek during the winter months, the water control structure or berm would allow overland freshwater flow to be conveyed downstream of the existing bridge occupying available storage in Cut-Off Slough and on adjoining properties similar to existing conditions.

Approximately 3,000 feet of Western Drainage Ditch, from the southern dune breech northward, would remain as a remnant side channel to the re-established Centerville Slough. It would then be reconnected to Centerville Slough on the northern end in an area that would be enhanced for ecological benefit and drainage efficiency. The reestablishment of Centerville Slough would reconnect Russ Creek and, provide conveyance for over-wash on properties to the south. In general, the Centerville Slough channel would be sized to enable the slough to serve as, conveyance, and brackish aquatic habitat sharing similar tidal amplitudes as the Inner Marsh.

Because Centerville Slough was located further east than the existing Western Drainage Ditch, it would be less susceptible to filling from dune over-wash sand. Material excavated from Centerville Slough would be reused on site to construct any new or refurbished berms or reused in within the Project area. The new slough channel would convey muted tides from the Inner Marsh as well as be the primary water course receiving and conveying runoff from Russ Creek, Shaw Creek and the Creamery Ditch. It would also improve the opportunity for fish passage to the tributary creeks.

Reconnection of Russ Creek to Centerville Slough

A new channel would be graded that follows an historic Russ Creek alignment to re-establish connectivity with Centerville Slough. This excavation above the 2.5 foot elevation would improve site drainage, create in-channel flood storage, re-establish a long tidal to freshwater ecotone and provide a wetland prism that includes freshwater wetland and/or riparian habitat. In addition, the improved Russ Creek channel would provide habitat connectivity for anadromous fish.

Develop Primary Sediment Management Area on Russ Creek

To accommodate natural flood processes, sediment management areas would be established in avulsion prone regions along Russ Creek. Sediment deposits on the EREP would remain or be seasonally relocated within sediment management areas and approved Project locations as needed. The sediment management area would then be seeded and irrigated as needed to enhance agricultural productivity in those areas.

Proposed Work – Russ Property

Reconnection of Shaw Creek to Centerville Slough

The Project would realign Shaw Creek to re-establish connectivity with Centerville Slough. This would provide approximately 1.1 miles of freshwater-brackish water ecotone, which would improve site drainage, create in-channel flood storage and provide habitat connectivity for anadromous fish.

Develop Primary Sediment Management Area on Shaw Creek

Similar to Russ Creek, natural flood processes would be leveraged to establish sediment management areas in avulsion prone areas on Shaw Creek. Sediment naturally deposited, mechanically placed and or excavated on the lands of Russ Ranch and Timber Company, LLC and Jack and Linda Russ would be tilled, seeded, fertilized and irrigated to re-establish or enhance livestock forage and grazing areas.

Develop Secondary Sediment Management Area and Floodplain Swales

Given the highly dynamic nature of Russ Creek and the limited capacity of primary sediment management areas, secondary sediment management areas would be designated on the Russ Ranch and Timber, LLC property. Floodplain swales or drainage facilities would allow release of over-bank flows to be directed to the secondary sediment management area from Russ Creek.

Flow and sediment would be directed to low lying areas thereby reducing flood frequency of nearby properties. These areas would function and be managed very similar to primary sediment management areas.

All excess sediment to be managed on site would be spread across designated sediment management areas existing agricultural areas at an agronomic rate that would sustain soil quality and increase the elevation of grasses thereby sustaining forage production of freshwater grasses in agricultural areas.

2.4.4 Enhance Existing and Create New Off-Channel Aquatic Habitat

The lack of tidal connectivity across the Project area has led to infilling and reduced availability of brackish and freshwater ponds for waterfowl and overwintering fish habitat. The existing freshwater ponds that are present on site have a long tradition of waterfowl hunting.

Proposed Work – EREP

The lack of hydraulic connectivity across the EREP has led to infilling and reduced availability of brackish and freshwater ponds for waterfowl and overwintering fish habitat.

Salmonid Habitat

The introduction of muted tidal exchange introduces the opportunity to recreate historic on- and off-channel ponds and the associated wetland habitats within the historic back-dune Centerville Slough channel system. Due to the relatively low amplitudes of restored tidal action, recreating brackish marsh will necessitate lowering (excavating) down into the proposed muted tidal range. Brackish marsh/ponds will likely be sighted in relatively low, off-channel lying areas and connected to create Project slough channels by excavation of relatively small connector channels. New brackish water ponds for overwintering juvenile salmonids would also be created by deepening other existing depressions in the floodplain of Centerville Slough/Russ Creek. Alcoves, terminal ponds and large wood structures would be established to provide additional habitat benefit.

Waterbird Ponds

Existing depressions in the landscape currently serve as freshwater ponds that are managed for waterfowl. These existing freshwater ponds would be deepened and re-configured with controlled inlets/outlets to enhance their habitat value and minimize long term maintenance. Seasonal rainfall would be the primary means of filling the ponds, while existing wellheads would provide backup supply.

New gated culverts and/or earthen berms would be constructed to allow water in the ponds to drain into Centerville Slough and the unnamed remnant slough to the east of the property. Expansion of the ponds and rehabilitation of the source wells are not proposed.

Proposed Work – Russ Property

No work is proposed on Russ Property for this component.

2.4.5 Protect and Enhance Drainage, Land Uses, and Habitats

Threats to existing habitat and land uses include disturbances of coastal dunes, saltwater intrusion, loss of estuary-inland water connectivity, sedimentation of watercourses, subsidence and natural conversion of agricultural pasture, and invasive species.

Sea level rise alters groundwater composition and vegetation communities. As soils become increasingly saline and brackish, salt marsh vegetation would dominate. Periodic dune breaches exacerbate this effect. This is already being observed widely across the Project area, and

particularly within the historic alignment of Centerville Slough. While some areas within the Project area are targeted for tidal wetland increases, other areas would be preserved for agricultural pasture.

Natural sand dunes are generally self-maintaining; however, their form and dynamics are influenced by vegetation, sediment recruitment, storm/wave strength, geologic changes and other factors. Non-native invasive vegetation such as Ammophila arenaria (European beachgrass) alters dune mobility and shape. Both natural and anthropogenic influences can disturb dune formation. Dunes traditionally migrate, and possess various zones of recruitment that tend to protect the leeward side of the dune system. More recently, significant disturbance has occurred at three distinct locations within the Project area: a northern area of approximately 15 acres located on EREP, a central area of approximately 3 acres on EREP, and a southern area of approximately 40 acres on Russ property. The disturbance and movement of this sand unconfined in any remaining dune network threatens the Western Drainage Ditch with infilling, a trend that threatens the safety and land use of the Project area and properties to the south, all of whom are parties to a formal drainage easement over the Project area. This movement has also facilitated breach and wave over-wash events that have inundated hundreds of acres of pasture with salt water, impacting their agricultural utility and causing conversion to salt marsh.

Re-establish Dune Configuration

This Project seeks to implement passive and active techniques in dune management aimed at increasing resiliency to sea level rise while minimizing impacts to known habitat of the Western Snowy Plover. The bulk of Project effort associated with dune enhancement would be directed towards three over-wash sites, referred to as the northern, central and southern sites and as depicted on Figure 2-4. Specific actions that would be taken at the over-wash sites are described below, and potentially elsewhere in the dune network, and were drawn from the *Eel River Coastal Plain Dunes Assessment and Restoration Feasibility Analysis* report (Appendix C) developed by Kamman Hydrology and Engineering (KHEb 2015). In addition to the actions proposed below at each site, restriction of off-road vehicles through signage and fencing of the immediate enhancement area and implementation of a long-term monitoring and management program will be necessary. Over time, natural wave processes and storm actions may re-shape any alterations made. Further storm events would cause scarping, potentially further inland from the mean high water mark due to the absence of stabilizing vegetation. Therefore, the Adaptive Management Plan would include performance measures and actions that track changes with time and take suggest corrective action to prevent reversal to the original situation.

Proposed Work – EREP

The proposed work at the northern and central sites would combine discrete enhancement actions with distinct actions intended to limit land use impacts and would promote trapping and retaining sand in a manner that rebuilds the dune in over-wash areas to former and surrounding heights. This combined effort would enable the dunes in their existing location to rebuild and fortify over time. In addition, the integrity of the dunefield west of the EREP would gradually reconfigure to near-historic breadth and height through these actions taken in the Project. Relinquishing the need for drainage conveyance in the Western Drainage Ditch allows for dune migration inland as part of its recovery process without conflicting with existing agricultural uses.

Proposed actions at the northern and central sites include, but are not limited to:

- Mechanical Dune Construction - The proposed Project design would include a pilot project to mechanically elevate and reconstruct dunes that have been lost to over-wash events. Sand

skimmed from the over-wash areas and adjoining areas would be used to construct new dunes to similar heights and widths of adjoining dunes and over a total area of approximately 8 acres.

- Sand Fence Installation - Sand fence would be installed in combination with the constructed dunes, or areas prone to over-wash, in order to promote the recruitment of sand for dune rebuilding purposes.
- Large Wood (Wrack) Placement - Recognizing that natural recruitment of large wood assists in the recruitment of sand on dunes, the final designs may include large wood placed at select locations in wave over-wash areas to promote dune rebuilding.
- Planting Native Vegetation - Native plants capable of encouraging dune stability would be planted as part of a revegetation strategy.
- Accommodating Natural Dune Building Processes - The design and configuration of Project features would ensure the ability of dunes to migrate eastward, thereby facilitating the reestablishment of zones of recruitment in the dune network capable of protecting the dune system from episodic disturbance.
- Beach Nourishment – Research and develop a strategy for long-term beach nourishment at the Project site.

The proposed actions described above at the northern and central sites are intended to convert the over-wash areas back to dunes thereby directly impacting known Western Snowy Plover habitat. To offset the loss of this habitat, the Project proposes to create similar habitat by removal of non-native beach grass on the dune strand west of the Outer Salt Marsh. Up to approximately 10 acres of non-native beach grass will be removed from this area using a combination of mechanical, hand removal, burning and/or herbicide methods.

Proposed Work – Russ Property

Proposed actions at the southern site include a combination of mechanical dune construction, sand fence and revegetation (as described above). However, actions are limited to the eastern-most fringe of the over-wash (approximately 3-acre footprint) to avoid direct and indirect impacts to the broader over-wash area, which serves as Western Snowy Plover habitat.

Invasive Species Removal

Invasive dense-flowered cordgrass (*Spartina densiflora*) has infested an estimated 90% of salt marshes in Humboldt Bay and the adjacent Eel and Mad River estuaries. Cordgrass is most abundant at low to mid-marsh elevations, where it has displaced native pickleweed (USFWS 2015). The Outer Marsh north of the Inner Marsh is dominated by invasive *Spartina* as is much of the northern Eel River estuary. Discrete isolated patches of Spartina exist within Centerville Slough and Cut-Off Slough. The *Humboldt Bay Regional Spartina Eradication Plan (Regional Plan)* and corresponding *Programmatic Environmental Impact Report (PEIR)* describe a programmatic approach for eradicating invasive cordgrass at a regional scale (HTH 2012). The proposed Project does not include activities within the Outer Marsh and therefore removal of *Spartina* in this area will be subject to available funding and implemented over-time in accordance to the Regional Plan. *Spartina* located south of the Outer Marsh and within the footprint of the proposed Project components will be treated prior to or during construction using various strategies including but not limited to top mowing, grinding and/or excavation and burial. Spartina located on the edges of Centerville and Cut-Off Sloughs adjoining ORF property will be removed on a site-by-site basis in coordination with the ORF. This area is less than one acre in size. To reduce colonization of

Spartina into the newly created tidal wetlands, *Spartina* monitoring and management post-construction would be discussed within the Adaptive Management Plan and Mitigation Measure BIO-3b in the Biological Resources section. Management treatments similar to those proposed within the Project footprint (mowing, grinding and/or excavation) will be proposed long-term.

European Beachgrass (Ammophila arenaria) is also present within the Project boundary. Limited Ammophila removal would also occur as part of dune reconfiguration areas and revegetation efforts; however, this is not a specific objective of this Project. Localized areas of limited Ammophila removal may occur on the dune strand north of the Inner Marsh with the intent to diversify dune function and promote Snowy Plover habitat.

The Project would provide the basis for ongoing invasive species management and eradication using passive and active restoration techniques, and participating when appropriate with local and regional programs.

Protect Agricultural Pasture through Berm and Infrastructure Construction – EREP Property

Existing set-back berms would be enhanced and new berms would be constructed to improve overland drainage efficiency and increase resiliency of agricultural land from wave over-wash and rising sea levels. The berms would be constructed of excavated soils with gradual side slopes to allow for grazing on the east slope, and a transitional wetland-upland ecotone on the west slope.

A new guide berm would be constructed to the east of Russ Creek at an approximate 8.0 foot elevation. The existing access roads and berms along the EREP property's eastern and southern boundaries would be improved by raising and resurfacing.

Three new one-way culverts would be installed in the northern berms to allow drainage of the freshwater off-channel habitat to the Inner Marsh from Cut-Off Slough. The existing bridge across Cut-Off Slough would be modified to include a new gated culvert, which would enable hydraulic equilibration between Cut-Off Slough and the Project area during the wet season.

In order to retain land management and agricultural utility of the entire Project area on EREP, two new bridges are proposed within the EREP property. One is located over the re-established Centerville Slough channel at the southern end of the Inner Marsh and the second is across Centerville Slough, northeast of the South Barn. Based on existing channel alignments and size, the bridges would have a maximum length of approximately 75-feet.

Protect Agricultural Pasture through Berm Construction – Russ Property

The existing guide berm along Creamery Ditch would be improved along with other existing set-back berms. A new berm would be constructed along Shaw Creek to restrict overland drainage and increase resiliency of agricultural land from wave over-wash. The berms would be constructed of excavated soils with gradual side slopes as previously described. Berms would be constructed to minimum 8.0 foot elevation to protect prime agricultural land from tidal influence and rising sea levels. A new gated culvert would be installed through the berm to provide conveyance of Creamery Ditch into Centerville Slough while preventing tidal exchange into adjoining agricultural land.

2.4.6 Public Education and Access

Russ properties are managed exclusively for agricultural production. TWC property is managed for agricultural production and for outdoor recreation and education opportunities. The EREP hosts an historic private duck hunting club, welcomes invited guests and docent-led group site visits, and uses the site to educate school children about wetland and estuary systems and agriculture as

practiced in the Coastal Zone. A Public Access Plan has been developed for EREP and has been included in Attachment C. There is an ongoing dispute between TWC and the Russ family regarding the existing easement to the EREP and whether it allows public access. This is discussed at length in the Recreation chapter.

Proposed Work – EREP

Main Barn and Parking Area

Minor improvements to the Parking Area and signage limiting visitors to existing trails would educate any visitors to the EREP about the prevailing agricultural land use in the area, limitations on recreational opportunities, and seasonally or topically oriented restrictions. Signs about the cultural, agricultural and natural heritage of the area would interpret the landscape for viewers. A vault toilet would be installed to reduce impacts to the landscape.

North Barn Parking Area

Minor improvements to the North Barn Parking Area and signage limiting visitors to existing trails would facilitate TWC's outreach and education efforts while minimizing impacts to the Project area. Signs about the cultural, agricultural and natural heritage of the area would interpret the landscape for viewers. A vault toilet would be installed to reduce impacts and traffic back to the entrance for use of the Main Barn vault toilet. The parking area would be limited to the existing heavy-use agricultural area.

Dune Walk and Overlook

A short boardwalk and trail with an overlook would take visitors along an existing trail, near the North Barn, into an intact dunefield for birding and natural observation.

Kayak Put In and Take Out

Two kayak 'put in and take outs' would be installed around the Inner Marsh. One is proposed to be located near the proposed bridge over re-established Centerville Slough and the second at the new muted tidegate west of the Cut-Off Slough tidegate and to the north of the Inner Marsh. The put in and take outs will consist of foot accessible ramps with all-weather gravel surfaces. Kayak access to the Inner Marsh would facilitate post-Project monitoring of the Inner Marsh, aquatic educational programs, and minor recreational use by visitors. Interpretative signage would be installed at each put in and take out informing visitors of appropriate kayaking locations and tidal conditions.

Road and Pasture Improvements

Several appurtenant structures are proposed, such as new gates on Russ Lane, an entrance sign and suitable lighting that clearly denotes EREP hours of operation, as well as additional area and/or perimeter fencing to provide adequate turn-arounds and protection for livestock. Project implementation and future management would require durable yet limited access routes that minimize impacts to the Project area. Some existing access routes, culverts and bridges would be improved and maintained, while others may be decommissioned. Routes would be designed to accommodate a range of vehicle types and weight classes and culverts replaced as needed to increase access reliability for agricultural and Project operations.

Proposed Work – Russ Property

Russ properties are managed exclusively for agricultural production. No public education or access is proposed on the Russ properties.

2.4.7 Beneficial Reuse of Excavated Sediments During Construction

Table 2-1 contains the primary earthwork volumes (cuts and fills) associated with the Project. The Project would generate significant quantities of excavated soils. The Project would attempt to balance the cuts/fills on-site through various beneficial reuses. Proposed onsite reuses include berm construction, agricultural upland application and rehabilitation of existing berms and roads on EREP, Russ and/or O'Rourke Foundation property and tidal hummocks to diversify tidal marsh elevations. Other off-site beneficial reuses may exist such as White Slough Wetland Enhancement Project and Salt River Ecosystem Restoration Project; however, these are not analyzed in this EIR because the Project is not expected to generate a surplus of soil that requires off-site placement.

The majority of the sediments tested are comprised of silty fine sands, sandy silts and clay, and are suitable for proposed construction activities. Laboratory analytical results indicate that soils within the Centerville Slough excavation have relatively high electrical conductivity (EC), exchangeable sodium percentage (ESP) and sodium adsorption ratio (SAR) values, indicating that they are saline-sodic. In general, the salinity of the soil increases with depth. Reuse of saline-sodic soils for agricultural purposes is not recommended due to the potential for soluble salts within the excavated material to leach into the soil and impede vegetative growth. Graded areas requiring immediate establishment of non-salt marsh vegetation would be capped with either low- or non-saline-sodic soils derived from the surficial soils within the Project area. Based on the final design, a decision would be made on the potential for sediment reuse for beneficial reuses.

Table 2-1 Approximate Project Earthwork Volumes

Description	Cut (CY)	Fill (CY)
Centerville Slough and Shaw Creek	130,000	
Russ Creek and Floodplain Swales	20,000	
Russ Creek Sediment Management Area	100,000	
Inner Marsh Slough	25,000	
Centerville Slough Berm		10,000
Angels Camp Berm		15,000
Inner Marsh Berm Improvements		2,000
Onsite Beneficial Reuse Opportunity Necessary to Balance cut/fill: • Agricultural upland application • Rehabilitation of existing berms and roads on EREP, Russ and/or adjacent O'Rourke Foundation properties • Tidal Marsh Hummocks		248,000
Dune Reconfiguration and Enhancement	50,000	50,000
Total	**325,000**	**325,000**

2.5 Project Implementation

2.5.1 Site Access and Staging

Primary access to the EREP portion of the Project area during construction and operation is via Russ Lane off of Centerville Road. Centerville Road is a two lane paved County road. Russ Lane is a single lane paved County road extending from Centerville Road to two deeded and connecting

easements that extend from the end of Russ Lane approximately 1,400 feet to the EREP. As discussed under the Recreation chapter, these easements are the subject of a dispute between TWC and the Russ family. That dispute is discussed at length under the Recreation chapter. Access to the Russ portion of the Project area during construction and operation is via a private drive off of Centerville Road, or Centerville Beach parking lot via Centerville Road. Construction equipment and materials would be transported to the work areas via these ingress/egress locations. During construction activities at specific locations, unimproved roads on top of dikes, and areas of pasture nearby, would be utilized for the duration of those specific work tasks. Construction equipment would not be stored in inundation areas or in sloughs. Construction staging areas would be indicated on construction documents. All areas disturbed by temporary staging and stockpiling would be de-compacted and naturalized as needed and prior to Project completion.

2.5.2 Utilities and Public Services

There are no public water or sewer utilities on site. PG&E supplies power to the Potato Barn, Quonset Hut, and a well. There are overhead power poles near this barn as well. There are no known public utility easements through the Project area for utilities, and there are no anticipated changes to utilities. The contractor would be responsible for supplying electrical power if needed for any construction activities and would be by means of a portable generator. There are no anticipated changes to public services such as law enforcement and fire protection.

2.5.3 Energy Usage and Conservation

During construction, energy would primarily be used in the form of diesel fuel in construction vehicles and equipment, and in generators. There would be minimal to no additional electrical use through the PG&E supply for construction. During grading, most sediment would be placed onsite, minimizing the energy consumption of trucking to offsite disposal locations. The contractor would be required to adhere to the Coastal Conservancy's Greenhouse Gas Reduction Best Management Practices (BMPs), except where such BMPs are determined to be infeasible.

Post-construction, daily activities would see a minor increase in energy consumption when interpretive activities become part of the EREP's operations. A ranger vehicle patrols the EREP portion of the Project once a day currently and this would continue into the foreseeable future. Battery-operated pressure transducers are in operation adjacent to tidegates. These may be temporarily taken out of operation if their positions interfere with construction activities, but would be reinstalled and operated post-construction for monitoring purposes.

The majority of the construction work would include excavation, grading, rock placement and channel armoring, planting, pre-cast bridge placement and construction of earthen berms. Typical earth moving equipment would be the majority of equipment used, including bulldozers, excavators, backhoes and small cranes. Other equipment and vehicles used would include dump trucks, concrete pump trucks, portable generator sets, and other various power and hand-tools. The Project would also require the delivery of equipment, workers, and materials via Centerville Road from the City of Ferndale.

The Project is designed to minimize the need for active sediment management, however, it is anticipated that heavy equipment could be used onsite for up to two weeks annually, post construction. Gravity and water is otherwise the primary mover of sediment for distribution across farmland, a key conservation feature of the Project.

Some electric cattle fencing is currently powered through solar energy. This is expected to remain in operation. The new tidegates proposed for the Project would be manually operated.

2.5.4 Construction Schedule and Duration

Project construction would be phased into multiple construction seasons based on available funding and sequencing earthwork with construction water management. Each season would last approximately 120 days between May and October and is anticipated for the years 2017 through 2020. The downstream-most improvements such as tidegate installation would be included in the initial phase. Excavation of Centerville Slough, Russ Creek, and Shaw Creek, and related sediment placement would be included in subsequent phases as would dune restoration, planting and invasive species removal.

Construction would generally occur between the hours of 6:00 AM and 6:00 PM, Monday through Friday. Construction during the weekends would be subject to approval by the landowners and construction manager. It is anticipated that between 15 and 25 construction workers would be present on the Project site at any given time. The number of motor vehicles is anticipated to be up to 30 per day.

The multiple sediment reuse areas coupled with the extent of Project excavation are anticipated to necessitate multiple active staging and excavation sites within the Project footprint. Each work site may include excavators, graders, scrapers, dozers, loaders, dump trucks, small tractors, compactors, and water trucks. Each site may also include up to 15 workers. Table 2-2 shows the range of Project construction equipment estimates for construction phases. The equipment listed would be the primary noise generating equipment and emission sources throughout construction, which is anticipated to occur over three seasons. Post construction there would be no noise generating equipment or emission sources aside from those generated during monitoring and maintenance activities.

Table 2-2 Estimate of Equipment Needed for Project Construction

Equipment Type	Estimated Quantity
Excavators	2-4
Scrapers	1-3
Dozers	2-4
Loaders	1-3
Dump Trucks	2-8
Small Tractors	1-3
Compactors	1-2
Graders	1-2
Water Trucks	1-2

During excavation, management of the stream inflow from upstream tributaries; Russ Creek, Shaw Creek, and Creamery Ditch would be required through the construction period. Preventing inflow into the active work zones (both tidal and freshwater) would be required to reduce the nuisance water to be managed within the active work area. Inflow management would also reduce the moisture content in excavated soils and prevent aquatic and non-aquatic organisms from entering the construction area. Cofferdams would be used to isolate instream work areas that would be dewatered and stream flow bypassed downstream.

The cofferdams may be comprised of native material or washed gravel encased with an impermeable geotextile or visqueen liner in combination with ecology blocks and/or temporary

sheetpiles pushed into the subsurface. A combination of pumped and/or gravity diversion pipes would be used to route flow around the active work areas. Fish screens would be installed immediately upstream from the cofferdams to prevent aquatic organisms from being transported into the bypass pipe.

Construction activities would be conducted in compliance with applicable state and local requirements and in a manner that minimizes disturbance to adjacent properties and disruption to traffic. It is not expected that traffic control would be required as a component of this Project as access routes are limited. Sediment re-use is proposed to be contained within the Project area and so there would be no sediment off-haul. The material excavated from the Project site is anticipated to be free of hazardous materials.

2.5.5 Adaptive Management Program

Ongoing operations and maintenance activities would be necessary to assure long-term hydraulic and ecological functions of the overall Project. Maintaining the proposed Project facilities, including the channel, sediment management areas, drainage ditches, berms, dunes, invasive species, and water control structures requires optimizing drainage inflows to the system and integrating sediment and vegetation maintenance areas with existing surrounding land uses. Designated maintenance areas may require vegetation removal, ongoing planting and/or repeated excavation or reworking of deposited sediments.

Establishing a formal and predictable structure is fundamental to preserving the long-term social and biological integrity of the Project. An Adaptive Management Program (AMP) assists managers to respond to unanticipated changes to Project components including: hydrology, sedimentation, target habitat development, or species response along the restoration trajectory (NRC 2004). This Project would benefit from an AMP for a number of reasons. The watershed is situated in a region with a combination of relatively active tectonic regimes, highly erodible soils, the threat of sea-level rise, and high rates of annual precipitation. This creates an extremely dynamic natural system in which to work. An AMP is the most effective and flexible management tool for coping with the challenges that may arise during the Project. These challenges include, but are not limited to:

- The large scale of the Project
- The variety of habitats and hydrologic conditions
- The high initial disturbance to the ecosystem from Project implementation
- Interactions with on and off-site agricultural land uses
- The typical level of uncertainty associated with the evolution of ecosystem restoration projects
- Flood preparedness and response
- Climate variability and sea level rise.

Adaptive management is a systematic and iterative process that facilitates feedback between monitoring and management actions. The feedback mechanism is engaged when monitoring data are analyzed and the results incorporated to adjust Project operations in a manner that enhances the achievement of Project goals. Adaptive management employs a structured approach, yet it is also a flexible tool that can adjust to a dynamic environment through the evolution of a project. In this way, adaptive management helps to enable a project to meet its goals and objectives, in spite of the inherent variability that exists within natural systems.

Project performance thresholds and acceptable practices would be developed for future adaptive management measures to maintain performance of the overall Project. This component would be most closely associated with tidal habitat enhancement, dunes and channel restoration, and includes identification of channel dimensions, channel maintenance access points, target habitat conditions, target tidal range, establishment of maintenance activities compatible with the overall Project goals and objectives, and BMPs for performing future channel and dune maintenance activities. The impacts associated with the anticipated operational and maintenance activities would be infrequent and short-term in nature. In addition, they are anticipated to be no greater than the traditional maintenance historically performed on these lands.

The AMP includes the following elements:

- The structure and responsibilities of the Project Management Team
- Responsibilities to identify/obtain funding for monitoring and adaptive management activities
- Monitoring program components for use in evaluating the results of Project implementation
- Triggering mechanisms or early stress indicators that would be used to alert the Project Management Team of the need to take action
- Potential adaptive Project management options once trigger thresholds have been reached
- Development of a conceptual model of adaptive management process.

The draft AMP ~~will~~ contains a chapter for water level management specific to the tidegate and water control structure operations~~. The AMP~~ and ~~WLMP will be~~ have been developed for the EREP portion of the proposed Project to support the EREP permit applications. The AMP is anticipated to be accepted by the regulatory agencies and the management practices contained within approved as part of permit issuance. ~~concurrent with the Project EIR and permits specific operational guidelines.~~ In the event the lead agency approves a project that differs from the proposed Project, the AMP and WLMP will be modified to reflect the CEQA approved Project. If permit coverage for long-term operations is desired by RR&T, an AMP can be developed specific to RR&T project components and operations. ~~The AMP and WLMP will be completed in draft format and circulated prior to issuance of the EIR, and finalized prior to issuance of Project permits.~~ The WLMP may be used as supporting information for potential revision of the existing drainage easement.

2.6 Required Permits and Approvals

The Project would likely require the following permits/approvals:

- County of Humboldt – Conditional Use Permit and Grading Permit
- California Coastal Commission – Coastal Development Permit
- California Department of Fish & Wildlife – Lake and Streambed Alteration Agreement, Incidental Take or Consistency Determination Process, and Consistency Determination for Salmonids with NMFS Biological Opinion
- North Coast Regional Water Quality Control Board – 401 Water Quality Certification
- U.S. Army Corps of Engineers – Clean Water Act Section 404
- USFWS and NOAA Fisheries – Section 7 Formal Consultation
- State Lands Commission - Lease

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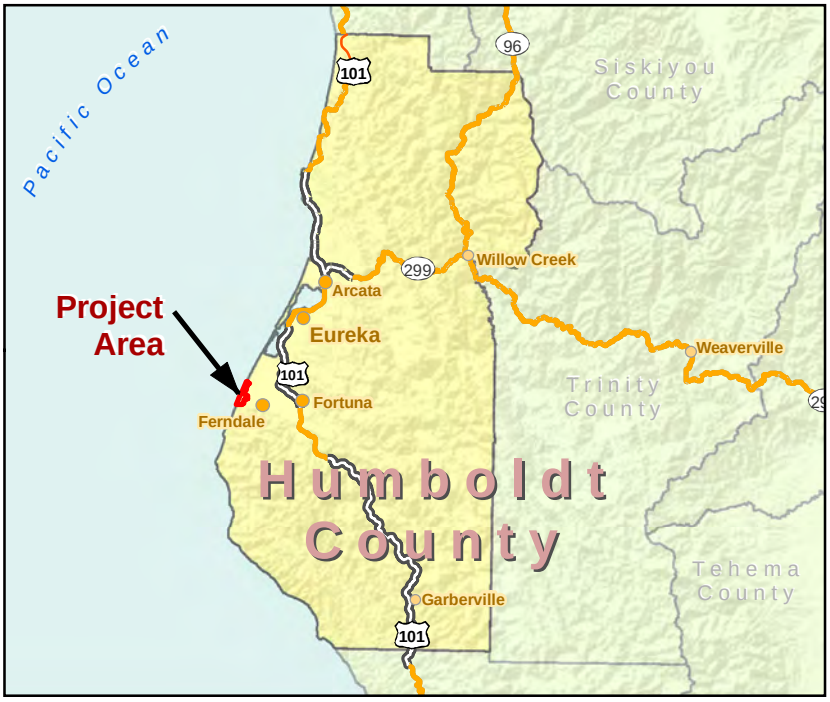

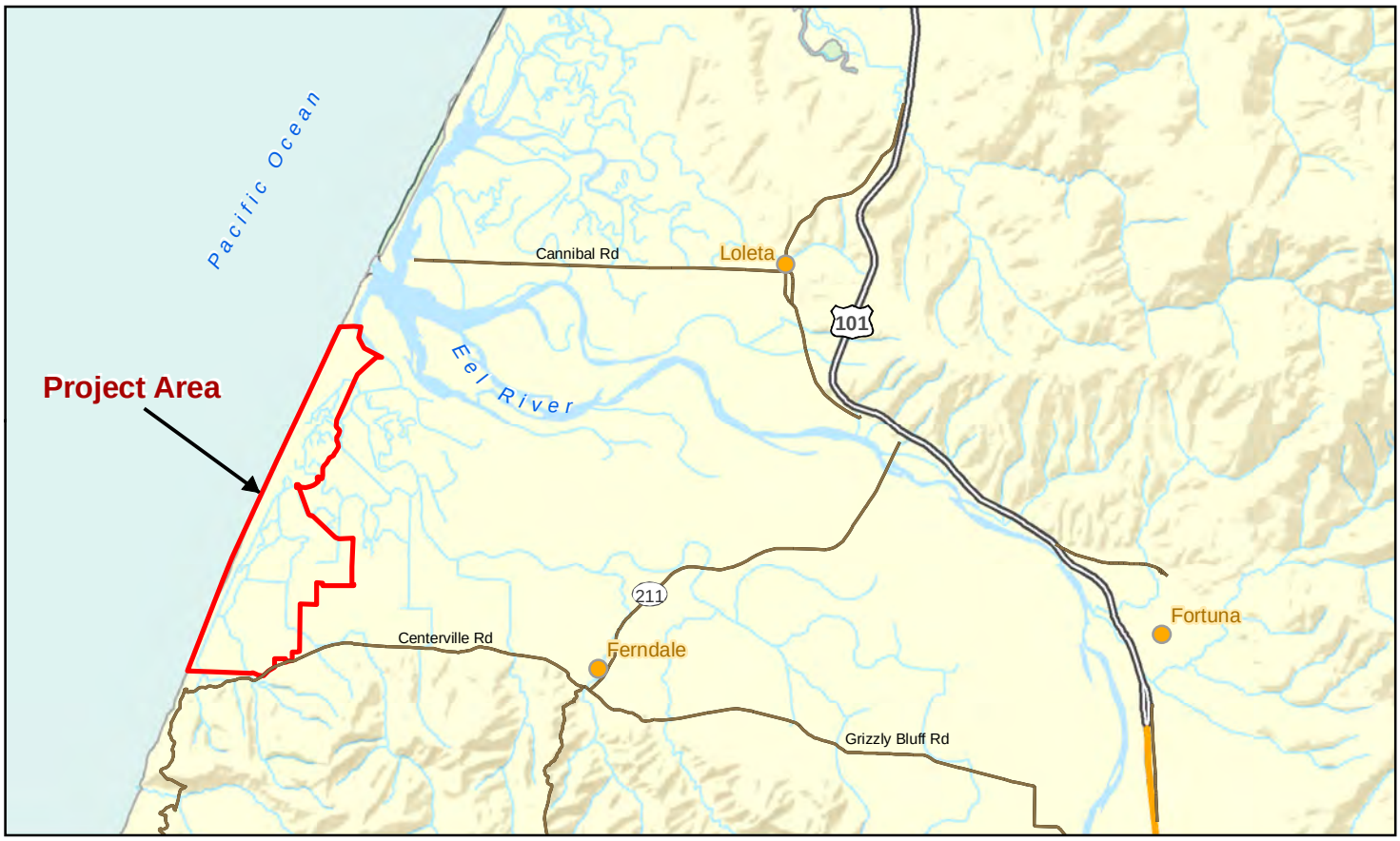

Project Area
Humboldt County
Counties
Freeway
Highway
Roadway
Waterways

Paper Size 8.5" x 11" (ANSI A)
0 0.5 1 2 3
Miles
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

Eel River Estuary and Centerville Slough Enhancement Project EIR

Job Number	8410882.03
Revision	2
Date	04 Jan 2016

Project Area and Vicinity

Figure 2-1

718 Third Street Eureka, CA 95501 T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

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Data source: USA Base Maps; USA Census; Humboldt County transportation data, 2008. Created by:jclark2

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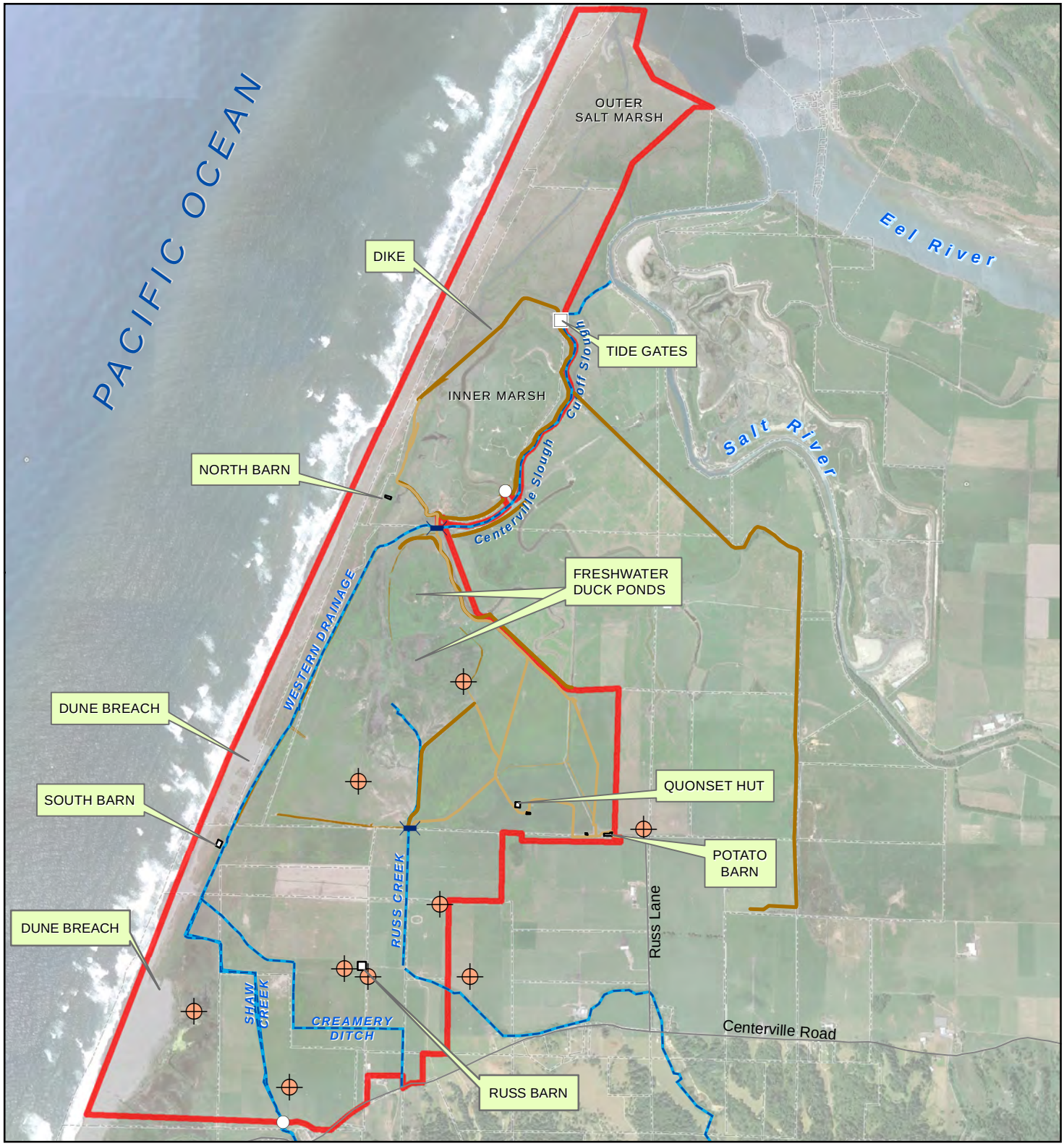

Existing Components

- Project Area
- Property Boundaries
- Bridge
- Buildings
- Local Roads
- Waterways
- Culvert
- Tidegate
- Well
- Access Roads
- Dike/Berm

Paper Size 8.5" x 11" (ANSI A)

0 1,000 2,000 3,000 Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US

N

Eel River Estuary and Centerville Slough Enhancement Project EIR

Job Number 8401072
Revision B
Date 06 Sep 2016

Project Area and Existing Conditions

Figure 2-2

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Data source: Google Earth Aerial, 2014; County of Humboldt: administrative boundaries. Created by:jclark2

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Project Boundary

Property Boundary (Reference: Humboldt County Parcel Data)

Paper Size 8.5" x 11" (ANSI A)

0 1,000 2,000 3,000 4,000

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

Eel River Estuary and Centerville Slough Enhancement Project

Job Number	8410882.03
Revision	A
Date	07 Sep 2016

Project Area Ownership

Figure 2-3

718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

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Data source: Parcel Lines, Humboldt County, v41, 2010; Aerial Imagery, 4 band 0.5ft resolution, NOAA, 2010. Created by:jclark2

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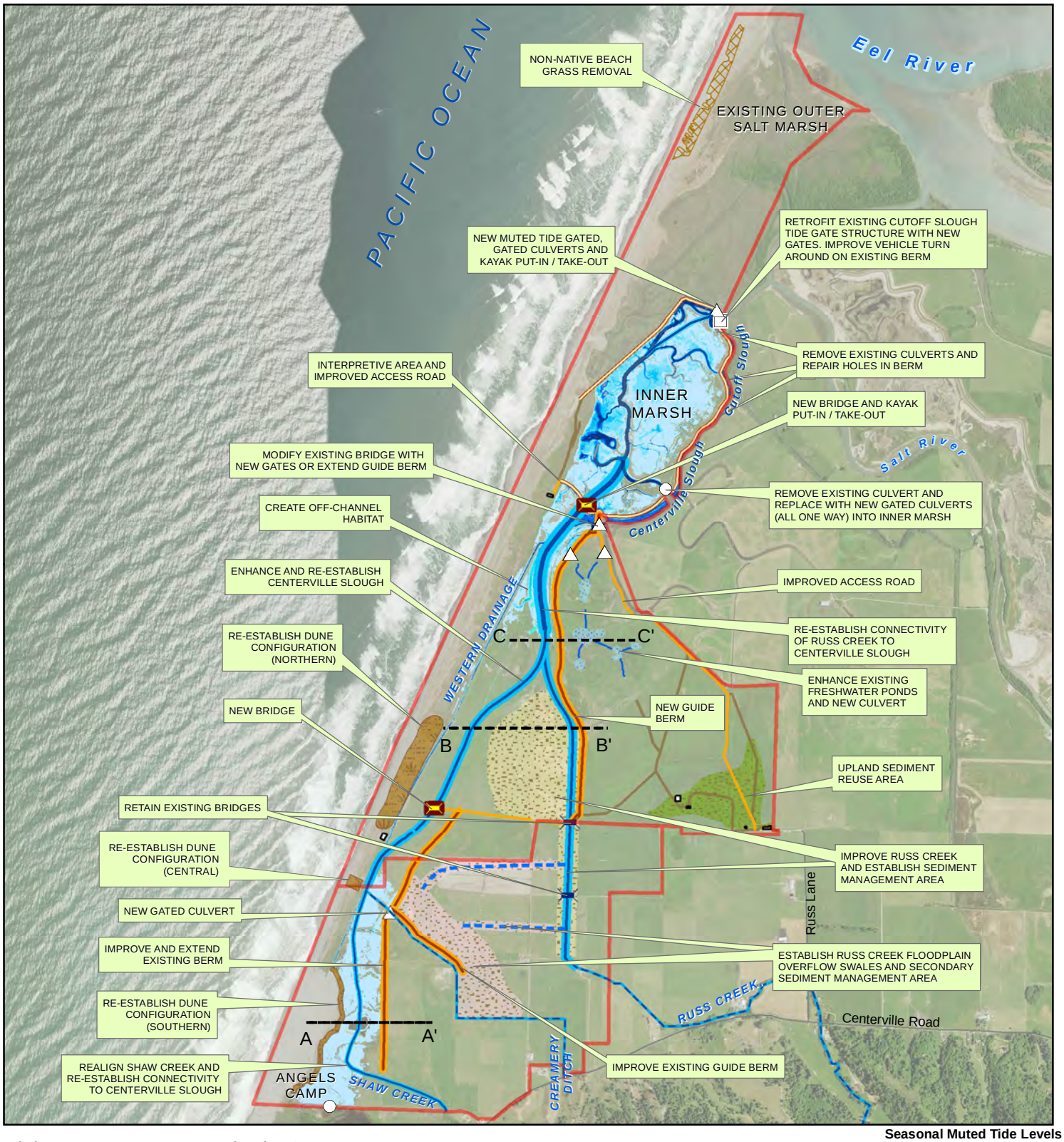

Existing Features

- Figure 2-4 Section Cuts
- Project Boundary
- Buildings
- Existing Drainage
- Existing Access Route
- Existing Bridge

Proposed Project Components

- Replace Existing Culvert/Tidegate
- New Culvert/Tidegate
- Retrofit Existing Tidegate
- Proposed Bridge
- Improved Access Road
- Berm with Improved Access Road
- Proposed Berm / Guide Berm
- Channel Re-establishment
- Channel Realignment
- Floodplain Overflow Swale
- Freshwater Pond Conveyance
- Non-Native Beach Grass Removal
- Existing Ag Exclusive Area Available for Future Sediment Management
- Enhanced Freshwater Complex
- Brackish Off-Channel Habitat
- Primary Sediment Management Area
- Secondary Sediment Management Area
- Upland for Sediment Reuse
- Re-establish Dune Configuration

Seasonal Muted Tide Levels (Reference: NOAA Lidar)

- <2.5'
- <3.0'
- <3.5'
- <4.0'
- <5.0'

Paper Size 8.5" x 11" (ANSI A)

0 1,000 2,000 3,000 4,000

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

Eel River Estuary and Centerville Slough Enhancement Project EIR

Job Number	8410882.03
Revision	B
Date	02 Dec 2016

Project Components

Figure 2-4

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N:\US\Eureka\Projects\Legacy\Projects\1000298 CalTrout\8410882 EREP EcosystemEnhancement\08-GIS\Maps\Figures\DEIR\F2-4_Conceptual Project Components.mxd

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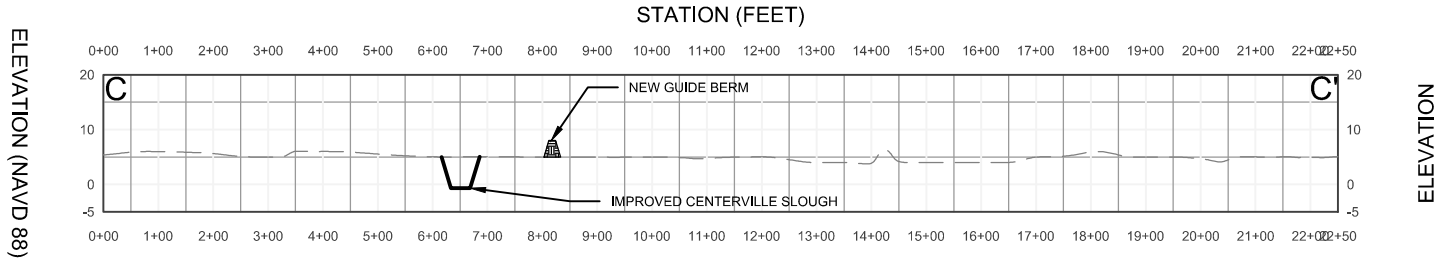
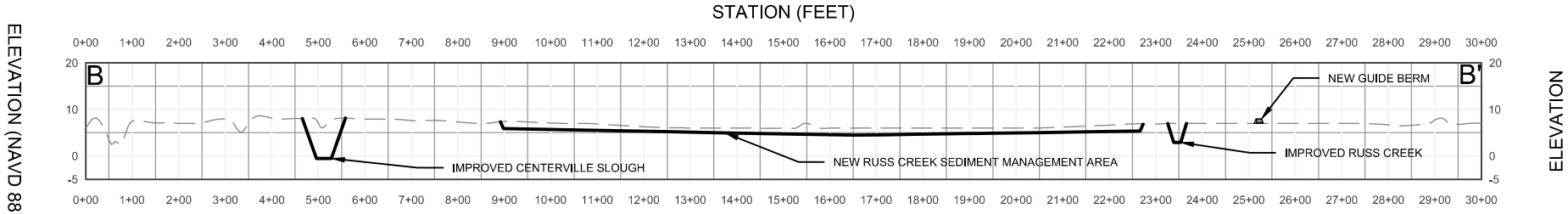
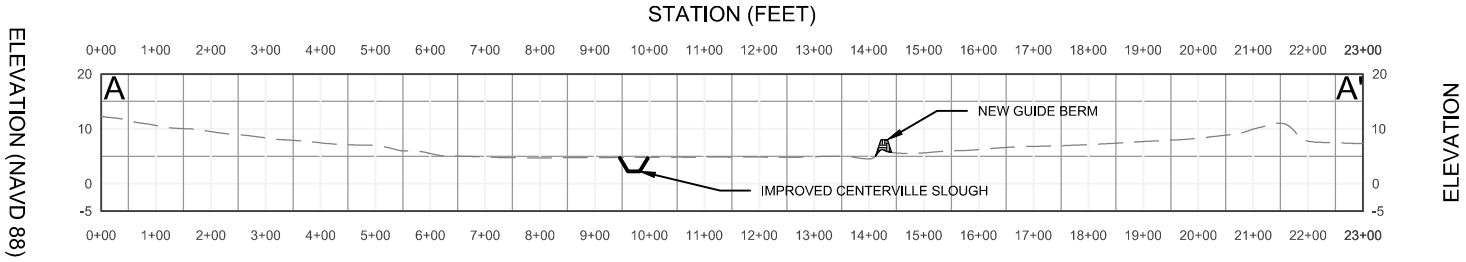


SECTION C: WEST - EAST



SECTION B: WEST - EAST



SECTION A: WEST - EAST

VERTICAL EX.: 10:1

SCALE: 0 350' 700' — HORIZONTAL SCALE

0 10' 10' — VERTICAL SCALE

Eel River Estuary and Centerville Slough Enhancement Project EIR

Project Area Proposed Condition Cross-Sections

Job Number 8410882
Revision A
Date 27 JAN 2016

Figure 2-5

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Plot Date: 18 July 2016 - 11:17 AM Cad File No: N:\US\Eureka\Projects\Legacy\Projects\1000298 CalTrout\8410882 EREP EcosystemEnhancement\06-CAD\Figures\X Sections.dwg

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4. Alternatives Description and Analysis

4.1 Introduction

This chapter presents the alternatives analysis for the Project. Section 15126.6(a) of the CEQA Guidelines requires EIRs to "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason." This section of the CEQA Guidelines also identifies the purpose (15126.6[b]) which is for the EIR to identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1). The discussion of alternatives shall focus on alternatives to the project or its location, which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

The CEQA Guidelines further require that the alternatives be compared to the proposed project's environmental impacts and that the "no project" alternative be considered (Section 15126.6[d] and [e]). CEQA Guidelines Section 15126.6(e)(1) states that the purpose of describing and analyzing the no project alternative is "to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." The no project analysis is required to "discuss the existing conditions at the time the notice of preparation is published…as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (Section 15126.6[e][2]). If the project is a "development project on identifiable property", the "no project" alternative is the circumstance under which the project does not proceed. Here the discussion would compare the environmental effects of the property remaining in its existing state against environmental effects which would occur if the Project is approved. In certain instances, the no project alternative means "no build" wherein the existing environmental setting is maintained. This would be the case for the proposed Project.

4.1.1 Identifying Project Alternatives

Meetings amongst property owners within and adjacent to the Project area to discuss land management and Project alternative options for the proposed Project began in 2009-2011. Numerous Project alternatives have been explored in the context of these discussions and in the development of a proposed Project. Ultimately, a proposed Project limited to TWC property was developed and a Notice of Preparation was circulated in December 2014. Subsequently, and in order to extend drainage and sea level rise adaptation benefits to surrounding properties, adjacent landowners requested participation in a broader project. The proposed Project was revised and re-scoped in 2015.

The alternatives analyzed in this chapter in addition to the proposed Project include the following: 1) No Project Alternative; (2), 2014 (original) NOP Alternative; (3), ~~and~~ Full Tidal Exchange Alternative; (4), a combination of components from the proposed Project and the 2014 NOP Project (Alternative 4) and; (5) the proposed Project components on EREP only (Alternative 5). The environmentally superior alternative is described in Section 4.3, and alternatives which were considered but are not being carried further in this Draft EIR are described in Section 4.4 below. Resource categories identified as having no impacts are not discussed below.

4.2 Description of Alternatives

4.2.1 Alternative 1: No Project Alternative

Under the No Project Alternative, no modifications to the Project area are proposed. The alternative maintains the existing levee and tidegate conditions and continues to preclude tidal exchange within the Project area with no provisions for sea level rise adaptation, sediment management, drainage improvement or ecosystem restoration. The Project site would continue to be managed to maximize agricultural potential and flood control, but would do so under increasingly deteriorating conditions. There ~~are~~ is no internal channel, culvert, tidegate, dune or levee improvements proposed under the No Action Alternative. Discussion of this alternative deliberately though incorrectly assumes that the existing channel geometry of Western Drainage Ditch and Russ Creek is static, and not subject to aggradation and infilling.

As described at length under the Agricultural Resources chapter, agricultural operations in the project area face significant challenges to present and future operations. These threats described in that chapter are compounded by sea level rise, saltwater intrusion, subsidence, wave overwash events, channel aggradation and diminishing drainage capacity. As commenters on the DEIR essentially acknowledged, the diminishing drainage capacity, threatened as it is, is constrained by wholly inadequate procedural and operational mechanisms to contend with these challenges. Arguably, the “No Project” alternative presents an existential threat to ongoing agricultural operations in the Project area, and is thoroughly undesirable to TWC, their agricultural lessees, and, presumably, adjacent property owners who have participated in the development of the proposed Project and are primarily approaching the Project from an economically motivated land management perspective.

As described at length in Biological Resources, state and federally listed salmonids, as well as other aquatic organisms, have derived no biological benefit from the Project area, closed as it has been from the estuary, for 150 years. The “No Project” alternative provides no assistance in recovering these species, and may contribute to the extirpation of the Coastal Cutthroat trout from the southernmost extent of its range by preventing its full biological expression in an estuarine setting. It certainly impairs the recovery of Eel River Coho salmon, chinook salmon and steelhead trout.

The No Project Alternative would have similar impacts to the proposed Project for Public Services, Recreation, and Transportation resource categories; and lesser impacts than the proposed Project for all other resource categories with the exception of agricultural, biological and hydrology as overtime these resources would continue to degrade.

4.2.2 Alternative 2: 2014 NOP

The 2014 Original NOP provides a detailed description of the proposed Project elements for this alternative. Figure 4-1 summarizes the enhancement features associated with the 2014 NOP

alternative, which is restricted to the EREP, or TWC property. Specific alternative hydraulic design details include the following.

1. Install new culverts between the Inner Marsh and existing outer Cut-Off Slough channel as described in the proposed Project. Seasonal control of maximum muted tide levels would be the same as described for the proposed Project.
2. Replace one existing flap gate in the existing Cut-Off Slough tide structure with a new side-hinge tidegate equipped with a 1-meter square auxiliary fish passage door. Retrofitted structure is intended to maintain the current water levels within inner Cut-Off Slough.
3. Improve existing internal berm around north, east and south sides of Inner Marsh to uniform minimum elevation of 5-feet. Remove two northern-most existing culverts through inner berm and fill and reconstruct berm.
4. Remove existing culverts at south end of Inner Marsh berm and replace with three new 5-foot diameter gated culverts to allow positive flow only between Centerville Slough and the Inner Marsh.
5. Excavate new 140- to 120-foot wide Centerville Slough along alignment indicated in Figure 4-1, upstream of the existing TWC Bridge. Connect the north end of new channel with existing Cut-Off Slough. Bottom of channel constructed to elevations ranging from 2-feet at south end to 0-feet NAVD88 at the tie-in to Cut-Off Slough.
6. Construct new 60-foot to 50-foot wide Russ Creek channel north of the RR&T-TWC property boundary along alignment indicated on Figure 4-1. This channel merges with new Centerville Slough approximately 650-feet upstream (south) of the existing TWC Bridge. Bottom elevation of 2.0-feet NAVD at confluence with Centerville Slough grades up to existing 8.0-feet NAVD88 channel bed elevations at the RR&T-TWC property boundary.
7. Raise the elevation of the access road bordering the TWC-ORF properties to a uniform elevation of 8-feet.
8. Construct a short boardwalk and trail with an overlook which would take visitors along an existing trail, near the North Barn, into an intact dunefield for birding and natural observation.
9. Reestablish the dune configuration at the northern and central sites.

Aesthetics

Impacts associated with the 2014 NOP Alternative would be similar to the proposed Project (less than significant) for the EREP portion of the Project; however, for the overall Project, impacts would be greater for the proposed Project because the proposed Project includes the RR&T property south of the EREP. Thereby increasing Project activities (i.e., new gated culvert, improve and extend existing berm, re-establish dune configuration, realign Shaw Creek and re-establish connectivity to Centerville Slough, establish sediment management area, etc.) in size, and proximity to Centerville Road. Therefore, the 2014 NOP Alternative would have lesser aesthetic impacts than the proposed Project.

Agricultural Resources

As with the proposed Project, the 2014 NOP Alternative would also have very similar agricultural resources impacts with respect to conversions of agricultural land. Similarly, the 2014 NOP Alternative would have less than significant impacts to agricultural resources, due primarily to the same proposed improvements in drainage and sediment management that increase overall agricultural productivity within the EREP. Therefore, the 2014 NOP Alternative is found to be

commensurate in impact and benefit with the proposed Project. However, this alternative provides a far lower level of long-term protection and resiliency to the overall Project area. In particular, this alternative excludes activities south of the EREP such as dune enhancements, berm and new Centerville Slough on the RR&T property intended to protect the agricultural land from future wave over wash. Therefore, the 2014 NOP Alternative would have equal agricultural resources impacts compared to the proposed Project, but still less than significant impacts. Neither the proposed Project nor this alternative would have any impacts to forest resources as there are no forest resources on the Project site.

Air Quality

The air quality impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of Mitigation Measure AQ-1 (Dust Control Measures during Construction) which complies with the best management practices recommended by air districts to reduce construction-related dust. As with the proposed Project, the 2014 NOP Alternative would have less than significant impacts to air quality. Air quality impacts (i.e., emissions) associated with the 2014 NOP Alternative would be less than the proposed Project because there would be no construction activities (therefore less emissions) south of the EREP; therefore, this alternative would have lesser air quality impacts than the proposed Project.

Biological Resources

Biological resources impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of mitigation measures (reference Section 3.4.5). Biological resources impacts associated with the 2014 NOP Alternative would also be less than significant with implementation of mitigation measures. Biological resources impacts associated with this alternative would be similar to the proposed Project for the EREP portion of the Project; however, with the removal of the RR&T property, and the construction-related activities in that area, there would be no construction-related biological resources impacts and no wetlands fill south of the EREP with this alternative. Therefore, this alternative would have lesser initial biological resources impacts than the proposed Project. In the long-run, it is plausible that this alternative would present slightly greater impacts to biological resources in the absence of habitat improvements to Russ Creek south of the EREP, and resulting improvement of biological connectivity between the estuary and the Wildcat Hills via Russ Creek. However, it is probable that these improvements could be compensated for through increased quality of habitat on Russ Creek on the EREP.

As with the proposed Project, minus the RR&T land south of the EREP, this alternative would also provide a net benefit to terrestrial, avian and aquatic species by the introduction of a muted tidal exchange into the EREP and recreates historic on- and off-channel ponds and the associated wetland habitats within the historic back-dune Centerville Slough channel system.

Cultural Resources

The potential impacts on cultural resources anticipated with this alternative are expected to be less than with the proposed Project because less land would be subject to construction-related activities with this alternative. However, as with the proposed Project, construction of the Project under this alternative could unearth unknown cultural resources which would be a significant impact. The same mitigation measures for the proposed Project (Mitigation Measures CR-1, CR-2, and CR-3) would also be applicable to this alternative (reference Section 3.5.5).

Geology and Soils

As with the proposed Project, the 2014 NOP Alternative would have less than significant impacts to geology and soils. The 2014 NOP Alternative would have fewer impacts than the proposed Project because less land would subject to construction-related activities with this alternative. The recommendations in the Geotechnical Study, as with the proposed Project, would still be applicable to this alternative.

Greenhouse Gas Emissions

As with the proposed Project, this alternative would result in a temporary increase in GHG emissions, including exhaust emissions from on-road haul trucks, worker commute vehicles, and off-road heavy-duty equipment. However, the 2014 NOP Alternative would have fewer impacts than the proposed Project because less land would subject to construction-related activities; therefore, less GHG emissions, with this alternative. As with the proposed Project, this alternative would also result in a less than significant impact for construction and operational activities.

Hazards and Hazardous Materials

The 2014 NOP Alternative would have fewer hazards and hazardous materials impacts than the proposed Project because less land would subject to construction-related activities with this alternative. As with the proposed Project, construction and operation of the proposed Project would not create a significant hazard to the environment or general public involving the release of hazardous materials into the environment.

Hydrology and Water Quality

As with the proposed Project, this alternative would also be subject to the same permits (reference Section 2.6) and have to comply with the same Humboldt County and NCRWQCB requirements with regard to water quality standards or waste discharge requirements as the proposed Project. The recommendations in the Geotechnical Study would also apply to this alternative. Hydrology and water quality impacts were determined to be less than significant with implementation of mitigation measures for the proposed Project (reference Section 3.9.5), and are anticipated to be less than significant for this alternative. However, the improvements to Centerville Slough and Russ Creek would be limited to EREP property only; thus, poor drainage and unchecked wave over wash would still occur on RR&T property. Therefore, although the hydrology and water quality impacts are anticipated to be similar, the resulting hydrologic deterioration of agricultural pastures on RR&T property under this scenario is expected to be more severe. The hydrology and water quality impacts associated with this alternative are anticipated to be greater than with the proposed Project.

Mineral and Energy Resources

As with the proposed Project, there would be less than significant impacts to mineral and energy resources associated with the 2014 NOP Alternative. The 2014 NOP Alternative would use even fewer materials (i.e, aggregate) derived from mineral resources and less energy than the proposed Project, as the construction footprint would be smaller than the proposed Project.

Noise

Similar to the proposed Project, implementation of this alternative would generate construction-related and maintenance noise associated with the use of heavy equipment within the EREP. However, there would be no construction-related or maintenance activities south of the EREP with this alternative. Therefore, noise impacts would be lesser overall than the proposed Project.

Public Services and Utilities

None of the alternatives would have a substantial adverse impact to public services or utilities as none are proposed. The 2014 NOP Alternative would have nominal impacts to public services and utilities similar to the proposed Project.

Recreation

As with the proposed Project, no recreational facilities are proposed for RR&T, and the 2014 NOP alternative differs little from the Project. Therefore, the 2014 NOP Alternative would have less than significant impacts to recreational resources. The 2014 NOP Alternative would not have a substantial adverse impact on existing or future recreational resources. As with the proposed Project, this alternative would have a beneficial impact on recreational resources by increasing visitor amenities such as: improved parking, signage, vault toilet, boardwalk for birding and observation, and two kayak put in and take outs.

Transportation

As with the proposed Project, the 2014 NOP Alternative would have less than significant impacts to transportation and circulation. Transportation impacts associated with this alternative would be lesser than with the proposed Project because there would be less construction-related and maintenance equipment and vehicles traveling to and from the Project site with the elimination of approximately 753 acres south of the EREP.

4.2.3 Alternative 3: Full Tidal Exchange

The Full Tidal Exchange Alternative assumes removing the existing Cut-Off Slough tidegates along with the existing levee bordering the north end of the Inner Marsh. This alternative allows for full and unrestricted tidal exchange back into the former wetlands/tidelands. No other improvements or infrastructure protections are included in this alternative.

Aesthetics

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts with regard to aesthetic resources. Impacts associated with the Full Tidal Exchange Alternative would be less than the proposed Project because the only construction-related work would be the removal of the existing Cut-Off Slough tidegates and levee bordering the north end of the Inner Marsh. None of the other proposed Project activities would be carried out; therefore, this alternative would have lesser aesthetic impacts than the proposed Project.

Agricultural Resources

The Full Tidal Exchange Alternative would have greater agricultural resources impacts than the proposed Project because this alternative would cause the greatest area of maximum inundation compared to the proposed Project and other alternatives by flooding (saltwater) existing agricultural lands in the Project area. According to the *Hydraulic Design and ~~Feasiblity~~ Feasibility* Assessment *Report* prepared for the Project (Kamman Hydrology & Engineering 2016), this alternative would result in un-muted tidal exchange and higher water levels relative to the other alternatives. Therefore, this Alternative would have greater agricultural resources impacts than the proposed Project. Neither the proposed Project nor this alternative would have any impacts to forest resources as there are no forest resources on the Project site.

Air Quality

The air quality impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of Mitigation Measure AQ-1 (Dust Control Measures

during Construction) which complies with the best management practices recommended by air districts to reduce construction-related dust. The Full Tidal Exchange Alternative would also be less than significant. Air quality impacts (i.e., emissions) associated with the Full Tidal Exchange Alternative would be substantially less than the proposed Project because there would only be emissions associated with the removal of the Cut-Off Slough tidegates and levee bordering the north end of the Inner Marsh; therefore, this alternative would have lesser air quality impacts than the proposed Project.

Biological Resources

Biological resources impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of mitigation measures (reference Section 3.4.5). Impacts associated with this alternative would also be less than significant with implementation of appropriate mitigation measures. Biological resources impacts associated with this alternative would be less than the proposed Project because Project area conditions would be returned to natural historic conditions, and less wetlands would be filled, thereby improving habitat for aquatic species. Impacts to terrestrial species would be more significant under the Full Tidal Exchange Alternative due to extensive inundation of terrestrial habitat. Nonetheless, this alternative would have beneficial biological resources impacts overall.

Cultural Resources

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts to cultural resources. The potential impacts on cultural resources anticipated with this alternative would be less than with the proposed Project because less land would subject to construction-related activities with this alternative. Only the removal of the Cut-Off Slough tidegates and levee bordering the north end of the Inner Marsh would have the potential of uncovering unknown cultural resources. However, as with the proposed Project, construction of the Project under this alternative could unearth unknown cultural resources which would be a significant impact. The same mitigation measures for the proposed Project (Mitigation Measures CR-1, CR-2, and CR-3) would also be applicable to this alternative (reference Section 3.5.5).

Geology and Soils

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts with regard to geology and soils. The Full Tidal Exchange Alternative would have fewer impacts than the proposed Project because less land would subject to construction-related activities with this alternative. The recommendations in the Geotechnical Study, as with the proposed Project, would still be applicable to this alternative.

Greenhouse Gas Emissions

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts with regard to GHG emissions. As with the proposed Project, this alternative would result in a temporary increase in GHG emissions associated with the removal of the Cut-Off Slough tidegates and levee bordering the north end of the Inner Marsh, including exhaust emissions from on-road haul trucks, worker commute vehicles, and off-road heavy duty equipment. However, the Full Tidal Exchange Alternative would have fewer impacts than the proposed Project overall because substantially less land would subject to construction-related activities. Furthermore, carbon sequestration rates would increase exponentially due to substantial conversion of agricultural pastures to salt marsh, and methane and CO_2 rates would decrease exponentially due to the reduction in utility of the area for livestock grazing; therefore, there would be fewer GHG

emissions, with this alternative. Additionally, there would be no operational activities associated with this alternative; therefore, no operational emissions.

Hazards and Hazardous Materials

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts with regard to hazards and hazardous materials. The Full Tidal Exchange Alternative would have fewer hazards and hazardous materials impacts than the proposed Project because less land would subject to construction-related activities with this alternative. As with the proposed Project, construction and operation of the proposed Project would not create a significant hazard to the environment or general public involving the release of hazardous materials into the environment.

Hydrology and Water Quality

The Full Tidal Exchange Alternative would include the removal of the Cut-Off Slough tidegates and levee bordering the north end of the Inner Marsh, resulting in the greatest area of maximum inundation within the Project area compared to the proposed Project and other alternatives. Downstream tidal exchange would not be restricted and the Project area would become more characteristic of historic conditions. This alternative could result in an inundated area of approximately 1,951 acres, which would inundate existing farmlands and a few onsite structures; however, there are no homes or people living on the Project site that would be impacted.

Hydrology and water quality impacts were determined to be less than significant with implementation of mitigation measures for the proposed Project (reference Section 3.9.5), however, they are anticipated to be significant for this alternative. This alternative would have both positive biological (inundation more characteristic of historic conditions) and negative agricultural (substantially altering the existing drainage) impacts; therefore, overall impacts are considered neutral to greater than the proposed Project.

Mineral and Energy Resources

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts to mineral and energy resources. As with the proposed Project, there would be less than significant impacts to mineral and energy resources associated with the Full Tidal Exchange Alternative. The Full Tidal Exchange Alternative would not use any materials (i.e, aggregate) derived from mineral resources and less energy than the proposed Project, as there would be no construction activities associated with this alternative.

Noise

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts with regard to noise. Similar to the proposed Project, implementation of this alternative would generate noise associated with the removal of the Cut-Off Slough tidegates and removal of the levee bordering the north end of the Inner Marsh. However, there would be no additional construction-related or maintenance activities with this alternative, and construction-related activities would be limited to a much smaller area. Therefore, noise impacts would be lesser overall than the proposed Project.

Public Services and Utilities

As with the proposed Project, the Full Tidal Exchange Alternative would either have no impacts or less than significant impacts to public services, and utilities and service systems. None of the alternatives would have a substantial adverse impact to public services or utilities. The Full Tidal

Exchange Alternative would not require any public services or utilities; therefore, this alternative would have fewer impacts overall than the proposed Project.

Recreation

The Full Tidal Exchange Alternative would substantially alter existing and future recreational resources because the Project area would be inundated more frequently because of tidal influences. This change would alter existing recreational uses, but while hiking and equestrian use may decline, duck hunting, fishing and kayaking recreational opportunities would increase. Overall, this alternative would result in use shifts, but would have similar impacts to recreational resources than the proposed Project.

Transportation

As with the proposed Project, the Full Tidal Exchange Alternative would have less than significant impacts with regard to transportation and circulation. Transportation impacts associated with this alternative would be less than with the proposed Project because there would be less construction-related equipment and vehicles traveling to and from the Project site with the removal of the Cut-Off Slough tidegates and levee bordering the north end of the Inner Marsh. There would be no ongoing maintenance vehicle trips associated with this alternative. Therefore, this alternative would be less impactful overall than the proposed Project.

4.2.4 Alternative 4: Combination of Components from the Proposed Project and 2014 NOP Alternative (EREP Only)

This alternative includes many of the same components from the 2014 NOP Alternative that were further improved upon in the proposed Project. Figure 4-2 depicts the components associated with this alternative, which is restricted to the EREP, or TWC property. The components distinguishing Alternative 4 from the 2014 NOP Alternative are:

1. The existing Cut-off Slough Tidegate would be retrofitted as described in Section 2.4.1.
2. Seasonally muted tidal prism would be re-introduced into the Inner Marsh through installation of a muted tidegate regulator (MTR) as described in Section 2.4.2. The seasonally muted tide would be limited to the Inner Marsh only and managed seasonally as described in the WLMP. A fundamental difference between this alternative and the proposed Project is that Centerville Slough would maintain its current alignment for this alternative, not connecting into the Inner Marsh. Therefore, seasonally varied muted tidal exchange would be prevented from entering Centerville Slough, Western Drainage and Angels Camp.
3. Centerville Slough would be re-established upstream of the existing bridge crossing (widened to 50- to 75-feet) along its current (historic) alignment and terminated north of EREP/RR&T property boundary to provide additional off-channel aquatic habitat and provide potential future drainage connection to the south. If Centerville Slough would be extended south in the future, a proposed access bridge would need to be constructed across the slough to maintain access to areas west of the slough.
4. Russ Creek would be re-established with a 50- to 60-foot wide channel and re-connected to Centerville Slough. A Primary Sediment Management Area would be established on Russ Creek as described in Section 2.4.3.
5. Re-establishment of the dune configuration at the Northern and Central sites as well as invasive Ammophila removal west of the Outer Marsh as similarly described in Section 2.4.5.

10. Improve existing internal berm around east and south sides of Inner Marsh to uniform minimum elevation of 8-feet (NAVD-88). Remove existing culverts as shown on Figure 4-2 through the Inner Marsh berm and reconstruct berm.
11. Remove existing culvert at south end of Inner Marsh berm and replace with new gated culverts to allow one-way flow into Inner Marsh.
12. Implement public education and access improvements as described in section 2.4.6
13. Excavated sediments would be placed in agricultural uplands as shown on Figure 4-2.
14. An Adaptive Management Program as described in Section 2.5.5 would be implemented post-construction

Aesthetics

Impacts associated with Alternative 4 would be similar to the proposed Project (less than significant) however impacts would be greater for the proposed Project because the proposed Project includes the RR&T property south of the EREP and construction of berms. Therefore, Alternative 4 would have lesser aesthetic impacts than the proposed Project.

Agricultural Resources

Alternative 4 would have fewer impacts to agricultural resources than the proposed Project for three key reasons: 1) Seasonally adjusted muted tidal exchange is limited to the Inner Marsh, so less area is inundated; 2) Centerville Slough excavation terminates further north, so less pasture (prime agricultural land in that location) is impacted by channel construction, and; 3) Most other project features such as drainage improvements and sediment management activities are retained, so overall productivity increases relative to the proposed Project, Accordingly, Alternative 4 is found to be commensurate in impact and benefit with the proposed Project. However, this alternative provides a far lower level of long-term protection and resiliency to the overall Project area. In particular, this alternative excludes activities south of the EREP such as dune enhancements, setback berm construction around Angels Camp and a restored Centerville Slough on the RR&T property all intended to protect the agricultural land from future wave over wash events and to provide adequate drainage for future operations. Therefore, this Alternative would have fewer overall benefits to the Project area but agricultural resources impacts similar to the proposed Project, and still less than significant impacts. Neither the proposed Project nor this alternative would have any impacts to forest resources as there are no forest resources on the Project site.

Air Quality

The air quality impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of Mitigation Measure AQ-1 (Dust Control Measures during Construction) which complies with the best management practices recommended by air districts to reduce construction-related dust. As with the proposed Project, Alternative 4 would have less than significant impacts to air quality. Air quality impacts (i.e., emissions) associated with this Alternative would be less than the proposed Project because there would be no construction activities (therefore less emissions) south of the EREP; therefore, this alternative would have lesser air quality impacts than the proposed Project.

Biological Resources

Biological resources impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of mitigation measures (reference Section 3.4.5). Biological resources impacts associated with Alternative 4 would also be less than significant with implementation of mitigation measures. Biological resources impacts associated with this

alternative would be similar to the proposed Project for the EREP portion of the Project; however, with the removal of the RR&T property, and the construction-related activities in that area, there would be no construction-related biological resources impacts and no wetlands fill south of the EREP with this alternative. Therefore, this alternative would have lesser initial biological resources impacts than the proposed Project. In the long-run, it is plausible that this alternative provides fewer biological benefits to aquatic species in the absence of habitat improvements to Russ Creek south of the EREP, and resulting improvement of biological connectivity between the estuary and the Wildcat Hills via Russ Creek. However, it is probable that these improvements could be compensated for through increased quality of habitat on Russ Creek on the EREP.

As with the proposed Project, minus the RR&T land south of the EREP, this alternative would also provide a net benefit to terrestrial, avian and aquatic species by the introduction of a muted tidal exchange into the EREP and would recreate historic on- and off-channel ponds and the associated off-channel habitat associated within the historic Centerville Slough.

Cultural Resources

The potential impacts on cultural resources anticipated with this alternative are expected to be less than with the proposed Project because less land would be subject to construction-related activities with this alternative. However, as with the proposed Project, construction of the Project under this alternative could unearth unknown cultural resources which would be a significant impact. The same mitigation measures for the proposed Project (Mitigation Measures CR-1, CR-2, and CR-3) would also be applicable to this alternative (reference Section 3.5.5).

Geology and Soils

As with the proposed Project, Alternative 4 would have less than significant impacts to geology and soils. Alternative 4 would have fewer impacts than the proposed Project because less land would subject to construction-related activities with this alternative. The recommendations in the Geotechnical Study, as with the proposed Project, would still be applicable to this alternative.

Greenhouse Gas Emissions

As with the proposed Project, this alternative would result in a temporary increase in GHG emissions, including exhaust emissions from on-road haul trucks, worker commute vehicles, and off-road heavy-duty equipment. However, Alternative 4 would have fewer impacts than the proposed Project because less land would subject to construction-related activities; therefore, less GHG emissions, with this alternative. As with the proposed Project, this alternative would also result in a less than significant impact for construction and operational activities.

Hazards and Hazardous Materials

Alternative 4 would have fewer hazards and hazardous materials impacts than the proposed Project because less land would subject to construction-related activities with this alternative. As with the proposed Project, construction and operation of the proposed Project would not create a significant hazard to the environment or general public involving the release of hazardous materials into the environment.

Hydrology and Water Quality

As with the proposed Project, this alternative would also be subject to the same permits (reference Section 2.6) and have to comply with the same Humboldt County and NCRWQCB requirements with regard to water quality standards or waste discharge requirements as the proposed Project. The recommendations in the Geotechnical Study would also apply to this alternative. Hydrology and water quality impacts were determined to be less than significant with implementation of

mitigation measures for the proposed Project (reference Section 3.9.5), and are anticipated to be less than significant for this alternative. However, the improvements to Centerville Slough and Russ Creek would be limited to EREP property only; thus, poor drainage and unchecked wave over wash would still occur on RR&T property. Therefore, although the hydrology and water quality impacts are anticipated to be similar, the resulting hydrologic deterioration of agricultural pastures on RR&T property under this scenario is expected to be more severe given the continued reliance on the vulnerable WDD. As such the hydrology and water quality benefits for the Project area are diminished somewhat with this alternative, relative to the proposed Project.

Mineral and Energy Resources

As with the proposed Project, there would be less than significant impacts to mineral and energy resources associated with Alternative 4. This Alternative would use even fewer materials (i.e, aggregate) derived from mineral resources and less energy than the proposed Project, as the construction footprint would be smaller than the proposed Project.

Noise

Similar to the proposed Project, implementation of this alternative would generate construction-related and maintenance noise associated with the use of heavy equipment within the EREP. However, there would be no construction-related or maintenance activities south of the EREP with this alternative. Therefore, noise impacts would be lesser overall than the proposed Project.

Public Services and Utilities

None of the alternatives would have a substantial adverse impact to public services or utilities as none are proposed. Alternative 4 would have nominal impacts to public services and utilities similar to the proposed Project.

Recreation

As with the proposed Project, no recreational facilities are proposed for RR&T, and Alternative 4 differs little from the Project. Therefore, Alternative 4 would have less than significant impacts to recreational resources. Alternative 4 would not have a substantial adverse impact on existing or future recreational resources. As with the proposed Project, this alternative would have a beneficial impact on recreational resources by increasing visitor amenities such as: improved parking, signage, vault toilet, boardwalk for birding and observation, and two kayak put in and take outs.

Transportation

As with the proposed Project, Alternative 4 would have less than significant impacts to transportation and circulation. Transportation impacts associated with this alternative would be lesser than with the proposed Project because there would be less construction-related and maintenance equipment and vehicles traveling to and from the Project site with the elimination of approximately 753 acres south of the EREP.

4.2.5 Alternative 5: Proposed Project Components on EREP Only

This alternative includes the proposed Project components described in section 2.4 for EREP only, assumes the proposed Project components on RR&T will not be implemented and as depicted in Figure 4-3. This alternative includes the same seasonal muted tidal operations as described in the proposed Project. As such, during the dry season the increase in tidal amplitude would extend up the re-established Centerville Slough into the existing Angels Camp tidal wetlands on RR&T. If this was determined unacceptable to RR&T and/or impactful based on follow-on hydraulic modelling, gated culverts could be placed in the re-established Centerville Slough and/or Western Drainage to

prevent dry season tidal inundation on RR&T while still permitting positive drainage towards the north during low tides. During the wet season, the muted tidal amplitude would be reduce as part of the seasonal operations and tidal exchange would be contained within the re-established Centerville Slough and Western Drainage, Notably, the gated culverts, if placed, could wrack debris from wave over-wash events and require routine monitoring and maintenance. Hydraulic analyses would need to be expanded to include the gated culverts to better quantify drainage and aquatic habitat affects,

Aesthetics

Impacts associated with Alternative 5 would be similar to the proposed Project (less than significant) however impacts would be greater for the proposed Project because the proposed Project includes the RR&T property south of the EREP. Therefore, Alternative 5 would have lesser aesthetic impacts than the proposed Project.

Agricultural Resources

This alternative provides a lower level of long-term protection and resiliency to the overall Project area. In particular, this alternative excludes activities south of the EREP such as dune enhancements, setback berm construction around Angels Camp and a restored Centerville Slough on the RR&T property, all intended to protect the agricultural land from future wave over wash events and to provide adequate drainage for future operations. Therefore, this Alternative would have fewer overall benefits to the Project area agricultural resources impacts similar to the proposed Project, and still less than significant impacts. Neither the proposed Project nor this alternative would have any impacts to forest resources as there are no forest resources on the Project site.

Air Quality

The air quality impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of Mitigation Measure AQ-1 (Dust Control Measures during Construction) which complies with the best management practices recommended by air districts to reduce construction-related dust. As with the proposed Project, Alternative 5 would have less than significant impacts to air quality. Air quality impacts (i.e., emissions) associated with this Alternative would be less than the proposed Project because there would be no construction activities (therefore less emissions) south of the EREP; therefore, this alternative would have lesser air quality impacts than the proposed Project.

Biological Resources

Biological resources impacts associated with the proposed Project were determined to be less than significant, particularly with implementation of mitigation measures (reference Section 3.4.5). Biological resources impacts associated with Alternative 5 would also be less than significant with implementation of mitigation measures. There would be no construction-related biological resources impacts and no wetlands fill south of the EREP with this alternative. Therefore, this alternative would have lesser initial biological resources impacts than the proposed Project. In the long-run, it is plausible that this alternative affords fewer benefits to aquatic biological resources in the absence of habitat improvements to Russ Creek south of the EREP, and resulting improvement of biological connectivity between the estuary and the Wildcat Hills via Russ Creek. However, it is probable that these improvements could be compensated for through increased quality of habitat on Russ Creek on the EREP and increased tidal connection from Centerville Slough to Western Drainage and Angels Camp.

As with the proposed Project, minus the RR&T land south of the EREP, this alternative would also provide a net benefit to terrestrial, avian and aquatic species by the introduction of a muted tidal exchange into the EREP and would recreate historic on- and off-channel ponds and the associated off-channel habitat associated within the historic Centerville Slough.

Cultural Resources

The potential impacts on cultural resources anticipated with this alternative are expected to be less than with the proposed Project because less land would be subject to construction-related activities with this alternative. However, as with the proposed Project, construction of the Project under this alternative could unearth unknown cultural resources which would be a significant impact. The same mitigation measures for the proposed Project (Mitigation Measures CR-1, CR-2, and CR-3) would also be applicable to this alternative (reference Section 3.5.5).

Geology and Soils

As with the proposed Project, Alternative 5 would have less than significant impacts to geology and soils. Alternative 5 would have fewer impacts than the proposed Project because less land would subject to construction-related activities with this alternative. The recommendations in the Geotechnical Study, as with the proposed Project, would still be applicable to this alternative.

Greenhouse Gas Emissions

As with the proposed Project, this alternative would result in a temporary increase in GHG emissions, including exhaust emissions from on-road haul trucks, worker commute vehicles, and off-road heavy-duty equipment. However, Alternative 5 would have fewer impacts than the proposed Project because less land would subject to construction-related activities; therefore, less GHG emissions, with this alternative. As with the proposed Project, this alternative would also result in a less than significant impact for construction and operational activities.

Hazards and Hazardous Materials

Alternative 5 would have fewer hazards and hazardous materials impacts than the proposed Project because less land would subject to construction-related activities with this alternative. As with the proposed Project, construction and operation of the proposed Project would not create a significant hazard to the environment or general public involving the release of hazardous materials into the environment.

Hydrology and Water Quality

As with the proposed Project, this alternative would also be subject to the same permits (reference Section 2.6) and have to comply with the same Humboldt County and NCRWQCB requirements with regard to water quality standards or waste discharge requirements as the proposed Project. The recommendations in the Geotechnical Study would also apply to this alternative. Hydrology and water quality impacts were determined to be less than significant with implementation of mitigation measures for the proposed Project (reference Section 3.9.5), and are anticipated to be less than significant for this alternative.

However, the improvements to Centerville Slough and Russ Creek would be limited to EREP property only; thus, poor drainage and unchecked wave over wash would still occur on RR&T property. Therefore, although the hydrology and water quality impacts are anticipated to be similar, the resulting hydrologic deterioration of agricultural pastures on RR&T property under this scenario is expected to be more severe given the continued wave overwash and no berm. As described above, hydraulic analyses of this alternative has not been fully completed to quantify the hydrology and water quality impacts/benefits, but those benefits are anticipated to be neutral to greater than

the proposed Project; and in part dependent upon the placement of the above mentioned gated culverts in Centerville Slough/Western Drainage and the unpredictability of sediment re-entrainment and transport efficiency from increased tidal amplitude.

Mineral and Energy Resources

As with the proposed Project, there would be less than significant impacts to mineral and energy resources associated with Alternative 5. This Alternative would use even fewer materials (i.e, aggregate) derived from mineral resources and less energy than the proposed Project, as the construction footprint would be smaller than the proposed Project.

Noise

Similar to the proposed Project, implementation of this alternative would generate construction-related and maintenance noise associated with the use of heavy equipment within the EREP. However, there would be no construction-related or maintenance activities south of the EREP with this alternative. Therefore, noise impacts would be lesser overall than the proposed Project.

Public Services and Utilities

None of the alternatives would have a substantial adverse impact to public services or utilities as none are proposed. Alternative 5 would have nominal impacts to public services and utilities similar to the proposed Project.

Recreation

As with the proposed Project, no recreational facilities are proposed for RR&T, and Alternative 5 differs little from the Project. Therefore, Alternative 5 would have less than significant impacts to recreational resources. Alternative 5 would not have a substantial adverse impact on existing or future recreational resources. As with the proposed Project, this alternative would have a beneficial impact on recreational resources by increasing visitor amenities such as: improved parking, signage, vault toilet, boardwalk for birding and observation, and two kayak put in and take outs.

Transportation

As with the proposed Project, Alternative 5 would have less than significant impacts to transportation and circulation. Transportation impacts associated with this alternative would be lesser than with the proposed Project because there would be less construction-related and maintenance equipment and vehicles traveling to and from the Project site with the elimination of approximately 753 acres south of the EREP.

4.3 Environmentally Superior Alternative

Table 4-1 (Comparison of Alternatives to the Proposed Project) compares the significance of the potential impacts for the proposed Project with the alternatives considered in the preceding sections. State CEQA Guidelines Section 15126.6(e)(2) requires that if the No Project Alternative is the environmentally superior alternative, then the EIR must also identify which of the other alternatives is environmentally superior.

As described above, the proposed Project is an environmental restoration and drainage improvement project, and its primary adverse impacts (although still less than significant or less

than significant with mitigation) are related to agricultural resources, hydrology, water quality, noise, and biological resources. A number of these impacts are short-term conditions that would result from construction-related activities. The No Project Alternative would eliminate these potential short-term construction-related impacts, and, because it would have the fewest impacts overall, would nominally be the Environmentally Superior Alternative. However, this alternative would forego the near and longer-term environmental benefits of the Project on fisheries, marsh, special-status wetland species habitat and agricultural land resiliency to sea level rise. While the Full Tidal Exchange Alternative would have fewer overall impacts compared to all other alternatives and the proposed Project, the impacts to agricultural resources would be significant and extremely difficult to mitigate; therefore, this alternative is judged to be environmentally inferior. The proposed Project is not the Environmentally Superior Alternative because the other alternatives would have fewer impacts overall during construction and operation. Relative to one another, the 2014 NOP Alternative and Alternative 4 have similar construction and operational impacts, however the proposed connection of Western Drainage Ditch to the re-established Centerville Slough as part of the 2014 NOP Alternative would provide an immediate drainage improvement and enhanced aquatic habitat relative to Alternative 4. If Centerville Slough is connected to Western Drainage/Centerville Slough in the future, Alternative 4 would provide longer-term drainage resiliency given the retreated position from the back dunes however such a connection is currently speculative under Alternative 4. While Alternative 5 would also provide longer-term drainage resiliency similar to Alternative 4, it may require placement of gated culverts near the EREP/RR&T property boundary to reduce tidal inundation on RR&T, thereby preventing full tidal exchange/scour potential and continued drainage vulnerabilities in this vicinity. Therefore, this EIR considers the Environmentally Superior Alternative to be the 2014 NOP Alternative.

Table 4-1 Comparison of Alternatives to the Proposed Project

Resource Category	No Project	2014 NOP	Full Tidal Exchange	Alternative 4	Alternative 5
Aesthetics	-	-	-	-	-
Agricultural Resources	+	=	+	=	=
Air Quality	-	-	-	-	-
Biological Resources	+	-	-	-	-
Cultural Resources	-	-	-	-	-
Geology and Soils	-	-	-	-	-

Greenhouse Gas Emissions	-	-	-	-	-
Hazards and Hazardous Materials	-	-	-	-	-
Hydrology and Water Quality	+	+	+	+	+
Mineral and Energy Resources	-	-	-	-	-
Noise	-	-	-	-	-
Public Services and Utilities	=	=	=	=	=
Recreation	=	=	+	=	=
Transportation	= (-)	-	-	-	-

Notes: "-" indicates an impact that is less than the proposed Project (environmentally superior)
"+" indicates an impact that is greater than the proposed Project (environmentally inferior)
"=" indicates an impact that is equal to the proposed Project (neither environmentally superior or inferior)
"( )"revised/updated from the DEIR

4.4 Alternatives Considered but not Carried Forward in this EIR

During the preliminary modelling and feasibility assessment phase of the Project, various configurations of alternative components were conceptually assessed by Kamman Hydrology & Engineering. Some of these conceptual components were assessed on adjoining lands including the O'Rourke Foundation (ORF). Expanding the Project components onto the ORF was rejected at the time of scoping by the ORF and therefore alternatives that included components on the ORF were neither fully developed nor fully analysed in this EIR, except insofar as alternatives were analysed to ensure the avoidance of impacts to adjacent properties.

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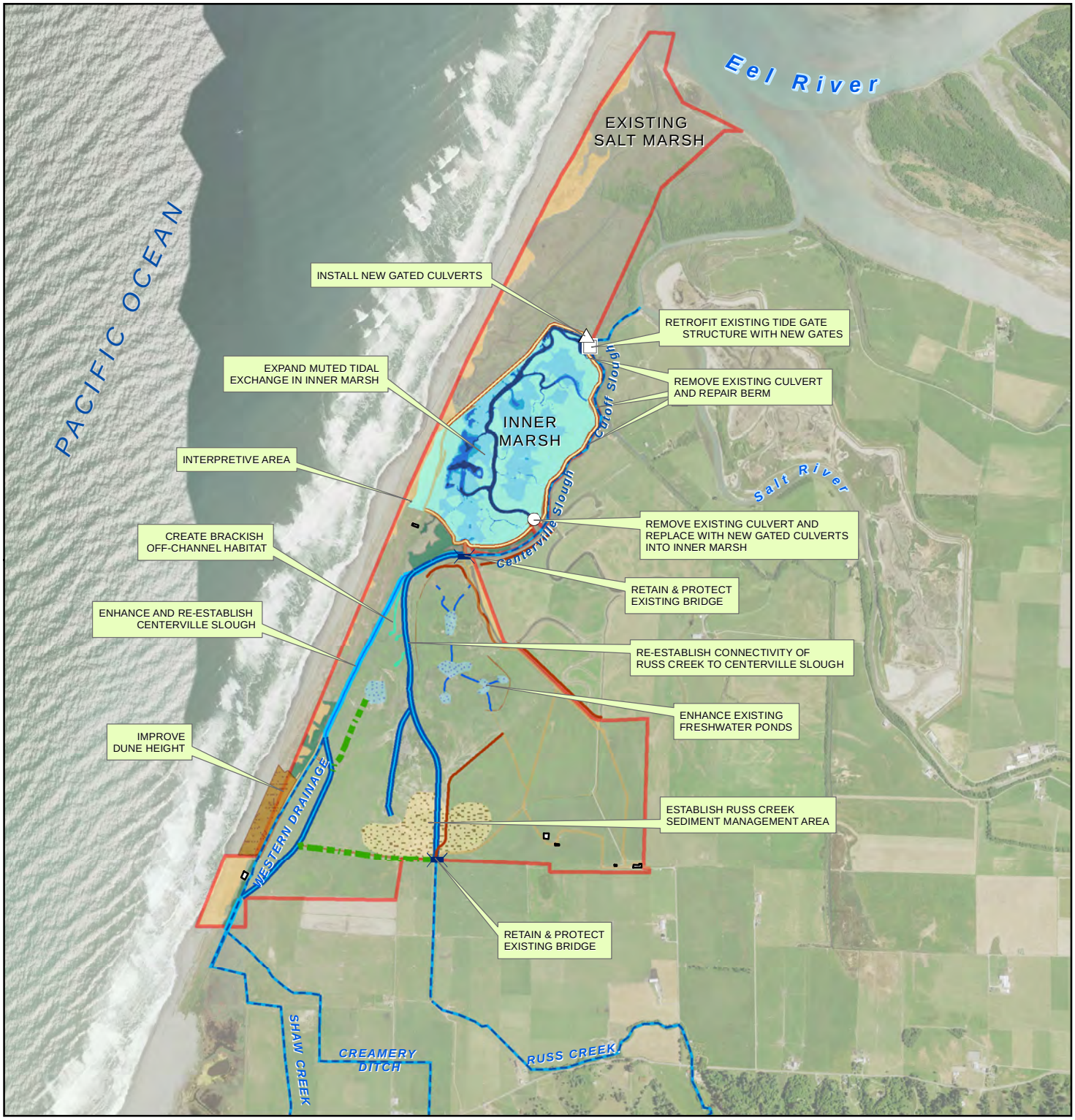

Replace Existing Culverts
New Culvert / Tidegate
Retrofit Existing Tidegate
Bridge

EREP Property Boundary (Reference: Humboldt County Parcel Data)
Buildings

Access Roads
Existing
Proposed
Dike with Improved Access Road
Existing Dike

Proposed Project Components
Existing Drainage
Channel Reestablsh
Channel Enhancement
Historic Drainage to be Abandoned
Freshwater Pond Conveyance

Proposed Project Components
Enhanced Freshwater Complex
Brackish Off-Channel Habitat
Sediment Management Area
Dune Restoration Area

Inner Marsh Muted Tide Levels
< 2.5'
< 3.0'
< 3.5'
< 4.0'
< 5.0'

Paper Size ANSI A

0 500 1,000 2,000 3,000 4,000 Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US

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Eel River Estuary and Centerville Slough Enhancement Project

Job Number 8410882
Revision A
Date 02 Dec 2016

Alternative 2 (2014 NOP)

Figure 4-1

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Existing Features
- Eel River Estuary Preserve
- Buildings
- Existing Drainage
- Existing Access Route
- Existing Bridge

Proposed Project Components
- New Culvert/Tidegate
- Replace Existing Culverts
- Retrofit Existing Tidegate
- Proposed Bridge
- Improved Access Road
- Berm with Improved Access Road
- Channel Re-establishment
- Freshwater Pond Conveyance
- Existing Ag Exclusive Area Available for Future Sediment Management
- Non-Native Beach Grass Removal
- Enhanced Freshwater Complex
- Brackish Off-Channel Habitat
- Upland for Sediment Reuse
- Primary Sediment Management Area
- Re-establish Dune Configuration

Seasonal Muted Tide Levels (Reference: NOAA Lidar)
- <2.5'
- <3.0'
- <3.5'
- <4.0'
- <5.0'

Paper Size 8.5" x 11" (ANSI A)
0 1,000 2,000 3,000 4,000
Feet
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Eel River Estuary and Centerville Slough Enhancement Project

Job Number 8410882
Revision A
Date 02 Dec 2016

Alternative 4

Figure 4-2

718 Third Street, Eureka, CA 95501 USA T 1 707 443 8326 F 1 707 444 8330 W www.ghd.com.au

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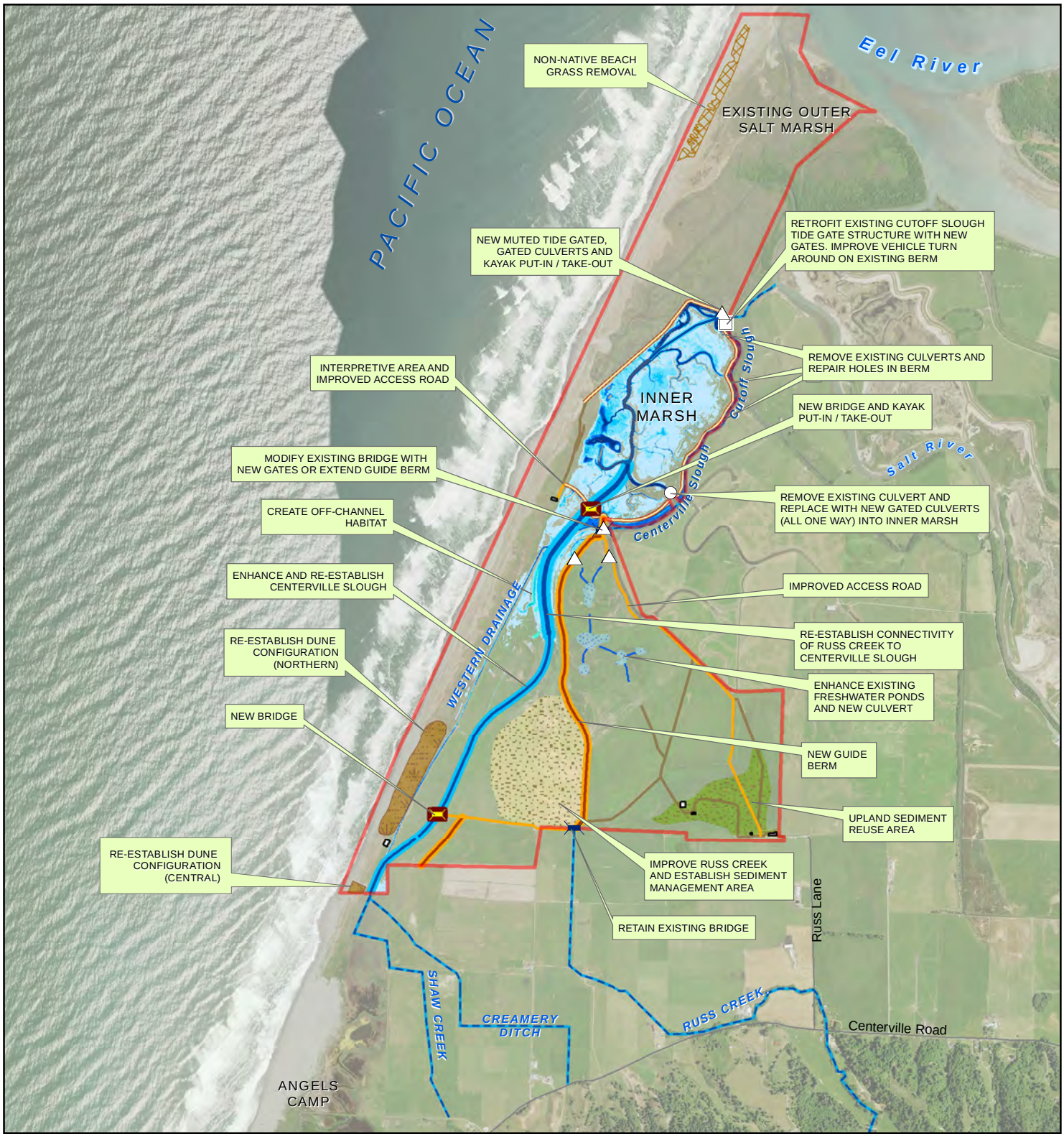

Existing Features
- Project Boundary
- Buildings
- Existing Drainage
- Existing Access Route
- Existing Bridge

Proposed Project Components
- Replace Existing Culvert/Tidegate
- New Culvert/Tidegate
- Retrofit Existing Tidegate
- Proposed Bridge
- Improved Access Road
- Berm with Improved Access Road
- Proposed Berm / Guide Berm
- Channel Re-establishment
- Freshwater Pond Conveyance
- Non-Native Beach Grass Removal
- Existing Ag Exclusive Area Available for Future Sediment Management
- Enhanced Freshwater Complex
- Brackish Off-Channel Habitat
- Primary SMA
- Upland for Sediment Reuse
- Re-establish Dune Configuration

Seasonal Muted Tide Levels (Reference: NOAA Lidar)
- <2.5'
- <3.0'
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- <4.0'
- <5.0'

Paper Size 8.5" x 11" (ANSI A)
0 1,000 2,000 3,000 4,000
Feet
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Eel River Estuary and Centerville Slough Enhancement Project EIR

Alternative 5

Job Number	8410882
Revision	B
Date	02 Dec 2016

Figure 4-3

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ATTACHMENTS

Attachment A – Response to Comments, Revisions, Appendices A-G

1. Revisions to the 2016 DEIR

This chapter includes revisions to the 2016 DEIR. When changes to the DEIR are necessitated, the change is indicated by indented text. Text that has been added to the DEIR is indicated in underline font, while text that has been deleted is indicated with ~~double strikethrough~~ font.

1. The following year is changed on page 2-4, Section 2.4.1 (first paragraph).

   - The existing tidal control structure in Cut-Off Slough is a tidegate structure first built in the late 1800's and replaced in 1977~~1979~~.

2. The following text is changed on page 3.15-4 (Existing Recreational Features, first paragraph).

   - The sole use of RR&T land and jack and Linda Russ property is agricultural production; recreation is prohibited there.
   - Replace with
   - Russ properties are a managed balance of agricultural production and natural resource values such as waterfowl habitat and Coastal Cutthroat trout habitat. This balance recognizes that agricultural income is the sole source of income. Private hosted educational tours are conducted on Russ properties.

3. The following text is changed on page 3.15-4 (last paragraph).

   - Other public recreation facilities or access points in the Eel River Delta include (on the north side of the Eel River) Crab Park, Pedrazzini Boat Launch, and Cannibal Island. ~~and Camp Weott Road.~~ On the South side of the Eel River recreation points include Camp Weott Road, Centerville County Park, Guthrie Creek, Fleener Creek, and Lost Coast Headlands.
   - ~~These visitors may be travelling to overnight stays in the Mattole River Valley, where there are many vacation cabins.~~

4. Mitigation Measure BIO-1b, second paragraph.

   - If active nests are detected within the construction or maintenance (operation) footprint or within 500 feet of construction activities, the applicant shall have locations flagged that are supporting breeding, and will not begin ground disturbing work or vegetation removal inside the buffers until the nests have fledged. Construction activities shall avoid nest sites until the biologist determines that the young have fledged or nesting activity has ceased. If nests are documented outside of the construction (disturbance) footprint, but within 500 feet of the construction area, buffers will be implemented if deemed appropriate in coordination with CDFW. In general, the buffer for common species would be ~~a minimum of three feet~~ determined on a case-by-case basis with consultation with CDFW, the buffer for sensitive species would be 300 feet, and the buffer for raptors would be 500 feet.

5. Mitigation Measure BIO-1e, title and first paragraph.

   - **Mitigate for potential impacts to salmonid species and Longfin Smelt**.

     The in-water construction and maintenance work window will be limited to June 15th through October 15th to avoid or minimize impacts to juvenile salmonids and Longfin Smelt. Before

potential de-watering activities begin in creeks or channels within the Project area, the qualified Biologist shall ensure that native aquatic vertebrates and larger invertebrates, if feasible, are relocated out of the construction footprint into a flowing channel segment by a qualified fisheries biologist. In deeper or larger areas, water levels shall first be lowered to manageable levels using methods to ensure no impacts to fisheries and other special status aquatic species. A qualified fisheries biologist or aquatic ecologist shall then perform appropriate seining or other trapping procedures to a point at which the biologist is assured that almost all individuals within the construction area have been caught. These individuals shall be kept in buckets with aerators to ensure survival. They shall then be relocated to an appropriate flowing channel segment or other appropriate habitat as identified by the qualified Biologist in consultation with NOAA Fisheries and CDFW. Federally threatened salmonid species that occur within the Project area either natal or non-natal Coho salmon, steelhead, and Chinook salmon.

6. Mitigation Measure CR-1, additional sentence added to the end of the mitigation measure.

- <u>The final disposition of archaeological, historical, and paleontological resources recovered on State lands under the jurisdiction of the Commission must be approved by the CSLC.</u>

2. Comments and Responses

2.1 Master Response to Comments - Hydrology and Water Quality

2.1.1 Introduction

The hydraulic and hydrologic assessment of project alternatives was completed by Kamman Hydrology & Engineering, Inc., using the MIKE11 model code and is documented in the Draft Hydraulic and Design and Feasibility Assessment Report (KHE, 2016). KHE has been using the MIKE11 as well as other DHI models (e.g., MIKE 21 and MIKE SHE) in the analysis and design of tidal wetland restoration projects for nearly 20 years. These modeling efforts are grounded in field assessment and monitoring. The model code and approach used in the EREP project is proven in the design of local projects (Riverside Ranch) and other comparable projects throughout California (e.g., Giacomini and Eden Landing wetland restoration projects). The successful implementation of these projects demonstrates the validity of our modeling approach and the efficacy of our designs.

The Project design team is cognizant of all the issues raised in DEIR comments during development of the project models and appreciate their peer review. The team believes the responses provided below will provide a better understanding of the hydrologic conditions and dominant hydraulic processes at the site and how they are adequately addressed in project models. The models and simulation results developed accurately portray existing and project hydrologic/hydraulic conditions and processes at the project site and provide a solid and defensible foundation for CEQA compliance and engineering design.

An overarching concern with the comments received is their applicability to a tidally-driven (gradually varied, unsteady flow) system that experiences significant back-water effects from the Eel River during high flow events. Most comments are better tailored to a gravity-driven fluvial (river and floodplain) dominated system. The dominance of momentum forces better reflect hydraulic processes at the project site. The responses below are intended to provide a better understanding of how the project models capture the unique project hydraulic environment under muted tidal exchange.

2.1.2 Overall Approach

Originally, the EFDC 2-dimensional (2-D) numerical model was selected as the numerical code for the hydraulic assessment of project alternatives. The transition from a 2-D to 1-D model involved moving from the preliminarily chosen EFDC code to MIKE 11 mostly because of the added work in integrating a number of different structures and structure operations into the EFDC code. The MIKE11 code contains and integrates algorithms for control structures, which need to be developed externally in EFDC. Given the importance of control structures in the project design, KHE recognized the value in streamlining the evaluation of a wide variety of alternative structure designs. KHE considered an integrated MIKE 11/21 model, but decided accurate modeling tools that achieve the ecological habitat and drainage design objectives more quickly and cost effectively could be achieved solely with MIKE11. In their experience, and given the large number of alternative models to be developed, KHE felt the pre-processing time would be more efficient going with the 1-D model. Computational processing time did not weigh heavily, if at all, in this decision.

An understanding of flow complexity was also considered in the selection of a 1-D model code. The flow patterns/complexity at the project site varies considerably between high- and low-flow periods. During low flow periods when there are no backwater effects from the Eel River and tidal exchange dominates, flow

and salinity patterns are considered more complex. Under muted tidal exchange, flows are predominantly restricted to the main channel network and simulated velocities and salinity are accurately represented in the project alternative models. Without reviewing the model geometries for the Project alternatives, this would not be evident. During winter high flow periods, the combination of tributary inflow and backwater effects from the River create large quiescent and low salinity ponded areas. During these flood periods, accurately accounting for mass and inundation areas is deemed of highest importance, which is successfully achieved with the MIKE 11 models.

Under existing conditions, many of the areas within the modeling domain are characterized by long cross-sectional profiles representative of pasture that experience sheet flow and ground surface elevations beyond the channels are predominantly above the influence of muted tidal exchange. A more in-depth analysis of the modeling domain DEM would aide this understanding. In the case of the O'Rourke Foundation (ORF) property, the intent of the branch and associated cross sections is to account for added storage area and mass exchange with the EREP Project area. Determining circulation patterns within ORF property was not a modeling objective: a) due to the lack of access and known channel bathymetry, and b) precluding tidal exchange with the ORF property.

2.1.3 Evidence of Problems with the Selected Approach

<u>Cross-Section Geometry</u>

A critique of the model is the number of broad cross section geometries (see OEI's Table 1) that include multiple low areas that are conveying flow simultaneously below a water level between intervening high areas. The assumption associated with this critique is that the elevated high areas should, in some cases, be restricting the exchange of flow between the inundated low areas within a section. In the cases of the Western Drainage ditch and Cutoff Slough, there is a primary channel of greatest depth that contains the majority of cross-sectional flow and the elevation of remaining flood/marsh plain areas are perched at significantly higher elevation that only contain water during higher flow periods. This condition is significantly accentuated under project alternatives with the creation of deeper and wider channels. During high flow periods, water is dispersed within interconnected low relief depressions of similar elevation throughout much of the project area downstream of the alluvial fans of the Wildcat tributaries. During periods when water occurs in the flood/marsh plain depressions, it is occurring as broadly inconnected sheet flow originating from tributary high flows filling the low elevations of the former tide lands or backwater ponding due to elevated river/tide levels and closed tide gates.

The Shaw Creek, RRTFP and Russ Lower cross-sections listed in Table 1 of OEI's report (see comment C-5) are dominated by very flat topography with ditches (several disconnected) that experiences sheet flow during high flow events. These low areas are laterally and longitudinally interconnected and intentionally allowed to "fill" uniformly across the specified section width to best reflect the movement of sheet flow and backwater flooding.

The upper reach of Russ Creek flowing over the higher elevation alluvial fan is modeled as a narrow channel bordered by levees. This geometry was chosen in order to integrate link channels that would accommodate lateral overbank flows to adjacent model branches. Original versions of the Existing Conditions model included these link channels. However, discussions with property representatives regarding the performance of the channel during the storms contained in simulation periods indicated that overbank flow events, if any, resulted from channel obstructions, not inadequate conveyance. Thus, the link channels were removed from the final model geometry to improve model efficiency.

OEI points out (Figure 4 of OEI's report) that there is a brief period during the peak flow event on February 6, 2015 when the simulated channel water levels exceed the top of bank, suggesting overbank flooding. However, knowing this did not occur, the water levels in this section were allowed to rise vertically for a brief period. Results of winter storm simulations indicate that all flows remain in channel. We accepted this unique localized model representation of the storm inflow hydrograph remaining contained in the channel in order to maximize the downstream conveyance into the project area as actually occurs.

It is our understanding that others on the Project Team will be designing and analyzing the proposed project elements on the RR&T property. We chose to utilize a 1-D model that supports rapid evaluation of multiple scenarios and accurately predicts tidal exchange and control of backwater flood recession across broad, low gradient marsh/floodplain. Although we did not feel 2-D modeling of this or any other part of the project model domain was necessary given our understanding of the hydrologic and hydraulic conditions/processes, a 2-D model may be adopted for future focused study on selected parcels or areas as deemed appropriate by the design team as part of Final project design.

Connectivity between Parallel Branches and Cross-Section Vertical Flow Boundary

A common technique used in modeling large laterally connected tidal marshes is the integration of parallel model branches that accurately account for storage of a large focus area. Branch alignments and cross-sections are developed that abut but don't overlap. A modeling objective is to get the water level elevations in adjacent branches to rise and fall in perfect unison, reflecting a single inundated area. In the case where there is no topographic feature segregating two branches (e.g., drainage divide or levee), the ends of the cross-sections between branches are treated as the "vertical wall" or vertical flow boundary OEI refers to in their report. This is necessary to correctly account for all storage within the marsh plain when modeling a single integrated marsh/floodplain with multiple branches.

The MIKE11 model(s) developed from project alternatives are cross-section integrated models that use equations to conserve mass and momentum to simulate gradually and rapidly varied, unsteady flood and tide propagation at cross-sections (nodes) through the model domain. If at any time the conservation of mass and momentum can't be solved at any section, the lack of balance will force a disturbance (between nodes) through the solution field (model domain). If this occurs, the water levels in parallel and adjoining branches that comprise a tidal marsh/floodplain will not rise and fall in unison. If the model is constructed correctly, this will not happen, as is the case with the models developed for the project. Part of evaluation of simulation results is to routinely check to ensure that water levels in such parallel branches rise and fall in unison (i.e., there is no difference in water surface elevations between adjacent cross-sections or model nodes in the two branches). In addition, we output and check the simulation mass balance to ensure there is balance between all inflows and outflows within the entire model domain over the simulation period.

Bed Roughness

Fluvial systems are dominated by balance of gravity vs. bed resistance. So bed resistance (roughness on the bed) is a big influence. Tidal flow is driven by the water surface gradient created when tides rise and fall. It is a head boundary control, the opposing force of the bed is not primary and bed friction is not a strong influence in tidal systems. KHE has tested this conclusion through model sensitivity analysis and have found insignificant differences in simulated water levels with even large variations in bed roughness coefficients.

During backwater flooding, drainage of the project area is controlled by outlet conditions and occurs at a relatively slow rate. Even if considered a fluvial dominated process, the choice of a 0.03 Manning's roughness coefficient is not unreasonable for existing pasture dominated floodplain, which is not the "typical" floodplain alluded to in OEI's report.

Simulated Velocity and Salinity

During the wet season, the project area floodplains become inundated due to backwater effects when high Eel River water levels and tides prohibit the tide gates from draining. During these events, flow velocities through the project channels and floodplains are relatively low and likely don't differ significantly. During flood recession, drainage is relatively slow in response to low gradients and flow rates impeded by river and tidal backwater that restrict tide gate opening.

During the summer, tidal exchange does not occur under existing conditions and flow is restricted to low baseflows from Wildcat tributaries and all flow is contained within the main channels. Under project conditions with muted tides, all new channels are designed to contain flows except for where they pass through low lying areas subject to short-lived shallow marsh plain flooding (e.g., Inner Marsh and Angels Flat). Thus, simulated velocities are reasonably representative of site conditions.

Given that simulated velocities are representative of project conditions, KHE contends that advection/dispersion processes are being captured accurately by the project models, which translates to an accurate representation of salinity conditions. This is substantiated by the close agreement between wet- and dry-season simulated and measured salinity concentrations.

2.1.4 Topographic Irregularities

Based on review of model cross-sections, OEI concludes that the development of model cross-sections from the project DTM, "produced many unexplained inconsistencies and irregularities", implying that that model cross-sections are not sufficient in representing hydraulic processes. Yet, in their introductory section they indicate that they have not reviewed the project DTM and their evaluation of model cross-sections comes from review of reference maps in the report. The reference maps are at scale and resolution not intended to convey the level of detailed contained in the model cross-sections. Analysis of the project DTM would provide the reviewers a better understanding of site topography and more importantly, an understanding of how project grades control large and small scale hydraulic processes within the modeling domain.

The representation and accuracy of the levee separating the EREP property and ORF property in model cross sections is questioned due to crest height elevations perceived to display too much variability. We assume OEI's concern about the levee crest height relates to lateral exchange over the levee between the EREP and ORF property. The general trend in levee crest elevations is helpful in understanding and modeling water movement and exchange between the EREP and ORF Properties. The N-S trending EREP-ORF levee grades down and ties into another levee near the intersection with Centerville Slough. Based on review of LiDAR-derived topography, the crest elevation of a large portion of this second levee (represented by cross-section 3140 in the O'Rourke model branch) is assumed to be generally lower in elevation than EREP-ORF levee.

During flood events water accumulates in the lower elevation areas at the north end of the project. As water levels rise to the crest elevation of the second levee, they overtop the (second) levee and flood into the low-lying areas of the ORF property while the higher elevation EREP-ORF levee maintains separation

between the two properties. As flood waters continue to rise and the inundation areas expand southward, water levels rise at equal rates on either side of the EREP-ORF levee as the ORF and EREP model branches are in hydraulic connection via the northern junction between the branches. These conditions and processes are captured and accounted for accurately in project models. In the absence of topographic survey data for the EREP-ORF levee, review of oblique aerial imagery suggests there may be spots along the levee that are relatively low, allowing lateral exchange between properties. However, until the elevations of the EREP-ORF berm are verified, this exchange is considered secondary in nature and is assumed to not alter the levels and timing of simulated flooding on either property. Pending the availability of survey data along the levee model, “link-channels” may be integrated into the existing numerical models to capture the lateral exchange as part of final project design and analysis.

The broad flat topography cited in the O’Rourke model branch cross-sections (Figure 5 of OEI report) are concerning to OEI. The topography in the ORF property comes from available LiDAR data. No ground surveys to verify pasture or levee crest elevations were completed by the EREP design team as access to the ORF property was not permitted. However, based on comparison of survey and LiDAR within other areas of the model domain, we feel the overall storage capacity associated with the ORF property is accurately accounted for by the project model geometries for this area. Although there is certainly very low relief micro topography within the flat portions of cross-sections, the modeled elevations are representative of the average elevation, providing a reasonably accurate accounting of storage.

The “wide shallow triangle” section depicted in the lowest graphic of OEI’s Figure 5 represents the internal levee/berm that separates the ORF property from Cutoff and Centerville Sloughs. This berm hosts culverts and this section also represents the berm as a broad-crested weir, coded into the model in order to model overflow across the berm during flood conditions. The simplified shape of this feature is a standard approach to represent the berm/weir while ensuring model computation stability in what could be a region of rapidly varied, unsteady flow.

2.1.5 Model Calibration and Simulation Periods

A well-known constraint to model development discussed for multiple years by stakeholders during project development is the limitation of measured tidal boundary conditions representative of tidal exchange between estuary and the project site. These data are crucial to project modeling given the dominance the project tidal boundary conditions have over the hydrodynamic and water quality conditions within the project area. Measured water level data within the project area available for model calibration is also very limited for areas beyond the northern portion (lower Cutoff Slough) of the project. However, two other approaches are available to evaluate if model simulations are representative of actual conditions. The first is detailed in section 3.7.2 of our Draft Hydraulic Design and Feasibility Report (June 2016) and includes the comparison of simulated inundation maps to oblique aerial imagery of the project area during the April 1, 2012 storm. This comparison reveals very close agreement between modeled and observed inundation areas during this storm. The second approach is an indirect evaluation of model hydraulic performance, tied to the advection-dispersion model calibration. As pointed out by OEI in their report, an accurate representation of salinity conditions can’t be developed without an accurate representation of velocity distributions. As presented in Section 4.3 of our Draft Report, simulated salinities of the calibrated Existing Conditions model resulted in reasonably close temporal and spatial agreement with measured salinity concentrations. These findings support a calibrated hydrodynamic model.

The flood magnitudes simulated are constrained by periods in which there is available boundary condition data. Four winter simulation periods were identified and chosen for simulation, some upon the recommendation of adjacent land owners. The project stakeholders understand well the importance downstream boundary conditions play in the extent and duration of flooding within the modeling domain area. Tidal and river backwater effects are a major control over the severity and extent of flooding. Simulation results indicate that worse flooding can occur during a relatively low recurrence vs. high recurrence interval floods due to longer duration of backwater effects. Model simulation results are varied enough to provide a solid understanding of the dominant controls over the extent and duration of flooding within the project area. The project alternative models are intended to evaluate and compare the performance of proposed project alternatives at meeting project objectives and identifying potential impacts. The existing 5 simulation periods are considered to represent a sufficient range of hydrodynamic conditions to provide a meaningful and defensible analysis. Therefore, the need to simulate a variety of additional "plausible" runoff and tidal conditions is not warranted.

2.1.6 Potential Model Insensitivity

A commenter suggests the model is insensitive to changes between the proposed project alternatives because of the small differences in simulation results of hydraulic conditions and that this insensitivity is due to modeling approach and assumptions rather than a realistic representation of real-world processes and conditions. In short, there aren't large differences between alternative scenarios within and between the NOP alternatives and it is not surprising to us that simulation differences are subtle. If the models were inherently insensitive because of the 1D approach taken, we would expect simulation results of Existing Conditions and the Full Tidal Exchange alternatives to produce inaccurate differences in hydraulic conditions. However, this is not the case, the Existing Conditions model provides accurate results for a wide variety of hydrologic conditions. Similarly, the Full Tidal Model results provides realistic large-scale changes in hydraulic conditions. The claim of the models being potentially insensitive is not supported when reviewing and comparing the results of all project alternative simulation.

2.1.7 Potential Influence of Groundwater

OEI states the magnitude of groundwater inflow is not based on any observations of groundwater conditions, but instead estimated purely through calibration. The inclusion of groundwater inflow to the project models is based on observed hydrogeologic conditions and information and realistic processes. Geotechnical and well soil borings completed across the site provide groundwater table elevations and descriptions of shallow aquifer lithology. When compared to groundwater level data, observations and measurements of water levels in project site channels indicate a direct hydraulic connection. During low tide summer periods, when channels drain, they refill quickly with relatively high salinity water. Given the lack of tributary or tidal inflow, and similarity in salinity concentration, this water must represent groundwater inflow. Representing this process in a 1-D model was best achieved by applying a constant rate of groundwater inflow along deeper internal channel lengths observed to exchange groundwater during tidal cycles. The rate of inflow was assumed constant and estimated through model calibration. The groundwater inflow through the dunes was calculated in response to observing W-E salinity gradients in groundwater and surface water bodies (esp. the Western Drainage Ditch). The measured hydraulic head between ocean and shallow water table beneath the project site also supports seepage. The magnitude of marine salinity seepage through the dune to the Western Drainage Ditch was estimated using standard groundwater flow equations and hydraulic conductivity values for beach/dune sand. Again,

simulation results better reflect measured and observed conditions when these important hydrologic processes were integrated into the model.

The MIKE11 model is not an integrated surface water-groundwater model and can't predict changes in groundwater elevations within the model domain. However, predications of dry-season water levels in modeled channels provides some indication on potential influences on surrounding shallow groundwater levels.

2.2 Master Response to Comments – Coordination

The SCC, RR&T, and The Wildlands Conservancy (TWC) began meeting to discuss land management strategies for the Project area in 2011. These meetings usually included Joe Russ IV, Lane Russ, Jay Russ, William Kleiner and Charles Holthaus (consultants to the Russ family) Greg Kamman (hydrologist) and Dan York (TWC). Leo Kunz (Nehalem Marine) attended at least one meeting and one field visit to discuss tidegate modification options. The meetings were small, informal and generally intended to identify areas and issues of common interest and concern, such as water management, drainage and wave overwash events then compromising agricultural productivity in the Project area. In general, the meetings were constructive, sufficiently so that attendance continued for a number of years. Project letters of support are found in Appendix A.

Initially, all funding to develop mutually beneficial conceptual designs was provided by the Coastal Conservancy through a grant to the Five Counties Salmonid Conservation Program. The project hydrologist, Greg Kamman, provided technical assistance in support of conceptual design development. By 2013 a conceptual design was presented to the group for their consideration (Appendix B).

Concurrent with the development of the conceptual design, TWC sought and received funding from SCC for ecosystem improvements such as had been discussed in the meetings to-date as well as for public access components. Unlike proposed drainage improvements, public access and habitat enhancement features were heatedly opposed by surrounding landowners (See master comment: Recreation). Discussions regarding enhancement degenerated, likely due to continued friction over Public Access. Consequently, the SCC Board imposed a special condition on its grant that at least one facilitated meeting be held to help resolve outstanding concerns. This is discussed in greater detail in the master comment: Recreation.

CalTrout secured significant grant funding in 2013 from SCC and CDFW Fisheries Restoration Grants Program (FRGP) to develop and design an environmental enhancement and agricultural improvement project in the Project area. Accordingly, CalTrout re-initiated meetings with the landowners and TWC in an effort to advance a mutually beneficial agricultural enhancement and ecosystem restoration project. This outreach effort began with the aforementioned professional facilitation, funded by SCC and TWC, in an attempt to resolve the public access dispute, or if not resolve, then to define a pathway for working toward mutually beneficial Project goals. Between the initiation of the project in 2013 and release of the DEIR in 2016, CalTrout hosted at least 36 recorded meetings which included the landowners and/or their representatives. All meetings listed below, except those where individual meetings are specified (Russ meaning Jay and Lane Russ), were open to and typically attended by the landowners and/or their representatives.

Date	Meeting Purpose
1/16/13	Conceptual Design meeting at Ferndale
5/3/13	Meeting with all Landowners
9/17/13	Meeting with Russ
10/24/13	Meeting with Don Hindley and Andy Albin
10/30/13	Meeting with Don Hindley and Andy Albin
12/17/13	meeting with Russ family
2/3/14	Conceptual Design Meeting
2/24/14	Conceptual Design Meeting
3/4/14	Conceptual Design Meeting
4/10/14	Meeting with Russ and NCRS/FWS at Ag Center
5/20/14	Project Meeting at GHD
8/20/14	Project Meeting at GHD
11/13/14	Project Meeting with Regulatory Agencies
12/15/14	Project Meeting for Release of NOP I
1/12/15	Public Meeting
5/1/15	Project Meeting at GHD
5/19/15	Project Meeting at GHD
9/9/15	Meeting with Russ
9/23/15	Project Meeting at GHD
10/13/15	Project Meeting at GHD
11/11/15	O'Rourke Foundation Board Meeting
12/9/15	Project Meeting for Release of NOP II
12/10/15	Project Meeting at GHD
1/14/16	Project Meeting at GHD
2/11/16	Project Meeting at GHD
3/10/16	Project Meeting at GHD
4/14/16	Project Meeting at GHD
5/12/16	Project Meeting at GHD
6/2/16	Meeting with Russ
7/14/16	Project Meeting at GHD
8/8/16	Meeting at GHD - Eureka (Salt)
8/11/16	Project Meeting at GHD
8/29/19	Dune Site Visit with Russes, TWC, USFWS
9/8/16	Project Meeting at GHD
9/28/16	ERECESP Scoping Meeting
9/30/16	Call to Don Hindley

As a result of facilitated meetings, significant modifications requested by adjacent landowners and stakeholders were made to the Public Access Plan. As a result of the entire series of meetings extensive modifications were made to the overall Project concept. In order to accommodate this dialogue and iterative design process, CalTrout requested two one-year extensions to the CDFW FRGP Grant Agreement, in 2014 and again in 2015. Both extensions were granted, resulting in an unusual extension of the grant duration from two years to four years (currently set to expire March 2017).

CalTrout also secured a supplemental grant funds from the Coastal Conservancy of $220,000 to extend the project footprint to include the Russ Ranch and Timber properties, as requested by the Russ family. This grant included funding to conduct additional topographic surveys, hydrologic modeling, analysis of dune morphology and processes, and biological resources investigations, and to include the RR&T properties in CEQA analyses and permit preparations.

Through this additional grant funding, the Project team integrated specific project elements requested by Russ Ranch and Timber which were reflected in the Conceptual Designs and in the Proposed Project of the DEIR. Those elements include several enhanced drainage features on the RR&T properties involving Shaw Creek, Creamery Ditch, Centerville Slough, and Russ Creek; a sediment management area, and a berm set between the Angel's Camp salt marsh and RR&T pastures to protect agricultural land from seawater incursion.

CalTrout and the Coastal Conservancy also invited Jay and Lane Russ to a meeting on September 9, 2015 at the Humboldt County Ag Center specifically to discuss the Recreation chapter of the DEIR. The USFWS and NCRS also attended this meeting. The explicit purpose of this meeting was to determine how the DEIR would address the public access dispute in a mutually acceptable way. It was determined at this meeting that the dispute would be acknowledged, that the ongoing public access plan would be described as the baseline condition in the DEIR and that this description of the baseline did not imply agreement to this plan.

With respect to CEQA Coordination, during the scoping process of the NOP, Jay and Lane Russ expressed interest in participating in the review process of the Project Description, Recreation, Hydrology and Agricultural Resources chapters of the DEIR with the purpose of editing and improving the document to fully represent all perspectives related to the proposed Project. Mutual editing of the Project Description yielded a mutually satisfactory result, with the exception of a passage pertaining to the disputed easement which Lane Russ wished to be added, and which SCC preferred to present in detail in the Recreation chapter. Review of the Recreation chapter was significantly delayed by the joint review, and never reached completion. Based upon the delay to the Recreation chapter and the multi-month process in developing the mutually agreed upon Project Description, the Agricultural Resources and Hydrology chapters were never circulated to the Russes prior to the release of the DEIR in anticipation the project schedule would be further delayed.

In summary, and regarding the assertion that the "project began on shaky ground with a single applicant, CalTrout, representing the Wildland's Conservancy," the record clearly shows that CalTrout began working on the Project through grant funding in 2013, while earlier and supported targeted SCC grant funds helped promote project discussions and components on the commenter's property as early as 2011. Regarding the commenter's "concerned visit" to the SCC board, which involved concerns expressed solely about public access, and the notion that the Project was "improperly initiated," the record indicates a multi-year, cooperative project development process not opposed at its inception.

2.3 Master Response to Comments – Reclamation Districts

As described in the DEIR, and as reiterated in the public comments on the DEIR, the Project area includes a series of dikes and tidegates that have been consensually managed for decades to sustain interior lands as a single hydrologic unit for the mutual agricultural benefit of those within the dikes. The operation of this infrastructure is of paramount importance to the Project area.

Historically, and as described in the DEIR, the collection of properties in and adjacent to the Project area were operated for mutual benefit within Reclamation Districts 461 (est. 1884) and 487 (est. 1888). These formal governance structures enabled multiple parties, primarily the ancestors of the commenters, to rapidly reclaim much of the Occidental Marsh and surrounding areas under the various reclamation laws of the day.

By 1930, however, the State of California's Department of Public Works, Division of Water Resources stated that these and many other such districts statewide were "inoperative" (Appendix C). No evidence to the contrary has been submitted to the lead agency, though these districts figure prominently in the public comments from the Russ family. What appears to be the case is that as the reclamation districts faded into inactivity, informal family and inter-party agreements obviated the need for a formal governance structure.

TWC's purchase of the Connick Ranch in 2008, combined with landowner fears that TWC did not share a common vision for agricultural production in the Project area, changed this, and re-kindled interest in a formal governance structure for the area. This structure was attempted at the time of purchase through the establishment of a formal drainage easement, described at length in the DEIR and in a related master response. This easement was crafted to provide the level of operational assurance, clarity and certainty for land management obligations and costs that the inoperative reclamation districts once had. It did not fully achieve these goals as explained in the accompanying master comment. Since the Reclamation District goes unmentioned in the drainage easement, and went unintroduced by the Russ family at the negotiations over the terms of the drainage easement, the drainage easement took precedence for identification of parties of interest, drainage features, and binding responsibilities for operations and upkeep.

Subsequently, and in possible conflict with the terms of the drainage easement, the Russ Family filed a "vested rights claim" with the Coastal Commission on November 30, 2010, see Appendix D. Prompted by a citation the Russ Family received from the California Department of Fish and Game for disconnecting and manipulating Russ Creek over their pastures for the historic purpose of accreting sediment and elevating pasture, this claim intended to formally establish historic land management "rights," evidently in reference to Section 30608 of the Coastal Act, though this was not formally specified."

Section 30608 of the Coastal Act exempts from coastal development permit requirements any development for which a "vested right" had been acquired:

"*No person who has obtained a vested right in a development prior to the effective date of this division or who has obtained a permit from the California Coastal Zone Conservation Commission pursuant to the California Coastal Zone Conservation Act of 1972…shall be required to secure approval for the development pursuant to this division. However, that no substantial change may be made in any such development without prior approval having been obtained under this division*.",

The Russ Family asserted that their historic tenure on the land, including the formation of the now inoperative reclamation districts, pre-dated the establishment of the Coastal Act and other environmental laws, and therefore established their right to conduct land management activities that seemingly conflicted with those laws.[1] This vested rights claim was deemed incomplete December 7, 2010. No further information was submitted to the Commission as requested, and no apparent activity in pursuit of that claim has occurred.

The vested rights claim, if successful, would presumably enable the Russes ("grantees") to conduct drainage improvements on theirs and TWC's property without the environmental compliance obligations specificed under the drainage easement.

Thus, the reclamation district revival and its associated vested rights claim is an appealing idea for the Russ family and the O' Rourke Foundation, but it presents challenges for TWC. First, it would render moot the environmental compliance and resource protection standards identified under the drainage easement. Second, the reclamation district would presumably be organized according to property interest within the historic district boundaries. The uniformity of the comment letters, and their organization along family lines, demonstrates fairly clearly why TWC finds the revival of the historic reclamation district problematic. Voting membership would most likely be apportioned along property ownership percentage, as major repair costs are in the drainage easement, so TWC would at best have a 40% voting right, while the Russ family would have a 60% voting right in control of infrastructure and drainage features on TWC property, potentially in conflict with existing laws and regulations. TWC is unlikely to enter into a governance structure that would threaten their existing land management goals, including that of agricultural production, while increasing their exposure to liability associated with unpermitted land management.

The Project DEIR proposed an Adaptive Management Plan (AMP) and an accompanying Water Level Management Plan (WLMP) to provide operational security and certainty to all parties. Ideally, the DEIR would have included finalized versions of those documents. These were not included in the initial DEIR because completion of a draft AMP and WLMP depended upon hydrologic and hydraulic analysis, as well as additional engineering, that went beyond CEQA level analysis. Such work has only recently been completed. Hence, the AMP and WLMP are now able to be included in a recirculated DEIR. These documents will address much of the uncertainty associated with the need for a governance structure and operational certainty for an area that is hydrologically and hydraulically connected regardless of property ownership. The WLMP provides the specific seasonal operations necessary to achieve the water level objectives within the diked system.

In summary, the reclamation districts are inoperative and the drainage easement inadequate to meet the current needs of landowners within the Project area. TWC and the Project team are highly amenable to any proposed idea for addressing this situation. One option for mutual coordination that remains possible is a Memorandum of Understanding substantially similar to that proposed by TWC in June 2015. See Appendix E. Absent an alternative, the Project team is proceeding with a strict adherence to the terms of and structures identified in the drainage easement. Other features will be operated by and at the expense of TWC in a manner that does not conflict with the intent or meaning of the drainage easement. The Russ

[1] The Vested Rights Claim filed with the Commission did not reference as an activity covered by a vested right the movement of Cut-Off Slough for the purpose of constructing a new tidegate on a newly excavated and parallel Cut-Off Slough in 1977.

family and surrounding landowners cited in the drainage easement will preserve their ability to exercise their rights as identified in the drainage easement with no additional burden or limitation other than that clearly enunciated in the drainage easement.

2.4 Master Response to Comments – Drainage Easement

Shortly before the close of escrow on the Connick Ranch purchase by TWC in 2008, TWC met with members of the Russ Family (collectively, Russ) and the Bertha Russ-Lytel Foundation (now O' Rourke Foundation, or "ORF") to discuss drainage, infrastructure and other issues of mutual importance and benefit. This discussion prompted the crafting of a drainage easement and its recordation on October 20, 2008.

The drainage easement describes some of the existing infrastructure on TWC (ditch, flood control dike, flood control gates) and prescribes the abilities of the grantees (Russ) to cross the grantors' property (ORF, TWC) in order to maintain this infrastructure. In general, the easement expresses the mutual desire of all property owners concerned to (Russ, ORF and TWC) to cooperate for the protection of existing land uses (agricultural pasture) within the Russ, ORF and TWC properties.

Grantees are prohibited from altering or widening existing drainage features to improve conveyance (Section 1). Furthermore, grantees must perform maintenance activities "in the least environmentally damaging manner" (Section 1) and in compliance with "…all local, state and federal laws and regulations…"(Section 12).

Maintenance is at the expense of the grantees (Section 9), although costs of major repairs (undefined) are apportioned between the parties, with TWC bearing 40% of the cost. Grantees, however, are wholly responsible for the cost of remediating "catastrophic damage" (Section 9).

In conducting repairs, the grantees "may bring onto and use upon and in the servient tenement (TWC) such equipment and/or materials as approved by TWC, which approval shall not be unreasonably withheld." (Section 9). Presumably, this refers to access to TWC via Russ Lane with the sort of heavy equipment that was used to construct many of the facilities and infrastructure referred to in the drainage easement.

The drainage easement states that "(g)rantors shall have no right to remove the flood control gates without Grantees' consent." No prohibition exists regarding the modification or improvement of the flood control gates, providing, it is implied, drainage is not adversely impacted.

Most importantly regarding the future disposition of TWC land as the servient tenement, Section 11 of the easement "Relocation of Easement" reads as follows:

At any time during the term of this Agreement, TWC, at its own cost, may contract engineering studies to find a more suitable method and location for the Drainage Easement through the Servient Tenement. As used herein, the word "suitable" means a location which corrects or improves any impacts on the environment caused by the current ditch and ditch easement location and which maintains the same drainage capacity from the Russ Properties onto, across, and through the down gradient TWC Property and the Lytel Foundation Property. If a more suitable method or location is found, TWC may move the drainage ditch at is sole expense and the Grantors shall grant a replacement easement to Grantees. All parties to this easement document agree to execute a recorded amendment to this easement to accomplish said purpose. Grantees shall have the right to consult and recommend with respect to the

selection of a different method or location of the Drainage Easement and in this regard TWC shall so advise Grantees when it commences any engineering studies."

TWC and its partners have identified a host of adverse environmental impacts associated with the current ditch and ditch easement location, and provided a host of environmentally preferable and hydrologically superior alternatives for the Russ Family and ORF to evaluate. In the absence of constructive input on design alternatives, TWC and its partners have opted to, as the drainage easement allows, improve drainage and hydraulic function in an environmentally superior fashion while leaving the existing drainage ditch and associated features intact and subject to the terms of the existing drainage easement. Drainage is anticipated to improve on TWC to the benefit of all parties, while the grantees can maintain their existing rights under the existing drainage easement.

2.5 Master Response to Comments – Recreation and Public Access

Following two years of enhancement efforts between TWC, the SCC and the Russ Family, the SCC granted funds to TWC for combined enhancement and public access improvements in 2013. When the Coastal Conservancy awarded those funds extensive correspondence and testimony for and against public access was received. Accordingly, the Coastal Conservancy Board imposed a special condition upon the grant that "(t)he work program shall include a requirement for ***a facilitated meeting***, within 60 days of this project approval, regarding public access."

Three facilitated meetings were held at the Coastal Conservancy and TWC's expense, two with members of a majority of parties in attendance, and one with limited participation by the parties involved in discussions about the disputed easement. The funds for the facilitation derived from and diminished the budget allocated to the actual public access capital improvement projects proposed under the grant.

Prior to the meetings, the viewpoints of each "side" were solicited by SCC and presented in written statements. The Landowner Outline from the opponents to public access was presented by Jay Russ, Lane Russ, Andy Albin (lessee on the neighboring Bertha Russ Lytel Foundation Property, now O'Rourke Foundation) and Jack Rice (attorney for the California State Farm Bureau Federation). In support of public access, and their land ownership interests, TWC also submitted a Landowner Outline. Numerous emails, phone calls and smaller meetings were then initiated by the Coastal Conservancy and the facilitators in an attempt to resolve this dispute. In addition, a majority of the parties involved in the facilitated discussions visited the EREP to discuss possible means of diminishing or avoiding any impacts associated with public access.

The results of the meetings, phone calls, site visits and discussion were organized by SCC staff into the draft public access plan described on page 3.15-6 of the DEIR. This draft was circulated to the parties for comment and feedback in hopes that the limitations on access suggested in the Plan could alleviate concerns raised about perceived conflicts between agricultural and recreational uses on the TWC-owned EREP and surrounding lands. Additional edits to the draft were not provided, and the draft Public Access Plan was never finalized. Due to the significant cost of the facilitiation (~$40,000), and the indication that the parties were not near agreement on basic principles, notably resolution of a disputed easement described at length in the Recreation chapter of the DEIR, the SCC declined to use additional funds from the limited budget to pay for facilitation and jeopardize the capital improvements authorized under the grant.

Opposition to the proposal can be broadly divided into three categories: 1) Legal suitability of the access easement to the property, 2) Availability of alternative access locations, and; 3) Conflicts between agricultural operations and public access.

The legal suitability of access to the EREP has been exhaustively debated in meetings and through correspondence, as discussed in the DEIR. This summary addresses numbers two and three, above.

Generally it is the opinion of the opposition that agriculture cannot coexist with public access. These concerns were raised prior to the January board meeting, and the item was postponed in order to allow opponents sufficient time to express more specifically their concerns in this regard. They have done so, and the opposition sentiment is best expressed by the Humboldt-Del Norte Cattlemen's Association:

> *Introduction of public access through and over established agricultural operations inherently brings with it conflict between the visiting public and the private landowners. These conflicts take many forms and include things such as; trespass, garbage, traffic, liability and more. Additional impacts are hard to quantify but include issues such as disruptions in access for existing uses, disruption of grazing and farming routines, disruptions of work schedules and impacts to the environment.*
>
> *Humboldt-Del Norte Cattlemen's Association*

There also appears to be a social element to the opposition best expressed by adjacent landowners and counsel to the easement owner in describing how public access will burden the existing easement to the property:

> *The increased burdens will include increased traffic,* ***a change in the character of people and vehicles using the easement*** *along with the inherent conflicts that arise whenever the public is exposed to commercial agricultural operations.*
>
> *Christopher J. Carr, Morrison Foerster*

The point of view expressed by the HDNCA is a legitimate topic of statewide concern, and frequently arises in similar situation. As this board meets to consider this item, the Elkhorn Slough Foundation is hosting a one-day seminar with livestock operators, non-profits and others to explore how best to co-manage vibrant coastal agriculture with suitable public access. Similarly, the East Bay Regional Parks District, the East Bay Municipal Utility District, the Sonoma County Parks and Recreation Department and many others, including the prospective grantee, must address the many challenges associated with co-managing agriculture and access.

The section below summarizes seven of the leading points of opposition, and provides SCC staff perspective on the concerns.

1. **The impacts caused by creating a public access route through neighboring lands that are dedicated to and actively managed as ongoing agricultural operations creates inherent conflicts that negatively impact businesses, property values and the quiet enjoyment of private property. Possible conflicts include vehicular traffic and interference with feed trucks, farm supply and farm equipment traffic, and moving livestock.**

    a. Public access at the site has been occurring since acquisition of the Connick Ranch in 2008, and no complaints have been registered to date. Evidently, conflicts between agricultural operations and visitors have not occurred.

b. No complaints have been registered relative to the private duck hunting club at Connick Ranch, the second oldest in the Eel River Delta, and maintained for decades by the Russ family who assert easement burden. It is estimated that with ten members visiting three times per week during the duck hunting season (30 round trips at ~16 weeks) the total visitation of club members is probably on the order of 400-500 visits per season. Last year, largely as a result of advertising and invitation, TWC attracted approximately 100 guests to the Preserve. Assuming that visitation is likely to be minimized during hunting season thereby preventing overlap, and that daily visitation does not exceed visitation to the hunting club (ten vehicles per day), any increase of visitation over historic use would seem to be insignificant, and substantially more passive, less consumptive and less disruptive than historic use.

c. Similarly, Centerville Beach is an increasingly popular site for OHV use, and that use is authorized by the County and the adjacent landowners in opposition to this project. OHV-ers have historically been allowed to roam fairly widely, including onto agricultural fields. This has resulted in graffiti and damage to barns, disruption to fields, and general degradation of the dune network. It is possible that this dune deterioration is a contributing factor to the increasing number of dune breach events, a phenomenon that has washed away one historic barn and probably caused an estimated 200-acres of prime agricultural land to convert to salt marsh/salt pan.

2. The Public Access Plan submitted by TWC is inadequate and lacks serious analysis of introduction and management of public visiting the site.

a. Although neither the plan nor the staff recommendation deeply analyzes the introduction of visitation, the DEIR does. Moreover, the plan does provide precedents and a tested mechanism whereby public use could be managed far in excess of surrounding ranch and park operations, namely through the introduction of paid ranger staff to supervise operations. Since 2009, TWC has had two rangers on staff. Thse rangers have overseen operations, contacted OHVers and directed them not to enter the Preserve property, and to date no conflicts between visitors and surrounding agricultural operations have been registered. Improvements to the stability of the dune network on TWC's property have also been documented.

3. TWC lacks adequate staff to manage the public over such a large property.

a. As discussed above, TWC has assigned two full time staff to the Preserve since 2008. The good condition of the Preserve, the continuing productivity of the surrounding agricultural lands, the lack of registered complaints and the contrast between the high dunes on the Preserve and the nearly disappearing dunes to the south would suggest that TWC staff has successfully managed the property. Their staffing level also appears to exceed that of any of the surrounding ranches who have registered this concern. County parks in the area are entirely unsupervised. In this era of budget austerity, TWC's commitment to supervising public access in order to provide a high quality visitor experience is unique.

4. The County Road accessing the area (Russ Lane) is insufficient to accommodate the increased traffic and must be widened.

a. Complaint acknowledges that Russ Lane is a County Road. Many County roads are similarly situated and do not require expansion.

5. **Centerville Road is heavily traveled past 3592 Centerville Road towards Centerville County Park, and it is insufficiently wide to allow two passing commercial vehicles. Without additional law enforcement presence and road upgrades the public safety (accident or loss) will be jeopardized by public access at Connick.**
    a. 3592 Centerville Road is west of Russ Lane. It is probable that diverting some visitors to the Preserve (entrance at Russ Lane, east of 3592 Centerville Road) will diminish road traffic currently traveling past 3592 Centerville Road

6. **There are multiple other access points in the lower Eel estuary including Riverside Ranch, Crab Park, Pedrazzini Boat Launch, Camp Weott Road, Riverside Ranch, the South Spit and Centerville Beach Park, and Conservancy funds should be directed towards improving those sites.**
    a. Of the proposed alternate access points, one (Centerville Beach) is both practical and near the City of Ferndale. The others are somewhat impractical, or located on the other side of the river, necessitating a 20-30 minute drive.

2.6 Master Response to Comments – Easement

On purchase of the EREP, formerly Connick Ranch, TWC agreed to continue to lease cattle grazing on their property to Joseph Russ IV (Joe Russ). Lane Russ, Joe and Karen's son, was a partner in those operations. The agreement to continue was made by TWC as an accommodation to the seller, Tom Connick, who had been leasing to Joe Russ, his relation, for many years prior to sale of the property to TWC. Joe and Lane worked with David Myers and Dan York (TWC) to modify the grazing lease in a way that would accommodate TWC's plan for public access.

From 2008 until the cattle lease with Joseph Russ IV was terminated at the end of 2011, opposition to public access was not expressed by Joe or Lane. To the contrary, during the entire time the Russ family leased the property public access was allowed (see 4/25/13 letter from Thomas Connick, Appendix F). Concerns were voiced by Lane and Joe, primarily with regard to ease of cattle movement, operations and visitor safety. Those concerns were answered by design adjustments for the public access.

For example, the public access corridor was placed on roads used for ranch operations, and in that way required no acreage conversion from production to public access. As a way of insulating the corridor from grazing operations, Lane suggested installing two (2) sets of gates on each side of the fenced corridor in between pastures. When closed, the fourteen (14) foot gates would retain the fence alignment and prevent cattle from entering into the public access/road corridor, or the public from entering pastures. When the gates were opened into the corridor, they could be chained together to create a lane (28 ft. wide) to safely move cattle from one pasture to another. TWC purchased several sets of gates to accommodate this design and made the fencing adjustments at their own cost.

At Lane's request, TWC also moved public parking spaces away from the boundary fencing between Russ property north of the "Potato Barn" on TWC property. This design modification was made to address Lane Russ' concern that visitors might disturb his cattle at the fence line.

After many iterations of the grazing lease and after two years of failing to come to an understanding, both parties agreed to terminate Joe Russ's grazing lease on December 31, 2011. It was after this, in late winter of 2012, that the Russ family began to dispute that the Grant Deed for Road Use across Harville Ranch, Russ family property, was adequate for public access.

An offer was suggested by Joe & Karen and Lane Russ, which required TWC to pay $100,000 to expand the easement rights to specifically include public access. TWC was advised by counsel that the Grant Deed for Road Use already gave them those rights. In the attempt to resolve the issue in a neighborly way, TWC counter-offered with $50,000 to spell out the specific inclusion of public access in a newly recorded Grant Deed for Road Use. This counter offer was never accepted by the Russ family nor would they ever provide a firm offer in response.

Meanwhile, a combination of grants from the SCC and the California Department of Fish & Wildlife through their FRGP were awarded to California Trout to design and permit a fish passage project on TWC's preserve that would include drainage improvements and additional security for agricultural production. That project would also include a public access component. Adjacent landowners were contacted and included in discussions about designs of the project footprint, and encouraged to join in the effort.

Within a few months (2013), an additional grant was awarded directly to TWC for drainage improvements (culverts to bridges) and public access improvements to the EREP. In awarding TWC this grant, SCC required facilitated discussions be conducted with adjacent landowners with regard to public access concerns.

In 2013, 2014, 2015 and 2016, several meetings were had to discuss the easement dispute: between Lane Russ and Dan York; and Lane Russ, Michael Bowen (SCC), and Dan York; and Lane Russ, Michael Bowen, Dan York and TWC counsel, Tim Needham; and Lane Russ, Dan York and Landon Peppel (TWC). Mr. Needham also wrote the attorney for the Russ attorney on multiple occasions and sought some explanation why they thought they could prevent public access. No response containing any legal reasons for their position was ever forthcoming, simply a reiteration of their position that the road couldn't be used. In the meetings, new offers were made to Lane Russ, all higher than the original $50,000 for consideration in expanding the Grant Deed or for fee title purchase of the easement. None of the offers have been accepted by the Russ' family.

TWC counsel continues to maintain that The Wildlands Conservancy already has adequate rights within the unrestricted Grant Deed for Road Use to cover the public access component described in the Recreation chapter of the current Draft Environmental Impact Report for the project.

2.7 Comment Letters and Responses

This chapter includes responses to specific comments received during the comment period. Included are copies of the written comments received by SCC through October 24, 2016, including oral comments (summarized) received at the public hearing held on September 28, 2016. Comment letters are listed alphabetically from "A" through "O," and each comment within each comment letter is numbered (e.g., A-1 is comment letter A, comment 1). Responses to each comment follow the comment letter, with the letter and number corresponding with the comment letter and number. Comments that are introductory or closing statements, general in nature, and/or not specific to a relevant environmental issue associated with the proposed project receive the words "comment noted" as a response.

Comments from Cheryl Laffranchi from the EREP Public Hearing on 9-28-16

I live at the end of Centerville Road – gets to drive by the project everyday – it is a beautiful area –– there have always been a lot of things that have gone on out there in regards to the ocean and its action and the effect from the dunes and people and various beach issues and the effect of people using the beach.

There have been several attempts in the past to remove the European beach grass in various areas – some areas the of the European beach grass was removed in some of the places where the ocean has breached the dunes – the ideas of removing more European beach grass – it's kind of strange to her that maybe that might be something that they reconsider for further down where it already failed up here where they removed the beach grass and the ocean came over –so there may be something else that can be done. **A-1**

Other comments and questions have to do with the tide gates:

I read the portion about the muted tide gates and that they were going to be below grade and stuff. My experience with water is, anytime you have two capsules and you join them by any kind of a pipe, the hydrology pressures from one side will obviously equal on the other side. So I'm really confused as to how this muted tide gate is going to do anything but match whether it's on the other side – so if you have a high water event over here or it's a high tide or we have a flood event and that muted tide gate access is open, the water on the other side will equal because of hydrology pressure and that's what you guys have been talking about is the hydrology so that is the concern because during high water events, the water actually comes all the way to Centerville Road and has block Centerville Road in the past and so that is why it's a concern of the tide gates – there is probably something I'm completely not understanding that isn't explained where in the portions of the EIR that she read. **A-2**

Those cover my comments and thank you for the time and letting us do this…

Letter A Response to Comments

Response to Comment A-1

Comment noted.

Response to Comment A-2

When the muted tide gate regulator(s) (MTR) are open, the water levels on either side of the MTR will allow water exchange per differential pressures described in this comment. However, when the water level reaches a designated elevation within the project area, the MTR gates will close and prohibit exchange of water regardless of water level (pressure) differences on either side of the gate.

September 28, 2016

California State Coastal Conservancy
Michael Bowen, Project Manager

Re: Draft Environmental Impact Report for the Eel River Estuary and Centerville Slough Enhancement Project

Dear Mr. Bowen:

P3.4-2: Spartina in the "Outer Marsh" formerly called the "Bathtub" is not addressed on this page, although it is a very large component of the vegetation in that area. B-1

Figure 2-4: European Beach Grass removal mentioned without any indication of how it would be replaced. B-2

Image 3.1-3: Appears to <u>not</u> be Cutoff Slough, but mostly the inside of the dike near Cutoff Slough. B-3

I note that you are using a Mad River Biologist report; in the aftermath of what happened to the leaders of that company, possibly not a good idea. B-4

P3.2-8: Historical context. I did not see one, and if you do not have it, you may want to obtain a copy of the map from the Connick Family, circa 1890, regarding the court case about the dike and tide gate. Which as you know went to the California Supreme Court and was filed for and against Robarts et al, regarding reducing the tidal prism in the navigable channel of Salt River thereby increasing sedimentation in the navigable slough. B-5

The new multiple tide gates were finished in 1977, not 1979. I know this for sure because of the extreme storm tide in October 1977 when the contractors had just finished digging a channel to the new multiple gates and the drag line was sitting on top of the dike. During that storm tide event the tide was so high that I observed it flowing across the dike underneath the drag line. B-6

The original tide gate was a single gate now buried in the dike nearby. For information, the gates on the new tide gate have already been replaced once since construction. The EIR mentions the dikes being rebuilt in 1965. This was from damage caused by the 1964 flood, and some of the rebuilding was done with scavenged material which formerly surrounded the "outer marsh". B-7

Mentioned are some of the reasons for the large amount of sediment on the Eel River plain. Not mentioned is the fact that the coast range of mountains is rather young geologically and tends to release a lot of sediment during storms. Slides in the Eel River canyon are one of the reasons there is no longer a railroad here. B-8

It should be noted that in the 1995, an anomalous flood, there was a large washout in the dike next to the tide gates from water spilling from the outside to the inside. B-9

Regarding duck hunting by the public in the "outer marsh" – see note for P3.15-2. B-10

P3.2-15: There seems to be some controversy as to why the dunes have been carried away in places by storm tides. Basic oceanography tells us that waves hitting the shore below a certain height will carry sand onto the shoreline, infilling. Waves above a certain height will pull sand off B-11

of the shoreline and deposit it in longshore bars from which it will be carried back to the beach eventually. B-11 cont.

To note, several years ago, after a strong winter, so much had been carried away from Centerville Beach Park that there was an approximately eight foot bluff at the west end of the parking area for which the county built a stairway. Currently in the area of the bathtub/outer marsh, just to the west of the dike separating that area, there is a storm tide blowout which occurred several years ago, which is not mentioned in your description of various storm tide blowouts along the coastline there. This area has for a long time been a low spot in the dunes and as I mentioned in a previous letter, in the 1964 flood, a second mouth was cut through the beach at that point, and there is still a little remnant lagoon on the inside which was part of that mouth. The existing blowout has built back up although it is not yet vegetated, and I would expect other large storm events to breach the dune line at that point. B-12

Regarding the pictured footprint of the project, unless it has been surveyed according to your deeds, I'm not sure the property extends that far north. If it only went to the pre-1955 mouth, that is several hundred yards south of the indicated north border. B-13

The mouth started moving north after the river cut through the Camp Weott peninsula upstream after the 1955 flood. Because of the long shore currents, which go from north to south in the summer/fall, and south to north in the winter/spring, the river ate more aggressively on the north side of the mouth, especially during floods. At one time (1995) the mouth was a couple of miles north of your indicated boundary. During the 1995 flood when the water was approximately two feet higher than normal flood event of the magnitude because of the mouth being so far to the north out of the main flow of the river, the river and associated storms over the next two years broke the beach open slightly south of where it is currently, and so the march northward continued again. B-14

P3.4-3: Note that the Grindelia stricta is the subspecies Blakei. This is known as the Humboldt Bay Gum plant, and is endemic to Humboldt Bay and the Eel River saltmarshes, which amount to the same thing with Table Bluff in the middle. I would also note another endemic plant to Humboldt Bay/ Eel River is the Humboldt Bay Owl's Clover. In the listing of Cord Grass on this page, it might be noted that there are usually Carex sedges at the borders of most of the waterways surrounding the Cord Grass. It is my understanding that European Beach grass was introduced into Humboldt County in 1900 to stabilize the sand dunes, and, mea culpa, in the mid 1960s while attending Humboldt State as a Wildlife Major, I belonged to Conservation Unlimited, a campus group promoting ecological restoration. One of the things the group did was to plant European Beach Grass on the north spit of the Eel River. At that time it was a "good thing". B-15

In your verbiage, you mention pickle weed mats as being Sarcocornia pacifica. I'm unable to locate the name Sarcocornia in any of my references, including Muns. Is this a mistake in the scientific name, or is this a new genus name? Please clarify. Some additions to the list of plants in the outer marsh which I would consider semi-charismatic, which I generally point out on my Natural History tours are Yarrow, Western Coltsfoot, California Blackberry, and several umbelliferae, Angelica, Cow Parsnip, and probably Poison Hemlock. Also not seen anywhere in your EIR, the parasite plant associated with pickleweed, Salty Dodder. B-16

P3.4-18: Regarding Zostera, formerly the waterways in the outer marsh, Cutoff Slough and Salt River, especially in the marsh, were choked with Eel Grass in the summer and early fall, making boating nearly impossible. For some unknown reason, in 2015 and 2016, all of that Zostera has B-17

vanished, including the former overgrowth in Morgan Slough in the mouth of Salt River. Nobody I've talked to knows why this might be, but is something you may wish to address. I also note that Cutoff Slough behind the dike is missing its Eel Grass. That waterway was also choked with Zostera when I assisted Greg Kammen with Thalwegs he was doing. B-17 cont.

P3.4-19: On this page is mentioned Aleutian Geese and Canada Geese as being there migratorily. In years past – many years – there were some migratory Canada Geese that came through this area, but as far as I know, all the large Canada Geese here now are stay-at-homes. B-18

P3.4-24: Some birds and mammals not mentioned, Common Loon, generally a migrant, but known to summer here; Brandts cormorant; not common in the summer, but observed with young of the year several years ago a Redneck Greebe. Observed swimming in the estuary about 15 years ago, a muskrat, probably lost from Klop Lake. B-19

And, many years ago, 50s and 60s before Salt River had infilled so extensively, large Western Pond Turtles were common in the upper reaches, especially above Francis Creek. Very seldom see one anymore; however, a year before the Ambrosini project was done I observed one on the bank of Salt River near the flood gate complex across from Zana's property. Because of the way Salt River was excavated by drag line in that project, I imagine it got scooped up and carried away in a dump truck. B-20

P3.4-37: After the excavation of Salt River above Cutoff Slough in the fall of the year, several times I observed large Coho jumping in the excavated area. B-21

P3.4-52 and -53: Re: Eel Grass, again, where has it gone? B-22

P3.5, Cultural Resources and P3.5-3, I see no indications of the Neolithic Indian encampment in the dunes which I pointed out to your people, although it may be part of the information you are holding back for security reasons. B-23

P3.5-5: Regarding the Scotia Gun Club cabin and the Scotia Gun Club in general, Lee Tomasini of Ferndale , formerly with the County Road Department and Fire Chief in Ferndale, would have more information about this than me, for he belonged to the Gun Club. B-24

P3.6-2: Regarding earthquakes, especially the "Big One", the result of a Cascadia subduction event, I see nothing mentioned about the resulting Tsunami, which I have read is estimated to be up to 50' in height. In the last one of these mega quakes, January of 1700, it has been estimated that the valley floor settled up to 12'. A point of interest in the 1992 quake series here, waterlogged timber and stumps, which had formerly been buried here and there, floated up out of the ground as much as three feet. B-25

Figure 3.61: I don't see noted the fact of the Eel River being in a Syncline, and that at the mouth of the river, bedrock is supposedly at 12,000 feet. That's a lot of sediment. B-26

P3.9-4: In the summer there is often a thermocline associated with the incoming tide coming across sun warmed tidal flats.

I know well of this thermocline because in the 1960s, learning to waterski out here, I dropped off the skis up at the tide gate and found that the water flowing back and forth had mixed the underlying cold with the surface warm – instant chill. B-27

P3.9-6: Regarding overbank flooding, Camp Weott Road may become impassible at 17' depending on the tide. B-28

P3.9-20: Jack's Slough – not mentioned on the list. B-29

P3.9-25; Lower Salt River below Cutoff Slough, since the excavation of the channel of the Ambrosini Ranch project,and increased tidal prism, the east bank between Cutoff Slough and Jack Slough has been undercut and large chunks are tumbling into the waterway, typical of Salt Marsh channels. B-30

P3.14-5: Once again I would like to reiterate that the apparent closure and loss of the former north-south inner beach road has a definite impact on among other things, Search and Rescue on the wave slope up to the mouth of the river. If there is a high tide, especially if it is stormy and your project area is flooded in the winter, that beach road through the dunes was the only way of accessing say, a shipwreck, on the shoreline up to the mouth of the river. The road should and could be gated off on its southern end to prevent intrusion from the general public, but it would be quite helpful in emergencies if the roadway was maintained to some extent. B-31

P3.15-2: And while I've got your attention, one more time, I would like to shill for access in the outer marsh for waterfowling by the public. Not those bunch of people who have more money than they know what to do with and pay you people to belong to the Centerville Gun Club. I'm talking about the general Tom, Dick and Harriet, who may wish to hunt in what you're calling the Outer Marsh. B-32

Some history: before the '64 flood all the land up to Jack Slough was held and used by the Scotia Gun Club, who had a game keeper during duck season keep the riffraff out. After the '64 flood, the waterways in the Outer Marsh, which had formerly been diked and gated off were opened up and because of the fact that the Eel River waters are public access, no attempt was made to keep the public out of the Outer Marsh area. This is not my personal ax to grind, for while I do occasionally duck hunt, I have other places around the delta to go. But for some, coming down the beach in a four-wheel drive with low impact camping for short periods of time so they can hunt in the Outer Marsh area was, until the Wildlands Conservancy bought the property, done on a regular basis, and nobody thought anything of it, especially after the Scotia Gun Club folded. Since the Conservancy took over this land, I've been told by several people that they are not allowing any trespass on the land in the Outer Marsh area. This seems to me to be a rather ridiculous and dog-in-the-manger attitude, for anyone with a boat can traverse the waterways and hunt from their boat or below the mean high tide line. I'm not suggesting you folks put up a big sign saying Welcome Duck Hunters, but it would be nice and excellent public relations to allow those who do find their way down to your Outer Marsh by land to do what they came there for, which is duck hunting. I would also like to note that along the dunes area is probably one of the best jack snipe hunting areas in Humboldt County, and again, those hunters are not being allowed to pursue their sport. B-33

I happen to know that one of the principals of the Wildlands Conservancy with whom I have had numerous conversations over the years is an avid water fowler, so what's really going on here, folks? I don't think the people who do hunt the Outer Marsh area are going to be particularly interested in contributing to your bottom line. 'Nuff said.

P3.15-3: Talking about the Humboldt Bay National Wildlife Refuge visitation, it should be noted that a number of the people going to the Refuge in the fall are duck hunters. B-34

P3.15-4: Camp Weott Road and the boat ramp at its terminus are on the south side of the river, not the north side. Regarding traffic on Centerville Road, the Mattole Valley is not accessed beyond Centerville, but in Ferndale, up the Wildcat. B-35

P3.15-5: Note that waterfowl hunting on the Riverside Ranch project is encouraged, and accessed mostly by boat from Salt River. B-36

I spent several hours going through your EIR to get these points, and skimmed part of your Volume II, but I think this is enough for now. B-37

Yours truly,

Bruce Slocum

Bruce Slocum
285 Morgan Slough Road
Ferndale, CA 95536
707.786.4187

Letter B Response to Comments

Response to Comment B-1

Cordgrass (*Spartina densiflora*) is discussed on page 3.4-3 of the DEIR under the section heading Existing Habitat Conditions. Cordgrass is also identified in Table 3.4-2, page 3.4-7 under the section heading Vegetation Communities (Tidal salt marsh and brackish marshes and Palustrine and Estuarine Wetlands), Table 3.4-3, Mitigation Measure BIO-3b, and in other various locations throughout the Biological Resources section.

Response to Comment B-2

Mitigation Measure BIO-1c states the following with regard to European beach grass, "…Enhancement would occur at a minimum ratio of 1.1:1, and would include removal of European beach grass through mechanical or other appropriate methods; and quarterly maintenance, through removal of re-sprouts, for a period of two years post-construction. The initial removal effort would occur concurrently with the impacts. This would result in no net loss nor temporal loss of suitable Western Snowy Plover breeding habitat." European beach grass is a non-native species and would not be replaced. Revegetation of other habitat types such as riparian or scrub shrub either passively or actively would be visually similar to those habitats that currently exist along Russ Creek and Cut-off Slough within the Project area.

Response to Comment B-3

Comment noted.

Response to Comment B-4

Comment noted.

Response to Comment B-5

The Lead Agency and consultants do have a number of historical documents, maps and photographs of the project area including the transcripts, notes, etc. of the 1899 People vs. Russ and 1901 People vs. Russ cases.

Response to Comment B-6

Year changed from 1979 to 1977. See Section 2 (Revisions to the 2016 DEIR), number 1.

Response to Comment B-7

Comment noted.

Response to Comment B-8

More localized soil erosion and sedimentation from the Wildcat Hills is discussed and mentioned throughout the EIR. For example, reference Section 3.6.1 (Geologic Setting) for the surficial geology of the Wildcat Hills and Eel River delta.

Response to Comment B-9

Comment noted.

Response to Comment B-10

Please see Response to Comment B-32.

Response to Comment B-11

Comment noted.

Response to Comment B-12

Comment noted.

Response to Comment B-13

Source of Boundary: Humboldt County parcel GIS data.

Response to Comment B-14

Comment noted.

Response to Comment B-15

Comment noted.

Response to Comment B-16

Sarcocornia pacifica is the nomenclature used for pickleweed by the 2015 online version of "A Manual of California vegetation" http://vegetation.cnps.org/alliance/458 and by numerous other recent references. The EIR is not intended to be a complete list of plant species found on the site, although it references earlier more detailed biological reports. The additional species mentioned in the comment are noted.

Response to Comment B-17

Comment noted.

Response to Comment B-18

Comment noted.

Response to Comment B-19

The EIR is not intended to provide a comprehensive list of animals; rather it incorporates by reference other more detailed documents, including a species list provided by TWC and the results of limited field work documented in a previous biology report. The species mentioned in the comment are noted.

Response to Comment B-20

Comment noted.

Response to Comment B-21

Comment noted.

Response to Comment B-22

Eel grass is discussed under Impact Bio-3 (5th paragraph) in the DEIR. Additionally, Figure 3.4-3 illustrates the Eel grass percentage of cover along Cutoff Slough.

Response to Comment B-23

The confidential cultural resources investigation for the project describes in more detail the ethnographic background, settlement and subsidence patterns of the Wiyot in the Project area, in addition to prehistoric archaeology (8,000 to 3,000 B.P.), the middle archaic period (5,000 to 2,500 B.P.), the upper archaic period (2,500 to 1,100 B.P.), and the late or emergent period (1,100 to 150 B.P.).

Response to Comment B-24

Comment noted.

Response to Comment B-25

Impact HWQ-8 (Place People or Structures in Areas Inundated by Tsunami) discusses how Project structures and operations would not exacerbate or enhance tsunami impacts over existing conditions. Nor would the Project inhibit evacuation routes in the event of tsunami warning. The Project does not include any structures for human occupancy, therefore, the impacts of the Project and structures on tsunami dangers would be less than significant.

Response to Comment B-26

Figure 3.6-1 is just meant to generally describe and illustrate the regional geologic setting in the Project area.

Response to Comment B-27

Comment noted.

Response to Comment B-28

Comment noted.

Response to Comment B-29

Jack Slough will be added to the list in the Final EIR.

Response to Comment B-30

Comment noted.

Response to Comment B-31

It is not entirely clear what is meant by the “loss” of this road. Anecdotally, this road was the historic access route for the Occidental Marsh, prior to the 1920’s (Joe Botkin, pers. Comm.). The commenter’s assertion that a remnant road is used for search and rescue operations is accepted and noted. There is no known prohibition against its continued use for emergency access, though recreational OHV use is prohibited by TWC on the EREP.

Response to Comment B-32

Comment noted.

Response to Comment B-33

Comment noted.

Response to Comment B-34

Comment noted.

Response to Comment B-35

Changes made as suggested. See Section 2 (Revisions to the 2016 DEIR), number 2.

Response to Comment B-36

Comment noted.

Response to Comment B-37

Comment noted.

COMMENT C

L.D O'ROURKE FOUNDATION
PO BOX 877
FERNDALE, CA 95536-0877
(707) 786-9946

RECEIVED
OCT 20 2016
COASTAL CONSERVANCY
OAKLAND, CALIF.

October 18, 2016

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

Dear Mr. Bowen:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Report (SCH # 2014122040). The L. D. O'Rourke Foundation, the owner of the adjacent property, is the lowest elevation of all properties in the area. As such, we have several questions regarding the project.

1. Where exactly are the proposed berms being constructed? From Figures 3.2-2, 3.2-3, and 3.2-4, it appears large portions of the L. D. O'Rourke Foundation are on the west side of Cutoff Slough. Is there and existing survey, or one planned, to determine the actual property lines and locations of the berms? C-1
2. Why are Russ Creek and Centerville Slough flows being diverted from Cutoff Slough? This leaves Cutoff Slough with insufficient water to prevent silting. If Russ Ranch and Timber is not included in the current project, how do you plan on diverting Russ Creek on their property? C-2
3. Have the parties to the Easement Agreement signed off on the changes to the flood gates? The Easement Agreement was recorded October 20, 2008, in Humboldt County, California, (2008-24826-32) and signed by The Wildlands Conservancy, Bertha Russ Lytel Foundation, Russ Ranch and Timber Company, Joseph and Karen Russ Family, LLC, and Jack and Linda Russ Family LLC. To date, the L.D. O'Rourke Foundation (Successor to the Bertha Russ Lytel Foundation) has not been consulted on changing or adding any flood gates. According to the easement, all parties share in changing/maintenance of the flood gates and drainage throughout the area. Also, no agreement has been made regarding the operation of the gates or drainage. There are more parties to this easement then just Russ Ranch and Timber, The Wildlands, and L.D. O'Rourke Foundation. C-3
4. No mention of the Reclamation District is made. This district is old, but it is still in effect. Is it the intention of the Wildlands to ignore the District? The obtaining of an agreement to replace the District with all landowners was discussed, but to date nothing has been done. Is a landowner's agreement being prepared? C-4
5. The Hydrology and Water Quality Section 3.9 in Volume I of II and Appendix F of Volume II of II appear to be flawed. In June 2016, we were asked to comment on the C-5

Hydraulic Design and Feasibility Assessment Report. Since we did not feel qualified to properly review the report, we obtained the services of O'Connor Environmental, Inc. They found several areas of significant concerns regarding the methodology and assumptions used. No reply has ever been addressed regarding the report submitted. It appeared that the report was dismissed without any further investigation. A copy of the 14 page report is included with this letter (Attachment A). We feel this report shows that the hydrology report was not properly prepared. C-5 Cont.

6. We discovered that US Department of Fish and Wildlife was asked to perform a technical review of the hydrology on the project. The review was conducted by Conor Shea, Ph.D.,P.E., Hydrologist. The qualifications of Dr. Shea are beyond reproach. This review was never made available to the neighboring parties or the public. After being able to obtain a copy of the review, it was found to support the findings made by O'Connor Environmental. This review by Fish and Wildlife points out many more flaws in the hydrology on the project. A complete copy of the report is attached (Attachment B). Why were these problems not addressed in the Draft EIR? Was it the intention of the preparers to dismiss any problems found in the hydrology data submitted? C-6
7. At the public hearing held September 28, 2016, at the Fortuna River Lodge Conference Center, it was stated that there were three alternatives available. The first was to do nothing, the second to do the project only on the Wildlands property, and the third was to do the project including Russ Ranch and Timber property. The hydrology for the project only covers the third option. Is Russ Ranch and Timber going to be included in the project? If not, the hydrology for the project is not accurate and should be redone. C-7

After reviewing the DEIR, and especially the hydrology section, we feel this project is not ready to move forward. As a neighbor to the project, we feel there are too many unanswered questions that may affect our property. We strongly feel the O'Connor Environmental, Inc. report and the report submitted by US Fish and Wildlife show the hydrology section to totally inadequate We recommend that the DEIR be rejected in its present form in order to correct the inaccurate data submitted. C-8

Once again, thank you for considering our questions regarding the DEIR. Please feel free to contact me if you have any questions.

Sincerely,

Don Hindley

Don Hindley, Manager
L.D. O'Rourke Foundation

July 11, 2016

To: Jeremy Svehla, PE
Project Manager
GHD, Inc.
718 Third Street, Eureka, CA 95501

From: Matt O'Connor, PhD, CEG#2449
President

Jeremy Kobor, MS, Certified Floodplain Manager
Senior Hydrologist

O'Connor Environmental, Inc.
447 Hudson Street
Healdsburg, CA 95448

Subject: **Peer Review of Draft Hydraulic Design and Feasibility Assessment Report, Eel River Estuary and Centerville Slough Enhancement Project**

Introduction

This memorandum summarizes key comments and questions resulting from our peer review of the technical report entitled 'Draft Hydraulic Design and Feasibility Assessment Report, Eel River Estuary and Centerville Slough Enhancement Project' (Report), which was completed by Kamman Hydrology & Engineering, Inc. in June 2016. We also reviewed the associated MIKE 11 model input and output files that were sent to us by Kamman on June 10th, 2016.

We are providing this peer review on behalf of Russ Ranch & Timber Company LLC and O'Rourke Foundation who are land owners adjacent to the proposed project. We have no prior involvement with restoration projects in the lower Eel River/Salt River system, and we have become somewhat familiar with relevant environmental background and design objectives for this complex restoration project. Our comments are focused on hydraulic modeling methodology and implementation. We fully appreciate that development of these hydraulic models and designs is technically challenging and that constraints of data, budget, and project schedules typically add to that challenge.

We commonly perform similar hydrology and hydraulics studies to analyze habitat restoration and flood mitigation projects in northern California. We routinely use the MIKE 11 model along with MIKE 21, MIKE FLOOD and MIKE SHE; Jeremy Kobor was employed for five years by DHI (the

Att.A

vendor of MIKE models) and is very experienced in the use of these models. Mr. Kobor has continued to work with MIKE models over the past 6 years with OEI.

This review of the MIKE11 model for the project focused primarily on evaluating the existing conditions model during the highest runoff event in the winter 2015 simulation period and we have not yet examined the other simulation periods or project alternative models in detail. We did not review the project Digital Terrain Model (DTM--the topographic data on which the hydraulic model was based), and have only evaluated the model's cross sections directly from MIKE11 files and by reference to maps provided in the Report. A more exhaustive review of other simulation periods and project alternative models was deemed unwarranted at this time owing to significant questions about the overall model structure and methodology that arose from review of the existing conditions model. Additional detailed review of the MIKE11 model developed for the project by Kamman has been deferred pending further guidance.

Overall Approach

A one-dimensional (1D) modeling approach was adopted for the project with the primary justification being that a two-dimensional (2D) approach presented challenges in simulating structure hydraulics and would be too computationally intense to facilitate running numerous scenarios.

Att.A Cont.

Using a coupled 1D/2D approach such as MIKE FLOOD would have solved both of these problems. In such an approach, channels and structure hydraulics are simulated in 1D with MIKE 11 and are dynamically linked along the top of banks to a 2D model of floodplain areas which are simulated in MIKE 21. This approach uses the same hydraulic structure formulations used in the study and would significantly reduce the required model runtimes by excluding channelized flows from the 2D calculations.

The 1D approach is not necessarily inappropriate, however, in areas of complex flow patterns similar to the study area, 1D modeling requires a wider array of input assumptions and more interpretation of results which inevitably results in higher uncertainty in model predictions.

The cross section widths used in the model are very wide (exceeding one mile in some areas), and the 1D model calculates single values of water level, discharge, and velocity to represent conditions along each cross section. The wide cross sections cover large areas with potentially complex hydraulics influenced by variations in topography, flow resistance, and gradient. In such complex areas, it is likely that flow conditions within channels would be expected to differ significantly from floodplain flow conditions. Consequently, there is substantial likelihood that the 1D modeling approach in this environmental setting could provide hydraulic simulations that do not accurately represent actual hydraulic conditions.

The 1D approach requires the modeler to pre-define the flow paths that will be simulated. The model was set up with only the primary channels represented as model flow paths. In floodplain and estuarine environments, numerous flow paths develop and interact to varying degrees depending on the tidal level and flood stage. In contrast to a 1D approach, a 2D approach can capture much of this complexity and provide a more accurate representation of the effects of the project alternatives.

Evidence of Problems with the Selected Approach

Review of the model input and result files revealed several areas of concern regarding the ability of the 1D model to accurately simulate hydraulic conditions at the site. As the water level in a given cross section increases, all portions of the cross section with elevations below the water level are assumed to be actively conveying flow even if there is elevated topography in the cross section that may prevent exchange of flow. Similarly, connectivity of flow parallel to the simulated flow path in secondary channels between successive cross sections may not exist. The complexity of flow patterns in this environment typically creates a situation across a single cross section where there are areas of downstream flow as well as ponding of water with minimal flow, and even flow in the opposite direction of the principal flow direction. Consequently, the assumed uniform pattern of flow in the 1D simulation as implemented may significantly misrepresent actual flow conditions. Examples of cross sections where this problem appears to occur are provided in Figures 1 and 2; a partial list of locations where this problem was observed is provided in Table 1. The list is considered partial because we did not conduct an exhaustive search of all cross sections on all simulated flow paths.

Att.A Cont.

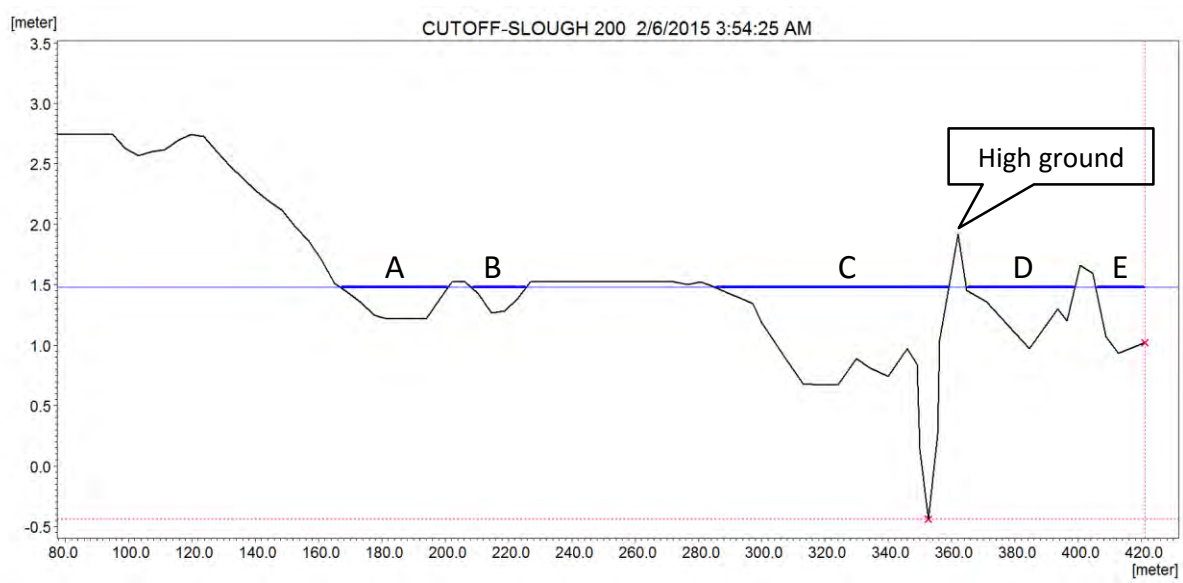

Figure 1: Example cross section from Cutoff Slough where the model assumes flow occurs in areas A through E even though the water level has not exceeded the high ground separating the main channel (C) from adjacent areas.

Table 1: Cross section locations where connectivity between cross sections of multiple channels oriented parallel to the simulated flow path is assumed despite the presence of intervening high ground as described visually in Figures 1 and 2. "Chainage" represents the distance (meters) of a given cross-section along a simulated flow path or "branch".

Branch	Chainage		Branch	Chainage
Western Drainage	900		Russ Lower	17
Western Drainage	1100		Russ Lower	346
Shaw Creek	397		Russ Lower	594
Shaw Creek	675		Russ Lower	932
Shaw Creek	1150		Russ Lower	1369
RRTFP	977		Russ Lower	1520
Cutoff Slough	200			

The cross section in Figure 2 illustrates the potential problems with calculating a single water level, discharge, and velocity value to represent conditions along wide cross sections in a 1D model even when the foregoing concerns regarding connectivity and continuity of flow are resolved. In the model's calculations, flow in the relatively narrow channel shown in the center of Figure 2 (location B) where simulated water depth is about 1-ft is averaged together with about 2,400-ft of floodplain width where simulated water depths are as low as 0.1-ft.

Att.A Cont.

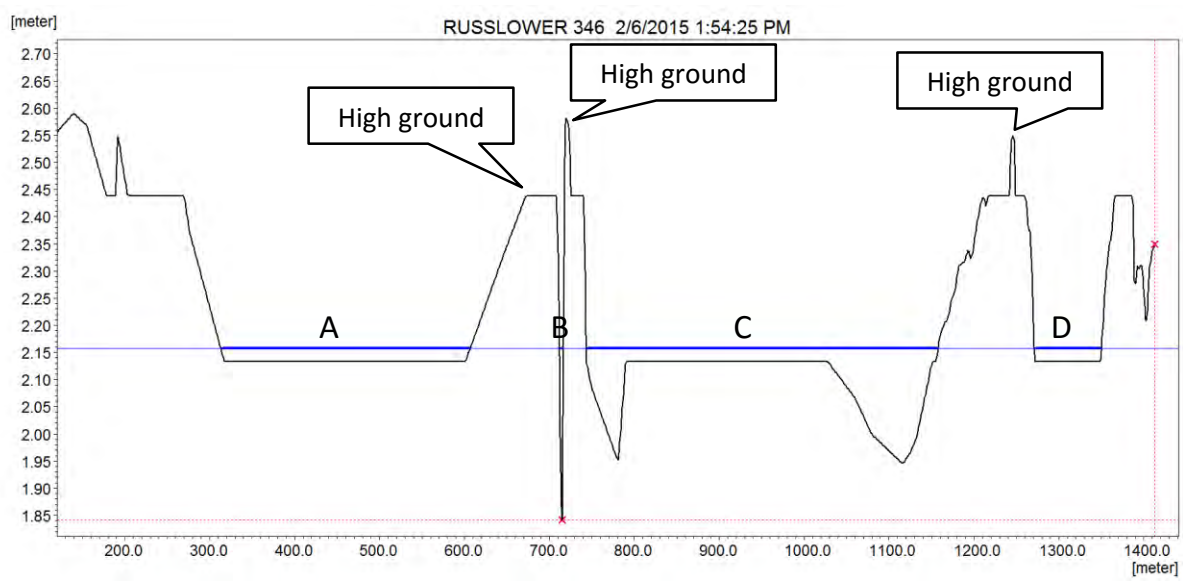

Figure 2: Example cross section from branch Russ Lower where the model assumes flow occurs in areas A through D even though the water level has not exceeded the high ground separating the main channel (B) from adjacent areas.

It is unlikely that an accurate representation of the hydraulics can be accomplished when areas of channelized flow are lumped together with wide areas of shallow floodplain flow. This is

particularly true for velocity in that the areas of shallow floodplain flow would be expected to have significantly lower velocities that those within the main channel. Lumping these areas together likely results in over-prediction of velocities on the floodplain and under-prediction of velocities within the channel. It is unlikely that an accurate representation of salinity conditions can be developed without an accurate representation of velocity distributions which are a key component of the advection/dispersion processes being simulated in the salinity modeling.

These problems are compounded by the use of a single roughness (flow resistance) coefficient value for all locations within the model including areas of channelized flow and areas of floodplain flow. It is standard modeling practice to develop estimates of flow roughness coefficients for portions of a study area with distinct vegetation and geomorphic characteristics and it is unlikely that the use of a single roughness value for the entire model domain is representative of the spatial variations in roughness characteristics at the site. For example, in floodplain and estuarine environments such as this, distinct flow channels usually have lower roughness (and relatively high flow velocity) and floodplain areas with shallow flow and dense vegetation usually have higher roughness (and relatively low flow velocity). It is our understanding that the model was implemented with uniform roughness (Manning's n) set to 0.03. This is a low roughness value for natural drainage features and would typically be used to represent channelized flow in a fairly uniform and smooth channel. This might be suitable for flow in channels, but probably is not suitable for the majority of floodplain and wetland areas where a substantially higher roughness value would typically be applied.

Att.A Cont.

In a 1D modeling approach, when the simulated water level in a given cross section exceeds the elevation of the topography along one or both edges of the cross section, the model assumes that a vertical 'wall' is present at the edge of the cross section to facilitate calculation of water levels in excess of the highest cross section elevations represented by topography. This useful aspect of a 1D model requires a considerable degree of caution in model implementation and interpretation of results in order to avoid unintended misrepresentation of conditions and potentially erroneous interpretation of model results. A partial list of locations where this occurs is provided in Table 2. The list is considered partial because we did not conduct an exhaustive search of all cross sections on all simulated flow paths.

In the cross sections from the model shown in Figures 3 and 4, vertical dashed red lines denote locations where the model imposed an artificial vertical flow boundary. In some cases this is problematic because flows are assumed to be contained within the cross section but the real flow may spread out onto an adjacent floodplain and/or discharge into adjacent channels.

Table 2: Cross section locations where calculated water levels exceed the elevations along one or both edges of the cross section. "Chainage" represents the distance (meters) of a given cross-section along a simulated flow path or "branch".

Branch	Chainage		Branch	Chainage
Western Drainage	1500		Russ Lower	1172
Western Drainage	3300		Russ Lower	1369
Shaw Creek	1150		Russ Lower	1520
Shaw Creek	1411		Cutoff Slough	200
Shaw Creek	1583		Cutoff Slough	500
Russ Upper	321		Cutoff Slough	800
Russ Upper	647		O Rourke	1903
Russ Upper	695		O Rourke	2179
Russ Upper	1079		O Rourke	2988
Russ Lower	594			

The model includes several parallel branches. When modeling parallel branches, care must be taken to ensure that the edges of the cross sections are placed such that flow conditions within each branch can be calculated independently (no lateral interaction). Alternatively, lateral interaction between parallel branches can be simulated by using link channels to allow for flow exchanges to occur between adjacent cross sections on parallel branches.

Att.A Cont.

A subset of the cross sections listed in Table 2 have parallel branches with simulated water levels high enough to promote lateral flow interaction. No link channels were included in the model, therefore no flow exchange between these parallel branches occurs despite the fact that water levels are high enough to allow for such exchanges. Figures 3 and 4 illustrate two examples of cross sections from parallel branches where the simulated water levels indicate lateral connectivity between the branches which is not represented in the model. For example, and as shown in Figure 4, the water level in branch Russ Upper is more than 0.8-ft above the highest elevation along the right-hand side of the cross section indicating that flow should be overtopping the right bank and flowing onto the adjacent floodplain. Branch RRTFP represents this floodplain area, however no flow occurs in this branch because the model is not setup to allow flow exchanges between parallel branches.

In addition to likely inaccuracies in simulated water levels, the absence of lateral flow exchange in the model branch Russ Upper also appears to have resulted in inaccurate mapping of inundation extents. For example, in Figure 33a of the project design report, no inundation is shown along branch Russ Upper for the Existing Conditions, 2014 NOP, and 2015 NOP runs despite the fact that water levels shown in model output files exceeded the top of one or both

banks throughout most of this reach. This problem appears to have resulted in a systematic under-representation of the inundation extent throughout large portions of the RRT properties.

Consequently, our interpretations of locations where lateral exchanges between parallel branches appear to be missing from the analysis are based only on examination of the topography contained in the model cross section files. It is possible that some of the locations where we have identified lateral flow exchanges that appear to be missing from the analysis are in fact accurately represented because of the presence of levees or other topographic separators that are not visible in the simplified view of the topography given in the model cross sections.

Att.A
Cont.

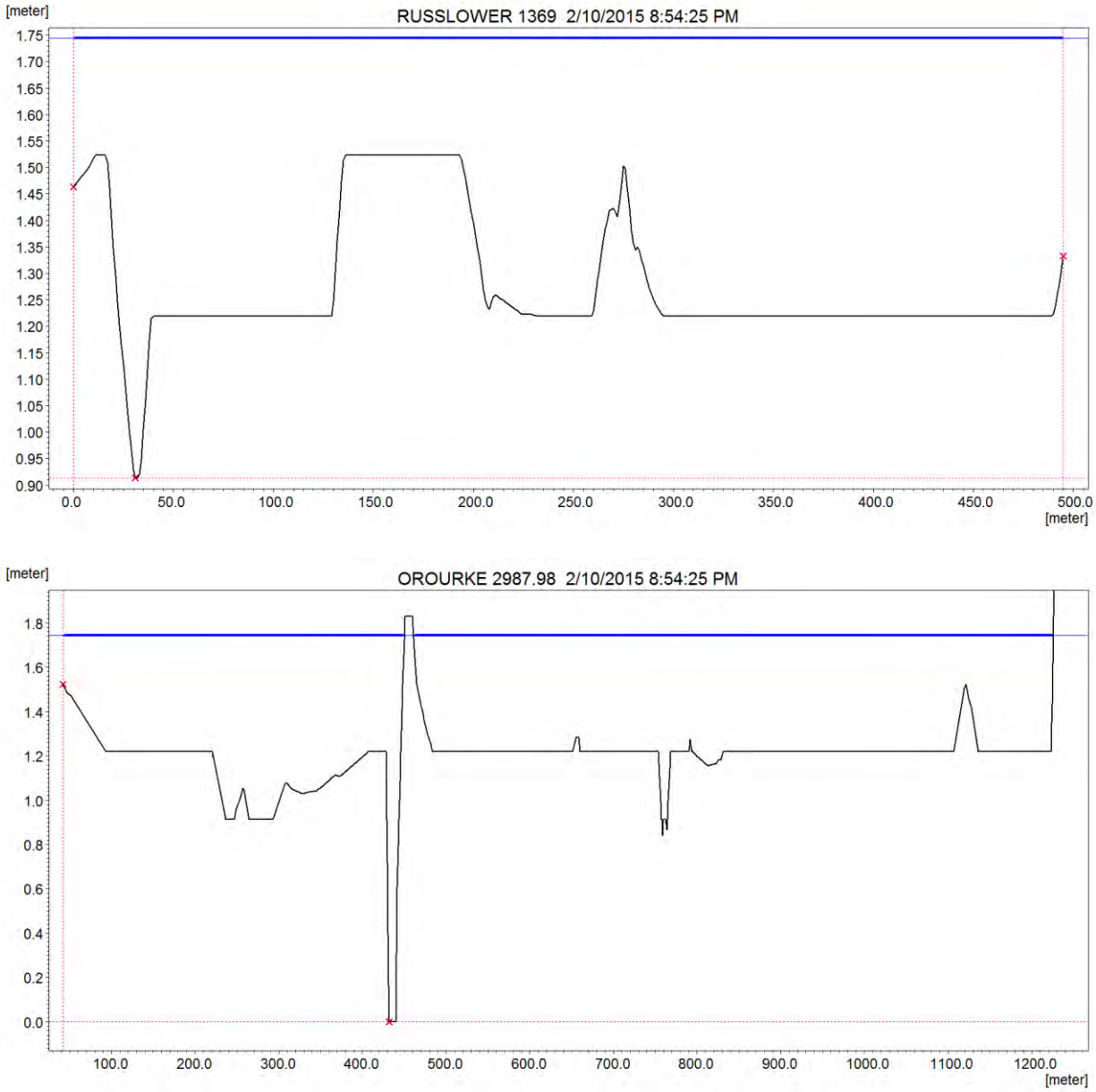

Figure 3: Example cross sections from the Russ Lower and ORourke branches where the model assumes no lateral interaction of flow between the right side of the Russ Lower cross section and the left side of the ORourke cross sections (which coincide spatially) despite a water level in excess of the elevations separating the two cross sections.

Att.A
Cont.

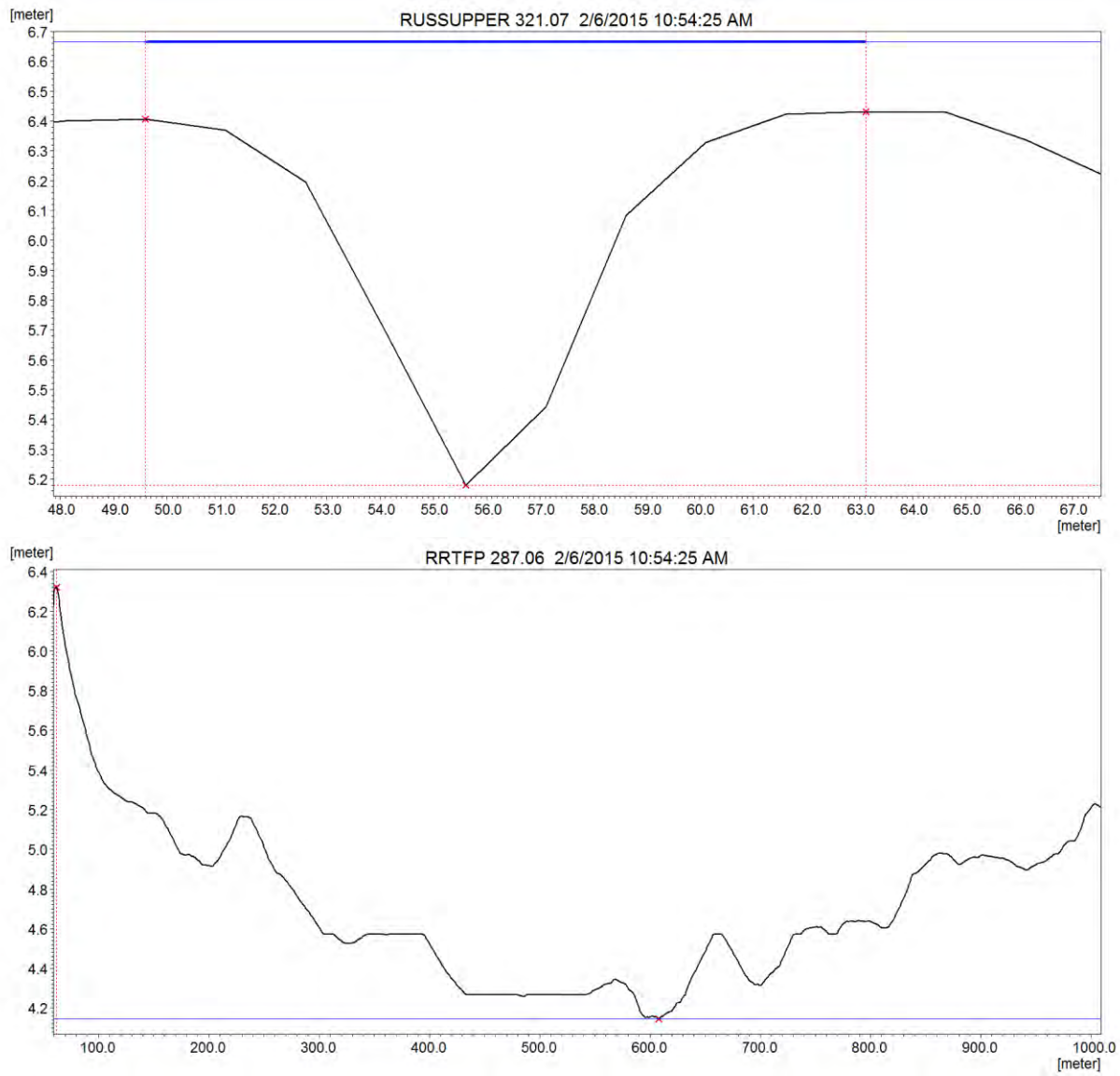

Figure 4: Example cross sections from the Russ Upper and RRTFP branches where the model assumes no lateral interaction of flow between the right side of the Russ Upper cross section and the left side of the RRTFP cross sections (which coincide spatially) despite a water level in excess of the elevations separating the two cross sections. No flow occurs within the RRTFP branch despite a water level in Russ Upper that is more than 0.8-ft above the elevation separating it from the adjacent RRTFP branch.

Att.A
Cont.

Topographic Irregularities

Inspection of cross sections in the model branches upstream of the Inner Marsh area revealed substantial irregularities in the lateral extent of cross sections and unexplained variations and simplifications of topography across cross sections. The translation of the project DTM, derived as we understand it from a combination of LiDAR and ground surveys of some channels, into the assemblage of topographic cross sections used to represent hydraulic processes is a critical element of the modeling process. Our observations from model files suggest that this process was completed in a manner that produced many unexplained inconsistencies and irregularities.

An example that demonstrates these irregularities is provided in Figure 5 which shows four successive cross sections on the ORourke branch of the model. The left side of the cross sections is located at the levee separating the EREP property from the O'Rourke property. The elevation of the levee crest as represented in the cross sections varies from 7-ft (2.1-m) to 5-ft (1.5-m) to 6-ft (1.8-m) between successive cross sections. Some variation in the levee crest elevation may exist but it is more likely that either the cross sections were not extracted from the project Digital Terrain Model (DTM) in a way that accurately represents the elevations of the levee crest or the DTM itself is flawed in its representation of the levee elevations.

Many of the cross sections contain wide areas coded with the exact same elevation value (flat areas visible in Figure 5). These areas likely represent locations where the project DTM and underlying LiDAR were unable to capture the topography due perhaps to water surface or vegetation interference. Some simplifications and/or inaccuracies in the topography are to be expected, however the number of cross sections that contain these flat areas and the large size of many of the areas (>1,000-ft wide in some cases) is a concern. The lowest cross section shown in Figure 5 is a wide shallow triangle and does not appear to represent any real-world topography. In some cases it is justifiable to insert simplified cross sections in a model in order to increase numerical stability, however this particular section seems very strange and no discussion of its inclusion was provided in the documentation.

Att.A
Cont.

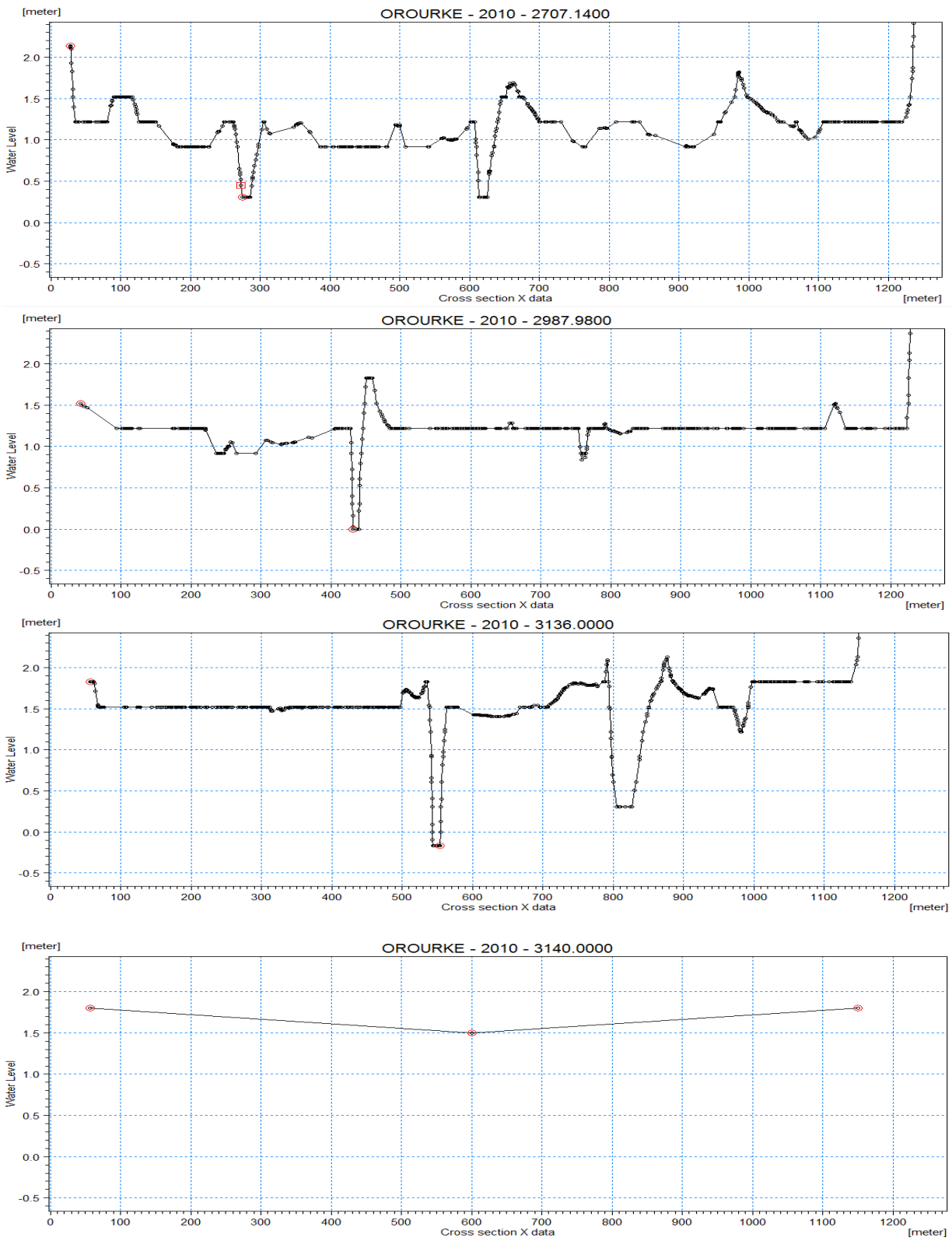

Figure 5: Successive cross sections on branch ORourke from upstream (top) to downstream (bottom).

Att.A Cont.

Calibration and Model Simulations Periods

As we understand it, the model was calibrated only to water levels at a single location near the downstream boundary of the study area. This comparison demonstrates that the model is capable of representing conditions in the lowest reach of Cutoff Slough but no quantitative evaluation of model performance is provided elsewhere throughout the complex and varied terrain of the study area.

The model simulation periods only include flow events up to a 3-yr recurrence interval. A variety of tidal conditions are represented; however, the documentation is not sufficient to understand how frequently outflows through the tide gates were restricted by elevated tidal/Eel River levels in relation to the timing of runoff. In order to better understand the potential effects of the project alternatives over a variety of plausible runoff and tidal conditions, it is recommended that larger flow events be simulated in combination with a variety of outflow restricting tidal conditions.

Potential Model Insensitivity

Att.A Cont.

In most cases, the simulation results for existing conditions and the various proposed alternatives result in only minimal changes in water levels and inundation extents. Reducing restored channel widths by 50% also resulted in only limited changes in simulation results. While changes in hydraulics under the alternatives may in fact be small, it is also possible that the minimal changes reflect an overall insensitivity of the model.

The primary means of calibrating the model was to introduce constant rate inflows to represent groundwater inflow and dune seepage. The magnitude of the groundwater inflow term was not based on any observations of groundwater conditions, but instead was estimated purely through calibration.

Inflows were maintained at the same values for existing and proposed conditions; thus by definition the project alternatives are assumed to have no influence on groundwater inflow. Fixing these two inflow values (which served as the principle control on the model calibration) may partially explain the minimal changes predicted by the model. Instead of accounting for groundwater as an inflow boundary condition, a water level boundary condition may be more appropriate and may allow for better representation of groundwater discharge in low-lying portions of the proposed dredged channels.

The apparent insensitivity of the model results may also be a reflection of the limitations of the simplified 1D approach as discussed in detail above. When a uniform water surface and discharge path are assumed across broad swaths of complex topography, the predicted changes in hydraulics resulting from modifications in topography in one part of the cross section may be modulated by the remaining areas of the wide cross sections where the topography remains

unchanged. When water levels in a given cross section exceed the elevations of the topography along the margins of the cross section and lateral exchange of flow with adjacent channels or floodplain areas is not represented, the model may be prone to insensitivity as any changes in overbank flows resulting from modifications to the topography will not be represented.

Potential Influence on Groundwater

As we understand the project, one of the principal hydrologic effects will be to increase the depth and duration of inundation in the Inner Marsh portion of the project area while at the same time lowering the depth and duration of inundation in other areas. Given the low relief and high water table in the project area it seems quite possible that the proposed project could affect the water table elevation in adjacent areas. Although this could potentially cause significant impacts, there does not appear to have been an assessment or analysis of this issue and groundwater inflows under the alternatives were assumed to be the same as under existing conditions.

Summary

Based on our review of the technical report and model input and output files, we have identified several areas of significant concern regarding the methodology and assumptions (implicit and explicit) imposed on the hydraulic model simulations of existing conditions and restoration alternatives at the project site.

Att.A Cont.

The specific concerns that we have raised include that the one-dimensional modeling approach with uniform roughness across very wide cross sections representing hydraulically-complex terrain is not capable of accurately simulating hydraulic conditions and the likely effects of proposed alternatives at the project site.

In addition, we found numerous locations where one or more of the following problems occur that suggest that the model contains substantial misrepresentations of hydrologic processes and hydraulic conditions:

- flow interaction between adjacent channels or between channels and adjacent floodplain areas is assumed to occur despite water levels being lower than the intervening topography,
- flow interaction between adjacent channels or between channels and adjacent floodplain areas is assumed **not** to occur despite water levels being higher than the intervening topography, and
- calculated water levels exceed the elevations of the topography along the edges of the cross section, thus introducing the potentially erroneous assumption that the cross section is bounded by vertical flow barriers imposed by the modeling process.

Other items of concern that have not been investigated in detail include the following:

- The model was calibrated only at a single location near the downstream end of the project site.
- Larger flood events and prolonged outflow-restricting tidal conditions were not simulated.
- The gross simplifications of flow hydraulics across very wide cross sections would be expected to produce inaccurate flow velocities that would be expected to affect the results of simulations of salinity.
- Groundwater conditions were assumed to remain constant under both existing and proposed conditions; there is reason to believe that may not be a valid assumption given the substantial modifications of topography and expected changes in the extent, depth and duration of areas of inundation Given the use of groundwater inflow as a model calibration parameter, the model implicitly assumes that groundwater conditions are not affected by the proposed project. Since this area has been modified in the past by construction of drainage facilities through the activities of a drainage management district, there is reason to believe that shallow groundwater may be affected by manipulation of topographic conditions and water table gradients. We believe that shallow groundwater conditions and processes could both affect and be affected by the proposed project.

Att.A Cont.

The model results for existing conditions and for the various alternatives generally show relatively small differences in hydraulic conditions. There is a substantial likelihood that these findings reflect overall insensitivity of the model attributable to the selected modeling approach and assumptions rather than a realistic representation of real-world processes and conditions. We were engaged by our clients in part to evaluate specific areas of concern regarding potential project effects on hydrologic conditions on their property. Given our concerns regarding model sensitivity described above, we do not believe that the model can simulate future conditions and the effects of the proposed alternatives with a reasonable degree of accuracy.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arcata Fish and Wildlife Office
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Arcata, California, 95521
Phone: (707) 825-5188 FAX: (707) 822-8411

In Reply Refer to:
Conor Shea

June 28, 2016

Mr. Jeremy Svehla, P.E.
Project Manager
GHD, Inc.
718 Third Street, Eureka, CA 95501

Re: Review - Draft Hydraulic Design and Feasibility Assessment Report
Eel River Estuary and Centerville Slough Enhancement Project

Att B

Dear Mr. Svehla:

I completed my review of version 4.0 of the Draft Hydraulic Design and Feasibility Assessment Report prepared by Kamman Hydrology and Engineering for the Eel River Estuary and Centerville Slough Enhancement Project. My review comments are attached to this letter.

My review comments are divided into three sections. The first section presents my comments on major report issues and themes. The second section presents my recommendations for incorporating this work into further project development. The third section presents my comments and questions regarding specific sections of the report text.

It is my hope that these comments will help improve the project development and design process and help develop a better understanding of hydrologic processes and design alternatives.

Yours truly,

Conor Shea, Ph.D., P.E.
Hydrologist

Enc: Review Comments

Cc by e-mail: Mr. Michael Bowen, California Coastal Conservancy
Mr. Darren Mierau, California Trout
Ms. Paula Golightly, USFWS

INTRODUCTION

This memo provides my review comments on the Draft Hydraulic Design and Feasibility Assessment Report V4 prepared by Kamman Hydrology and Engineering and dates 6/1/2016.

Att B Cont

My review comments are divided into three sections. The first section presents my comments on major report issues and themes. The second section presents my recommendations for incorporating this work into further project development. The third section presents my comments and questions regarding specific sections or figures in the report.

SUMMARY COMMENTS

1. Habitat Goals and Objectives

The overall Project Goal is:

> *to improve geomorphic and ecosystem functions that would enhance habitat for native fisheries and aquatic species, support waterfowl and wildlife species, and benefit agricultural land management by more effectively managing onsite flooding and sedimentation.*

C-9

The report further defines these goals in the introductory text.

Unfortunately, the report does not establish Project Objectives, which are statements of measurable actions that support completion of a goal within a specified time frame (see Skidmore et al., 2011[1]). There is an implicit project objective to avoid flooding impacts by maintaining post project flood elevations at or below existing conditions. Objectives for other project goals including habitat objectives, however, are undefined.

The project proponents should clearly identify aquatic and wetland habitat objectives for the project:

A. As a primary motivation for this project is to restore habitat for salmonids, the project proponents should clearly identify the salmonid species that are anticipated to occupy the project area, their life-stage, the time of year that they are projected to occupy the project area, their habitat needs (e.g., rearing, refugia, etc.), and their water quality and habitat requirements. Objectives should identify minimum water quality requirements and the types and forms of stream channels, marshes, and off-channel habitats.

B. The objectives should identify how the project will establish biological connectivity for marine aquatic species.

C. The project proponents should identify the forms and amounts of marsh habitats the project will create. Project objectives should identify the hydro-periods and other conditions required to achieve desired marsh habitats.

---

[1] Skidmore, P.B., C.R. Thorne, B.L. Cluer, G.R. Pess, J.M. Castro, T.J. Beechie, and C.C. Shea. 2011. Science base and tools for evaluating stream engineering, management, and restoration proposals. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-112, 255 p.

2. Flood Management and Drainage Goals

The report documents model development of several project alternative geometries and simulation of five storm events. The report presents two means of evaluating model results: (1) maps showing the maximum extent of surface inundation; and (2) stage-frequency curves for the different project alternatives. The report focuses on the maximum extent of flooding as a key metric to determine the potential of a project alternative to meet project goals.

I believe it is more important to focus on the stage-frequency curves and on how quickly areas within the model boundary drain between flood events. The differences in the extent of flooding during major flood events between differing project alternatives are minor. The extent of major flooding of the Centerville Slough/Eel River Delta system is largely controlled by the volume of rainfall and the height of the Eel River following region-wide floods. The project alternatives create only minor differences in the flooding outcome. The drainage between flood events is a key concern of the Wildlands Conservancy's adjacent land owners. Small increases in the frequency of flooding at low elevations (2 to 5 feet) could impact the quality of grazing lands. C-10

Selection of final project alternatives and development of final designs should carefully evaluate the impact to more frequent flooding of lands within the project area and adjacent lands rather than the flooding associated with extreme events.

3. Validate Modeling of Tide-gates

Hydraulic modeling of existing and proposed configuration of the Centerville Slough/Eel River Delta system requires accurate simulation of tide gates. The report does not provide sufficient documentation of how the tide gates were modeled. The report does not provide sufficient information that validates that the model can accurately simulate gate discharges. My comments below describe several instances where gate operations appear anomalous or incorrect. I need to see better information that validates the gate operations are modeled accurately. I have included recommendations in my comments below for how to present this data. C-11

4. Tidal Marsh Vegetation

The vegetation analysis in the report needs additional work to clarify the types and areas of tidal marsh that will be created by the project alternatives. I have a key concern that the report implies that areas that the report defines as Low Marsh (areas that are inundated 18-48% of the time) will result in vegetated marsh. Humboldt Bay researchers have documented sparse or no vegetation establishment in the Low Marsh zone. My review of vegetation sampling for the Salt River Restoration Project (used as a basis of analysis in this report) supports this finding. C-12

RECOMMENDATIONS

1. **Gate Design for Connecting Inner Marsh to Outer Cut-off Slough:**

   A. Side-Hinged Gates: More design analysis is required to set the sill elevations, and potentially, optimum gate size dimensions. Discussions with Leo Kuntz[2] indicates that: C-13

[2] Personal Communication between Conor Shea and Leo Kuntz 6/27/2016.

i. Setting the sill elevations at -3.92 is inadvisable because this precludes the ability to maintain the gates without dewatering the gate-structure.

ii. The design must evaluate the flow velocities at gate closing. Excessive closing velocities cause gate damage and structure damage. Excessive closing velocities can also result in water hammer that also can cause structure damage.

iii. Gate sizing should take into account the pool area and pool inundation levels.

B. MTR Gate: The MTR gate design should be re-evaluated so that the design provides better operating performance. The current design described in Appendix G sets the sill elevation for a 5'x6' gate at -3.94 feet. Discussions with Leo Kuntz[3] indicates that:

i. The invert of the MTR gate should not be set so that it closes with the gate fully flooded. There should be at least a foot or more of clear space between the top of the gate and the water surface at closing.

ii. Design of the MTR gate must take into account the water velocity at closing. Excessive velocities at closing will damage the MTR gate and the tide-gate structure.

C. Biological Connectivity: From a habitat perspective, the current design creates a concern because it precludes connectivity of surface drift through the structure. Surface drift, or Neuston (the collective term for the organisms that float on the top of water) contains fish larvae, insect larvae, seeds, small organic debris, and other materials. Establishing connectivity for these materials is important to ensuring establishment of estuarine biota within the Inner Marsh and restored Centerville Slough. The current gate design allows only connectivity for Neuston only at extreme low tides. The gate design should be re-evaluated to promote better connectivity of surface water through the structure on inflows and outflows from the Inner Marsh.

D. Design Redundancy: The current gate configuration is optimized to minimize the number of gates required to meet maximum water level objectives. That is, the design has the minimum number of gates required to maintain maximum flood elevations at or below existing flood levels for the five simulation periods.

I recommend adding at least one additional side-hinged gate to the structure to improve the reliability of the design for the following reasons:

i. Although the hydraulic modeling has been prepared with great care and effort, there are substantial uncertainties associated with model results. Uncertainties are inherent in modeling the Centerville Slough/Eel River Delta system because of the large number of boundary conditions and complexities of the internal drainage network. The flood conditions that can result from interactions and variations in timing between local storm events, regional flooding on the Eel River, and high ocean water levels, and extreme wave

C-13
Cont.

[3] Personal Communication between Conor Shea and Leo Kuntz 6/27/2016.

events are too numerous to ever model completely. The current design does not allow for uncertainties that exist in the analysis.

ii. Local hydrologic, topographic, and hydraulic conditions in the Eel River Delta, both inside and outside the project boundaries, are likely to change over time. Changes will result from project actions; from natural and human-induced system variability in flows, wave climate, and climate; and from changes in sediment supply and deposition patterns. The design should allow for additional redundancy in the face of changing conditions, rather than assuming that the minimum number of gates needed to address today's conditions will address all potential combination of future conditions.

iii. The marginal cost of adding a gate is small compared to potential long-term costs if the design provide inadequate.

iv. Small improvements in drainage between flood events are of great benefits to adjacent landowners.

C-13 Cont.

2. Two Dimensional Modeling for Design

There are several questions about the proposed design which were not resolved by the hydraulic modeling prepared for this report. The focus of the modeling for the report was on broad scale inundation patterns in the project area. The model results did not provide sufficient spatial and temporal resolution to address several concerns that I have about flow patterns and hydro-periods.

C-14

To resolve these questions, I recommend conducting two-dimensional hydraulic modeling of an area limited to the Inner Marsh, Inner Cut-off Slough, and Centerville Slough. Simulation events should be limited to a two-week tidal cycle under winter and summer gate settings, and one flood event. The questions that I would recommend this two-dimensional modeling address are:

A. Inner Marsh hydro period: Data from this analysis would allow examination of the timing and duration of surface inundation under normal tides. I think an important design feature is to avoid flat-topped stage-graphs that sometimes accompany muted marsh designs. Gate design for the MTR gate should provide minimum closure times so as to prevent flat-topped stage graphs and allow the muted marsh stage-graph to mimic the pattern of the outside stage-graph.

C-15

B. Marsh Habitat Zones: Two-dimensional modeling would provide a better assessment of potential marsh plain habitats.

C-16

C. Circulation Patterns: Two-dimensional modeling would provide insight into circulation patterns within the marsh. For example, representatives from the O'Rourke Foundation raised concerns that the reconfiguration of drainage from Centerville Slough/West Side Ditch through the Inner Marsh might cause stagnation in the portion of Cut-off Slough adjacent to their lands.

C-17

D. Habitat Complexity: The current designs for new channel network employ simple, uniform trapezoidal cross sections. I would like to the final design incorporate more complexity into channel design to create better habitat features. Two dimensional modeling would prove useful in developing these features.

C-18

TEXT AND FIGURE SPECIFIC COMMENTS

1. Page 3: *project design team's aquatic ecologist to evaluate and characterize the potential benefits and impacts to important species that exist or could colonize the project area:* C-19
   A. Was this done? What were the results?
2. Page 3: 1916 USGS Map – *... the area was relatively flat...*
   A. The 1916 quad has 100-foot contour intervals. It is difficult to justify this conclusion using this map. C-20
3. Page 5: It would be useful to provide a schematic representation of existing hydraulic connectivity that depicts and identifies (by name) channels and gates. Unless one has spent much time with the charts and figures, it is difficult to fully understand the description of actions. C-21
4. Page 6: *Replace one (1) existing flap gate in the existing Cut-Off Slough tide structure with a new side-hinge tide gate equipped with a 1-meter square auxiliary fish passage door. Retrofitted structure is intended to maintain the current water levels within inner Cut-Off Slough.* C-22
   A. The text should clearly state at this location how the auxiliary fish passage door be operated. It is my impression from further reading in the report that the auxiliary door is a "pet-door" or permanent hole in the gate.
5. Figure 14 –The Y-Axis label for Salinity is incorrectly labeled. C-23
6. Page 17: Validation of Control Structure Discharges
   A. The ability of the hydrodynamic model to accurately simulate flow velocity through the tide-gate structures is critical to producing reliable model results. The report should include a section that demonstrates that the model is providing accurate simulation of discharge through the gates. The section should compare model results with independent (i.e., hand or spreadsheet) calculations of gate discharges for a series of upstream and downstream stages at each type of gate that is modeled. C-24
7. Page 18 – Figure 20: Cutoff Slough Gage Calibration: The model run reproduces timing and magnitude of peak water levels at high and low tides well, but does not capture the rapid rise in water levels to near peak tide after low tides. The observed rapid rise and rapid fall at low tide might be a local condition due to drawdown at the gate, may represent limits in Cutoff Slough channel conveyance at low stages, or rapid gate leakage. Failure to simulate this behavior or to properly explain its occurrence and the model's inability to simulate it correctly could lead to errors in assessing the ability of the system to drain down at low water stages. C-25
8. ***Simulation Period 1: 2009 Spring Storm,*** Page 23 and Figure 30:
   A. Text: *With the exception of water levels that are slightly higher at the RR&T (Site 2) and ORF (Site 7) locations, the 2014 NOP alternative water levels are equal to or lower than Existing Conditions.* This is an inaccurate characterization because: C-26

i. Figure 30a shows 2014 NOP water levels at Angel's Camp Site 1 are generally higher than existing.

ii. Figure 30e shows that 2014 NOP water levels in the Inner Marsh Site 5 are higher at stages below 3.0 feet. C-26

iii. Figure 30f shows that 2014 NOP water levels in Cutoff Slough Site 6 are higher at stages below 2.0 feet.

B. Using Figures 30b (Site 2: Russ Ranch and Timber) and 30d (Site 4: EREP) to compare alternatives with existing conditions are misleading because under existing conditions the minimum levels at Sites 2 and 4 are about 4.0 feet. C-27

C. Text: *Simulation results also indicate that there is very little if any difference between wide and narrow channels in the 2014 and 2015 NOP alternatives.* My assessment is that there is a significant difference between 2015 NOP wide and narrow channels options:

i. In Figure 30a, the 2015 NOP narrow stages exhibits a fluctuation in stages caused by tides, while there are no stager fluctuations for the 2015 NOP stages. C-28

ii. The amplitude of the tidal fluctuations for the 2015 NOP narrow at Sites 2, 3, 4, and 5 are much greater than the amplitude of the tidal fluctuations for the 2015 NOP. As a result, the 2015 NOP narrow option stage-frequency curves generally have higher stages than the 2015 NOP option stage-frequency curves for stages with a 20% frequency of occurrence.

9. ***Simulation Period 2: 2012 Winter Storm,*** Page 24 and Figure 32:

A. Text: *Water levels are typically the same between the 2015 NOP original and wide alternatives as well with the exception of 0.1-foot higher narrow channel water levels through the Centerville-Inner Marsh main flow corridor, likely due to decreased capacity associated with small channels.* C-29

i. It's not clear if *decreased capacity* refers to decreased channel storage capacity or to decreased channel transmission capacity. I would argue that the results show that channel width has a significant impact on tidal amplitude at Sites 2-5 (*the Centerville-Inner Marsh main flow corridor*) by changing the stage/storage relationship at stages of four feet or less.

B. In Figure 32g, Water levels are the same at Site 7: ORF for the 2015 NOP and 2015 NOP narrow. The stage-frequency curves for the two alternatives are very different. Is there a mistake in the plot? C-30

10. ***Simulation Period 3: 2014/15 Winter Storms*** Page 24 and Figure 34

A. Again, I would argue that the results show that channel width impact tidal amplitude at Sites 2-5 (the Centerville-Inner Marsh main flow corridor) by changing the stage/storage relationship at stages of four feet or less. C-31

B. Because there are only two significant storms in this simulation, much of the simulation covers periods when there is little inflow into the system. I observe that during this condition, narrower C-32

channels in Centerville Slough result in better drainage from ORF because the stage in Cutoff Slough is slightly lower due to lower discharge rates out of Centerville Slough. C-32 cont

C. Text Page 25: *Equilibrium alternative do not differ significantly from the original and "narrow" channel design versions.*

i. There is little difference between narrow and equilibrium water levels during storm events, but there are differences in drainage between storm events. At Sites 1 – 5, the 2015 NOP equilibrium produces lower average water levels between storm events, lower minimum stages, and larger tidal amplitudes than the 2015 NOP narrow.

ii. The differences between Centerville Slough stage-graphs for the 2015 NOP, 2015 NOP narrow, and the 2015 NOP equilibrium models indicate significant differences in the levels of success in achieving multiple project goals of improving habitat, drainage and agricultural productivity. The trade-offs between these goals should be evaluated carefully prior to selection of a preferred design alternative. C-33

D. Wave Overwash: I suspect that the 2015 wave overwash was accompanied by a sand blockage in the Western Ditch, similar to what was seen in 2016. This may explain discrepancy between observed and simulated stages. C-34

E. There is no discussion of Figure 36 Sea Level Rise Simulation. C-35

11. Site 1: Angel's Camp 2015 NOP vs. 2015 NOP narrow All Simulations:

A. The 2015 NOP water stages do not decrease below 3.0 feet. (Figures 30a, 32a, 34a, 38a, and 41a). The 2015 NOP narrow water stages do decrease below 3.0 feet. It would appear that the 2015 NOP model geometry has some form of sill or minimum thalweg elevation at 3.0 feet at Angel's Camp that is different the 2015 NOP narrow model geometry. C-36

i. Please explain why the 2015 NOP Site 1 stages do not drop below 3.0 feet.

12. Velocity - ***Simulation Period 3: 2014/15 Winter Storms*** Page 29 and Figure 44

A. Figures in this sequence show extended periods of slack water (i.e., zero velocity) at most sites.

i. Are the velocities zero or near-zero? This is an important habitat and water quality question.

ii. If non-zero, velocity exceedance figures should be replotted with a Y-axis increment that makes clear that there is a non-zero velocity. C-37

iii. What was the time step used for these simulations?

iv. What causes the velocity to spike for short time intervals? Is this an artifact of the time-step? Is the time-step short enough to provide accurate velocities at flow reversals?

v. Are reported velocities sensitive to time-step duration?

13. Site 4 EREP Bridge – Figure 44d, 45d, 46d, 48d

    A. Figures 44d and 45d indicate zero velocity at Site 4 – EREP Bridge for all 2015 NOP options for the duration of each simulation.

    B. Figures 46d and 48d show much lower salinities at the EREP Bridge for all 2015 NOP options than other locations (both upstream and downstream) in Centerville Slough.

        i. Why are there zero velocities at Site 4?

        ii. How can salinities be higher upstream of Site 4 than at Site 4 during summer months?

        iii. Figure 43 indicates that Site 4 is on the Centerville Slough main-stem. Salinities and velocities should reflect a transition between upstream and downstream locations. Is this location actually in a backwater?

        iv. Please explain these discrepancies.

C-38

14. Fish Passage Assessment –

    A. Page 33: Design Intent: The project proponents should clearly identify fish passage goals for this project. The description should identify the salmonid species that are anticipated to occupy the project area, their life-stage, the time of year that they will occupy the area, their habitat needs (e.g., rearing, refugia, etc.), and their water quality and habitat requirements.

C-39

    B. One of the primary project goals is to improve access to aquatic habitats for other aquatic species besides salmonids. No analysis or discussion is provided for other species.

C-40

    C. Table 5: Juvenile Fish Passage Maximum Water Velocity 2.0 feet per second:

        i. This is incorrect. CDFW (2002) specifies maximum of 1 foot per second for juvenile salmonid passage. NOAA (2001) states: *The maximum average water velocity at this flow should not exceed 1 fps. In some cases over short distances 2 fps may be allowed.*

        ii. Results in Tables 6, 7, and 8 should be revised to reflect the 1.0 foot per second limit for juvenile Fish Passage.

        iii. Results for the 2.0 feet per second limit could be shown if the project proponents make clear that they intend to seek a waiver for the 1.0 foot per second requirement.

C-41

    D. Page 34/Table 7: Passage through Project Tide Gate Structure

        i. It's not clear if this refers to passage between the Inner Marsh and Outer Cutoff Slough or between Inner Cutoff Slough and Outer Cutoff Slough. I am assuming that this refers to the new tide-gates the Inner Marsh and Outer Cutoff Slough

        ii. Table 7(b) indicates that the MTR gate is open 100% of the time during a period when the gate should be shut when water levels in the Inner Marsh exceed 2.5 feet and water levels in Outer Cutoff Slough exceed Inner Marsh water levels. During the time period represented by this simulation, there are two major storm events and Eel River floods (Figure 12). During these flood events, the Eel River remains elevated above 4.0 feet for weeks at a time and

C-42

reach peak stages at high tide that exceed 8.0 feet. Figure 34e indicates that modeled water levels in the Inner Marsh are well in excess of 2.5 feet for the same time periods, which should result in gate closure during high tides. It does not seem possible for the MTR gate to remain open during the entire period.

iii. Table 7(b) indicates high rates of juvenile fish passage (flow velocity < 2.0 feet per second). It does not seem feasible that the flow velocities would allow passage given the head differences across the MTR gate.

C-42 Cont

E. Calculations used to prepare Table 6, 7, and 8 should be documented with tabular data that show stage levels and gate discharge. C-43

15. Predicted Project Wetland Habitat Distribution Analysis – Page 39, Figure 49 and 50.

A. It is not clear how Figure 49b was developed from the identified references. Please check references or explain how the identified references were used to develop Figure 49b. C-44

B. Figure 49b defines Low Marsh Zone as areas that experience 18% -48% time water level equaled or exceeded. The vegetation surveys conducted for the Salt River Restoration Project[4] in unleveed areas of the Eel River Delta detected sparse or no vegetation coverage in the Low Marsh Zone. This is consistent with observations in Humboldt Bay[5] which found little or no vegetation in the Low Marsh Zone. Thus, proposed project areas in the Low Marsh zone are unlikely to develop more than sparse plant cover. C-45

C. Figure 50 shows the 2015 NOP alternatives will generate Mid Marsh and High Marsh in areas where the ground surface is between approximately 4.0 to 5.0 feet. Figure 1 appears to indicate that much of the Inner Marsh lies below elevation 4.0 feet. **As a result, the 2015 NOP alternatives are likely to result in conversion of large areas of the Inner Marsh to mud flat.** C-43

D. The planning documents for this project should provide a better understanding of the spatial distribution of vegetation conversion associated with 2015 NOP alternatives. It is recommended that this report include:

i. Maps showing areas that are subject to tidal flooding under the 2015 NOP options color coded to indicate the habitat zones (not flooded, high marsh, mid marsh, low marsh, tidal flat, sub-tidal).

ii. Tables that quantify project areas subject to tidal flooding by habitat zones (not flooded, high marsh, mid marsh, low marsh, tidal flat, sub-tidal).

C-47

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[4] Winzler and Kelly, Kamman Hydrology and Engineering, and H.T. Harvey Associates. 2011. Salt River Ecosystem Restoration Project, Riverside Ranch Wetland Conversion Assessment.

[5] See:
Eicher, A.L. 1987. Salt marsh vascular plant distribution in relation to tidal elevation, Humboldt Bay, California. M.A. Thesis, Humboldt State University, Arcata, California; and
Takekawa, J.Y., Thorne, K.M., Buffington, K.J., Freeman, C.M., Powelson, K.W., and Block G. 2013. Assessing marsh response from sea-level rise applying local site conditions: Humboldt Bay National Wildlife Refuge. Unpubl. Data Summary Report. USGS Western Ecological Research Center, Vallejo, CA. 45pp + Appendices.

E. Text Page 39: *We assume the summer period tidal inundation duration periods control the distribution of vegetation community zones because both the leveed and unleveed areas within the Project vicinity experience very similar freshwater flooding and salinity conditions.* C-48

i. This assumption should be checked by providing a figure that compares stage frequency curves for winter simulations and summer simulations for Inner Marsh and for Outer Cutoff Slough.

16. Figure 53:

A. The chart shows that the 2015 NOP Equilibrium increases the flows peaks generated by summer tide conditions over existing conditions by as much as 500 cfs. Figure G-4 shows maximum outflows from the Inner Marsh MTR gate of about 100 cfs. C-49

i. Is the data in Figure 53 correct? Please explain.

17. Page 43-44: Impacts to Receiving Channels

A. As a check, how much would the cross sectional area of downstream channel need to widen to reduce 2015 NOP velocities to existing velocities (assuming no channel deepening)? C-50

18. Conclusions – Page 18

A. The conclusions should be revisited and verified in light of the comments and observations made in this review. C-51

19. Appendix B:

A. References are made to the "Closed Cell" which should be changed to "Inner Marsh". C-52

20. Appendix G

A. Text Page G-1: *As indicated in Table 1, additional culverts added to either the new or existing tide gate structures did not reduce maximum inundation levels. Although these measures to increase drainage conveyance may allow slightly more rapid drainage after peak flooding, the benefits are minor and likely not worth the added expense.*

i. Although I expect that the conclusion is true, it is not clear from Table 1 that *additional culverts added to either the new or existing tide gate structures did not reduce maximum inundation levels.* C-53

ii. Measures that allow more rapid drainage after peak flooding, such as increasing the discharge capacity of the main Cutoff Slough tide gate, are likely of great value to adjacent low-lying land owners. They would also likely increase the reliability of the entire project, provide allowance for uncertainties in analysis and design, redundancy as the design ages, and decrease risk of negative impacts. Thus, such measures should not be dismissed without more detailed analysis of the costs and benefits.

B. Invert Analysis C-54

i. Test Page G-3: *Thus, a resulting design criteria is to place culverts as low as practical to maximize flow conveyance.*

   a. That is, if flow conveyance is the only project goal. See other comments on the relationship between invert elevation and biological connectivity.

ii. I discussed the design recommendations with Leo Kuntz (Nehalem Marine). His comments on the design include the following:

   a. Setting the inverts at -3.94 was a bad idea because this would create a system that is too deep to allow for maintenance.

   b. The invert of the MTR gate should not be set so that it closes with the gate fully flooded. There should be at least a foot or more of clear space between the top of the gate and the water surface at closing.

   c. Design of the MTR gate must take into account the water velocity at closing. Excessive velocities at closing will damage the MTR gate and the tide-gate structure.

C-54 Cont

C. Figure (G-)4:

i. I am unsure if Figure 4 is constructed correctly. It seems to indicate some errors in modeling the MTR gate. The MTR gate should operate under the following rule set:

   a. Outflow from the Inner Marsh to Outer Cut-off Slough occurs when:

      1. Inner Marsh Stage > (Outer Cut-off Slough Stage + Door Opening Head)

   b. Inflow to the Inner Marsh occurs:

      1. MTR Gate previously opened by outflow AND

      2. Inner Marsh Stage < Outer Cut-off Slough Stage AND

      3. Inner Marsh Stage < 2.5'

ii. My interpretation of the data shown in Figure G-4 is that

   a. Outflow from the Inner Marsh to Outer Cut-off Slough is represented by Positive (+) discharge.

   b. Inflow into the Inner Marsh from Outer Cut-off Slough is represented by Negative (-) discharge.

   c. The Green Bands represent periods of inflow to the Inner Marsh.

   d. The Red Bands represent periods of outflow from the Inner Marsh.

   e. White (unshaded) bands represent periods of gate closure.

iii. Based on my understanding of the operating rules and on my interpretation of the symbology, I observe the following discrepancies in Figure 4:

C-55

a. The gate operates under the wrong rule set. Inflow to the Inner Marsh Occurs when:

1. Inner Marsh Stage < Outer Cut-off Slough Stage AND

2. Outer Cut-off Slough Stage < 4.0'

b. On 5/20/2009, there are two occasions, when there is inflow into the Inner Marsh, when clearly the Inner Marsh Stages are greater than 2.5 feet and the gate was not previously opened by outflow.

c. Inflow into the Inner Marsh is stopped (gate shut) when Outer Cut-off Slough stages rise above 4.0 feet even though all three conditions are met for allowing the MTR gate to remain open. For example, see gate closures from 5/23/2009 onward. C-55 Cont

d. The relative magnitudes of the inflows and outflows to the head differences appear incorrect. For example, on 5/27/2009, Outflow peaks at about 40 cfs under a head difference of 1 foot while Inflow peaks at 130 cfs under a head difference of 1.5 feet.

e. Timing of discharge peaks appears to be offset from timing of peak head differences.

iv. The discharge data appears spikey which suggests too long of a time-step for rapidly varying head conditions at the gates. This may be an artifact of Figure 4's time-scale.

v. Use of the terms Ebb and Flood Flow in the Figure 4 Legend appears incorrect. Ebb flow is indicated as periods when the Inner Marsh is filling and Flood Flow is indicated as periods when the Inner marsh is draining.

D. Figure (G-)5:

i. The y-axis for Discharge starts at the value of zero. Thus, Figure G-5 does not show negative inflows corresponding to inflow into the Inner Marsh.

ii. It's not possible to analyze the Figure further without a corrected Discharge Axis. C-56

iii. As with Figure G-4, the use of the terms Ebb and Flood Flow in the Figure G-5 Legend appears incorrect. Ebb flow is indicated as periods when the Inner Marsh is filling and Flood Flow is indicated as periods when the Inner marsh is draining.

E. Simulated Retrofitted Existing Culverts

i. The report should provide discussion of model results relating to the proposed auxiliary door. I would like to have a better understanding of how much discharge passes through the auxiliary door, the velocity, and the impacts to water levels in Inner Cutoff Slough. C-57

F. Recommended Culvert Design

i. I concur with the recommendation of concrete box culverts. These would provide better service life than round culverts. C-58

G. Figure (G-)7 C-59

i. I suggest re-plotting Figure 7 with a maximum depth of 10-feet. This would provide a better understanding of flow rates at the stage differences most commonly seen. C-59 Cont

21. Appendix I:

A. Table 2 – Check figures for last column (Annual Sediment Yield –CY/Ac-yr). The numbers are off by three orders of magnitude. C-60

B. Apples and Oranges?: The KHE estimate is based on sediment deposits. The Fenton sediment quantities are total suspended sediment estimated by turbidity measurements. Only a fraction of the total suspended sediment should deposit within the project area. The analysis is treating the two sediments estimates as equivalent, when they are much different. This invalidates the remaining discussion. C-61

Letter C Response to Comments

Response to Comment C-1

Respectfully, the figures stated in this comment do not depict proposed Project comments such as berms. Please see Figures 2-2, 2-3 and 2-4 for existing and proposed berms. New berms are not proposed on L.D. O'Rourke Foundation Property based on the approximate deed line shown on the Record of Survey (Exhibit E-1 and E-2) in Drainage Easement 2008-24826-32 recorded October 20, 2008 for Russ Ranch & Timber.

The project does propose placing gravel base on top of the existing Inner Marsh Berm to provide a more durable road surface for tidegate operations and infrastructure maintenance access. The above referenced deed line bisects the top of the Inner Marsh Berm in four discrete locations suggesting these portions of the Inner Marsh Berm are located on the L.D. O'Rourke Foundation Property with a cumulative length of approximately 400 feet.

Response to Comment C-2

Please see Project Description section 2.4.2 and the draft WLMP section of the EREP Management Plan (EMP).

Russ Creek and Centerville Slough would flow into the Inner Marsh during the dry season allowing for greater tidal amplitude (max. 5 foot elevation). During the wet season Russ Creek and Centerville Slough would flow into both Cut-off Slough and the Inner Marsh, similar to existing conditions and the maximum inflow tidal amplitude would be 2.5 foot elevation The seasonal flow direction would be achieved by a proposed water control structure or earthen berm placed in Centerville Slough near the existing TWC bridge.

Russ Creek is not proposed to be diverted on Russ Ranch & Timber Property.

The hydraulic connection of Russ Creek and Centerville Slough to Cutoff Slough is being disconnected during non-storm periods in order to restore tidal exchange and circulation to these water bodies. Non-storm flow in Russ Creek and Centerville Slough will experience tidal exchange via new culverts installed between the Inner Marsh and Outer Cutoff Slough. Under this new configuration, silt will be restricted from entering Cutoff Slough, during non-storm periods. During large storms, when water levels exceed 5-feet in elevation in the new Centerville Slough channel, flow will be directed into the south end of Cutoff Slough. Drainage of flood waters through Cutoff Slough will mobilize and transport silt out of the channel as occurs under existing conditions. Russ Creek can't be manipulated on the Russ Ranch & Timber property without the permission of the land-owners.

Response to Comment C-3

Please see Master Response to Comments - Drainage Easement and Coordination.

Response to Comment C-4

Please see Master Response to Comments - Reclamation District and Master Response to Comments - Drainage Easement. TWC circulated and proposed a Memorandum of Understanding in June 2015 to neighboring landowners, including the L.D. O'Rourke Foundation, and remains amenable to considering alternative "landowner agreements" proposed by L.D. O'Rourke, or others.

Response to Comment C-5

A response to the comments provided by O'Connor Environmental, Inc. (OEI) in their July 11, 2016 letter are provided in Section 4, Master Response to Comments - Hydrology and Water Quality. Based on the responses provided to OEI's questions, we don't feel the Hydrology and Water Quality Section of the DEIR is flawed.

Response to Comment C-6

The Draft Hydraulic Design and Feasibility Assessment Report (Kamman Hydrology & Engineering, Inc., 2016) is a source document prepared in support of the project DEIR and is incorporated as part of the DEIR. Therefore, questions or comments to this source document are addressed herein as part of comments to DEIR. A response to the comments provided by the USFWS in their June 28, 2016 letter are provided starting with Response to Comment C-9.

It was not the intent, nor the practice, of the Coastal Conservancy to "dismiss any problems found in the hydrologic data." In fact, the Project team has hosted 34 meetings with the ORF and others in order to discuss modeling data, assumptions, boundary conditions, anecdotal reports and more.

Although ORF declined the opportunity to participate in a mutually beneficial project, the Project team dedicated extensive time and effort towards ensuring that the Project would have no adverse impacts on ORF's land.

During the first 30 meetings, ORF and the Russ family (Russ) indicated a preference that the U.S. Fish and Wildlife Service's Partners Program serve as a peer reviewer of the Project as it relates to surrounding properties. In addition, the USFWS offered to develop project components on Russ properties on a pro bono basis.

Accordingly, and as a significant part of the Project team's due diligence, the USFWS was provided with a review copy of the Basis of Hydraulic and Hydrologic Design Report and asked for technical feedback. It was assumed, perhaps incorrectly, that since the USFWS was assisting Russ and ORF in their understanding of the Project, that this information would be shared with ORF and Russ.

As indicated above, the commentary provided by USFWS is addressed in the detailed responses beginning with Response to Comment C-9. Most of the commentary by USFWS pertained to the Project design level discussion, and not to a CEQA level analysis.

Response to Comment C-7

The commenter describes the aerial extent of properties affected by the proposed project alternatives. The hydrologic and water quality analysis of the proposed project alternatives is not restricted to these boundaries, but includes surrounding areas potentially affected by project actions. The hydrologic and water quality analysis also considers the influence of hydrologic and water quality conditions and influences from surrounding properties on the alternative project areas. Therefore, the domain of hydrologic and water quality conditions evaluated does not differ between project alternatives.

The DEIR analyzes four alternatives, including a “full tidal exchange” alternative. Hydraulic analyses for all alternatives have been developed, though not at the same level of detail as the Proposed Project.

Response to Comment C-8

Comment noted. Although the DEIR will not be “rejected,” it will be recirculated. It is hoped that the materials and information provided in the recirculated DEIR will address the comments and concerns raised.

Response to Comment C-9: Attachment B (USFWS Comments)

The Report is not intended to be a stand-alone document. The Report is a supporting project resource document focused on presenting results of hydrology and hydraulic (H&H) assessments completed as part of project design development. As indicated on page 2 of the Report, project goals and objectives are described in the 2014 and 2015 NOP documents. Additionally, the DEIR provides more in-depth discussion of aquatic and wetland habitat objectives. Please also see response to Comments K-1 through K-7.

Response to Comment C-10: Attachment B (USFWS Comments)

Final designs will continue to carefully evaluate the impact of all types of flood and tidal magnitude events. Subsequent and final versions of the Report will present results in a manner that captures the changes in flood frequency for all types of flood magnitude events.

Response to Comment C-11: Attachment B (USFWS Comments)

This comment indicates that the Report does not provide sufficient documentation of how tide gates were modeled. Descriptions of the gates and modeling approach were provided in Section modeled are provided in Chapter 3 and Appendix G of the Report. Responses to proposed reporting recommendations provided by commenter are provided in response to comments below.

Response to Comment C-12: Attachment B (USFWS Comments)

Predictions on the types and areas of vegetation that will be created will be further evaluated and vetted through analysis of final design by a larger number of project team members, including project botanists/biologists and ecologists. The presentation of final analysis results may be shifted to a different resource document or portion of the Basis of Design report.

Response to Comment C-13: Attachment B (USFWS Comments)

The hydrology and hydraulic analysis presented in the June 1, 2016 Draft Report reflects on presenting analysis results in support of environmental compliance. Given the final project alternative will not be chosen until the project EIR is finalized and ratified, a complete and comprehensive hydraulic analysis tailored for final engineering design was not warranted. The H&H analysis presented in the Report is sufficient and consistent between EIR project alternatives to reflect reasonable hydraulic conditions and capture the differences between proposed project alternatives. Upon selection of the final project alternative, further hydraulic analyses will be completed that will include the recommendations provided in USFWS comments. We are aware of the issues/concerns and trade-offs raised in the USFWS comments and will further evaluate the following tide gate design elements, but not limited to: a) invert elevation; b) energy loss associated with different gate types (side- vs. top-hings); c) gate maintenance/repair accessibility; d) flow velocities and structural integrity (e.g., water hammer); e) gate sizing factor of safety; f) introducing redundancies at individual structures as well as the overall drainage of the project domain; g) need to consider gate soffit elevation with respect to orifice flow conditions to biological considerations; h) sedimentation and erosion; i) fish passage; and j) operation and maintenance.

Response to Comment C-14: Attachment B (USFWS Comments)

The commenter indicates that there are several questions about the proposed design which were not resolved by the hydraulic modeling presented in the report. The primary critique is that the model results presented in the report do not provide sufficient spatial and temporal resolution to address several concerns about flow patterns and hydro-periods. In response to the critique on modeling approach and spatial coverage, the reader is directed to Section 4, Master Response to Comments - Hydrology and Water Quality.

A recommended solution to the perceived inadequacies of the modeling approach presented in the Report is the development of a two-dimensional (2-D) model to address four key questions. These questions are addressed in the following responses.

Response to Comment C-15: Attachment B (USFWS Comments)

A two dimensional model is not necessary for the preparation of stage-hydrographs. The stated design objective to avoid flat-topped stage-hydrographs requires an exercise in MTR tide gate design and analysis. A two dimensional model is not needed to conduct the analysis and design of tide gate structures. In fact, the approach and numerical representation and computations associated with tide gates structures is virtually identical in 1- and 2-D hydrodynamic models. The stated design objective and associated modeling of tide gates can be achieved through the use of the existing 1-D hydrodynamic model. It's also important to note that the model includes a much higher density of nodes where stage-hydrographs data is generated. Only a subset of model results representative of selected project areas are presented in the Report. Project design and analysis can rely on the full model output to assist in final design and evaluation of potential impacts.

Response to Comment C-16: Attachment B (USFWS Comments)

The results generated from the 1-D model provides the necessary information to aid in the assessment of potential marsh habitats. Neither 1-D or 2-D hydrodynamic models "assess" or predict marsh habitats. It is the data (water levels, inundation duration or hydroperiod, salinity, etc.) output from the models that is

evaluated along with many other empirical vegetation-hydrology-water quality relationships by a multi-disciplinary team that are used to predict the type and distribution of marsh habitats. A two dimensional model may provide a more immediate graphic display of the distribution of hydrologic variables, but an adequate or comparable representation can be achieved by mapping or visualizing 1-D model output. Regardless of the other project analysis and design variables that went into prioritizing 1-D over 2-D model development, along with the subjective interpretation required to predict wetland habitats, the claim that a 2-D model is “better” at predicting wetland habitats over a 1-D model is unsubstantiated.

Response to Comment C-17: Attachment B (USFWS Comments)

Here again, the output from the 1-D model provides sufficient information that identifies the flow rates and velocities through Cut-Off Slough and associated state of stagnation under varying project conditions. The graphic display of flow conditions of a modeled channel would be better using a 2-D model, but the same determination is provided by analysis of the 1-D model output.

Response to Comment C-18: Attachment B (USFWS Comments)

The channel alignments and dimensions evaluated and presented in the Report are representative of preliminary project alternative designs. Upon selection of the preferred project design, more detailed design development and analysis will be completed. The benefits of completing focused 2-D modeling in the design of complex channel features is acknowledged and such analyses are intended, as necessary, as part of final design development.

Response to Comment C-19: Attachment B (USFWS Comments)

The hydraulic and salinity modeling results suggest no significant change in water quality conditions, only an expansion of aquatic capacity available for expanded habitat and specie benefits.

Response to Comment C-20: Attachment B (USFWS Comments)

The presence of a back-dune wetland and bifurcating slough channel system indicated on the 1916 map is indicative of very low gradient conditions.

Response to Comment C-21: Attachment B (USFWS Comments)

Please see Figure 1 of Hydraulic Analysis Report (KHE 2016).

Response to Comment C-22: Attachment B (USFWS Comments)

Upon development of final project design, a full description of the auxiliary door and operations will be provided in the final version of this Report or the Basis-of-Design report.

Response to Comment C-23: Attachment B (USFWS Comments)

The y-axis of the bottom graphic of Figure 14 will be corrected on the final version of the Report.

Response to Comment C-24: Attachment B (USFWS Comments)

Tide gate flow hydraulics for the final culvert design will be confirmed by independent analyses and findings documented in the final version of the Report.

Response to Comment C-25: Attachment B (USFWS Comments)

A concern is expressed that the numerical model is not reproducing the exact shape of the rising limb of each semidiurnal tidal cycle during baseflow conditions, which could lead to errors in assessing the ability of the system to drain down at low water stages. However, simulation results of the falling limb for each semidiurnal tidal cycle closely track measured hydrographs indicating that the model is accurately and consistently reproducing system drain down. The numerical model is a simplification of the actual physical system and simulation results indicate there are some minor deviations between simulated and measured water levels. Such deviations are anticipated, but the overall ability of the model to simulate hydrologic conditions is good and provides a reasonable basis for identifying the benefits and impacts between existing and proposed project conditions.

Response to Comment C-26: Attachment B (USFWS Comments)

The comments regarding differences in simulated 2014 NOP water levels to existing conditions are correct and the Report text will be modified to reflect the slight increase in 2014 NOP water levels at the sites noted.

Response to Comment C-27: Attachment B (USFWS Comments)

The notable differences in water levels between project and existing conditions are presented as simulated and are not intended to be misleading. The reason for these differences are explained in the Report text on page 23 as follows.

> *In contrast, the 2015 NOP alternative results in water levels that are lower than Existing Condition water levels at the RR&T and ORF sites. The lower 2015 NOP water levels in these areas occur because: a) this alternative includes a new deeper channel up through Angels Camp and guide berm that precludes backwater onto RR&T; and b) the alternative preferentially redirects the majority of flows into and through the Inner Marsh, reducing flows and water levels in Cut-Off Slough, which control water levels in ORF. The creation of the new Russ Creek channel into and through the TWC property under both NOP alternatives results in lower water levels as the grade has been lowered and non-peak flow water is contained within the banks of the new channel.*

Response to Comment C-28: Attachment B (USFWS Comments)

Although there is very little difference in simulated water levels between the wide and narrow channel widths of the 2014 NOP alternative, there are notable differences between wide and narrow channel widths under the 2015 NOP alternative. The Report text will be expanded to describe these differences under the 2015 NOP alternative.

Response to Comment C-29: Attachment B (USFWS Comments)

The decrease in capacity under varying channel widths as noted in text will be clarified to reflect a decrease in storage capacity at stages lower than approximately 4 feet in elevation.

Response to Comment C-30: Attachment B (USFWS Comments)

The commenter is correct. The stage-frequency curve for the 2015 NOP narrow simulation should be identical to that for the 2015 NOP alternative. The graphic will be corrected in the Report.

Response to Comment C-31: Attachment B (USFWS Comments)

The decrease in capacity under varying channel widths will be clarified to reflect a decrease in storage capacity at stages lower than approximately 4 feet in elevation.

Response to Comment C-32: Attachment B (USFWS Comments)

It is agreed that because the ORF area drains to Cutoff Slough, lower water levels in Cutoff Slough during any period will allow waters within ORF to drain to a lower elevation.

Response to Comment C-33: Attachment B (USFWS Comments)

Although the differences in water levels between the 2015 NOP alternative described in this comment are very small and characterized as not significant in the Report, the differences will be described in more detail for the final culvert design in the Report. The trade-offs between achieving project goals will be evaluated carefully as part of selecting the preferred design alternative.

Response to Comment C-34: Attachment B (USFWS Comments)

Comment noted.

Response to Comment C-35: Attachment B (USFWS Comments)

The results of winter period sea level rise analysis presented on Figures 36a through 36g is provided in Section 5.1.3.3 (page 26) of the report.

Response to Comment C-36: Attachment B (USFWS Comments)

For the 2015 NOP alternative, there is a sill or portion of the Western Drainage ditch channel where the bed elevation is at 3.0-feet in elevation at a location downstream of Angel's Camp, which precludes water levels from dropping below 3.0-feet in elevation within Angel's Camp. This channel depth could be increased in order to reproduce the lower Angels Camp water levels observed in the 2015 NOP narrow alternative.

Response to Comment C-37: Attachment B (USFWS Comments)

i. The velocities are near-zero
ii. When plotted on a logarithmic scale, the graphics in Figure 44 illustrate the range of low magnitude velocity around zero.
iii. The time step for the model simulations is 3 seconds, however, in order to minimize data output file size, only hourly velocity estimates were stored.
iv. The velocity spikes correspond to storm inflow events from the Wildcat tributary creeks. See middle graphic of Figure 12.
v. Overall, model stability is sensitive to time-step duration. Therefore, the short time-step of 3 seconds proved to account for stable mass/energy transfer and balance and smooth transitions in

water levels and velocity. The variability in velocity are attributable to constant tidal variability punctuated by storms of varying intensity.

Response to Comment C-38: Attachment B (USFWS Comments)

i. Under 2015 NOP project conditions there are zero velocities at the EREP Bridge (Site 4) because it is located at the head of a dead-end channel. Cutoff slough essentially terminates at the bridge as there is a berm (and channel plug) constructed across the channel to segregate it from the New Centerville Slough channel. Thus, there is no water transfer between New Centerville and Cutoff Slough at this location until water levels to the west rise above 5-feet in elevation, at which time they would spill over a broad weir from Centerville into the Cutoff Slough corridor.
ii. At water surface elevations less than 5-feet, there is no hydraulic connection south of this terminus in Cutoff Slough.
iii. Yes, as described above, this location reflects a backwater condition.
iv. The reason for the low salinity at Site 4 is an artifact of model geometry and assigned boundary conditions. In the MIKE11 model, a flow and salinity boundary condition must be assigned at the end of each branch. In the case of the 2015 NOP alternative, Cutoff Slough is a dead end branch, terminating at the EREP bridge as described above. There is no inflow to this branch, thus the inflow and associated salinity concentration was assigned a value of zero. However, assigning this salinity value at the end of the branch forces the salinity be always be zero, which skews salinity concentrations away from the end of the channel. An alternative boundary condition will be developed for Cutoff Slough to eliminate the static salinity concentration at the upstream end of the dead-end channel.

Response to Comment C-39: Attachment B (USFWS Comments)

See response C-9 above.

Response to Comment C-40: Attachment B (USFWS Comments)

See response C-9 above.

Response to Comment C-41: Attachment B (USFWS Comments)

As part of final culvert design, the juvenile fish passage assessment will be revised and use a maximum water velocity threshold of 2.0 feet per second. The report text and tables will be updated.

Response to Comment C-42: Attachment B (USFWS Comments)

The MTR and Side-Hinge gates addressed in Table 7 reflect the new proposed gates between the Inner Marsh and Outer Cutoff Slough. An error was discovered in the spreadsheet algorithm used to analyze model velocities and calculate duration of passage. This mistake is the reason for the errors identified in USFWS comments. The error has been corrected and fish passage results for the final tide gate design will reflect a corrected computation as well as use a 2.0 ft/s maximum flow velocity threshold to calculate juvenile fish passage, in lieu of the 1.0 ft/s value used in the Report.

Response to Comment C-43: Attachment B (USFWS Comments)

Comment noted.

Response to Comment C-44: Attachment B (USFWS Comments)

Wetland ecologists on the project design team have reviewed and updated the water level to vegetation inundation-duration relationships since release of the Report. This new data will supercede the references and approach presented in the Report and will be cited pending analysis of final project/culvert design.

Response to Comment C-45: Attachment B (USFWS Comments)

The updated wetland habitat distribution relationships support the sparse plant cover that will occur in the Low Marsh Zone. This section of Report will be updated as part of final culvert design and assessment.

Response to Comment C-46: Attachment B (USFWS Comments)

See responses to Comment C-44 and C-45.

Response to Comment C-47: Attachment B (USFWS Comments)

Predicted distribution of vegetation communities will be updated pending final culvert design. The results of this analysis will be presented in an updated section of the Report including the recommended maps and tables.

Response to Comment C-48: Attachment B (USFWS Comments)

The assumption in question has been reviewed as part of the work described in response to Comment C-44.

Response to Comment C-49: Attachment B (USFWS Comments)

Figure 53 presents the cumulative discharge from the Inner Marsh to Outer Cutoff Slough, which includes discharge through one MTR equipped culvert and three (3) additional non-MTR culverts equipped with one-way tide gates. Figure G-4 shows only outflow rate from MTR equipped culvert.

Response to Comment C-50: Attachment B (USFWS Comments)

An estimate of potential channel widening will be quantified as part of final culvert design and assessment. This determination will rely on comparison of tidal channel hydraulic geometry relationships for project and existing conditions.

Response to Comment C-51: Attachment B (USFWS Comments)

Conclusions in Final Report will be updated as recommended.

Response to Comment C-52: Attachment B (USFWS Comments)

References to “Closed Cell” will be updated to “Inner Marsh” in Appendix B.

Response to Comment C-53: Attachment B (USFWS Comments)

The term “Table 1” in quoted text should read “Figure 1” – this correction will be made in final version of Report. Additional comments noted.

Response to Comment C-54: Attachment B (USFWS Comments)

See response to Comment C-9.

Response to Comment C-55: Attachment B (USFWS Comments)

See response to Comments C-39 through C-43.

Response to Comment C-56: Attachment B (USFWS Comments)

Figure G-5 will be updated as recommended upon final design and analysis of project culverts and documented in final version of Report.

Response to Comment C-57: Attachment B (USFWS Comments)

Presentation and discussion of simulated retrofitted existing culverts will be provided upon final design and analysis of project culverts.

Response to Comment C-58: Attachment B (USFWS Comments)

Comment noted.

Response to Comment C-59: Attachment B (USFWS Comments)

Comment noted. The need to revise this figure will be evaluated upon final design and analysis of project culverts.

Response to Comment C-60: Attachment B (USFWS Comments)

The values in Table 2 will be rechecked and corrected as needed.

Response to Comment C-61: Attachment B (USFWS Comments)

The basis for the commenter's conclusion that the sediment aggradation assessment is invalid is based on their statement, "Only a fraction of the total suspended sediment should deposit within the project area". This statement is unsubstantiated. Given a) the dominance of sediment grain-size falling at the break-point between suspended and bedload sediment and b) low gradient and alluvial fan nature of depositional area, it is not unreasonable to experience deposition of a significantly large percentage of total suspended sediment load. Comparison of available data indicate that measured suspended sediment delivery rates to volumes of aggraded sediment are very similar, supporting this phenomenon.

Russ Ranch & Timber, LLC
P.O. Box 1435
Ferndale CA 95536

October 20, 2016

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, Ca 94612-2530

RE: Comments on the Draft Environmental Impact Report, (DEIR) SCH #2014122040, For the Eel River Estuary and Centerville Slough Enhancement Project

Dear Mr Bowen:

The following comments are submitted on behalf of Russ Ranch & Timber, LLC, a multi-generational family owned business who has operated on and developed the Project Lands for decades. We are dependent on the productivity of the land in order to sustain our ranching and farming family business and have had a strong commitment to both the ecological and agricultural productivity of the land which is evidenced by not only our stewardship but as well as our ongoing participation in the development of this project.

Russ Ranch & Timber formally joined the Project in November of 2015, because we saw a opportunity to not only enhance our property but more importantly because we believed that only a landscape wide approach could provide the most advantageous ecological and agricultural benefit. In addition, we believed that a joint project with The Wildlands Conservancy (TWC) would result in a planning process that would reduce conflict and produce a mutually beneficial outcome for all. D-1

Unfortunately, the planning process that developed the DEIR has not produced a product that we have confidence in. As a result, we have independently hired outside consultants to review the DEIR to provide technical expertise and comments. This includes Ken Davlin of Oscar Larson & Assoc., and Matt O'Connor of O'Connor Environmental, Inc. They will be submitting specific technical comments elaborating on our concerns. It does not appear this project is sustainable nor implementable as it is unclear as to potential impacts to our lands as well as our neighbors nor does the

Project include baseline agreements spelling out responsibilities nor addressing underlying existing property rights. It is in this light that we wish to submit the following specific comments. D-1 Cont.

1. **Inadequate hydrological analysis**

The hydrological analysis presented in the DEIR is inadequate as well as incomplete. The underlying 1D modeling used in the DEIR is inadequate as it does not correctly describe the existing flow and movement of water across the land. In this landscape, water moves across as a sheet flow as well as a channel flow. The 1D model does not adequately predict how, where, and when that water will move. The importance of adequate hydrological analysis cannot be understated because of the importance of efficient drainage is critical to the productivity of the agricultural lands. In addition, the proposed Project components such as the 8' foot berm on the east side of Russ Creek that extends for over a mile running North to South and the disconnection of the West side drainage ditch to Cut-off slough will radically alter existing drainage patterns. Also, from a biological standpoint, the disconnection of Cut-off slough from the Western Drainage Ditch, its only freshwater source, will alter the biological makeup of the Slough which is home to a multitude of species, including species currently listed as endangered. In addition, the number of cross sections used in developing the underlying hydrological model is in adequate as well as the general lack of information on drainage components of neighboring properties. We do not believe the existing modeling accurately captures the landscape features and, therefore, it is impossible to accurately assess the potential impacts to our property from implementation of the Project. D-2 D-3 D-4 D-5

2. **Lack of Design for Project Components**

There is a general lack of design information that has been shared with us and the other surrounding landowners as well as a lack of design information included in the DEIR. We have requested, but have never received, the 30% plans much less the 65% design plans. The Project proposes to radically change how the water moves across not only our lands and TWC but also four other landowners that are not included in the project boundary. Without adequate design information, it is impossible to adequately comment on potential impacts to our property and leaves the project open to challenge. D-6

3. **Lack of operational agreements**

The underlying Project Lands as well as the neighboring landowners were all incorporated under Reclamation District #461 & # 487 with certain rights and D-7

obligations. These rights and obligations have never been addressed. In addition, there is an existing drainage easement that limits changes to the drainage system. Project components such as retrofitting the existing Cut -off Slough tidegates as well as alterations to the existing flood control dike and disconnecting Cut-off Slough from the Western Drainage Ditch are all in jeopardy without necessary agreements between the landowners. The DEIR is inadequate in addressing any of these issues. In order to implement this project it will be necessary for the Project Lands as well as the O'Rouke Foundation, the Fern Cottage Corporation and L&K Russ properties to all be a part of an operational organization that has the responsibility and obligations that currently exist today. The lack of any agreements to or structured outline of an organization that all parties agree to puts the Project in serious jeopardy as well as making it impossible to assess the potential impacts of changes in operation. D-7 Cont.

4. **Agricultural Resources**

In order to assess the impacts to agricultural resources on our property it is imperative to have a clear picture of the potential changes to hydrology from the project, design elements of the components, as well as future operational responsibilities. At this point, none of the these elements are clearly set forth or detailed in the DEIR. Therefore it is impossible to assess impacts to Russ Ranch & Timber lands. The underlying agricultural analysis set forth as the baseline productivity of the Project Lands is incomplete and underestimated. According to the DEIR, productivity was based on a number of factors. Some of them, such as soils and elevation are valid. However, as far as historical production, the DEIR is incomplete. The DEIR was based on extensive interviews with the Lessee, the Miranda family. They had been in operation on the TWC's property for approximately 11 months. Basing agricultural production on such a short window production does not represent accurate baseline conditions and the productivity of the Property. In addition, TWC through their own management decisions have significantly reduced the agricultural productivity of their property. These decisions include allowing Russ Creek to disconnect from its historic channel and fan out across the landscape, failure to manage sediment areas, and allowing invasive species to take hold. Also, TWC has fenced off areas and excluded grazing and then claimed no agricultural value in areas that had been productive agricultural land for decades. The DEIR fails to capture the true baseline agricultural productivity by not fully analyzing what has been the historic productivity of the Property. D-8

5. **Recreation**

The Recreation section contains misleading and inaccurate statements related to Russ Ranch & Timber. There has been an ongoing dispute as to TWC's proposed use of its access easement in allowing public access. We do not believe that TWC's expansion of the use to include public access is allowable under the current easement they operate under. It is accurate that we have temporarily set aside this issue to cooperate and participate in the development of the restoration and drainage aspects of the Project. However, the blanket statement that we support the Project is not accurate. We do not support the inclusion of public access as part of the project and, prior to joining the Project, we made our position clear both to the California Coastal Conservancy as well as the California Department of Fish & Wildlife (the primary source of funds for the planning grant). In addition, the statement 'there has been no assertion that implementation of the project would have no adverse impacts from the recreational aspects of the Project' is not accurate. Russ Ranch & Timber along with all of the immediate neighboring landowners submitted written statements setting forth the fact that they each have great concern with the inclusion of public recreation as a component of this Project in a letter to the California Coastal Conservancy in March of 2013 when funding for the project was first considered. This position has not changed. D-9

Prior to TWC's ownership, the only recreation that was permitted was the existing private duck club. No public access or public recreation was allowed. As a result of TWC's acquisition and intent to open up the Connick Ranch to full public use, the Harville Ranch LLC, in November of 2014, filed and served a revocable Notice of Consent to Use with the Court. This was done to protect Harville Ranch LLC's property rights and allow time to resolve this dispute over access in a mutually beneficial manner. TWC has been operating under that Consent Notice in order to accommodate their invited quests. In addition, they developed unpermitted infrastructure to accommodate that use. Using TWC's last 7 years of use and development as the baseline to justify "no impact" is not accurate. D-10

On page 3.15-4, the language describing traffic patterns is not clear nor accurate. What if any traffic studies have been done? We have not been made aware of any traffic studies. Also, there is no connection between the west bound traffic on Centerville Road and the Mattole Valley as DEIR implies. D-11

On page 3.15-6, under Public Access Plan, the language is misleading. We, along several neighboring landowners, participated in mediated meetings to resolve the concerns we raised with public recreation to The California Coastal Conservancy. However, the process was cut short by the Coastal Conservancy and there was not an agreed upon resolution nor a Public Access Plan developed by the landowners as implied by the DEIR. It was written by California Coastal Conservancy and TWC with no review or input from the rest of the group. We believe the DEIR should analyze the change in use that has taken place since TWC's acquisition. This approach would better capture the impacts of their current use as well as be a better predicator of future impacts. D-12

Overall, the DEIR lays out a foundation of a Project that is attempting to drastically alter the existing landscape to an extent not seen since the initial reclamation efforts in the early 19th and 20th Century. Such an effort should not be done without thorough analysis of the potential impacts to the Project lands as well as the neighboring landowners who not only have a stake in the landscape, but also ownership and responsibility for the existing flood control and drainage infrastructure. The current DEIR falls short of that. D-13

In order to have a project with a more complete design as well as a better understanding of potential impacts to our Lands as well as the neighboring landowners it is going to be necessary to have a more robust hydrological analysis done, one that does an adequate job of capturing the complexity of the landscape that the Project is proposing to alter. As well, the necessary agreements on operations that spell out responsibilities in order to insure the long term viability and success of the Project. D-14

Thank you for the opportunity to comment on this Project. We look forward to working with all our partners to complete this project.

Sincerely,

Jack Russ

Jack Russ, authorized agent of Russ Ranch & Timber, LLC

Joseph Russ IV

Joe Russ IV, authorized agent of Russ Ranch & Timber, LLC

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OAKLAND, CALIF.

Letter D Response to Comments

Response to Comment D-1

This comment includes an introductory paragraph about RR&T; RR&T joining the project in November, 2015; and that RR&T hired outside consultants to review the DEIR to provide technical expertise and comments.

Response to Comment D-2

Please see Section 4, Master Response to Comments -Hydrology and Water Quality.

Response to Comment D-3

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment D-4

Comment is general and does not indicate what change is anticipated or whether the change will be beneficial. Hydrodynamic modeling results do not indicate a significant change in seasonal salinity concentrations in Cutoff Slough under project alternatives. Thus, there is no salinity-change that will drive a change in habitat for aquatic species.

Response to Comment D-5

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment D-6

Please see response to Comments K-5 through K-7.

30% Design Plans for the TWC portion of the proposed project are complete. An equivalent design for project components on RR&T is not. In order to avoid discontinuity in presented data, TWC design plans were not included in the DEIR. The 30% Design Plans for the TWC portion of the project may be obtained upon request from the State Coastal Conservancy.

Preliminary design (approximate 10% level) was completed for TWC and RR&T in Spring 2016 to support the CEQA analyses and was developed based on feedback provided by both landowners. Figure 2-4 and 2-5 reflects the proposed project preliminary design as agreed upon by RR&T and TWC in Spring 2016. The preliminary design drawings were developed using computer aided drafting (CAD) and were provided to RR&T and their design team partners (NRCS and USFWS) in Spring 2016 with the expectation the RR&T portion of the design would be advanced, see Appendix G (memos to USFWS and NRCS of January 5, 2016 and April 13, 2016, respectively). Unfortunately it has not.

Response to Comment D-7

Please see Master Response to Comments - Reclamation Districts and Operations Needs, and Master Response to Comments - Drainage Easement.

Response to Comment D-8

With respect to the assessment of impacts to agricultural resources on RR&T property, the commenter is referred to page 3.2-2 of the Draft EIR which outlines how the authors approached analyzing agricultural resources for RR&T. Despite the Project Team's repeated requests for data, such as stocking rates, growth rates, vegetation analyses, etc., the authors were provided with no data or information from RR&T. Therefore, as described, and due to the paucity of data from RR&T lands, the authors met with the landowners on December 9, 2015 to discuss an alternative analytical approach. That approach was discussed and accepted at that meeting. This recent rejection of this approach does not change the fundamental conclusion though, that RR&T land is readily divided into land unsuitable for agricultural production (Angels Camp), and highly productive and prime agricultural land (the remainder).

Assessment of future productivity is a crucial question, and the rationale for the Pasture Monitoring Plan. Clarification on hydrologic changes, modeling results, and more is provided in other chapters. It is agreed that prospective agricultural assessment of the Project area depends upon future data collection efforts specified in the Mitigation Monitoring and Reporting Program.

With respect to operational responsibilities, see Master Comment: Reclamation Districts and Operations Needs. The AMP and WLMP, the Memorandum of Understanding (MOU) and the proposed revisions to the drainage easement are all intended to provide and procedurally clear, technically defensible and a legally binding means of managing the Project area for more effective agricultural operations in the future, while also providing the ability to verify future productivity levels based on real data.

Regarding the comment that baseline productivity is incomplete and underestimated, the authors respectfully disagree. The Miranda Brothers operate two dairies, one in Ferndale and one in Texas. The Mirandas have leased the EREP for their replacement heifer herd for six years, not 11 months. Their detailed pasture descriptions, herd size quantifications, forage descriptions, understanding of regional forage variations and much more, in combination with soil and vegetation studies, have played a significant role in providing expert guidance to the authors.

Regarding the comment that TWC actions have significantly reduced baseline agricultural productivity through management decisions, the overall productivity of the EREP has quantifiably increased under the tenure of the Mirandas as lessees.

The commenter indicates that TWC "decided" to let Russ Creek avulse from its relatively artificial course and "fan out across the landscape." This is incorrect. As described elsewhere in the DEIR, establishment of a broad alluvial fan is the normal and natural course of events for Russ Creek as it departs the steep and erosive Wildcat Hills.

The Winter of 2008 avulsion occurred immediately following RR&T's decision to excavate Russ Creek upstream of EREP in the middle of a storm, drastically and suddenly increasing the velocity and flow of Russ Creek upstream of the EREP. Predictably, Russ Creek avulsed out of the 90-degree elbow that the Russes had constructed on the Connick Ranch some years before. The result was the establishment of the avulsion area, and the corresponding decline in agricultural productivity there. Not necessarily deliberate, this event was fully in keeping with historic land management practices described on page 3.2-

10 of the DEIR. TWC's desire to improve sediment management practices, not a "failure to manage" the sediment there, is one of the key reasons TWC has proposed the Project's sediment management area in conformance with existing laws and regulatory standards.

Regarding areas fenced off or otherwise removed from production due to water quality concerns or other land management decisions, the authors evaluated the entire land base on a productivity basis, as if those structures were not present. In other words, all land is assumed to have an agricultural production value, regardless of whether or not it is accessible to livestock.

Response to Comment D-9

Please see Master Response to Comments - Recreation and Public Access.

Response to Comment D-10

Please see Master Response to Comments - Recreation and Public Access.

Response to Comment D-11

No traffic impact study has been completed for the project because the project would not generate a substantial amount of traffic during construction and even less traffic during operation. As described in Section 3.16.5 (Impact TR-1), page 3.16-4, "Because the Project would attempt to balance the cut and fill (approximately 325,000 cubic yards) on-site through various beneficial reuses, as described in Section 2.4.7 (Beneficial Reuse of Excavated Sediment) the number of haul truck trips over the course of construction would be low." The words "These visitors may be travelling to overnight stays in the Mattole River Valley, where there are many vacation cabins" has been removed from the DEIR.

Response to Comment D-12

Please see Master Response to Comments on Recreation and Public Access, and Coordination.

Response to Comment D-13

Comment noted.

Response to Comment D-14

Given the final project alternative will not be chosen until the project EIR is finalized and ratified, a complete and comprehensive hydraulic analysis tailored for final engineering design is forthcoming. Upon selection of the final project alternative, further hydraulic analyses will be completed to address issues/concerns and trade-offs raised in the DEIR comments and will further evaluate the following tide gate design elements, but not limited to: a) invert elevation; b) energy loss associated with different gate types (side- vs. top-hinge); c) gate maintenance/repair accessibility; d) flow velocities and structural integrity (e.g., water hammer); e) gate sizing factor of safety; f) introducing redundancies at individual structures as well as the overall drainage of the project domain; g) need to consider gate soffit elevation with respect to orifice flow conditions to biological considerations; h) sedimentation and erosion; i) fish passage; j) operation and maintenance; and k) WLMP and AMP included as Appendix H.

L & K Russ
477 Coffee Creek Rd
Ferndale, CA 95536

October 21, 2016

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

Comments on the Draft Environmental Impact Report, (DEIR), SCH #2014122040
For the Eel River Estuary and Centerville Slough Enhancement Project

Dear Mr. Bowen:

L & K Russ own approximately 120 acres accessed by Russ Lane and located immediately East of the Wildland's property described in the DEIR. We wish to submit comments concerning their proposed project and the potential impacts to our property that the DEIR fails to address.

Our property is highly dependent on the existing drainage and flood control structures that were developed and have operated under Reclamation Districts #461 & #487. To this day we have continued with our neighbors to operate and maintain these structures in a collaborative fashion. The DEIR make little mention nor does it go into much detail as to how, who and in what form the drainage and flood control structures will be managed as a result of the development of the Project. In order to properly analyze this project it is necessary to have agreements and an organizational structure identified prior EIR certification that will identify this. As stated currently, on page 2-18 the DEIR proposes just circulating a draft proposal of a WLMP. Presently, we have not received nor had input any draft agreement. If there is not the agreement by the necessary landowners this could result in a significant challenge to implementing the project. **E-1**

In Chapter 2-4.1, pg 2-12, the proposal to establish a 8' foot berm east of Russ Creek will dramatically change how the entire landscape floods and subsequently drains. L & K's property, along with the O'Rourke property are lower elevation than either TWC nor Russ Ranch & Timber's lands. The current DEIR hydrological analysis does not adequately describe how to what degree changing the movement of water **E-2**

across the landscape from a sheet flow to a focused channel flow will effect our property. There has been no work to document the interior drainage structures that exist between properties outside of the Project Boundary and Project Lands. The entire drainage landscape is interconnected between Project Lands and neighboring lands and any proposed change to the current flood and drainage system needs to analyze the entire drainage landscape. **E-2 Cont.**

Under Chapter 3-15, pg 3.15-6, we participated in the mediated discussions whose goal was to produce a public access plan that was agreeable to all the participants. We are not aware of nor did we review nor agree to any draft public access plan as is implied by the DEIR. **E-3**

The only access to our property is on Russ Lane and we depend on its uninterrupted and unimpeded use in order to operate our livestock business on our property. We do not support in any way the establishment of public access on the private easement portion of Russ Lane. We utilize this area regularly in order to move cattle, treat sick animals, and manage our property. The current use by TWC has made it harder to do that and the DEIR does not take into account our current use or adequately describe the impacts to our property. The construction traffic alone will be extremely disruptive to our ability to manage our land and livestock and the DEIR states that there is little to no impact. The DEIR need to complete a more thourogh analysis of the surrounding neighbors in order to better understand the potential impacts. **E-4** **E-5**

Sincerely,

Kathy Christiansen

Kathy Christiansen

Lane Russ

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OAKLAND, CALIF.

Letter E Response to Comments

Response to Comment E-1

The first part of this comment is introductory in nature identifying the property and size of L & K Russ's property. Please see Response to Comment D-14.

Response to Comment E-2

Project plans include the creation of a new Centerville Slough channel that will extend southward from the Inner Marsh to Angel's Camp. This channel will connect to Outer Cut-Off Slough (i.e., reach of Cut-Off Slough north of the existing tide gates) on the north side of the existing tide gates through a new tide gate structure constructed through the Inner Marsh levee and equipped with Muted MTR(s). Internal berms will be improved and created along the east side of the new Centerville Slough channel to restrict tidal exchange east of the new/improved berms. The majority of the new berms will have crest elevations set at 8-feet. The height and bottom width of the berm varies depending on existing ground surface elevations, but it will have a 12-foot top-width and side slopes no steeper than 3:1 (H:V). The alignment and dimensions of the new berm are provided in the 30% Design Plans prepared by GHD in June 2016.

Other project elements will direct all of the Wildcat Tributary flow into the upstream end of the new Centerville Slough channel. The new Centerville Slough channel will be disconnected from the upstream end of Cut-Off Slough by the placement of earthen fill. The crest of the channel fill hosts a berm that merges with improved Inner Marsh internal berm to the north. A 330-foot long portion of the berm north of the Inner Marsh would be constructed as a high flow spillway weir by lowering the berm crest elevation to 5-feet NAVD88. This allows exchange of flood waters onto ORF property during flood events when water level in the new Centerville Slough channel attain an elevation of 5-feet. This new channel alignment will restrict drainage from the Wildcat Tributaries (including Russ Creek) from entering Cut-Off Slough except when local flood waters reach an elevation of 5-feet.

Model simulation results were used to identify potential project impacts, which informed revisions to project design and subsequent re-analysis to avoid identified potential impacts. Important considerations during the analysis of the berm spillway weir design included maintaining drainage from off-site properties and precluding any unwanted increase in flood levels/area. Through an iterative process of adjusting the crest elevation of the berm spillway, an optimal wetland and berm spillway design was developed that would not increase or prolong the areas of inundation within the ORF property during winter periods. Simulated Project water levels in the ORF property for the four winter and one summer simulation periods indicate that water levels for the preferred 2015 NOP narrow and equilibrium alternatives are equal to or less than the Existing Conditions levels. This indicates that the Project does not increase flood levels or inundation areas in the ORF property.

Drainage from the ORF property to the Eel River estuary would be maintained as-is via Cut-Off Slough and the existing tide gates. Replacement of the top-hinge gates with side-hinge gates would improve drainage efficiency, if completed. The reduction of flow through Cut-Off Slough with the creation of the new Project channels and tide gate structure would reduce the volume of water passing through the existing tide gates, although the rate of floodwater drainage would still be controlled by Eel River and tidal backwater processes. At a minimum, the method of drainage from the ORF property would not change and if new side-hinge tide gates were installed to replace the existing gates, drainage could only improve.

Response to Comment E-3

Please see Master Response to Comments on Recreation and Public Access, and Coordination.

Response to Comment E-4

Please see Master Response to Comments on Recreation and Public Access, and Coordination.

Response to Comment E-5

The analysis in the DEIR describing construction traffic impacts is detailed and accurate. As described in Section 3.16.5 (Impact TR-1), pages 3.16-4 and 3.16-5, “as required by the Caltrans, Project work that requires the movement of oversized or excessive load vehicles on State roadways, such as U.S. Highway 101 and State Route 211, would require a transportation permit issued by Caltrans. Additionally, a Transportation Management Plan would be required for any traffic restrictions and detours that could affect the highway system, which would be prepared in accordance with the California Manual on Uniform Traffic Control Devices. Because the Project would not require encroachment onto a Caltrans or County right-of-way, and with required compliance with the Caltrans permit for movement of any oversized or excessive load vehicles, the temporary impact of haul-trucks on the circulation system would be less than significant.”

Humboldt County Farm Bureau

5601 So. Broadway, Eureka, CA 95503
Serving Agriculture Since 1913

October 20, 2016

Michael Bowen, Project Manager
California State coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

Re: Eel River Estuary and Centerville Slough Enhancement Project EIR
SCH # 2014122040

Dear Mr. Bowen:

The Humboldt County Farm Bureau appreciates the opportunity to comment on the Eel River Estuary and Centerville Slough Enhancement Project. Approximately one year ago, the Coastal Conservancy was planning to develop an "Agricultural Assessment" in this project area which is a much needed tool to understand the overall Eel River Estuary project. To date, this assessment has not been completed which makes commenting on this proposal very difficult. We believe the Agricultural Assessment should be completed as originally defined and should include the Russ Properties as well as the Wildland Conservancy property. **F-1**

We believe that the Operational Agreement including the project feasibility must include a long term maintenance agreement or this project should not move forward. The potential use of the existing Dike or Reclamation District should be considered to establish a landowner group for input and review. This project cannot be feasible if there is not the mutual consent of all the landowners who enter into the agreement. **F-2**

The term "Public Access" is a legal right and must be obtained before a Public Access can be established. The proposed access is not in the Coastal Plan inventory of the existing Public Access. **F-3**

The concern of providing adequate emergency response personnel to the individuals recreating at these remote locations will be an ongoing concern for the volunteers in the community. **F-4**

We are concerned with the long term maintenance and how will be funded for this project and who will incur the costs? Threats to Agriculture include dunes eroding and the introduction of salt/brackish water into the soil are all concerns of the adjacent landowners. Water needs an efficient direction to return back to the estuary. The Eel River Area Plan says that "Public Recreation" cannot exist at the detriment of Agricultural Production. **F-5**

The Farm Bureau is concerned with cumulative effects this project will have on the existing Salt River Restoration Project and the Occidental Ranch. The lower stretch of the Salt River Channel was not dredged and this could create additional flooding. We are concerned with the amount of water that will need to exit the restricted channel. Are the existing flood gates sufficient in size to handle the volume of water? **F-6**

In our comment letter dated January 18, 2015, we raised concerns with your explanation of the "enhanced agriculture production" through "more effectively managing onsite flooding." In our opinion, this statement is not correct and flooding does not enhance agricultural production in Humboldt County. **F-7**

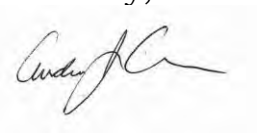
The Farm Bureau is working with government agencies on the State Ground Water Monitoring requirements in the Eel River Delta. We asked for elaboration on the existing wellheads (as backup) capacities and the effect of withdrawals on groundwater source in this area. The possibility of introducing salt water into the ground water due to increased tidewater action will create a negative impact on agricultural production. **F-8**

We believe there is a need to identify the locations/effects upon the "Approved upland and agricultural locations as needed" (for sediment deposit). If offsite, you will need formal agreements with the property owners, and the costs for this ongoing activity must be addressed. **F-9**

This project scope should also include the possible increase risk of Tsunami effects on the improvements including the danger it creates for the recreating public within the Tsunami Zone. **F-10**

We appreciate the opportunity to provide comments to this expanded project. This inclusive plan was needed at the beginning of this project.

Sincerely,



Andy Albin
Humboldt County Farm Bureau
President

Letter F Response to Comments

Response to Comment F-1

The aforementioned “Agricultural Assessment” was actually initiated twice. The first time, in 2009, SCC staff requested U.C. Coop Extension assistance in conducting the analysis. Ms. Valacovich declined, possibly due to concerns about conflicts related to the disputed easement and public access components of the Project. Later, following RR&T’s inclusion into the Project, the U.C. COOP Extension was again contacted. Mr. Jay Russ was requested to provide data on growth rates of cattle to the extension. The extension would then purportedly “reverse analyze” this data into productivity levels for the benefit of the Project analysis. The Team agreed to the approach, and this analysis was a frequent topic of requested updates at Project Team meetings. The requested data was never circulated to our knowledge, and the analysis never proceeded as far as we are aware. In lieu of that effort, the Project Team advanced the analysis presented in the DEIR. This included some extrapolation onto RR&T lands that were discussed with Mr. Russ on December 9, 2015. Consensus on that approach was achieved at that time. At that time it was understood that RR&T property was readily divided into two categories: 1) non-productive lands in Angels Camp, and; 2) highly productive and prime agricultural lands in the remainder. This level of understanding and the extrapolation described in the DEIR is sufficient for CEQA purposes of the DEIR analysis.

Response to Comment F-2

Please see Master Response to Comments - Reclamation Districts and Operations Needs.

Response to Comment F-3

Please see Master Response to Comments - Recreation and Public Access. The inclusion or exclusion of a public access point from a Local Coastal Program is irrelevant.

Response to Comment F-4

The concern of providing adequate emergency response personnel to individuals recreating in remote locations throughout the county, including the Project site, is a valid concern; however, the DEIR (Section 3.16.5, Impact TR-3 on page 3.16-6) concluded that implementation of the Project would not prevent emergency access to the Project site or to adjacent land uses along Centerville Road or Russ Lane, and the impact would be less than significant.

Response to Comment F-5

Long term maintenance of agricultural lands is ultimately the responsibility of the private landowner. Funding agencies can assist with construction of improvements and help establish protective features that reduce risk or maintenance obligations, but gifts of public funds for private benefit are prohibited by law.

The Project team is well aware of the threats to agriculture described in this comment, and shares the concern about the viability of future agricultural pursuits absent decisive preventative action. The dunes are currently in a state of destruction, not equilibrium, and salt/brackish water is frequently introduced into the entire Project area through the dune breach on RR&T. This trend is already causing extensive

damages to RR&T and EREP property. The Project seeks to establish a more efficient direction and course to run back to the estuary, while leaving the existing drainage system and corresponding maintenance structure entirely intact. As indicated by the Coastal Commission, the review standard for the Coastal Development Permit is first and foremost the Coastal Act. Relative to the Eel River Area Plan, no specific recreational components have been demonstrated to be detrimental to agricultural production.

Response to Comment F-6

First, the Project tide gates will significantly increase the total flood flow conveyance leaving the project site. Project gates will also provide sufficient capacity to accommodate dry-season tidal exchange. The concerns about increased flow magnitude through downstream section of the Salt River is addressed in: a) Section 3.9.6 (Cumulative Impacts – Hydrology and Water Quality) of the DEIR; the "Off-Site Erosion Potential" section of Impact HWQ-3 on pages 3.9-25 to -26; and in response to Comment C-50.

Response to Comment F-7

In its letter of January 18, 2015, the Humboldt County Farm Bureau requested "an explanation of 'enhanced agricultural production' through 'more effectively managing onsite flooding.'" The dynamics associated with water management and its associated effects on agricultural resources are described in detail in the hydrology and agricultural resources chapters, respectively.

Managing flooding does not imply only and increase if flooding. Managing flooding means controlling the location, timing and duration of floodwaters. If done correctly, flood management strategies can reduce overall or cumulative impacts to benefit agricultural production.

Response to Comment F-8

The section entitled, "Local Groundwater Basin and Beneficial Uses" on pages 3.9-8 to -9 in the DEIR provides a description of groundwater conditions beneath the project site. Recharge to the deeper confined aquifers that host the existing water supply wells occurs well outside of the Project area. Thus, the introduction of higher salinity waters in association with the Project would not impact recharge or water quality of the existing site irrigation wells and impacts to irrigation water quality would be less than significant. An excerpt from this section of the DEIR follows.

> *Beneath the shallow alluvium underlying the Project area, are partly to fully confined aquifers in the Carlotta formation. In the vicinity of Ferndale, where the coarse gravel in the alluvium is absent, there are at least two aquifers in the Carlotta formation. In the early 1950's, wells tapping these aquifers ranged from 180- to more than 340-feet and displayed artesian conditions (flowing water out of well heads)(Ibid). There are at least three artesian wells located within the Project area designated as "Artesian" wells on Figure 3.9-4. The deep flowing wells tap confined aquifers that are distinctly separate from the shallow groundwater system. Based on the artesian conditions and fresh water quality, recharge to the confined aquifers occurs from river and rainfall further up-valley, well outside of tidal influence, as well as contributions of recharge and underflow along the sides of the river valley where the confined aquifer formation slopes up to the ground surface (Ibid).*

Response to Comment F-9

The Project design ensures that no material will need to be moved off-site. Specific locations for staging and placement of fill on-site are identified in the 60% plans, and are designed to avoid or minimize adverse impacts to wetlands or productive agricultural areas. The Project also intends to utilize sediment deposits in an intensively managed area (i.e. the Sediment Management Area) where deposits can be efficiently tilled, seeded and utilized for maximized agricultural production. The SCC has repeatedly offered neighboring landowners the opportunity to participate in the Project and receive CEQA and regulatory coverage to utilize Project fill to improve their infrastructure, such as levees now in a state of disrepair and presenting a danger to the area within the historic reclamation district. For now, those offers have been declined.

Response to Comment F-10

The increased risk of exposing people and structures to inundation by Tsunami is addressed under Impact HWQ-8 on page 3.9-30 of the DEIR. The finding of this analysis was that, “The Project structures and operations would not exacerbate or enhance tsunami impacts over existing conditions. Nor would the Project inhibit evacuation routes in the event of tsunami warning. Therefore, the impacts of the Project and structures on tsunami dangers would be less than significant.”

Jay Russ
P.O. Box 391
Ferndale CA 95536

October 20, 2016

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, Ca 94612-2530

RE: Comments on the Draft Environmental Impact Report, (DEIR) SCH #2014122040,
For the Eel River Estuary and Centerville Slough Enhancement Project

Attention Michael Bowen,

Thank you for receiving my comments, as you know I am a fifth generation farmer/resource manager, I have grown up on the project site and managed the lands of Jack and Linda Russ and Russ Ranch and Timber adjacent to the 'Connick ranch' for the past 19 years. During those years I have witnessed significant geomorphic changes; an erosion, flattening and eastward migration of the Centerville beach sand dunes. This geomorphic process has been occurring from south to north, see images (Appendix A, A-2, A-6), the result is seawater onto agricultural lands. Seawater, is a natural herbicide, killing all freshwater, agricultural vegetation that it touches. To date Russ Ranch and Timber has lost the production from 69 acres of Angels Camp, which previously supported 720 AUMs, because of seawater contamination. **G-1**

While we respect the strength of the Pacific Ocean and its ability to reshape and relocate the Centerville dunes, there are intelligent things we can do to respond. For instance, the primary feature we support in this project is the restoration of Centerville Slough. This restored slough channel has the potential to return over washed seawater to the estuary, while providing habitat, connecting Russ, Shaw, Halley's creeks and protecting and draining the productive agricultural lands to the east of its alignment. **G-2**

In the meantime, 2013, we have taken action, RRTC is in the midst of describing and selling a NRCS Wetland Reserve Easement, with the sale of the WRE comes funds and enhancement design to restore Centerville Slough. **G-3**

Myself and other members of the Russ family have spent hundreds if not a thousand hours at meetings and preparing for meetings relating to the Eel River Estuary Centerville Slough project. We have done so with a keen interest in solving these resource issues while enhancing the agricultural production and resource values of our lands. **G-4**

Unfortunately, this project began on shaky ground with a single applicant, Cal Trout, representing the Wildland's Conservancy; one land owner in a District of several landowners, and a lack of understanding of the interconnected nature of these lands reclaimed for agriculture in the late 1800's. Not to mention, since the time of reclamation, a coordinated group of landowners has functioned to maintain the flood control structures of this District with the sole purpose of protecting these properties from sea water **G-5**

contamination. The project boundary occupies approximately half of the lands protected from estuarine sea water by a major District dike. The adjacent property within the confines of the District, Occidental Ranch, belonging to the O'Rourke Foundation is the lowest in elevation relative to EREP and nearby Riverside Ranch and likely to suffer serious impacts from errors in the design of this project. Therefore, it is imperative that the hydrologic modeling be robust in testing project actions and components. **G-5 Cont.**

From the time of my concerned visit to the SCC board meeting in 2012 until I have actively participated to broaden the scope of analysis and plan a landscape wide project. Twelve months ago a second Notice of Preparation was prepared including the Russ Ranch and Timber and Jack and Linda Russ properties. This second notice of preparation was a step in the right direction but too late and without the adequate funds necessary to accomplish much. **G-6**

There are components of this project Russ Ranch and Timber support and those which we oppose and critical items that are absent such a current governing structure, e.g. 'Current Operational Drainage District', Operations /Maintenance Plan, agreements that supersede existing drainage and access agreements. **G-7**

At this point, in reviewing what has been presented and developed, I would support the "**NO Project Alternative**". That choice is a difficult one given all of the time and money our family has expended so far. As I stated earlier, because this project was improperly initiated, the result of that has been a discoordination and inefficient use time and funds. Hopefully, the majority of this work will be beneficial to begin a coordinated regrouping of the Drainage District and a more comprehensive future successful project. **G-8**

CEQA Comments

CH2 2.4.1

Retrofit existing Cut-Off slough Tidegates:

2-5

As described the Cutoff Slough tide gates "Leak". Can you explain in detail, all wooden door tide gates leak.

"...not adversely impact existing hydraulic conditions up stream."

- Please explain as planned Cut-off slough and it tidegate are to be disconnected from water to the south below 5' elevation. How can that not impact hydraulic conditions to the south "upstream".

I do not support this concept and have verbalized it many times at project meetings. As stated in the Drainage easement:

"The parties to this Agreement shall cooperate to keep the present water course or courses open to maintain the flow of water from the end of the Drainage Easement(RRTC) to the flood control gates associated with the Flood Control Dike as that area shown in Exhibit E-1 and Exhibit E-2." **G-9**

5 feet inundation during the summer months.

- How was this level of inundation determined? Is it the maximum? What is the benefit of 5 feet versus 4 or 3? G-10

These need to be sound justifications in order to justify changes to historic and effective sea water exclusion/ flood control system.

2.4 2-6

A MTR would be seasonally operated based on biologic, geomorphic, hydraulic and land use objectives...

- Who will have the authority to make those decisions and how do they rank in terms of importance; given these lands are zoned by Humboldt County as agricultural exclusive AE? G-11

These decisions have the ability to severely impact the agricultural use of all properties protected by the Flood Control Dike Easement.

2.4.3 2-7

Re-establish and Enhance Centerville Slough.

This feature is strongly supported by the Russ's, as failing Centerville dunes have filled Western Ditch. Western Ditch is the only south to north connection for Shaw creek and Hally's creek and property as well as returning sea water to the estuary. Russ's do not support the disconnection of Cut-off slough and it's tidegates and view it as a violation of the Drainage easement. G-12

"The parties to this Agreement shall cooperate to keep the present water course or courses open to maintain the flow of water from the end of the Drainage Easement (RRTC, south) to the flood control gates(north) associated with the Flood Control Dike as that area shown in Exhibit E-1 and Exhibit E-2."

How can the project justify the disconnection of Cut-off slough from the south?

2.4.3 2-8

Develop sediment Management areas on Shaw Creek.

Sediment naturally deposited, mechanically placed and or excavated on lands of Russ Ranch and Timber Company LLC and Jack and Linda Russ would be tilled, Seeded, fertilized and irrigated to reestablish or enhance livestock forage and grazing areas. G-13

- **Does the project evaluate the dollar cost and or feasibility of these proposed actions and evaluate them in terms of increased agricultural productivity versus cost?**
- **Who is responsible for these actions and how are they funded?**

2.4.3 2-8

Develop Secondary Sediment Management Area and Floodplain Swales

- Has this concept been evaluated in terms of its feasibility? G-14

- What will be the cost to the agricultural operation?
- Will it obstruct agricultural operations such as row cropping, irrigation, and haying?
- Once the cost of maintenance and rehabilitation is expensed will it result in a net improvement of agricultural productivity when the dollar profit margin on the acre is less than the cost of the rehabilitation?

All excess sediment to be managed would be spread across designated sediment management areas existing agricultural areas and an agronomic rate...

- Where specifically is this agronomic spreading to occur or be applied?
- How does this increase agricultural productivity at a cost of $100 per hour?
- Please quantify the impact of this practice.

G-14 Cont.

2.4.5 2-9

Sea level rise alters groundwater composition and vegetation communities.

- If the project proposes to increase tidal inundation up to 5' how can that not negatively impact adjacent prime agricultural lands? Please explain further this potential impact.

G-15

2.4.6 2-12

Public Education and Access

Russ properties are managed exclusively for agricultural production.

- Russ properties are a managed balance of agricultural production and natural resource values such as waterfowl habitat and Coastal Cutthroat trout habitat. This balance recognizes that agricultural income is sole source of income.
- Private hosted educational tours are conducted on Russ properties.

G-16

3.15-2

Recreation

The sole use of RR&T and Jack and Linda Russ property is agricultural production: recreation is prohibited there.

- This is a misstatement. RR&T and Jack and Linda Russ' properties are primarily managed from agricultural production but also its natural resource values, habitat for waterfowl and California Cutthroat trout. Private recreational use is allowed but not to impact agricultural production in accordance with Humboldt county zoning and agricultural income requirements. Can you please explain or correct your misstatement?

G-17

Agricultural Resources

- See comments from Oscar Larson & Associates

G-18

3.2.53.2-38

In conclusion, agricultural operations on and outside the Project area tend to operate on a narrow profit margin...thus, seemingly common sense-improvements to habitat and agricultural operations may be desirable, but they are not necessarily feasible.

- This statement captures my concern with feasibility as stated above concerning project components relating to sediment management. i.e. spreading at an agronomic rate, over-washing pastures west of Russ creek traveling to the Secondary sediment management area for Russ creek.

G-19

3.5-5

Cultural Resources

Figure 7: Dike and Ditch System.

States, "This feature includes a coastal levy system and a tide flood gate, **all** constructed after 1964 floods."

- I don't believe this statement to be true, as many of the ditches and dike predate the 1964 flood as is apparent is in 1948 aerial photos of project site. Can you explain this misstatement and analyze the impact to these historically-structures?

G-20

Hydrology and Water Quality

3.9

- **My Hydrology comments will be provided by *O'Connor Environmental, Inc.***

G-21

3.9.29

However, this would introduce increased recharge potential from the internal channel to the shallow groundwater system, seasonally raising the saturated water table elevation closer to the ground surface. This would bring brackish groundwater closer to or within the root-zone of a larger area of pasture lands than occurs currently. Also as stated at **2.4.5 2-9 "Sea level rise alters groundwater composition and vegetation communities."**

- Introduction of muted tides into and adjacent to prime agricultural lands can have the same effect as sea level rise. Can you explain this potential impact of bringing additional brackish water to the nearby root zone of agricultural lands?

G-22

Thank you for the opportunity to comment,

Jack and Linda Russ and Jay Russ

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Letter G Response to Comments

Response to Comment G-1

Comment noted.

Response to Comment G-2

Comment noted.

Response to Comment G-3

Comment noted.

Response to Comment G-4

Comment noted.

Response to Comment G-5

As to the assertion that the "project began on shaky ground with a single applicant, CalTrout, representing the Wildland's Conservancy," the commenter is reminded that CalTrout began working on the Project through grant funding in 2013, while project discussions with the commenter about components on his property began as early as 2011. Regarding the commenter's "concerned visit" to the SCC board, which involved concerns about public access, or that the Project was "improperly initiated," the commenter appears to forget a process he participated in, contributed to and did not oppose or critique at its inception.

Response to Comment G-6

Comment noted.

Response to Comment G-7

Comment noted.

Response to Comment G-8

Comment noted.

Response to Comment G-9

During high tides when water levels on the seaward side of the tidegate are higher relative to the landward side, seawater can be observed flowing (leaking) from the seaward wide to the landward side between the interface of the wood gates and concrete walls.

Cut-off Slough and the existing tidegate structure would only be "disconnected" during the dry season when flood storage is not a concern however tidal flooding is a concern. The proposed water control structure placed near the TWC bridge would allow these management objectives to be achieved. Please see the WLMP section of the EREP Management Plan for further description.

Further, as indicated at the beginning of Section 2.4.1, the existing tide gates leak. This leakage is observed to occur at the seams of the wood boards used to construct the six top-hinge flap gates. The low magnitude rise in water level elevations in synchronization with flood tides also suggest there may be some degree of leakage through the gates. Comment also noted that “all wooden door tide gates leak.”

The commenter asks how changes to the existing tide gate structure could not be construed to “impact hydraulic conditions upstream” of the structure. There is no question that the changes to the existing gates would alter hydraulic and water quality conditions upstream of the structure. However, the DEIR is careful to indicate that these changes are not considered an adverse impact as they wouldn’t lead to detrimental changes in environmental conditions, especially flood storage/conveyance or water quality. When considering the changes below an elevation of 5-feet generated by modification of the existing gate, these changes must be considered in combination with the other project elements, including increased hydraulic connection below this elevation and flood drainage capacity with the new Centerville Slough channel.

In response to commenters past objections to the “concept”, the Project design team is evaluating alternative means to provide increased hydraulic connection through and upstream of Cutoff Slough. One alternative is the installation of control gates beneath the new and existing Wildlands Conservancy Bridge. The feasibility of this project element will be evaluated using project numerical model(s) as part of further and final project design.

Response to Comment G-10

The maximum dry season tidal inundation of 5-feet (NAVD-88) was based on objectives to maximize aquatic habitat capacity in existing low productive agricultural areas while protecting higher productive agricultural areas; remaining consistent with the Eel River Area Plan policy of no net loss of agricultural land productivity.

Response to Comment G-11

Please see Master Response to Comments - Reclamation Districts and Operations Needs.

Response to Comment G-12

Comment noted. Please see response to comment C-2 and the WWLMP section of the EREP Management Plan. The commenter is respectfully reminded the configuration of the proposed project components provides redundant outlets (gates), which has been supported by the commenter, and for which increases rate of drainage and does not “disconnect” Cut-off Slough from the south during the wet season with the placement of a new water control structure near the existing TWC Bridge.

Response to Comment G-13

The activities described by the commenter and in the DEIR are normal agricultural activities. Soil spreading, grading, tilling seeding, irrigation and harvesting are considered to be the purview and responsibility of the farmer and private landowner. The Project does not propose to pay private citizens agricultural operations costs as this would constitute a gift of public funds.

Notably, the relatively low elevation of RR&T properties in this part of the Project area are at extremely high risk of three significant forces; wave overwash, ponding of stormwater and avulsion of Russ Creek. Sediment inputs to raise elevation over time can only benefit the property by providing increased protection against these three forces of nature. In any alternatives analyzed in the DEIR this risk is a reality of life at this site, and a continuing risk to operations. The Project merely proposes means of managing this risk in an agriculturally profitable and predictable regulatory environment. It does not propose to pay the farmer to farm.

This Project concept was proposed by the commenter; Strategically targeted sediment buildup has been an explicit practice for the Russ family for many decades. The commenter at one time intended to secure the assistance of the U.S. Fish and Wildlife Service Partners Program to more fully develop this and other project components on his property (Appendix G).

Response to Comment G-14

Please see Response to Comment G-13.

Response to Comment G-15

Proposed and existing berms and channels will prevent tidal inundation on lands dedicated to future agriculture production. Within the Project Area, there is likely a strong connection between shallow groundwater levels and water level in the internal channel network. The concern is that raising the water level in an internal drainage channel would introduce increased recharge potential from the internal channel to the surrounding shallow groundwater system, seasonally raising the groundwater table closer to the ground surface. Introduction of muted tides into and adjacent to prime agricultural lands can have the same effect as sea level rise. Hydrodynamic modeling results of project alternatives indicate that during the winter baseflow (non-storm) periods, the magnitude of change in project area water levels due to SLR is greater under Existing Conditions than under the 2015 NOP Narrow alternative. Assuming 1-foot of SLR, simulated water levels in Angel's Camp, the Russ Ranch & Timber, Cut-Off Slough and the ORF site are all higher under Existing Conditions than water levels under the 2015 NOP Narrow alternative (see Figure 36 of Hydraulic Analysis Report). The prolonged backwater effects and higher elevation of low tide elevations during winter storms combine to reduce the drainage efficiency of the project area drainage network under the Existing Conditions alternative more so than under the 2015 NOP alternative, resulting in high Existing Conditions water levels under SLR conditions. Given the connection to shallow groundwater, this suggests the shallow groundwater table under SLR conditions will be higher in elevation under a no project scenario than the 2015 NOP narrow alternative.

During the Summer and 1-foot of SLR, simulated Existing Conditions water levels in Angels Camp and Russ Ranch & Timber are higher than those simulated under the 2015 NOP Narrow alternative. However, further north project summer 2015 NOP Narrow alternative water levels are higher than Existing Condition water levels along Centerville Slough and within the Inner Marsh. Simulation results indicate equal water levels within the ORF property for the Existing Condition and 2015 NOP Narrow alternatives under SLR conditions (see Figure 42 of Hydraulic Analysis Report). Thus, the hydrodynamic modeling analysis indicates that in the relatively near future, under 1-foot of sea level rise, the 2015 NOP Narrow project

alternative would lead to equal to lower channel and groundwater water levels on adjacent properties (e.g., ORF and RRT) than would occur under a no project (Existing Conditions alternative) scenario.

Response to Comment G-16

Comment noted.

Response to Comment G-17

Comment noted and text revised.

Response to Comment G-18

Comment noted. Comments from the Oscar Larson & Associates letter are responded to below under the heading “Letter I Response to Comments.”

Response to Comment G-19

Please see Response to Comment G-13.

Response to Comment G-20

The cultural resources investigation prepared for the project proponent’s property did identify that the two tide flood gates (#1 and #2) were all constructed after the 1964 floods; however, regardless of the date, per the cultural resources investigation “the sites are not significant under Criterion B because they are not likely to be directly associated with an important person. These sites cannot be considered significant under Criterion C because they do not possess a particular quality such as the oldest type or best available example of its type. The sites are not eligible under Criterion D because they do not possess data to address important research questions.”

Response to Comment G-21

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment G-22

Please see Response to Comment G-15.

October 20, 2016

TO: Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

FROM: Matthew O'Connor, PhD, CEG #2449

Jeremy Kobor, MS, CFM

PROFESSIONAL GEOLOGIST
Exp 10-2017
M.D. O'Connor
No. 2449
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

SUBJECT: Comments on the Draft Environmental Impact Report for the Eel River Estuary and Centerville Slough Enhancement Project, SCH # 2014122040

Introduction

The comments provided in this letter on the above-referenced document have been prepared on behalf of Russ Ranch & Timber LLC and The O'Rourke Foundation, landowners in or adjacent to the Project area. O'Connor Environmental, Inc. (OEI), was hired by these landowners to provide technical review of the hydrologic and hydraulic analyses used to support project design work and environmental analysis of potential project impacts provided in the Project DEIR.

Qualifications

OEI is well-qualified to conduct technical review of the Project hydrologic and hydraulic analyses. OEI was founded in 1996 in Seattle and has been based in Sonoma County, California since 1997. Dr. Matthew O'Connor, the founder of OEI, has 20 years of experience in hydrology and geomorphology in northern California and the Pacific Northwest working on a wide variety of projects ranging from site- to watershed-scale. These projects frequently include analyses of runoff, erosion and stream channel geomorphology and potential effects of proposed changes in land or water resources management. In 2010, OEI added to its staff an experienced hydrologic and hydraulic modeler, Jeremy Kobor, M.S., who is also a Certified Floodplain Manager. Mr. Kobor joined OEI after 5 years working as a Water Resources Scientist for DHI in Portland, Oregon. DHI is the vendor of a wide range of hydrologic and hydraulic modeling software applications, including MIKE11, the primary modeling tool used to analyze Project hydrologic effects. H-1

Mr. Kobor became an expert in MIKE applications at DHI, and has continued to use MIKE11, MIKE21, MIKE-FLOOD and MIKE SHE, among other hydrologic and hydraulic model over the past six years at OEI. He has applied MIKE11, MIKE-FLOOD and/or MIKE21 in various estuarine environments similar to the Project site where tidal influences are critical to analysis of flooding. Examples of Mr. Kobor's work with OEI in estuarine environments with OEI include Easkoot Creek, a tributary of Bolinas Lagoon in Marin County, the Elk River in Humboldt County, and portions of Alameda County adjacent to San Francisco Bay. In the

past five years, OEI has worked on several hydrology and hydraulics studies of proposed aquatic habitat enhancement and restoration projects in Sonoma and Mendocino Counties and has developedwatershed-scale hydrologic models in the lower Russian River focusing on streamflow limitations affecting anadromous fish, particularly coho salmon.

H-1 Cont.

Overview of Comments

These formal comments on the Project DEIR include three elements. First, we reference and summarize prior comments submitted to the Project team dated July 11, 2016 regarding Project hydrologic and hydraulic modeling. This is followed by a new set of comments that supplement the July 11 comments. Finally, our comment memorandum dated July 11, 2016 is appended.

Prior Comments to the Project Team Regarding Hydrologic and Hydraulic Modeling

OEI submitted a memorandum on July 11, 2016 to Jeremy Svehla, GHD, Inc. with the subject line "Peer Review of Draft Hydraulic Design and Feasibility Report, Eel River Estuary and Centerville Slough Enhancement Project" (attached). The scope of the review included the Draft Hydraulic Design and Feasibility Assessment Report for the Project prepared by Kamman Hydrology & Engineering, Inc. (Appendix F-Hydraulic Design Report in Volume II of the Project DEIR). Furthermore, we requested and received the working copies of MIKE11 (computer files) used to simulate hydrologic and hydraulic conditions in the Project area. Our comments in the prior memorandum were focused on hydraulic modeling methodology and implementation evident from the MIKE11 files and the Draft Hydraulic Design and Feasibility Assessment Report. We did not receive any written response to the previous set of comments dated July 11, 2016. H-2

<u>The key points from our July 11, 2016 review comments are summarized below and the attached memo from July 11, 2016 contains substantial additional detailed comments.</u>

1. The selected one-dimensional (1D) modeling approach with uniform roughness across very wide (>1 mile wide in some areas) cross sections representing hydraulically complex terrain is likely not capable of accurately simulating hydraulic conditions at the site. The 1D approach requires the modeler to pre-define the flow paths that will be simulated. The model was set up with only the primary channels represented as model flow paths. In floodplain and estuarine environments, numerous flow paths develop and interact to varying degrees depending on the tidal level and flood stage. In contrast to a 1D approach, a 2D approach can capture much of this complexity and provide a more accurate representation of the effects of the project alternatives. H-3

2. We identified numerous locations where one or more of the following problems occur, suggesting that the model contains substantial misrepresentations of hydrologic processes and hydraulic conditions:

   - flow interaction between adjacent channels or between channels and adjacent floodplain areas is assumed to occur despite water levels being lower than the intervening topography,
   - flow interaction between adjacent channels or between channels and adjacent floodplain areas is assumed not to occur despite water levels being higher than the intervening topography, and

H-4

- calculated water levels exceed the elevations of the topography along the edges of the cross section, thus introducing the potentially erroneous assumption that the cross section is bounded by vertical flow barriers imposed by the modeling process. H-4 Cont.

3. The absence of lateral flow exchange in certain branches of the model such as branch Russ Upper appears to have resulted in inaccurate mapping of inundation extents. For example, in Figure 33a of the project design report, no inundation is shown along branch Russ Upper for the Existing Conditions, 2014 NOP, and 2015 NOP runs despite the fact that water levels shown in model output files exceeded the top of one or both banks throughout most of this reach. This problem appears to have resulted in a systematic under-representation of the inundation extent throughout large portions of the RRT properties. H-5

4. Inspection of cross sections in the model branches upstream of the Inner Marsh area revealed substantial irregularities in the lateral extent of cross sections and unexplained variations and simplifications of topography across cross sections. Specific irregularities include the following: H-6

    - Many of the cross sections contain wide areas coded with the exact same elevation value (these flat areas are >1,000-ft wide in some cases).
    - Successive cross sections show substantial and unrealistic variations in bounding levee crest elevations and in some cases, the levee crest elevations between adjacent cross sections along parallel branches differ significantly even though they represent the same location.
    - Several cross sections are represented as wide shallow triangles and do not appear to represent any real-world topography; no discussion of the inclusion of generalized cross sections was provided in the documentation.

5. The model was calibrated only at a single location near the downstream end of the project site. This level of calibration is not sufficient to evaluate the degree to which the model is capable of accurately simulating conditions at the site. H-7

6. Larger flood events and prolonged outflow-restricting tidal conditions were not simulated. Simulation of such events is necessary in order to evaluate the effects of the proposed restoration on drainage of adjacent agricultural lands. H-8

7. The gross simplifications of flow hydraulics across very wide cross sections would be expected to produce inaccurate flow velocities (same velocities in channels and on floodplains) that would be expected to affect the results of simulations of salinity and inaccurate assessment of erosion potential. H-9

8. Groundwater conditions were assumed to remain constant under both existing and proposed conditions; there is reason to believe that may not be a valid assumption given the substantial modifications of topography and expected changes in the extent, depth and duration of areas of inundation. H-10

9. Given the use of groundwater inflow as a model calibration parameter, the model implicitly assumes that groundwater conditions are not affected by the proposed project. Since this area has been modified in the past by construction of drainage facilities through the activities of a drainage management district, there is reason to believe that shallow groundwater may be affected by manipulation of topographic conditions and water table gradients. We believe that H-11

shallow groundwater conditions and processes could both affect and be affected by the proposed project. H-11 Cont.

10. The model results for existing conditions and for the various alternatives generally show relatively small differences in hydraulic conditions. There is a substantial likelihood that these findings reflect overall insensitivity of the model attributable to the selected modeling approach and assumptions rather than a realistic representation of real-world processes and conditions. We were engaged by our clients in part to evaluate specific areas of concern regarding potential project effects on hydrologic conditions on their property. Given our concerns regarding model sensitivity described above, we do not believe that the model can simulate future conditions and the effects of the proposed alternatives with a reasonable degree of accuracy. H-12

New Comments

11. The concerns we raised regarding the approach used for hydraulic modeling in our July 11, 2016 memorandum could possibly have been addressed informally within the structure of the Project team's planning process prior to this formal submittal. The Project team should explain the context in which modeling decisions were made, including implicit or unstated constraints in the Project planning and design process, and should attempt to justify the approach taken by reference to the scope and objectives of hydraulic modeling work, contrasting work to-date with planned future work. H-13

12. The modeling work to-date emphasizes simulations of the extent of flooding that would occur under the various Project Alternatives. Given the circumstance under which flooding occurs and the influence of tides and the flow stage of the Eel River on the tide gates that control the accumulation and release of water from the Project area, the 1D modeling approach may provide reasonable predictions of the static elevation of accumulated flood waters. However, the 1D modeling approach as implemented does not provide an accurate simulation of dynamic flow conditions when flood waters are accumulating and when flood waters are released through tide gates when Eel River stage and tide conditions permit. H-14

13. Local flow velocities from the 1D model used to evaluate channel stability (Project DEIR, Appendix F-Hydraulic Design Report, Section 5.2, p. 29-31) are most likely to be inaccurate when drainage of adjacent inundated areas is occurring. This is because of the inherent inaccuracies of hydraulic simulations using a 1-d approach across very wide cross-sections with uniform roughness in areas with potentially complex flow and drainage patterns and non-uniform roughness characteristics as discussed in our comments dated July 11, 2016. The Hydraulic Design Report concludes that flow velocities are insufficient to cause erosion of channels based on evaluation of six locations (Figure 43, Figures 44a-f, Figures 45a-f). The largest changes in velocity occur in the simulated summer 2005 period at Site 2 (Middle Centerville Slough) as shown in Figure 45b and Site 6 (Inner Marsh) as shown in Figure 45f. Flows at these sites are affected by drainage of tidally-flooded areas, circumstances under which we believe the 1D modeling approach is prone to inaccuracy. The existing model results and interpretation with respect to flow velocity and channel stability should be re-evaluated. H-15

14. Furthermore, the evaluation of potential erosion associated with flow in the project area is limited to six locations where well-defined channels are present. Flowing water in the project area during highly dynamic periods when floodwaters are accumulating or draining could also cause erosion, H-16

and the analysis of erosion does not evaluate erosion that could occur at other locations such as drainage spill points and choke points located along drainage features (dikes, guide walls, and channels). The existing 1D model approach does not allow for evaluation of this type of erosion. H-16 Cont.

15. As noted in our July 11, 2016 comments, the DEIR does not address potential changes in groundwater flow and water table elevation, but does implicitly acknowledge that groundwater flow in the project area is substantial because assumed rates of groundwater inflow were used to calibrate the 1-d hydraulic model. The proposed summer operation of the project that would allow tidal flow into the Inner Marsh and extend as far south as Angels Camp is expected to allow tidal inundation up to 5 ft amsl, 2.5 ft higher than occurs under existing conditions. As noted in the July 11, 2016 comments, the potential effect of this tidal inundation on water table elevations in the project area is apparently not addressed. Cyclical inundation by tidal flows in the Inner Marsh, Restored Centerville Slough, and Russ Creek under proposed Project conditions during the summer period can be expected to raise water table elevations and introduce brackish or saline water to some areas; this could affect growing conditions of grasses and other vegetation. Restoration of the tidal cycle through the network of existing and proposed channels in the Project area during the summer months could potentially have significant long-term effects. Tidal inflows to this area have been largely prevented for many decades and have been managed since the 1870's. In question is the degree to which water table and water quality impacts of the proposed project may reverse the effects of drainage and reclamation efforts since the 1870's that have allowed much of the Project area, including lands owned by Russ Ranch & Timber LLC, and adjacent lands east of the Project area owned by The O'Rourke Foundation, to be used for agricultural purposes. H-17

16. The potential environmental effects of the Project are difficult to evaluate because a Water Level Management Plan that would "include specific tidegate settings and seasonal operational guidelines to meet the desired hydraulic conditions for the area" (DEIR, Section 2.4.2) has not been defined or determined. This critical but undefined aspect of the Project may be particularly important in evaluating potential effects on water table elevation under Project conditions. H-18

17. The analysis of Project hydrologic effects for the 2005 summer period shows constant water levels for Existing Conditions at Sites 1 (Angels Camp), 2 (Russ Ranch/Timber), 4 (EREP) and 7 (ORF) in Figure 41, (DEIR, Appendix F-Hydraulic Design Report, pp. 73-79). Such unvarying, constant water level seems unlikely to occur naturally. Existing Condition water levels were used to evaluate changes caused by the Project. The data or assumptions used to define the Existing Condition water levels for these sites need to be stated in order that readers of the DEIR may better understand the evaluation process used to conclude that Project effects are not significant. Depending on the cause of the constant water levels described above, it may be appropriate to re-evaluate potential Project effects on inundation where Existing Conditions water levels are used as the reference condition. H-19

<u>Our comments dated July 11, 2016 are appended beginning on the following page.</u>

Letter H Response to Comments

Response to Comment H-1

This comment includes introductory comments in addition to the qualifications of the consultant to conduct a technical review of the Project's hydrologic and hydraulic analyses.

Response to Comment H-2

Comment noted.

Response to Comment H-3

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-4

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-5

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-6

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-7

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-8

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-9

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-10

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-11

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-12

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-13

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-14

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-15

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment H-16

The Report presents results for six representative locations. Longitudinal profiles of flow velocity were also reviewed as part of model output analysis in order to identify local sites of potential instability. Continued and focused analysis of potential erosion sites and recommended mitigations, as needed, will be completed as part of final culvert/project design and analysis.

Response to Comment H-17

Please see Section 4, Master Response to Comments - Hydrology and Water Quality and Response to Comment G-22.

Response to Comment H-18

Please see the WLMP section of the EMP. Please also see Response to Comment G-15.

Response to Comment H-19

The static water levels at the sites noted are spatially removed and hydraulically segregated from tidal influences. Upstream summer boundary conditions to these locations are treated as constant or no inflow. Given the simplified representation of the hydraulic system, there is no reason for there to be fluctuations in water levels. The commenter opines that unvarying water levels are unnatural, however this opinion is unsubstantiated. It is important to note, that apart from the reintroduction of downstream tidal exchange, no other changes were made to summer boundary conditions under Project Alternative models. The intent of this approach is to provide an unbiased model comparison of hydrologic conditions between alternatives. Unfortunately, no existing conditions water level monitoring data representative of “reference conditions” exists for the RRT and ORF sites, at least that the design team is aware.

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October 20, 2016 JN:7321.2

Michael Bowen, Project Manager
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Subject: Eel River Estuary Preserve Ecosystem Enhancement Project and Comments on the Draft Environmental Impact Report, (DEIR) SCH #2014122040, Currently Available for Public Review and Input

Dear Mr. Bowen:

This letter contains comments, questions, and recommendations regarding the subject DEIR at the request of Russ Ranch and Timber Company (RRT). The private lands located within the Project boundaries have been historically vested in private ownership and control since 1884 when certain lands were reclaimed in accordance with Federal, State, Reclamation Acts, and County programs which allowed Reclamation Districts to be formed and managed. The lands overlap the lands of the Project.

General Comments I-1

There is a necessity for the DEIR to include identification of environmental and other impacts due to the Project, the Project construction, the Project's future operations, and management of the completed Project. Analyses to identify these impacts should be based on quantities, amounts, dimensions, depths, and other project metrics and should address physical impacts, as well as issues, consequences and risks related to obligations, responsibilities, costs, authorities, management, operations, maintenance, budgeting and other operational aspects which, if not addressed in this DEIR, could cause negative impacts after the Project is built. Without knowing the actual potential operational requirements and details of the impacts upon the private parcels, the DEIR cannot properly address whether the Project is completely and correctly designed, nor even be operated without causing unintended consequences.

As a private landowner, with lands located in the middle of the constructed Project, the intent of RRT is to maintain its historical rights of use and to maintain its agricultural production capabilities, without any diminution of use or authority to use, and without becoming responsible for additional and un-expected new costs due to the Project; and to avoid becoming unexpectedly responsible for any yet unstated and/or unintended consequential impacts or obligations that may result from this Project. Since all operational and management plans and their organization, budgeting, authorities, and standards for performance, have not yet been prepared, nor evaluated for future impacts, there exists at this time of consideration of the DEIR, potential un-planned, un-anticipated, and unknown impacts and consequences as a result of the actual construction of the Project. Because of this lack of knowledge about how the new Project will be operated, it is I-2

requested that the DEIR be amended to incorporate and identify any environmental, as well as operational and potential constructed feature failure impacts which might occur to the agricultural lands historically granted to RRT and others which are currently used for agricultural operations. **I-2 Cont.**

The DEIR lacks substantial information on project specifics. At this point in the process design plans should have been developed sufficiently to give more concrete details of construction scenarios and associated impacts. The lack of information in this document makes it deficient. A subsequent revised draft should be made available for review based upon a more complete set of plans with specific metrics, a complete and acceptable hydrology, incorporation of complete topo (recently completed in this month of October), and operational and management planning. **I-3**

The use of the Quonset hut as the clubhouse for the Eel River Waterfowl Association is not mentioned. The Quonset hut is currently being utilized as a club house and has been used as such for over 50 years. Page 3.5-5 addresses its use as an historically used facility by the Centerville Duck Club but it does not address the fact that it is currently in a private-not-public use. How will the Project impact that facility and its operation? **I-4**

There seems to be a lack of discussion on the impacts to historic and operational setting of the duck club and its various facilities (ponds, blinds, club house, etc.). There is a short discussion as to the determination that the club and facilities are not "eligible" but the issue demands further explanation and conclusions. The impacts upon this private and historical feature should be evaluated. **I-5**

Under NEPA (National Environmental Policy Act) provisions, the Project will need to comply with Section 106 of NEPA, and since these features have not previously been evaluated, the Project likely needs to get SHPO (State Historic Preservation Officers) concurrence on their findings. Of course this will be the responsibility of the Corps when issuing the 404, but it is expected that the DEIR would contain any special studies, reports and analyses to support and expedite the 404 permit. In order to avoid conflicts and impacts. **I-6**

Impacts associated with the project with respect to hydrology, recreational use, etc… to the adjacent land owners are not fully addressed. This project cannot be completed without Project work occurring on adjacent landowner's properties. Discussion of these types of impacts appears insufficient. **I-7**

How is the lead agency able to make the "significance" finding of "Less than Significant", on biological resources, recreational elements, transportation, and hydrology when insufficient Project specifics have been offered or described, and fully disclosed? **I-8**

There is discussion on the realignment of Russ Creek. The current baseline condition is that it empties out south of the duck ponds, and forms a marsh/wetland feature. The discussion implies that this is no longer viable Ag land; and that by re-channeling Russ Creek the Project will be able to create Ag land, which would offset some Ag losses which would occur due to the Project. However, by channelizing Russ Creek the Project is, in essence, dewatering an existing freshwater wetland feature. Is there a necessary mitigation for offsetting impacts associated with loss of freshwater wetland? **I-9**

The DEIR does not provide a full and detailed description of the "No Project Alternative". The discussion is very general without clear justifications or documentation why there is a need for the Project vs. leaving the setting as it is. There are no discussions or conclusions regarding the benefits of the Project compared to the value of the current setting vs. the cost of the Project, which is not stated, but in team meetings has been suggested to be in the range of $15 million. **I-10**

It is recommended that prior to approval of the DEIR, the construction planning and all operational aspects and agreements which may affect private lands, and the operations of all lands, be prepared and agreed to by all affected parties, by preparing an Operations Management Plan containing operational responsibilities, authorities, obligations and requirements of the parties during post construction. **I-11**

1. Article 1.8 (Area of Controversy and Key Issues to be Resolved), pages 1-4, 1-5.

    a. Increased traffic is listed as an issue to be resolved. However, there is no traffic study included which should have analyzed and estimated vehicle trips to properly characterize traffic impacts – both construction and Project development as well as during the Project's operational life. **I-12**

    b. Increased day use is unstated or unknown. The installation of boat ramps will create unknown traffic volumes and types of traffic – and the potential for gas and oil spills, which are not analyzed or quantified. **I-13**

    c. Traffic uses are stated as exclusively "public"; however, there are private parcel traffic uses. The privately organized Duck Club within the Eel River Wildlife Area (ERWA) has not been analyzed nor addressed with respect to the **I-14**

construction of the Project nor the long-term impacts to that private facility during the life of the Project. **I-14 Cont.**

2. Article 2.4.3 (Re-establish and Enhance Centerville Slough and Reconnect Russ and Shaw Creek with the Estuary), pages 2-7, 2-8. The Project seeks to re-establish and reconnect Russ and Shaw creeks in a manner to flow more directly to Centerville Slough. Results are stated to be that the design would:

    a. Alter the existing flows within existing channels which extend upon RRT Property.

    b. Alter the quantities of sediments deposited on the RRT Property.

    At the time of distribution of the DEIR, the hydrology study has not been completed to confirm the quantities, amounts, the timing, frequency, velocities, and other metrics of the potential hydraulic and sediment impacts on RRT and other parcels. It is recommended that the DEIR be based upon a design which incorporates accurate metrics and state specific impacts, so RRT and the affected private landowners and the public can consider those impacts. It is inappropriate that the design is being prepared even without a completed and accepted hydrology report. It is requested that the hydrology report be complete and available prior to the consideration of approval of the DEIR to clearly identify all impacts upon the environment of the affected lands; as well as impacts upon current agricultural productive uses of the RRT and other parcels. **I-15**

    The accuracy and completeness of the hydrology study, which has been used to develop design solutions, has not yet been fully vetted by all reviewers and is said to be in a process of revision per the DEIR author. It is requested that agreement and accountability be reached by all parties regarding the hydrology study prior to consideration of the DEIR, and prior to any acceptance of a judgement of "insignificance" to the Project area regarding hydrologic related issues. **I-16**

    None of the dimensions, heights, grades, capacities, etc. of the channels to be created, relocated or improved have been provided in order to evaluate channel capacities. It is, therefore, impossible to determine if the design will, in fact, improve anything. There is no indication as to what level of flow, i.e. 10-year, 50-year, or 100-year flood, the channels are to be designed to carry, or when or to what degree the RRT and other lands might be flooded when or to what levels due to the Project. **I-17**

A new water control structure and/or berm is to be constructed at the north end of Centerville Slough to control inflow from high tides during summer, and allow outflow of freshwater in winter. It is stated that the Project will raise the elevation of the existing tide gate flow line; however, the impacts upon the RRT and affected upstream properties have not been stated nor defined. No dimensions, capacities, elevations, rates of flow, water retention quantities, or other characteristics have been presented for review. Therefore, the potential environmental impacts and the impacts to the upstream properties cannot be determined at this time. The logic of raising a flow line level implies that the upstream areas will be subject to higher water levels. **I-18**

No information is provided regarding the costs of future operations and maintenance which will befall the Project Sponsor or landowners as a result of the Project and its proposed improvements and future operations. **I-19**

The Project description states that construction will "create swales" on the new Russ Creek diking to reduce, but still allow, overflow from the new Russ Creek channel on to RRT and other property. Since the hydrology report is not yet complete, these quantities are not presented, and it is not yet stated in the DEIR what responsibilities RRT and other landowners may incur regarding cost, maintenance, future obligations, the performance of future mechanical movements, placements, or excavations of sediments, or water, upon the affected lands, where the sediment would then be "filled, seeded, fertilized and irrigated…" (as stated in the DEIR) for someone to expend resources to re-establish forage and grazing areas. Impacts upon other eligible agricultural crops within the Ag parcels are not addressed. **I-20**

It is requested that the Project identify the actual potential environmental impacts upon the existing agricultural productivity of the impacted properties regarding grass crops, food crops, and husbandry. **I-21**

Previous easement descriptions addressed some rights and responsibility among The Wildlands Conservancy (TWC), Russ, and Lytle. However, the construction will establish new conditions of operation resulting in impacts which should be addressed in the DEIR. **I-22**

The DEIR should identify the authority or persons who will be responsible for the Russ Creek channel management, the costs and the performance of maintenance, operations, repairs, monitoring and future regulatory compliance in order to minimize the potential **I-23**

for future environmental impacts, and to achieve the effective operations which are being sought by the Project Sponsor. **I-23 Cont.**

The Project's impacts upon the productive agricultural uses of the private parcels currently in agricultural production, as they have been since program approvals established the rights of use in 1884 and 1886, should be identified in the DEIR to ensure the Project does not create conflicts with the rights and practices granted to the existing Reclamation Districts. **I-24**

The Project Description leaves an impression of "build the Project first and then figure out who will operate it and how to operate it." To the credit of the preparer, a future "Adaptive Management Plan (AMP) is proposed. It is recommended that a currently prepared Operations Plan would provide the basis for subsequent implementation of a future AMP. **I-25**

The DEIR should address the planned operation in some detail to confirm that the construction has the correct Project components to minimize impacts due to construction and future operational environmental outcomes. **I-26**

Without an Operations Plan in place at the time of construction, there is a risk that there will need to be modifications made to constructed Project components in the future which will require time and funding from someone currently not defined, to identify and then implement those modifications. If modifications are needed, and funding is not available, environmental impacts and damages could result. **I-27**

3. Article 2.4.3 (Re-establish and Enhance Centerville Slough and Reconnect Russ and Shaw Creek with the Estuary), pages 2-8, 2-9.

    a. Within paragraph "Develop Secondary Management Area and Floodplain Swales". This discusses the creation of secondary management areas which have potential impacts to Russ and other properties. The statement is: "Floodplain swales or drainage facilities would allow release of over-bank flows to be directed to the secondary sediment management area from Russ Creek." How much? When? What are the impacts upon the affected properties? What are the management and operational impacts and requirements to repair any damage? **I-28**

    b. Figure 2-4, on page 2-27, shows the overflow swale location as dashed lines emanating from Russ Creek and flowing westerly across Russ property. This **I-29**

mapping is in conflict with the title reports for APNs 100-142-008, 100-142-009, 100-142-011, and 101-011-005. Each title description contains statements which do not allow for any diversion from Russ Creek for any purpose. This conflict needs to be resolved prior to adoption of the DEIR. **I-29 Cont.**

4. Article 2.4.4 (Enhance Existing and Create New Off-Channel Aquatic Habitat), page 2-9, Waterbird Ponds. The DEIR presents that the "freshwater ponds would be deepened and re-configured…" There is no analysis which confirms that such work is consistent with the beneficial establishment of waterfowl breeding and feeding habitat. It is suggested that a special study be the basis for that assertion. The DEIR contains no plan or drawings to deepen the existing ponds, nor is there any documentation of a study which confirms the value to waterfowl of such work. **I-30**

5. Article 2.4.5 (Protect and Enhance Drainage, Land Uses, and Habitats), pages 2-9 through 2-12. The Project intends to construct a "guide berm" east of Russ Creek at approximately 8.0 feet elevation. Improvements to the berms to be constructed along the west side of the RRT property (page 2-12) are intended to be constructed with "gradual side slopes" to allow for grazing on the east slope, and a "transitional wetland-upland ecotone on the west slope". More specific geometry is necessary to identify the potential impacts of erosion, which may occur due to inappropriately selected slopes and currently unidentified overflow volumes, locations and frequencies. **I-31**

The hydrology report should state the expected frequency of overflow, on private parcels, and the conditions which might occur if the dikes are breached. Physical impacts should be stated. The responsibility for maintenance and repair of these constructed facilities should be stated and agreed to by the landowners, and the Project Sponsor, prior to construction. **I-32**

There is discussion of the work on the "Western Drainage Ditch" as it affects the TWC property. It is not clear what will be constructed regarding ditch connectivity to the Russ property, nor what the metrics are proposed to be in the construction. The DEIR should fully address the issue based upon specific special studies and analyses. The hydrologic impacts on the parcels and neighboring parcels and properties should be presented to properly evaluate the necessary elements of construction and define predicted flows and frequency. The DEIR is incomplete in this portion of its impact description. **I-33**

The article discusses the commendable intent to remove "Invasive Species" (page 2-11) and to plant Native Vegetation (page 2-11). Are these efforts part of the construction of **I-34**

the Project? Or are these efforts to be undertaken at some other time period? There are no clear statements, nor quantities, amounts, areas, volumes, or periods of time when the work would be done, nor at what cost. Table 2-1 does not specify the details of a proposed replanting program. **I-34 Cont.**

6. Within the Project Description section of the DEIR, the various drainage improvements are discussed only in general terms while the plans remain currently unavailable at the time of public DEIR review. Design details are not presented. Therefore, the potential for environmental impacts cannot be stated, or known, by a reviewer; nor are they available or stated for review within this DEIR based on a specific design. **I-35**

   The channel dimensions provided in the Draft Hydraulic Design Report were limited to those in Appendix I of that Report (page I-6), in Volume II of the DEIR. It is not clear in that presentation for which channel the dimensions were provided. Nor were there any general or specific presentations sufficient to provide details regarding the timing, frequency, nor amplitudes of flow or flooding which may result from the hydrology operations. Therefore, the potential for environmental impacts has not been sufficiently stated. **I-36**

7. Article 2.5.1 (Site Access and Staging), pages 2-14, 2-15. This article discussed site access and staging during construction, but not for long-term operations. The descriptions are vague and do not fully address impacts associated with temporary roads, soil disposal/staging, and equipment staging. The DEIR should identify access roads and construction staging locations. Permanent and temporary impacts on species, habitats, etc.. require that these locations have been identified and analyzed. **I-37**

8. Article 2.5.4 (Construction Schedule and Duration), pages 2-15, 2-16. This section discusses construction schedule and how the Project operations will generate 30 trips per day. This assertion has not been made based on a special study of traffic volumes. The impacts of these trips on Russ Lane are not fully identified. It offers that construction will occur from 6:00 AM to 6:00 PM. Is this consistent with the County noise ordinance? There are sensitive receptors, which have not been stated, that can be impacted as a result of heavy equipment and traffic in this sensitive environment. Will a Storm Water Pollution Prevention Plan (SWPPP) be required? What lands will be included in the SWPPP? **I-38**

9. Article 2.5.5 (Adaptive Management Program), pages 2-17, 2-18. The implication of this discussion is that there is no currently defined criteria for implementation of an AMP, **I-39**

since there is no current Operations Plan. Will Project changes due to the AMP trigger additional DEIR review? The DEIR states that the AMP will be circulated prior to the EIR, but if the effects are significant enough and the changes are deemed significant wouldn't this trigger the necessity for the DEIR to be re-released for circulation prior to construction? A draft AMP should have been circulated as part of this DEIR document and should be sequential to adoption of an Operations Plan, which would establish the basis issues the AMP would respond to. **I-39 Cont.**

10. Article 2.6 (Required Permits and Approvals), pages 2-18, 2-19. Presentation on technical and procedural issues related to US Army Corps permits (such as 106 and 404 permits) have not been included. Any potential mitigations required as a result of permit conditions and mitigations would require modifications to the construction plans. It would seem that it is important to address any conditions within the current design, rather than cause the development plans to be modified from their current form in the future in response to Corps review. No mention is made regarding a requirement for preparation of a NEPA document. Is it clearly not required? **I-40**

11. In comparing the cross sections (Figure 2-5, Project Area Proposed Condition Cross-Sections, page 2-29) provided in the DEIR; with cross sections provided previously in the Project Description (also Figure 2-5), it is seen that although both figures are dated 27 January 2016, the channel widths shown in the DEIR (Figure 2-5, page 2-29) are smaller (different dimensions) than those in the previously provided Project Description. Which set of dimensions are consistent with the Construction Plans? The DEIR should explain the differences, and any consequences, as to why that is the case, in order to clearly identify the intended construction and the potential for resultant environmental impacts. **I-41**

12. The Adaptive Management Program (AMP) and Water Level Management Plan (WLMP) are discussed on pages 2-17 and 2-18 of the DEIR, but in a general fashion with no draft Table of Contents, without identification of criteria, standards, who will be responsible for management and operations, nor where the capital will come from to support management and operations. Both the AMP and WLMP will need to rely upon a not-yet-developed nor adopted Operations Plan. How will these plans coordinate with the existing Reclamation District? These issues should be addressed in the current DEIR, not after construction. **I-42**

13. Article 3 (Environmental Setting, Impacts, and Mitigation Measures), page 3-1. The presentation does not address issues nor mitigations related to: **I-43**

a. Archaeological, historical, and historically registered resources.
b. Native American Archaeology.
c. The privately operated "Gun or Hunting Club".
d. The existence of the existing Reclamation Districts.

I-43 Cont.

It is recommended that these issues be included, evaluated and addressed.

14. Page 3.2-13, first paragraph: discusses the current maintenance of the duck ponds and alludes to the fact that the current way they are being managed decreases the Ag use in that location. Is this management protocol consistent with how DFW (California Department of Fish and Wildlife) and USFWS (United States Fish and Wildlife Service) manage waterfowl habitat in conjunction with agricultural use? An example might be the existing management protocol used by the Humboldt Bay National Wildlife Refuge. It is not documented that creating an Ag use would help offset some undefined loss due to the Project. **I-44**

15. Table 3.2-4, Change in Agricultural Productivity (in acres); Table 3.2-5, Change in Agricultural (Ag) Productivity (in lbs); and Table 3.2-6, Agriculture Conversions (in acres); do not clearly present the information nor the changes that may potentially occur. Table 3.2-5 presents an assessment of Ag productivity of (grasses?) in lbs/month. Given the fact that variable and yet to-be-determined hydrology has the potential to alter the water levels/inundation and the amount of time the water sets on each parcel, it is important to state what the impacts of weekly, monthly, and annual changes might be upon the various types of agricultural production. For example, Table 3.2-5 appears to show that total change in productivity on Russ Pasture 1, is a negative 648.6 lbs/month – or perhaps lbs/acre. Is it lbs/month/acre, or something different? It is expected that productivity will vary during each month of the year, so an assumption of a single monthly value does not sufficiently, nor accurately, represent the impact, nor the range of potential impacts upon annual Ag productions. **I-45**

16. Page 3.2-39; Monitoring Measure AR-1: Pasture Monitoring Plan. Since the Project will impact the private parcels (including RRT), it should be stated whether private parcels will also be monitored as part of this Project, and by whom, and at whose cost. Will the monitoring program have secure funding so as to provide for future management which will have the capability to manage a monitoring program in the future, which would address not currently identified environmental impacts? **I-46**

17. Impact AR-2, page 3.2-39. Does the Project bear the costs of any near term and after construction permit processes and post construction permit requirements? Can the DEIR state that the Project may cause future changed conditions of the private properties? If the Project does not bear future costs, who does? Or which agency or entity does? Lack of currently secured or committed funding to resolve future Project system breakdowns or failure would potentially allow yet unstated, and as yet unanalyzed, environmental impacts to occur. **I-47**

    In the event of another significant flood of the Eel River such as the substantial historical floods which have occurred in the recent past, during a project's lifetime, the DEIR should address the consequences to make it clear that the private landowners will not be responsible in any way for consequential impacts, nor for the responsibility nor obligations to fund, to repair, replace, or perform any other activity related to re-establishment of this Project. **I-48**

18. Section 3.15, Recreation. A Recreation Plan should be part of, and integrated with, an Operations and Management Plan to identify what the elements of the Recreation Plan would consist of and how access, traffic and security shall be organized and managed so as to protect all parcels and all owners' uses of their parcels from unintended events, and potential environmental impacts. The DEIR should address how access to the various sites will be controlled after completion of this Project. The public attractions, which may exist as a result of the Project, will create opportunities for potential impacts which could be significant even with low public traffic volumes. How will trash be managed? How will "dumping" of waste materials be managed? How will security be managed? **I-49**

    The "laydown" areas for construction contractors should also be identified with a discussion of potential impacts and their resolution.

19. Page 3.15-3, first sentence on top of the page: The public does not need to regain access to this marsh system. The navigable water within the marsh to the north of the existing flood gate is public land and is currently legally accessible. Is the intent of the Project to generate public access on the south side of the flood gate which would result in traffic across public access currently using private property? How will the public access this area if they could not use Russ Lane? Since the easement use has not yet been resolved, it is premature to assume future use by the Project. **I-50**

20. The "Public Access" plan referred to on page 3.15-6 is a statement that the Project sponsor will adopt its plan, without having reached final legal agreement with affected **I-51**

landowners. This access issue and use of easements should be resolved prior to all permit approvals, adoption of the DEIR, and prior to construction in order to avoid any Project delays or conflicts that might occur at some later date. **I-51 Cont.**

21. Page 3.15-12, the last paragraph above "Existing Recreational Features". The discussion implies that the existing dispute on the use of Russ lane is irrelevant and that there are no interrelated effects or consequences. The argument lacks supporting documentation to reach this conclusion. How would the Project be fully implemented if public use of the easements and access to the Project property is precluded? The DEIR does not fully disclose construction related impacts on the road and how these impacts will be offset. Road use maintenance, traffic management, security, etc. will need to be resolved before determination of a potential "level of environmental significance" for this Project can be determined. **I-52**

22. Section 3.16, Transportation. Section 3.16.1, Settings. This section requires additional details to address, analyze, and conclude whether traveled ways which access the areas of the Project (where being designed to support bicycle, pedestrian and/or vehicular traffic) would become a future responsibility of private lands or easements, or private landowners. **I-53**

23. Reclamation District and Vested Rights Issues

    The DEIR should address physical, environmental, and procedural/operational impacts upon the following Districts and private properties vested rights. It is recommended that the Project Sponsor evaluate the need for, and if required the need to enter into, written agreements with the two existing Reclamation Districts.

    a. Reclamation District (RD) # 461 was granted to Russ and other parties in 1884 by the State of California law and as approved by, and granted by Humboldt County in 1884. Comprehensive rights were granted for construction, maintenance, management, operations, filling areas with sediment and sediment management, diking and channel construction and repairs, and all associated activities to reclaim land, to use the land, to and to manage and operate said land for the purposes of agricultural production, all to be in accordance with the approval conditions of the By Laws of RD #461 which are vested rights as approved in 1884. **I-54**

The DEIR should contain a discussion of impacts and effects which could occur with, or without, an operational agreement with this District. **I-54 Cont.**

b. Reclamation District (RD) # 487 was granted to Russ and other parties in 1886 by the State of California law and as approved by, and granted by Humboldt County in 1886. Comprehensive rights were granted for construction, maintenance, management, operations, filling areas with sediment and sediment management, diking and channel construction and repairs, and all associated activities to reclaim land, to use the land, and to manage and operate said land for the purposes of agricultural production. These vested rights have existed since 1886. **I-55**

The DEIR should contain a discussion of impacts and effects which could occur with, or without, an operational agreement with this District.

Thank you for the opportunity to comment upon the DEIR.

Sincerely,

OSCAR LARSON & ASSOCIATES
CONSULTING ENGINEERS, INC.

Kenneth G. Davlin, PE

Letter I Response to Comments

Response to Comment I-1

Comment noted.

Response to Comment I-2

Please see master response to comments for Reclamation District and Operations.

Response to Comment I-3

We respectfully disagree about the lack of project information provided in the DEIR. There is sufficient level of detail to complete the Environmental Compliance process under CEQA. More detailed project designs and assessments will be completed on the preferred project alternative once the EIR is certified.

Response to Comment I-4

No changes are proposed to the Quonset Hut.

Response to Comment I-5

The operational characteristics of the Duck Club are not proposed to be change as part of the project.

Response to Comment I-6

Comment noted.

Response to Comment I-7

Comment noted. Comment is not specific enough to allow response, however, please see master response to comments for Recreation and Public Access, Coordination, and Reclamation District.

Response to Comment I-8

The DEIR and its Appendices provide adequate enough information on the proposed Project components to make level of significance determinations for each resource category throughout the DEIR. Per CEQA Guidelines Section 15124 “The description of the project shall contain the following information but should not supply extensive detail beyond that needed for evaluation and review of the environmental impact.”

Response to Comment I-9

Creation of the new Russ Creek channel extension will not dewater the existing freshwater wetland. These wetlands consist of low-relief topographic depressions that are fed by artesian wells. There is sufficient distance and topographic relief between the proposed channel and existing wetlands to prohibit drainage of the wetlands. An intended objective of the project is to retain and protect the subject freshwater wetlands. If required, the final project design will include grading or other measures to ensure the wetlands remain protected and functioning. Since these wetlands will not be adversely impacted, there is no need for wetland mitigation.

The DEIR does not mean to imply that the avulsion area is no longer viable for agricultural production. To the contrary, as the DEIR states, the area has very high potential for agricultural production. What the DEIR describes is a current low-productivity status resulting from avulsion events and overall hydrologic dysfunction, and a prospective uncertainty associated with agricultural operations in the absence of active management of the area as described. With respect to the freshwater wetland purportedly impacted by the restoration of an active channel and riparian zone, the commenter is referred to the Biology section of the DEIR.

Response to Comment I-10

Per CEQA Guidelines Section 15126.6(e)(1), "the purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project," not the need for the project versus leaving the setting as it is, as stated in Comment I-10. CEQA is not used to discuss the benefits of the Project versus the cost of the Project. The purpose of CEQA is to:

- Disclose to the public the significant environmental effects of a proposed discretionary project, through the preparation of an Initial Study (IS), Negative Declaration (ND), or Environmental Impact Report (EIR).
- Prevent or minimize damage to the environment through development of project alternatives, mitigation measures, and mitigation monitoring.
- Disclose to the public the agency decision making process utilized to approve discretionary projects through findings and statements of overriding consideration.
- Enhance public participation in the environmental review process through scoping meetings, public notice, public review, hearings, and the judicial process.
- Improve interagency coordination through early consultations, scoping meetings, notices of preparation, and State Clearinghouse review.

Response to Comment I-11

Please see Master Response to Comments - Reclamation District and Operations Needs.

Response to Comment I-12

Please see Response to Comment D-11.

Response to Comment I-13

Boat ramps are not proposed as part of the Project. As described in Section 2.4.6 of the DEIR, two kayak 'put in and take outs' would be installed around the Inner Marsh. Kayaks (or standup paddleboards) are human powered; therefore, there would be no potential for gas or oil spills.

Response to Comment I-14

Section 3.15.1 (page 3.15-6) of the DEIR states "…the freshwater pond conditions have deteriorated from the perspective of the ERWA, and both they and TWC propose to enhance the existing freshwater ponds

in order to improve hunting conditions for club members. ERWA use will continue to operate for the foreseeable future much as it has for more than a century."

Response to Comment I-15

As a perceived project partner, it was agreed that all project design elements on RR&T property be the responsibility of the property owner. The omission of the studies and design elements indicated in this comment is because the work had not been completed and provided at the time the DEIR was prepared.

Response to Comment I-16

Please see Section 4, Master Response to Comments - Hydrology and Water Quality.

Response to Comment I-17

Project channel dimensions are provided in the 30% Project Plans prepared and submitted by GHD. The drainage performance for this channel design is presented in the Draft Hydraulic Design and Feasibility Assessment Report. The rationale for not simulating the 10-, 50- and 100-year floods is also provided in this report.

Response to Comment I-18

The commenter is referred to the Draft Hydraulic Design and Feasibility Assessment Report (KHE, 2016) for a presentation of the simulated changes in hydraulic/hydrologic conditions throughout the project area of influence in response to the new water control structure. The impacts on RR&T for a variety of winter storms and summer baseflow periods are presented. The dimensions of the structure are provided in the 30% Project Plans, as well as described in report text. Raising the flow line is intended to allow for increased summer water levels (maximum elevation of 5-feet) as part of ecosystem enhancement. However, winter water levels will remain no higher than those under existing conditions in order to preserve the current level of flood storage.

Response to Comment I-19

The authors acknowledge that there is no precise cost estimate for future land management activities in the DEIR. Compliance activities specified in the Mitigation Monitoring and Reporting Program are presumed to be the responsibility of the lead agency in conjunction with the Project partners. Agricultural Activities such as soil spreading, seeding, irrigating and haying are presumed to be the responsibility of individual landowners or their lessees. The lessees on the EREP have expressed a desire to conduct these activities in order to increase the agricultural productivity of their pastures and derive an economic benefit from those activities.

Response to Comment I-20

Please see Response to Comment I-15. The questions raised in this comment can't be fully addressed without a design of project elements on the RR&T property.

Response to Comment I-21

No known food crops are produced in the Project area, and it is unclear what the commenter means by 'husbandry.' Projected environmental effects as specified in pounds and tons of available forage are described at length throughout the agricultural resources chapter.

Response to Comment I-22

The comment states that "the construction will establish new conditions of operation resulting in impacts which should be addressed in the DEIR." The comment is not specific as to what impacts are not discussed in the DEIR; therefore, no response is provided.

Response to Comment I-23

Please see the WLMP and AMP sections of the EMP.

Response to Comment I-24

Please see Master Response to Comments - Reclamation District

Response to Comment I-25

Please see draft WLMP section and AMP sections of the EMP.

Response to Comment I-26

Please see Master Response to Comments - Reclamation District & Operations.

Response to Comment I-27

The WLMP has been provided and provides seasonal guidelines for managing water levels to support achievement of project goals.

Response to Comment I-28

Please see Response to Comment I-15 and I-20.

Response to Comment I-29

Given high sediment loads and existing topography of the adjoining floodplain, high flows in Russ Creek frequently exceed its channel capacity in multiple locations on RR&T. The proposed floodplain swales allow excess flow and sediment to be conveyed overland, similar to existing conditions, however in a less impactful way to agricultural lands that reduces prolonged inundation.

The floodplain swales are not critical to the overall functionality of the Proposed Project and the concept was supported by RR&T for inclusion into the Project Description. The floodplain swales have not been hydraulically designed but could be in a way that captures overland flow/sediment from natural overtopping of Russ Creek. The description of this project component in the DEIR provides latitude for RR&T's design team to avoid any direct intended diversion of Russ Creek per the title reports while beneficially managing excess floodwaters and sediment on agricultural lands. Concepts brought forward

by RR&T during earlier site visits and preliminary design discussions such as “guillotine” style diversion gates placed in Russ Creek would likely be in conflict with the title reports.

Response to Comment I-30

The ponds are primarily intended for continued use by the Duck Club and have other non-specie specific benefits to waterbirds and amphibians. The duck ponds are at present very shallow with soft silt bottoms.

Response to Comment I-31

Preliminary modeling results indicate structure will function without undesirable consequences with the incorporation of standard erosion control and energy dissipation measures. A complete analysis of erosion potential and mitigations will be completed as part of final project design.

Response to Comment I-32

The frequency the structure will be overtopped is provided in the probability exceedance graphics that presented throughout the Report. The condition for overtopping is when water levels exceed 5-feet in elevation within the New Centerville Slough channel. The AMP outlines the measures that will be taken if any damage to project components occur. Operations will be conducted by TWC in accordance to the WLMP. Maintenance would be conducted in accordance to the AMP and drainage easement.

Response to Comment I-33

Please see Response to Comment I-15 and I-20. Design elements associated with the Western Drainage ditch are detailed in the DEIR/NOP documents and 30% project plans. Hydrologic impacts associated with these design elements are fully assessed and documented in the Draft Hydraulic Design and Assessment Report. How these design elements will affect the Drainage Agreement between stakeholders is unresolved, but the DEIR is not the forum to resolve this agreement between parties to the Agreement.

Response to Comment I-34

Regarding whether the removal of invasive species are part of the construction of the Project, yes, as discussed on pages 2-11 and 2-12 of the DEIR, invasive species removal is part of construction. Invasives control efforts would include removal of Ammophila arenaria on dunes in the northern part of EREP early in the project, with ongoing maintenance; and a longer-term effort to control Spartina and other invasive species. Additional detail is included in the Habitat Mitigation and Monitoring Plan and the Adaptive Management Plan referenced in the DEIR.

Response to Comment I-35

The project descriptions provided in the DEIR are of sufficient detail to complete defensible and informative evaluation of potential environmental impacts.

Response to Comment I-36

The commenter is referred to the Draft Hydraulic Design and Feasibility Assessment Report (KHE, 2016) for a detailed presentation of the timing, frequency and amplitude of flows that result from implementation

of Project alternatives. This document along with the DEIR evaluates the potential impacts to Hydrology and Water Quality resources.

Response to Comment I-37

Comment noted.

Response to Comment I-38

Section 2.5.4 (page 2-16) of the DEIR says that the number of motor vehicles is anticipated to be up to 30 per day during construction not operation. This is based on the number of workers and deliveries anticipated for the project during the construction period, which is temporary and seasonal. Additionally, sediment re-use is proposed to be contained within the Project area and so there would be no sediment off-haul. Humboldt County does not have an adopted Noise Ordinance. The County's General Plan Update does propose the preparation of a Noise Ordinance; however, the General Plan has not been adopted yet and a Noise Ordinance has not been adopted yet. Sensitive receptors have been stated within the DEIR. Please see Section 3.12.1 (page 3.12-3) of the DEIR under the heading "Sensitive Receptors."

As stated in the DEIR, a SWPPP would be prepared in compliance with Mitigation Measure HWQ-1a (Manage Construction Storm Water). The SWPPP will cover the active Project site. Additional mitigation that would address protecting water quality from Project actions are provided in the Hydrology and Water Quality section (Section 3.9) and include: Mitigation Measure HWQ-1b (Implement Contractor Training for Protection of Water Quality); Mitigation Measure HWQ-1c (In-Stream Erosion and Water Quality Control Measures during Channel Excavation and Operations); and Mitigation Measure HWQ-3 (Implement Erosion and Water Quality Monitoring, Maintenance and Adaptive Management Plan).

Response to Comment I-39

Please see draft AMP section of the EMP.

Response to Comment I-40

The CEQA document does reference studies which would support NEPA and U.S. Army Corp permitting completed as a separate process from CEQA.

Response to Comment I-41

The cross-sections shown on Figure 2-5 represent the proposed project. The KHE draft hydraulic design report describes the various channel size alternatives that were analyzed.

Response to Comment I-42

Please see Master Response to Comments - Reclamation District & Operations. Please see draft WLMP section and AMP sections of the EREP Management Plan.

Response to Comment I-43

As shown on Page 3-1 of the DEIR, the DEIR covers all applicable environmental resource categories listed in the CEQA Initial Study Checklist (Appendix G of the CEQA Guidelines). Archaeological, historical, and historically registered resources, and Native American archaeology are discussed in the Cultural Resources section of the DEIR (Section 3.5). The privately operated gun club is discussed throughout the DEIR (see Sections 3.2.4, 3.5.1 and 3.15.1). Reclamation districts are also discussed in the DEIR (see Sections 2.1, 3.2.1). The DEIR addressed all applicable environmental resource categories listed in Appendix G of the CEQA Guidelines.

Response to Comment I-44

With respect to the Duck Club pasture, the DEIR intended to show not that the "way they are being managed decreases their ag use." What the agricultural resources chapter attempted to show was that a variety of factors, including hydrology, soil chemistry, vegetation characteristics, land management choices, and other factors have resulted in relatively low productivity in this pasture, particularly in the northern reaches subject to lower elevation, greater inundation, higher soil salinity and other factors. The DEIR also found that although some of those factors cannot be altered, others can for the overall improvement of productivity in that part of the Project area. Although the prospective improvement is not terribly dramatic, it does provide an opportunity for more active and fruitful management and agricultural enhancement in the Project area.

Part of this comment is too unclear to respond to; The Project does not intentionally adhere to any land management protocol practiced by either USFWS or CDFW.

The commenter suggests that the DEIR has "not documented that creating an Ag use would help offset some undefined loss due to the Project." First, there is no "undefined loss" the authors are aware of, and conversions of agricultural resources are quantified and depicted throughout the chapter numerically and graphically. Second, and more importantly, the authors remind the commenter that there is no proposal to "create an Ag use" where none existed previously. Instead, the authors describe verifiable means by which productivity may be increased in the Project area through better and more active management.

Response to Comment I-45

The authors regret that the commenter finds these tables unclear. However, in in Table 3.2-4, the specific pastures for all properties are identified on the X axis. These are described narratively throughout the chapter. The acreage changes in productivity are organized in the cells of the table, along the productivity levels depicted on the Y axis. Thus, for example, the first row shows that within 138.3 total acres, 2.5 of which is 11.6 of which is available as pasture, and 2 of which is prime ag land, the Project results in a total of shift of the prime ag land (~1.6 acres) to not-prime status.

As suggested by the commenter, productivity levels expressed by weight generally reference grass forage. No row crops, specialty crops, fruits or vegetables are known to be produced in the Project area for the support of livestock.

The commenter raises the point that productivity levels are highly influenced by either deliberate water surface level adjustments, or seasonal or climactic variations and events, such as flooding or ponding. With respect to the former, the commenter is reminded that any area proposed for inundations is immediately assumed to have experienced a complete conversion to non-agricultural use, even though it may retain some modest level of seasonal productivity as suggested by other commenters. This conservative approach tends to overstate diminishment of agricultural productivity.

In situations where reasonable forecasting is feasible, and where that forecasting is capable of guiding a reasonable and defensible assessment of productivity shifts, the authors have attempted to do so. For example, stocking rates and general knowledge show that grass growth rates are far higher in July than January, and the authors have attempted to account for these seasonal variations. Similarly, avulsion events and wave overwash pasture disturbances are more likely to occur in or near Russ Creek or adjacent to the dune network, respectively. There, too, the authors have accounted for seasonal and spatial productivity variations. However, the authors are unable to forecast with the suggested precision (e.g. “weekly”) how those factors might theoretically alter productivity levels in the Project area in the future.

Response to Comment I-46

Private parcels owned by Russ are not expected to experience significant impacts to prime agricultural land, and are therefore not subject to the pasture monitoring plan. Sufficient resources to ensure fulfillment of the MMRP and the EREP will be a necessary part of the Project budget, and ultimately the responsibility of the lead agency and the effected landowner.

Response to Comment I-47

Private property management obligations, including adherence to permit obligations for development, are the responsibility of private property owners. To the extent that Project partners can describe how these relate to the Project goals and objectives, the Project team will work together to identify funding sources to assist with these obligations, provided it does not constitute a gift of public funds.

Response to Comment I-48

Comment noted.

Response to Comment I-49

Please see Master Response to Comments - Recreation and Public Access.

Response to Comment I-50

This comment is somewhat confusing and conflates “public land” with “navigable waters.” That portion of the historic Occidental Marsh north of the levee is private property owned by TWC. Navigable waters therein may, depending on the findings of the CSLC, be in State jurisdiction. Access may be allowed, but use may be prescribed by the landowner. As described in the Project Description and Recreation chapters, a kayak put in-take out is proposed for Cut-Off Slough north of the tidegate. There is no proposal for access into Cut-Off Slough south of the tidegate. However, as the commenter notes, a boater

could access the EREP via navigable waters, and cross the berm to enter the Inner Marsh, with the permission of the landowner.

Response to Comment I-51

Please see Master Response to Comments - Recreation and Public Access.

Response to Comment I-52

Please see Master Response to Comments – Recreation.

Comment noted. With regards to traffic related impacts, the impacts were determined to be less than significant, see DEIR Section 3.16.5.

Response to Comment I-53

The ownership and responsibility for Project area roadways would not change with the proposed Project.

Response to Comment I-54

Please see Master Response to Comments - Reclamation Districts and Operations Needs.

Response to Comment I-55

Please see Master Response to Comments - Reclamation District.

Harville Ranch, LLC
546 Washington Street
Ferndale, California 95536

October 20, 2016

VIA E-MAIL: Michael.Bowen@scc.ca.gov
AND FIRST CLASS MAIL

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, California 94612-2530

Re: Eel River Estuary and Centerville Slough Enhancement Project, Comments on Draft Environmental Impact Report

Dear Mr. Bowen:

Please consider the following comments related to the Draft Environmental Impact Report for the Eel River Estuary and Centerville Slough Enhancement Project.

Harville Ranch, LLC sent a letter to you dated December 18, 2015, with comments regarding impacts that should have been considered in the Environmental Impact Report. Please consider the comments in that letter as is fully set forth here. **J-1**

The Draft Environmental Impact Report concludes that impacts to agricultural resources would be less than significant and therefore no mitigation measures are necessary other than monitoring the pastures for productivity changes over a five year period. We disagree.

Any reduction in the availability and utilization of flat coastal agricultural lands in Humboldt County should be considered a significant environmental impact. Approximately 1.6 percent of the land area of Humboldt County consists of high quality agricultural lands suitable for intensive agricultural production. Humboldt County's general plan update process sets a goal of no net loss of prime agricultural lands. Humboldt County is relatively isolated and should maintain the capability to sustain production of agricultural products for consumption within its own boundaries. According to the Draft Environmental Impact Report, this project will result in the conversion of approximately 126 acres of flat coastal agricultural lands to other uses. We believe that the true loss of agricultural lands for productive use resulting from this project is much higher than 126 acres due to the exclusion of agricultural uses in those areas where seasonal wetlands can be grazed or farmed during the dry seasons. The Draft Environmental Impact Report should consider the actual acreage of land proposed for the exclusion of productive agriculture with the project area to evaluate the significance of such a loss. Even the loss of 126 acres is significant and should not be summarily dismissed as is proposed in the Draft Environmental Impact Report. **J-2**

The loss of productive agricultural lands in Humboldt County to alternative uses, including preservation or conservation for the sake of fish and wildlife habitat or passive outdoor recreation has caused and is causing significant impacts to agricultural potential. Any additional losses such as those proposed in the proposed project need to be evaluated in accumulation with the continuing loss of high quality agricultural land in Humboldt County. The Humboldt County General Plan Update Draft Environmental Impact Report notes that according to the County Framework Plan (1984), over several decades nearly 100,000 acres of farmlands were converted to non-farm uses due to subdivision activity. Since the adoption of the Framework Plan, it is estimated that the County has lost approximately 3,000 to 5,000 acres per year of productive farmland to other uses from 1984 through 2003 (Humboldt County Agricultural Resources and Policy Report, August 2003). Again, any loss of agricultural lands in Humboldt County must be considered significant and needs real mitigation, such as the acquisition and restoration of an equal area of high quality farm land that was previously taken out of production for non-agricultural use. A five year productivity monitoring plan is inadequate. The proposed loss of agricultural lands from the project should be considered a significant impact and mitigation measures should be implemented to assure that there is no net loss of agricultural lands of type involved in the proposed project. J-3

Converting these valuable farmlands into areas that will be offered to the public for outdoor recreational use will have a tendency to discourage traditional farming operations in the surrounding areas. Clearly investment of public funds in developments to improve and facilitate public access and recreation must be viewed from a perspective that such investments will attract and encourage public use of the project area. The increase in public access will result in a wide variety of impacts to surrounding farm operations. The problems associated with public access on and around commercial farming operations are well documented and will tend to lessen the farmer's willingness to continue the struggle to make the lands profitably productive. When they see their neighbors selling their farms to conservation groups for prices far above what can be justified for farming, and those conservation groups tapping into hundreds of thousands of dollars of public grant funds to convert the lands to quasi parklands for public use, the surrounding farmers are going to be further encouraged to follow suit. This will only tend to encourage the continuing exponential loss of farmland in Humboldt County. The impact from the investment of public funds in projects that reduce agricultural productivity in the name of habitat and recreation needs to be addressed in the Draft Environmental Impact Report. J-4

In our letter to you dated December 18, 2015, we explained our claims regarding public use of the easement that burdens our lands. As we explained, we are not going to stand by and let the private road across our property be turned into a public thoroughfare, and will seek to enjoin any use that exceeds the purposes of the easement according to its historic use. If we are successful in our efforts, the project will need to use some other path for access. No alternative access paths are considered in the Draft Environmental Impact Report and the resulting impacts of using such alternative routes is missing from the evaluation of impacts. We filed and served a Notice of Consent to Use Land pursuant to California Civil Code section 813 in November, 2014, effectively stopping any development of any prescriptive rights related to the easement. To the extent public use of the easement within the preceding five years is relied upon in the Draft Environmental Impact Report's evaluation of the impacts of public access, it is inaccurate. No use after November 2009 can be considered as altering the rights to use the easement by way of prescription. J-5

Let me make it clear that Harville Ranch, LLC does not support any public access to the project area for any purpose, particularly over the easement that burdens its land. The Draft Environmental Impact Report in the Recreation section concludes that there will be no adverse J-6

impacts from public access to the project area for recreation because there has been historic public access from the members of the duck club. This is incorrect. The duck club is and always has been a private club, and access by its members and guests should not be counted as public access. J-6 Cont.

The Draft Environmental Impact Report concludes that the proposed project is unlikely to result in increased visitor use. If that were the case, why are public funds being used to enhance and improve facilities in the name of public access. It is not reasonable to spend public funds on projects that will have no public benefit. Any investment in improving public access must be considered as intended to attract increased use. The impacts of this increase needs to be considered, and if significant, needs appropriate mitigation. J-7

The project area is within historic reclamation districts that were approved under applicable law for the reclamation of these lands from unusable swamps to productive agricultural lands. The reclamation districts are responsible for the operation and maintenance of the facilities necessary to hold back the tide and keep these lands productive. Under applicable law, the districts have a number of rights, duties and responsibilities regarding how water is managed within their boundaries. The Draft Environmental Impact Report seems to ignore the reclamation districts and assume that a couple of landowners and a state agency can just take over drainage and do as they wish. That simply is not legal. The Draft Environmental Impact Report needs to address how the proposed project will impact the management and operation of the reclamation districts, and how the project will obtain authorization from the districts to alter the facilities under their jurisdiction. J-8

The Draft Environmental Impact Report concludes that there will be no adverse traffic impacts from the project. This conclusion seems counterintuitive as discussed above. If the Wildlands Conservancy is going to encourage use of the area for public recreation and public funds are going to be used to enhance public access, it must be viewed from a perspective of increased use. That increase in use will have significant impacts on traffic on the narrow rural roads in the area. The project should include mitigation measures to address these impacts and provide appropriate road widening and traffic control measures along Centerville Road and Russ Lane. J-9

The Draft Environmental Impact Report incorrectly states that access to the Mattole Valley can be made by way of Centerville Road. No such public access exists. The Draft Environmental Impact Report needs to correctly evaluate traffic impacts and not rely on false conjecture. J-10

Sincerely,

Harville Ranch, LLC

Renee Jackson

Renee Jackson

Managing Member

RECEIVED
OCT 24 2016
COASTAL CONSERVANCY
OAKLAND, CALIF.

Letter J Response to Comments

Response to Comment J-1

The Coastal Conservancy received no letter dated December 18, 2015. It is presumed this refers to the joint letter from various Russ family members and organizations ('collectively referred to as "the private landowners'") dated January 18, 2015. Those scoping comments were received and individually analyzed by the Project team. The results were presented in various chapters of the DEIR, particularly Hydrology, Agricultural Resources and Recreation. There may, however, be one notable exception. The technical team may not have conducted a "comprehensive scientific investigation of the Russ Creek watershed from the headwaters to Cutoff Slough" to the degree requested, although it is unclear by the comment how comprehensive the investigation should have been.

Regarding the significance of impacts on agricultural resources, the authors respectfully disagree and refer the commenter to the Agricultural Resources findings.

Response to Comment J-2

The Project area is almost entirely comprised of seasonal wetlands, many of which can be grazed or farmed during the dry season. These are acknowledged throughout the DEIR as being unique, highly productive and significant to the local and state economy. The authors regret any unintended suggestion that any loss is "summarily dismissed."

The commenter believes that the "true loss of agricultural lands for productive use resulting from this project is much higher than 126-acres due to the exclusion of agricultural uses in those areas where seasonal wetlands can be grazed or farmed during the dry seasons." The comment is unclear, but implies that parts of the Project area other than the 126-acres are proposed to be closed to future agricultural use. This is not true, and no evidence is presented to support this assertion. However, land management is the prerogative of the private landowner. Even if the landowner chose to fence off other project areas, that would not constitute a significant effect under CEQA, because it would not meet the measures of significance identified under CEQA. Furthermore, the productivity of land, which is anticipated to improve, is of greater significance economically to the regional agricultural economy than the gross area. A larger more poorly managed block of land is not of a greater utility or economic value.

The 126-acres comprise significantly large areas that will only be seasonally inundated, and therefore will remain available for flash-grazing periodically. Technically, this does not represent a conversion of agricultural land as defined under CEQA. Thus the "true loss" assuming the commenter means "conversion" as defined under CEQA, is actually lower than 126-acres. However, in an effort to remain conservative in their assessment of impacts, the authors have presumed that seasonal inundation in the Inner Marsh effectively constitutes a complete diminishment of agricultural productivity –and hence a conversion-for purposes of this analysis.

Response to Comment J-3

The commenter states that loss of agricultural land to habitat enhancement "has caused and is causing significant impacts to "agricultural potential." "Agricultural potential is undefined and not an impact

analyzed under CEQA. The commenter suggests that the cumulative impacts of the Project have not been adequately analyzed with respect to the historic loss of agricultural land to habitat enhancement in Humboldt County. Of the agricultural land conversion in Humboldt County most was lost to housing and development, and relatively little to habitat enhancement. The commenter goes on to state that the loss is significant and must be mitigated. The commenter appears to disagree with the approach of increasing overall productivity of the area in order to compensate for any loss of prime or less than prime agricultural lands. The authors respectfully disagree with the implied notion that all agricultural land is equally important, equally productive regardless of its condition or productivity.

Response to Comment J-4

The EREP is actively and profitably farmed, despite an active duck hunting club, and the frequent visits by TWC staff and their invited guests. Similarly, productive RR&T property is proximate to intensive and loud OHV use. Many refuges and wildlife areas are actively and compatibly managed for agricultural production, hunting and other active and passive public uses. No evidence has been presented during the last five years of project development, and during the development of the Public Access Plan (please see Master Response to Comments - Recreation and Public Access) to validate this assertion.

Response to Comment J-5

The DEIR describes three historic roads to the Connick Ranch. These are the original dune road, Port Kenyon Road, a County Road (which passed through the Occidental Ranch and finally Russ Lane, a County Road. Since Jay Russ, Jack and Linda Russ and RR&T expressed support for the proposed Project to the Coastal Conservancy Board in November 2015 (see support letter in Appendix A) and sought significant funding to expand the project onto RR&T property, it was presumed by the Coastal Conservancy that Russ Lane, a County Road accessing the site, serves as the most appropriate access point for project development and implementation. Please see Master Response to Comments - Recreation and Public Access.

Response to Comment J-6

As noted in the DEIR, public access to the Project site has been and would continue to be via Centerville Road to Russ Lane, and the Project would not substantially increase use or access. The DEIR also states that “access to RR&T or Jack and Linda Russ property is achieved either via Centerville Road or Russ Lane. Those properties are solely managed for agricultural operations, and no public access is allowed. Some trespass, primarily OHV use, and minor duck hunting, occurs via Centerville Beach.” The dispute about public access is discussed on page 3.15-2 of the DEIR. The Project is primarily an ecosystem restoration and agricultural enhancement project and would not have any adverse recreational impact on the surrounding area, and TWC has voluntarily agreed to a self-imposed restriction on the level of access to the EREP. Further, as noted in Section 3.15.5 (on page 3.15-14), even if visitation to the EREP doubled in size, visitation to EREP would still fall well below 1,000 visitors per year, or 7 percent of the visitation to the Loleta Visitors Center of the Humboldt Bay National Wildlife Refuge. Therefore, the proposed Project features would not have a significant adverse impact on the environment.

Response to Comment J-7

Public funds are being used for the Project with the primary goal to improve geomorphic and ecosystem functions that would enhance habitat for native fisheries and aquatic species, support waterfowl and wildlife species, and benefit agricultural land management by more effectively managing onsite flooding and sedimentation. The minor improvements for outdoor recreation and education at the EREP portion of the Project (improved parking area, signage, short boardwalk and trail, kayak put in and take outs, etc.) are just a small part of the overall Project's components and benefits.

Response to Comment J-8

Please see Master Response to Comments - Reclamation Districts.

Response to Comment J-9

The DEIR concludes that temporary and seasonal construction impacts would be less than significant and that during operation the Project would result in approximately three to six additional vehicles visiting the site per week compared to existing conditions. This increase in Project trips equates to less than one additional vehicle per day. Additionally, the Project would not result in changes to the existing roadway network. Access to the Project site would remain from Russ Lane via Centerville Road. The Project would not change the configuration or capacity of any roadways or intersections, and would not affect existing speed limits. The Project would not conflict with the goals outlined in Section 4220 of the Humboldt County General Plan. Impacts would be less than significant and mitigation is not necessary.

Response to Comment J-10

Please see Response to Comment B-35.

CALIFORNIA TROUT

October 24, 2016

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland CA 94612-2530

RE: ***California Trout*** Letter of Support for the State Coastal Conservancy's Draft Environmental Impact Report

Dear Michael,

California Trout (CalTrout) is pleased to submit the following comments regarding the Draft Environmental Impact Report (DEIR) developed by the California State Coastal Conservancy (SCC) for the proposed project titled: Eel River Estuary and Centerville Slough Enhancement Project (ERECSEP or Project).

Completion of this DEIR marks a significant milestone in the development of the Eel River Estuary Project. In 2012, CalTrout submitted grant applications to two State Agencies, including the Coastal Conservancy and CA Department of Fish and Wildlife, on behalf of our project partners – The Wildlands Conservancy, and supported by our technical team of restoration design and environmental compliance experts. Restoration grants totaling $1.2 million have been awarded to CalTrout to complete restoration designs and engineering plans, prepare a CEQA Environmental Report, and fulfill all regulatory permit requirements.

The focus of the project has always been *to restore a balance in natural resource and preserve agricultural land uses* in one of the most significant expanses of the Eel River Estuary. The Eel River Estuary is recognized as one of the most ecologically important tidal marsh habitats in California. It is the third largest estuary in the State and, along with Humboldt Bay, the only substantial tidal marsh habitat between San Francisco and Coos Bay. This landscape has been subjected to over 150 years of land conversion, isolation from the Eel River and saline waters by tidegates and levees, and operated as a monotypic seasonal wetland cattle pasture. The consequences to this isolated landscape, as well as to the surrounding Eel River estuary, have been severe to the native fish, wildlife and plant species of the estuary, summarized as follows: K-1

- For more than 150 years, fish migratory access to any remaining aquatic habitats within the 1,850 acre Project footprint to the south of the tidegate and levee system, as well as habitats in the watersheds south of the Project, have been entirely blocked to many of California's native fish species, including: (1) three federally listed salmonid species: Chinook salmon, coho salmon, and steelhead trout, (2) the state species of concern

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coastal cutthroat trout; (3) federally listed endangered tidewater goby , and (4) an entire community of estuarine-dependent fish and crustacean species, most notably the green sturgeon, Starry flounder, Pacific herring, English sole, and Dungeness crab.

- Public Trust lands including stream and slough channels, tidal marshes and seasonal wetlands, and riverine floodplains have been severely degraded by ranching land uses. This degradation of Public Trust lands includes: (1) the formerly navigable Centerville Slough which was eliminated across more than 8,000 feet of pasture lands south of Cutoff Slough, (2) many hundreds of acres of tidal, brackish, and freshwater wetlands, and (3) Russ Creek which historically provided migratory passage and critical habitat for the four native salmon and trout species.
- Water Quality has been severely degraded as a result of the prevention of saline and brackish estuarine waters, from cattle pasture runoff, and from sedimentation of stream and slough channels from the surrounding land uses .
- Entire vegetation communities within the project footprint have been reduced or eliminated to make way for cattle ranching, including native dune communities, riparian woodlands, brackish marsh and salt marsh habitats; non-native invasive species such as *Spartina* and *Ammophila* have colonized native habitats; these changes have in turn impacted the wildlife species dependent upon these vegetation communities.

K-1 Cont.

For more than four years, our Project team has sought to propose viable solutions to the existing condition of severe natural resource degradation and consequent impacts to Public Trust resources. Initially the project focused only on the private properties acquired and managed by The Wildlands Conservancy (TWC), within TWC's Eel River Estuary Preserve. Feasible and balanced solutions in this heavily managed setting are incredibly challenging, given the scrutiny from surrounding private landowners. Our Project established a central principle of enhancing natural resources, alleviating winter flooding conditions, and increasing agricultural productivity without risking any impacts to the surrounding private properties and their ongoing cattle grazing uses.

K-2

To meet this challenge of protecting surrounding land uses with no risk of harm, CalTrout twice petitioned the CA Department of Fish and Wildlife and the State Coastal Conservancy to request time extensions to enable our Project team to thoroughly evaluate the proposed Project. Those contract amendment requests were granted, which extended the term of CalTrout's Grant Agreements by two years (doubling the project duration). In addition, CalTrout requested additional funds from the SCC to expand our Project footprint to include the Russ Ranch and Timber ranching lands to the south of the Eel River Estuary Preserve, to include Project elements requested by the Russ Ranch and Timber operators, and to conduct detailed analyses of those Project elements.

K-3

Our Project has not only met our Project Goals and Objectives stated in the DEIR, but has exceeded our expectations by offering the best balance of natural resource enhancement project elements across this landscape with no demonstrable risks or impacts to the surrounding lands. The Proposed Project will accomplish the most meaningful steps to the protection and enhancement of Public Trust resources on this landscape since the lands

K-4

were originally "reclaimed" by the ranchers so many decades ago. These Project elements will bring great benefits to natural resources across The Wildlands Conservancy properties and the Russ Ranch and Timber properties, including these significant improvements:

- The project will upgrade and retrofit the existing Cutoff Slough tidegates with modern tidegate technology (including proven Side-Hinged and Muted Tide Regulator systems) that will not only significantly control and improve drainage of freshwater out of the system during large flooding events, but will most significantly allow native fish species a migratory pathway into the aquatic habitats on TWC's Estuary Preserve. Fish passage will be accomplished by the active mechanical operation of the tidegates (the MTR design) as well as during significant portions of the twice-daily outgoing tides when the tidegates are fully opened to fish passage. These tidegate designs have been utilized and proven highly effective in several locations in Humboldt Bay in the past 12+ years, including at several locations funded by the State Coastal Conservancy.
- The Project will significantly expand aquatic habitats within the enhanced 125 acres of Inner Marsh and more than 8,000 feet of Centerville Slough, providing high quality habitat to listed salmonids, tidewater goby, and other native fish fauna. The Project will incorporate key design features and elements implemented in the Salt River Ecosystem Restoration Project, which has already witnessed the recolonization of newly restored habitats by coho salmon, tidewater goby, and other native fish species.
- The Project will restore migratory connection through Centerville Slough to Russ Creek and into the Russ Creek watershed to the south of Russ Ranch and Timber, allowing salmon, steelhead, and trout access to their natal spawning and rearing habitats in the upper watershed.
- The Project will establish a meaningful precedent and active response to ongoing seawater incursion and the consequent enormous risks to the ranching lands, likely resulting from Sea Level Rise (SLR) of the Pacific Ocean combined with the steadily degrading dune system. We are not aware of a location more singularly vulnerable to the threat of SLR than this Project footprint in the Eel River estuary. Maintenance of viable working landscapes depends on our immediate response including those Project elements proposed in this Project: dune enhancement, construction of dikes, and restoration of drainage channels capable of intercepting ocean water that has overtopped the beaches. These project elements are indeed the integrated "rebalancing" of competing land use demands, and are proposed intentionally to preserve the functions of both working lands and natural resources.
- For over 150 years, the Public has been denied the opportunity to experience firsthand this unique expanse of the Eel River estuary. Acknowledging Public Access as an important and ongoing part of The Wildlands Conservancy's private property operations within this Project is a significant step to remedy this.

K-4 Cont.

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The challenge to our project of achieving the right balance in natural resource enhancement and protection of working ranching lands has been paramount in our Project design. Despite being fundamentally a Project oriented and funded for natural resource enhancement, our Project team expended considerable effort toward addressing issues related to the surrounding ranching land uses. We have conducted ongoing and lengthy design and modeling analyses, held numerous stakeholder outreach and communications meetings to describe in detailed way the analysis our engineering team has conducted, and have incorporated numerous project elements designed to eliminate risks from unintended consequences of landscape-scale changes in this region of the estuary. **K-5**

In order to accommodate the risks and fears of additional seawater incursion onto the surrounding pasture lands resulting from the intentional tidegate operations, our Project made three fundamental concessions in the Project designs. First, the Project proposes the realignment of Centerville Slough to a safe distance away from the surrounding properties, isolated by new and improved dikes and mechanical water management facilities, specifically included in our Project to keep saline water far away from the neighboring pastures. Second, we truncated the proposed muted tidal prism to the minimum level (5 ft maximum tide elevation) that will accomplish meaningful tidal marsh restoration but minimize the threat of tidewater incursion. Third, we propose a seasonal operation to the tidegates (MTR's closed in winter to mimic existing tidal conditions) specifically incorporated into our designs to preserve the floodwater storage space afforded by The Wildlands Conservancy's Inner Marsh area and not affect the surrounding ranching lands. Without these constraints, the project could likely achieve additional natural resource enhancement, but these concessions were necessary to achieve the twin goals of habitat enhancement and agricultural protection. **K-6**

In conclusion, CalTrout is quite satisfied that our Project has made every effort to accommodate the needs of the local community and neighboring lands, while simultaneously developing a Project that will offer much needed and meaningful improvements to the Eel River estuary. **K-7**

We wish to sincerely thank our project funders and partners: the State Coastal Conservancy and CA Department of Fish and Wildlife, the landowner The Wildlands Conservancy, Russ Ranch and Timber, our Project design team of Kamman Hydrology and Engineering, GHD Inc., HT Harvey and Associates, LACO Associates, Roscoe and Associates.

Sincerely,

Darren Mierau
California Trout
North Coast Director
CALIFORNIA TROUT

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Letter K Response to Comments

This is a letter of support for the Project from California Trout (a Project partner) who has been instrumental in all aspects of this Project from initial submittal of grant applications to completion of the DEIR and other studies; therefore, the words "comment noted" follows each response to comment below.

Response to Comment K-1

Comment noted.

Response to Comment K-2

Comment noted.

Response to Comment K-3

Comment noted.

Response to Comment K-4

Comment noted.

Response to Comment K-5

Comment noted.

Response to Comment K-6

Comment noted.

Response to Comment K-7

COMMENT L

STATE OF CALIFORNIA—NATURAL RESOURCES AGENCY

EDMUND G. BROWN, JR., *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
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ARCATA, CA 95521
VOICE (707) 826-8950
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October 24, 2016

Michael Bowen
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, Ca 94612

Re: **Comments on the Draft Environmental Impact Report (DEIR) for the Eel River Estuary Preserve Ecosystem Enhancement Project**

Dear Michael:

Thank you for soliciting input from the California Coastal Commission (Commission) on the Draft Environmental Impact Report (DEIR) for the above-referenced project, a proposal by The Wildlands Conservancy to restore ecosystem functions within the Eel River Estuary Preserve, to enhance habitats for native fisheries and aquatic species, support waterfowl and wildlife species, and to enhance agricultural productivity by decreasing and more effectively managing onsite flooding. The Commission's North Coast District office received an electronic copy of the DEIR for this project on September 12, 2016. Please note that the following comments are provided by Commission staff; the Commission itself has not reviewed the document. Commission staff also provided comments on the Notice of Preparation for this DEIR on January 22, 2015 and has participated in at least a half dozen interagency meetings and site visits related to the project over the past three years.

L-1

As you know, the proposed project will require a coastal development permit (CDP) from the Commission. The County of Humboldt has a certified local coastal program (LCP), but the site is within an area shown on State Lands Commission maps over which the state retains a public trust interest. Therefore, the standard of review that the Commission will apply to the project in its review of the forthcoming CDP application is the Chapter 3 policies of the Coastal Act. The certified LCP may be used as guidance.

The intent of this letter is to provide general feedback on the primary project elements. It is our understanding that The Wildlands Conservancy intends to submit a CDP application for Commission review in the coming weeks, and we look forward to providing more in-depth review and comment on the proposed development at that time.

As we understand it, the principal components of the project are as follows:

- Repair the Cut-Off Slough tidegate structure to serve its original purpose with modified gates that would improve fish passage without significantly altering water quality and water level relative to existing conditions;
- Install a new tidegate structure (multiple gates including a muted tidegate regulator) connecting the Inner Marsh to Cutoff Slough to increase and improve tidal wetland and salmonid rearing habitat;
- Reestablish Centerville Slough by excavating a channel along its historic alignment, reconnecting the south end to Shaw Creek in the existing Angels Camp area and realigning the north end into the Inner Marsh in order to increase aquatic habitat and enhance the movement of water and fish/wildlife across the property;
- Reconnect the Western Drainage Ditch to Centerville Slough for ecological enhancement and drainage efficiency;
- Excavate a historic channel of Russ Creek to re-establish connectivity with Centerville Slough to provide habitat connectivity for anadromous fish and restore the tidal to freshwater ecotone; **L-2**
- Establish sediment management areas in avulsion prone regions along Russ Creek to accommodate natural flood processes and enhance agricultural productivity in those areas;
- Restoring overwintering habitat for juvenile salmonids by excavating brackish water ponds in the floodplain of Centerville Slough/Russ Creek and establishing alcoves, terminal ponds, and large wood structures to provide additional habitat benefit;
- Restore dunes that have been lost to overwash events through mechanical dune construction, sand fence placement, wrack placement, revegetation of native dune plants, and through the design and configuration of project features that would allow dunes to migrate inland over time for sea-level rise resiliency;
- Enhance opportunities for public access and recreation to the dunes, wetlands, and sloughs for nature study, boating access, and other passive recreational uses.

In general, the project goals are aligned with and supported by several Coastal Act policy directives, including the following:

- **Section 30210-30214**, which collectively require that in new development projects (a) maximum public access shall be provided consistent with public safety needs and the need to protect natural resource areas from overuse, (b) access from the nearest public roadway to the shoreline be provided except where it is inconsistent with public safety, military security, or protection of fragile coastal resources, or adequate access exists nearby; (c) development shall not interfere with the public's right to access gained by use or legislative authorization; and (d) the public access policies of the Coastal Act shall be implemented in a manner that takes into account the capacity of the site and the fragility of natural resources in the area. **L-3**
- **Section 30230**, which requires in part that marine resources shall be maintained, enhanced and, where feasible, restored; and

- **Section 30231**, which requires in part that the biological productivity and the quality of coastal waters, wetlands, and estuaries appropriate to maintain optimum populations of marine organisms shall be maintained and, where feasible, restored.

Other major Coastal Act issues raised by the project include:

- **Section 30233**, which allows for diking, dredging, and filling of coastal waters, wetlands, and estuaries for specific enumerated uses that include, among others, boating facilities that provide public access and recreational opportunities, restoration purposes, and nature study, provided that the project represents the least environmentally damaging feasible alternative and includes feasible mitigation measures to minimize adverse environmental effects.
- **Section 30236**, which allows for substantial alternations of rivers and streams where the primary function is the improvement of fish and wildlife habitat, provided that the project incorporates the best mitigation measures feasible;
- **Section 30240**, which protects environmentally sensitive habitat areas;
- **Section 30241, 30242, and 30243**, which protect prime and non-prime agricultural lands and the long-term productivity of soils and limit the conversion of agricultural lands to nonagricultural uses; and
- **Section 30253**, which requires in part that new development shall minimize risks to life and property in areas of high geologic and flood hazard, shall assure stability and structural integrity and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area.

L-3 Cont.

In conclusion, based on our preliminary review of the document, we believe the DEIR does an adequate job of identifying the project's myriad of issues, potential impacts, feasible mitigation measures, and project alternatives, all of which will require more detail and analysis during the CDP application review process. But at this point it appears that the project's principal goals of restoring and enhancing habitats for native fisheries and aquatic species, enhancing agricultural productivity, and increasing public access and recreation opportunities are largely aligned with the fundamental goals of the Coastal Act's resource management policies to maximize public access and recreation, protect and restore where feasible coastal resources, and address climate change (sea-level rise) in project planning. We look forward to reviewing and providing detailed feedback on the CDP application for the project in the near future and ultimately scheduling a complete CDP application received for the project for our Commission's consideration. Thank you again for the opportunity to comment on this draft environmental document.

L-4

Sincerely,

Melissa B. Kraemer
Supervising Analyst

Letter L Response to Comments

Response to Comment L-1

This is an introductory comment acknowledging receipt of the DEIR; that the project will require a CDP, that the Project site is within CSLC lands, and that the Coastal Commission looks forward to receiving the CDP and providing more in-depth review and comment.

Response to Comment L-2

This comment just reiterates and summarizes the Project description.

Response to Comment L-3

This comment notes that the Project goals are aligned with and supported by several Coastal Act policy directives, and then goes on to list those applicable sections of the Coastal Act.

Response to Comment L-4

This is a closing comment stating that based on the CCC's preliminary review of the document they believe the DEIR does an adequate job of identifying the Project's myriad of issues, potential impacts, feasible mitigation, and project alternatives. The CCC also states that they look forward to reviewing and providing detailed feedback on the CDP application when it's submitted.

STATE OF CALIFORNIA

EDMUND G. BROWN JR., *Governor*

CALIFORNIA STATE LANDS COMMISSION
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Established in 1938

October 24, 2016

File Ref: SCH # 2014122040

Michael Bowen
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

Subject: Draft Environmental Impact Report (Draft EIR) for the Eel River Estuary Preserve Ecosystem Enhancement Project, Humboldt County

Dear Mr. Bowen:

The California State Lands Commission (CSLC) staff has reviewed the subject Draft EIR for the Eel River Estuary Preserve Ecosystem Enhancement Project (Project), which is being prepared by the California State Coastal Conservancy (Conservancy). The Conservancy is the lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The CSLC is a trustee agency for projects that could directly or indirectly affect sovereign lands and their accompanying Public Trust resources or uses. Additionally, because the Project involves work on sovereign lands, the Commission will act as a responsible agency. CSLC staff previously provided comments related to this Project on the original Notice of Preparation (NOP) (January 16, 2015) and the Revised NOP (December 14, 2015).

M-1

<u>CSLC Jurisdiction and Public Trust Lands</u>

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6009, subd. (c), 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the common law Public Trust.

As general background, the state of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership

extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. On navigable non-tidal waterways, including lakes, the State holds fee ownership of the bed of the waterway landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark, except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections.

After reviewing CSLC's internal records and the Draft EIR, it appears that the following Project components in the Centerville/Cutoff Slough would involve sovereign lands under CSLC's jurisdiction (see Figure 2-4 on page 2-27 in Draft EIR):

- Retrofit existing Cutoff Slough tide gate structure with new gates and improve vehicle turn around on existing berm
- Remove existing culvert and replace it with new gated culverts (all one way) into Inner Marsh
- Remove existing culverts and repair holes in berm

A lease would be required from the CSLC for any portion of the Project encroaching on State-owned sovereign land. Please contact Marlene Schroeder, Public Land Management Specialist (see contact information below), for information about CSLC's jurisdiction or leasing requirements.

M-1 Cont.

Project Description

The Conservancy proposes to retrofit and remove existing structures as an environmental restoration and drainage improvement Project to meet the agency's objectives and needs as follows (page 2-3 of the Draft EIR):

- Improve access to restored aquatic habitats for salmonids and other aquatic dependent species by increasing or creating migratory access between estuarine and inland waters and by restoring overwintering and rearing habitat for juvenile salmonids
- Improve drainage efficiency and manage sediment loads more effectively using both passive natural processes and active management approaches, while enhancing tidal influences by re-establishing connectivity of Russ Creek, Shaw Creek and Creamery Ditch to a rehabilitated Centerville Slough
- Increasing resiliency to sea-level rise and reducing salt water influences to pastures, enhancing drainage, and establishing avulsion management areas for Russ Creek and Shaw Creek
- Enhance tidal processes by restoring tidal prism and improve reliability of tidegate infrastructure to provide adaptability for sea-level rise and varied land management
- Enhance dune formation to increase resiliency to sea-level rise
- Enhance freshwater pond habitat for water birds and other native aquatic dependent species

- Facilitate access for continued passive and active agricultural land management, and nature study opportunities consistent with existing conditions
- Suppress invasive species
- Establish long-term Adaptive Management Program

From the Project Description, CSLC staff understands that the Project would include the following components (page 2-4 of the Draft EIR):

- Retrofit Six Existing Cut-Off Slough Top-Hinge Tidegates from 1979 to improve drainage efficiency and provide fish passage to and from the Eel River
- Expand Seasonal Tidal Prism to 150 acres of Inner Marsh and Re-established Centerville Slough through the installation of New Muted Tidegates to reintroduce tidal exchange resulting in improving tidal wetland and salmonid rearing habitat
- Re-establish and Enhance Centerville Slough and Reconnect Russ and Shaw Creek with the Estuary to increase aquatic habitat and enhance the movement of water and fish/wildlife to the north and south
- Enhance Existing and Create New Off-Channel Aquatic Habitat to create more brackish and freshwater ponds for waterfowl and overwintering fish habitat
- Protect and Enhance Drainage, Land Uses, and Habitats to enable the dunes in their existing location to rebuild and fortify over time
- Install Public Education and Access Signs around the Project site to help educate the public about properly using the site and limiting negative impacts to the site
- Beneficial Reuse of Excavated Sediments during Construction where feasible. Table 2-1 on page 2-14 of the Draft EIR lists sediment volumes. Approximately 130,000 cubic yards of sediments would be excavated from Centerville Slough and Shaw Creek. Sediments from Centerville Slough (under CSLC's jurisdiction) have higher salinity levels and cannot be reused for agricultural purposes.

The Draft EIR identifies Alternative 2: 2014 NOP Alternative (page 4-2 of the Draft EIR) as the Environmentally Superior Alternative.

M-1 Cont.

Environmental Review

CSLC staff requests that the Conservancy consider the following comments on the EIR.

General Comments

1. Previous CSLC Comment Letters: Several comments from the CSLC staff's prior letters on the original and revised NOPs (Appendix B of the Draft EIR) do not appear to have been addressed in the Draft EIR. The CSLC staff is re-emphasizing those previous comments below because of their importance to the CSLC staff's evaluation of a lease for the Project (e.g., see "Title to Resources" comment below).

M-2

2. Project Description: CSLC staff requests that the Project description provide additional detail on the components below. Additional maps would also help the reader understand where the referenced activities would occur.

   - Excavated Sediments. CSLC staff requests that Table 2-1 on page 2-14 of the Draft EIR separately identify the volume of sediment that would be excavated from Centerville Slough (i.e., land under the CSLC's jurisdiction) and Shaw Creek separately, instead of providing only a total volume of approximately 130,000 cubic yards. Because sediments are considered minerals, the CSLC staff would need to know how much sediment would be excavated, where it would be stored, and how it would be used if there would be "no sediment off-haul" (Page 2-17 of the Draft EIR). If sediment from State land is sold, the CSLC may be entitled to royalties. Please contact Marlene Schroeder, Public Land Management Specialist (see contact information below), for additional information about excavated sediments and their use. **M-2 Cont.**
   - Staging Areas, Site Access, and Excavation sites - Please provide maps showing all staging areas, site access routes, and excavation sites (pages 2-14 and 2-16 of the Draft EIR). **M-3**
   - Cofferdams and Fish Screens - Please show cofferdam and fish screen locations, sizes, materials, and how they would be installed on the Project site (page 2-16 of the Draft EIR). **M-4**
   - Sheetpiles - Please include locations, number, and methods of how the proposed sheetpiles would be pushed in the subsurface (page 2-16 of the Draft EIR). **M-5**
   - Other Project Details. Please provide information on how the tidegates would be retrofitted, how existing culverts would be removed, how holes in the berms from removing culverts would be repaired, and how the existing culvert would be replaced with new gated culverts (all one way) into the Inner Marsh (see Figure 2-4 on page 2-27 in Draft EIR). **M-6**
   - Vehicle Trips: Please clarify if the anticipated 30 per day trips are 30 round trips or one-way trips for 15 to 25 construction workers on the Project site at any given time (page 2-16 of the Draft EIR). If these are one-way trips and not round trips, please update the analysis for vehicle emissions in the Air Quality or the Greenhouse Gas emissions sections of the EIR. **M-7**

Aesthetics

3. Photographs of Project Sites: CSLC staff requests that additional photographs of the proposed Project components under the CSLC's jurisdiction be included in the Aesthetics section (Figure 3.1-1 on page 3.1-9 of the Draft EIR) for a reader to independently analyze possible environmental impacts based on the existing site conditions. **M-8**

Biological Resources

4. Consultations with Resource Agencies: CSLC staff requests that the EIR discuss results of any new consultations with California Department of Fish and Wildlife (CDFW) and other resource agency staffs (for example, more recent than the site visit in Spring 2011 discussed on page 3.4-4 of the Draft EIR). This is essential for a reader's understanding of whether the proposed avoidance measures such the size and type of fish screens (page 2-16 of the Draft EIR) are adequate. M-9

5. Spill Prevention and Contamination Plan: CSLC staff requests that the Conservancy include a Spill Prevention and Contamination Plan in the EIR because of possible spills from the vehicles and equipment on the Project site can result in the following as explained on page 3.8-11 of the Draft EIR:

   "Accidental spills could occur during construction as hazardous materials would be used in varying amounts during construction of the proposed Project. Construction activities would use hazardous materials including but not limited to cleaning products; fuels (diesel and gasoline); lubricants and oils. Construction workers could be exposed to hazards and hazardous materials as a result of improper handling and storage." M-10

6. Construction Noise: CSLC staff recommends the Conservancy add the following to the noise discuss on page 3.12-7 of the Draft EIR:

   a. Please explain if the construction noise would impact fish and birds.
   b. Please explain how the construction noise would be monitored so it is kept below recommended thresholds.
   c. Please explain any consultations with the CDFW or U.S. Fish and Wildlife Service regarding construction noise and wildlife. M-11

Cultural Resources

7. Submerged Resources: CSLC staff recommends that the Conservancy contact Assistant Chief Counsel Pam Griggs (see contact information below) to obtain shipwrecks data from the CSLC's shipwreck database and Commission records for the Project site to add to the existing cultural resources analysis. The database includes known and potential vessels located on the State's tide and submerged lands; however, the locations of many shipwrecks remain unknown. Please note that any submerged archaeological site or submerged historic resource that has remained in State waters for more than 50 years is presumed to be significant. M-12

8. Title to Resources: The Draft EIR should mention that the title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC (Pub. Resources Code, § 6313). CSLC staff requests that the Conservancy consult with Assistant Chief Counsel Pam Griggs (see contact information below) should any cultural resources on state lands be discovered during construction of the proposed Project. In addition, CSLC staff requests that the M-13

following statement be included in Mitigation Measure CR-1 on page 3.5-10 and Mitigation and Monitoring Plan:

"The final disposition of archaeological, historical, and paleontological resources recovered on State lands under the jurisdiction of the Commission must be approved by the CSLC." M-13 Cont.

Recreation

9. Public Access: CSLC staff requests that the Conservancy add the following to the discussion on page 3.15-2 of the Draft EIR:
   a. Please explain how areas under CSLC's jurisdiction are currently being used for recreation by public.
   b. Please explain how construction equipment would affect those public uses.
   c. Please explain what measures would be implemented to ensure public access to these areas is not impeded.

M-14

Thank you for the opportunity to comment on the Draft EIR for the Project. As a trustee and responsible agency, CSLC staff will need to rely on the Final EIR for the issuance of any new lease as specified above and, therefore, we request that you consider our comments prior to certification of the EIR.

Please send copies of future Project-related documents, including electronic copies of the Final EIR, Mitigation Monitoring Program, Notice of Determination, CEQA Findings and, if applicable, Statement of Overriding Considerations when they become available, and refer questions concerning environmental review to Afifa Awan, Environmental Scientist, at (916) 574-1891 or via e-mail at Afifa.Awan@slc.ca.gov. For questions concerning archaeological or historic resources under Commission jurisdiction, please contact Pam Griggs, Assistant Chief Counsel, at (916) 574-1854 or via e-mail at Pamela.Griggs@slc.ca.gov. For questions concerning Commission leasing jurisdiction, please contact Marlene Schroeder, Public Land Management Specialist, at (916) 574-2320 or via email at Marlene.Schroeder@slc.ca.gov. M-15

Sincerely,

Cy R. Oggins, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
A. Awan, CSLC
P. Griggs, CSLC
M. Schroeder, CSLC
J. Garrett, CSLC

Letter M Response to Comments

Response to Comment M-1

This comment identifies the CSLC's role as a trustee agency under CEQA; the CSLC's jurisdiction and management over all tidelands, submerged lands, and the beds of navigable lakes and waterways; the Project components under their jurisdiction; and a summary of the Project description.

Response to Comment M-2

State Lands has not established a claim line boundary of jurisdiction within the project area and therefore its currently unknown the volume of sediment (if any) will be excavated within said jurisdiction. All excavated sediment will be reused on site as described in section 2.4.7.

Response to Comment M-3

These items are described in Section 2.5.1 and 2.5.4 of the DEIR and will be shown on the construction plans submitted to State Lands as part of the lease application process.

Response to Comment M-4

Please see Response to Comment M-3

Response to Comment M-5

See Response to Comment M-3.

Response to Comment M-6

Please see Section 2.4.1 and 2.4.2 for description.

Response to Comment M-7

Regarding the comment of one-way trips versus round trips, the intent of the second paragraph on page 2-16 of the DEIR is to identify the number of construction workers and motor vehicles on the Project site for a typical day. For an analysis of construction workers and haul trips conflicting with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, reference Section 3.16.5 (Impacts and Mitigation Measures) of the DEIR.

Response to Comment M-8

CSLC has not established a claim line boundary of jurisdiction within the project area and therefore its currently unknown which project component(s) are located within said jurisdiction. An oblique aerial photo has been provided below with the existing Cut-off Slough tidegate circled in red.

Existing Cut-off Slough Tidegate (circled)

Response to Comment M-9

Additional discussions have been held with USFWS, National Marine Fisheries Service (NMFS), and CDFW as part of endangered species consultation. These discussions, including a site visit, have primarily been intended to convey Project information to the agencies. USFWS has recommended conservation measures for Western Snowy Plover during these discussions, and they have been included in a biological assessment currently in draft form and soon to be submitted to the agencies. The size of fish screens has not been part of discussions, pending NMFS and CDFW review of consultation documents. Recent biology-related meetings include:

- June 30, 2016. Meeting with John Hunter, USFWS to discuss Western Snowy Plover.
- August 31, 2016. Phone conversation with Julie Weeder, NMFS to discuss Biological Assessment format.
- September 23, 2016. EREP site visit with NMFS, USFWS, and CDFW to discuss aquatic species.
- September 21, 2016. E-mail correspondence with Matthew Lau, NPS (previously HSU Plover Crew lead) to discuss the Western Snowy Plover.
- October 11, 2016. Interagency Project meeting held at the GHD office in Eureka, California; general discussion of permits.

Response to Comment M-10

As discussed in the DEIR, Section 3.8.5, Impact HAZ-2, existing regulations and codes, including, but not limited to CCR Titles 8 and 22, Uniform Fire Code, and Division 20 of the California Health and Safety Code: all reserve fuel supplies and hazardous materials must be stored within the confines of a designated construction area; equipment refuelling and maintenance must take place only within the staging area; and construction vehicles shall be inspected daily for leaks. These regulations and codes must be implemented, as appropriate, and are monitored by the state and/or local jurisdictions, including the Ferndale Fire Protection District. Additionally, contractors would be required to comply with Cal/EPA's Unified Program; regulated activities would be managed by Humboldt County Division of Environmental Health, the designated CUPA for Humboldt County, in accordance with the regulations included in the unified Program. Such compliance would reduce the potential for accidental release of hazardous materials during construction of the proposed Project. As a result, it would lessen the risk of exposure of construction workers to accidental release of hazardous materials, as well as the demand for incident emergency response. The impact is less than significant with existing regulations in place, and an additional spill prevention and contamination plan are not warranted.

Response to Comment M-11

Noise with the potential to impact salmonids or Western Snowy Plover, for example, are discussed in Section 3.4.5 (page 3.4-47) of the DEIR, and Mitigation Measures BIO-1a through BIO-1e are included to reduce potential impacts to a less than significant level. Additionally, clearing of shrubs or other vegetation, if necessary for construction or maintenance, shall be conducted during the fall and/or winter months from August 16 to February 29, outside of the active nesting season for migratory bird species (i.e., March 1 to August 15).

Response to Comment M-12

As requested, an email was sent to Pamela Griggs on October 28, 2016 requesting to "obtain shipwrecks data from the CSLC's shipwreck database and Commission records for the Project site to add to the existing cultural resources analysis." As of mid-November, 2016, no response has been received.

Response to Comment M-13

We agree with this comment that the title to any currently unknown but discovered abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC (Public Resources Code, Section 6313). We've added additional text to Mitigation Measure CR-1 as requested. Please see Section 2 (Revisions to the 2016 DEIR), #5.

Response to Comment M-14

The following text is added to the DEIR:

Public access to areas within the jurisdiction of the State Lands Commission is limited to infrequent pedestrian or OHV visitation below the mean high water mark along Centerville Beach, and infrequent boat access within the slough networks outboard of the Cut-Off Slough tidegates. No construction is

planned along the dunes, and therefore there will be no effect upon access there. Construction outboard of the Cut-Off Slough tidegates is primarily limited to establishment of a kayak put in/take out intended to enhance visitation and recreational opportunities. Construction will be limited to weekdays and therefore impacts on recreational uses under the jurisdiction of CSLC will be insignificant.

Response to Comment M-15

Agreed, the CSLC will be sent future project-related documents including but not limited to, the Final EIR, MMRP, NOD, CEQA Findings, etc. Thank you for listing staff members from your office to contact regarding certain issues and for questions.

October 24, 2016

Michael Bowen, Project Manager

California State Coastal Conservancy

1330 Broadway, 13th Floor

Oakland CA 94612-2530

RE: Letter of Support for the State Coastal Conservancy's Draft Environmental Impact Report

Dear Michael,

On behalf of Trout Unlimited, America's oldest and largest organization dedicated to the preservation and restoration of the nation's coldwater fisheries, I write with the following comments on the draft Environmental Impact Report (DEIR) for the Eel River Estuary and Centerville Slough Enhancement Report. We appreciate the opportunity to provide input to the process.

This project is one of three large scale restoration projects in the Eel River delta. TU supports all three projects, but believes the instant project offers a particularly valuable chance to restore estuarine habitat. In addition, the project would enhance agricultural resources in the Coastal Zone and provide valuable public access. We also note the project is specifically designed to address sea level rise conditions, which are a significant threat to the project area. **N-1**

We believe the DEIR would benefit from greater discussion of the general decline of the Eel River watershed's salmonid resources over the last century. The watershed once supported annual runs of more than a million salmon, but these have now diminished to a fraction of this former number. **N-2**

We would also like to highlight several immediate ecological threats in the project area. These include wave overwash events, which have converted valuable pasture to salt marsh overnight. In addition, many streams have become entirely disconnected from the Eel River estuary due to sediment impacts. Likewise, placement of poorly-designed tidegates have caused the entire project area to become disconnected from the estuary for almost a century and a half. **N-3**

We further note the project would benefit a number of listed and sensitive species. The return of muted tidal action to the Inner marsh and the re-establishment of Centerville Slough would result in a significant expansion of available habitat for the federally endangered Tidewater Goby and federally threatened Coho salmon, Steelhead, and Chinook Salmon. It would also contribute to an expansion of habitat for Cutthroat Trout which are currently isolated in the upper watershed. **N-4**

Trout Unlimited: America's Leading Coldwater Fisheries Conservation Organization
California Office: 4221 Hollis Street, Emeryville, CA 94608
Direct: (510) 280-5392 • Email: mclifford@tu.org • www.tu.org

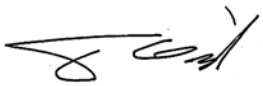
Re-establishment of muted tidal action would also allow the expansion of eelgrass beds into the Inner Marsh, providing improved aquatic habitat structure. Removal of invasive Spartina would enhance existing tidal areas in the northern half of the site, with resulting benefits for a variety of native plant and animal species. **N-5**

Proposed removal on invasive *Ammophila* on low dunes near the northern end of the site would re-establish native dune mat habitat and encourage expansion of nearby populations of federally endangered Beach Layia and Menzies Wallflower. It would also offer an expansion of potential nesting habitat for federally threatened Western Snowy Plovers currently utilizing the adjacent sandbar at the mouth of the Eel River.

In sum, we believe this is a well-conceived project with significant benefits to ecological resources of statewide importance. **N-6**

Thank you for your consideration of the above comments. We look forward to the opportunity to provide additional detailed input as the Project enters the permitting and implementation funding phase.

Best regards,



Matt Clifford
California Water Project Attorney

Letter N Response to Comments

Response to Comment N-1

This comment includes introductory language about Trout Unlimited and the identification of two other large scale restoration projects in the Eel River delta, and Trout Unlimited's support for all three.

Response to Comment N-2

Yoshiyama and Moyle (2010) documented dramatic declines in salmonid abundance within the Eel River watershed. They estimated that salmonid numbers ranged from over a million fish in wet periods with good ocean conditions (Chinook, Coho, and Steelhead combined) to about half that many in less favorable years. As of the time of publication they estimated about 3,500 fish total, and stated that "Coho Salmon, Chinook Salmon, and Steelhead are all on a trajectory toward extinction in the Eel River system."

Response to Comment N-3

This comment highlights a number of ecological threats in the Project area that the EIR has addressed including: wave overwash, impacts from sediment, and old tidegates.

Response to Comment N-4

Comment noted.

Response to Comment N-5

Comment noted.

Response to Comment N-6

Comment noted.

Emil & Mary Ann Feierabend
590 Russ Lane
Ferndale CA 95536

October 21, 2016

Michael Bowen, Project Manager
California State Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

Re: Comments of the Draft Environmental Impact Report, (DEIR) SCH#2014122040, Eel River Estuary and Centerville Slough Enhancement Project

Dear Mr. Bowen,

I am writing to comment on the proposed Eel River Estuary Project. I have been living at my current residence for over 20 years and it is located immediately on Russ Lane at the end of the paved public road. Following my residence, there is a gated private single lane gravel road accessing the Wildland's property.

I have had multiple issues with TWC's guests and their use of the gravel lane. This includes people arriving after hours and at all ours of the night looking for TWC's property, driving down the lane and attempting to turn around and getting stuck subsequently blocking the lane and having to pull them out. Also, people parking their cars in lane and aborning their vehicles and jumping the gate thereby trespassing on Harville Ranch and accessing TWC. Historically, this lane was a simple ranch road used for agricultural use and the duck hunting club. In the DEIR it states that there is going to be no impact from this project. I strongly disagree with that representation. There is an existing impact that will only be exacerbated by approval of the DEIR without appropriate mitigations. O-1

As far as the constructions related impacts there is very little information or discussion of how that will be managed. Where are all the equipment people and materials going to be stored, used and managed? My wife and I walk on and use the gravel lane regularly and that use will become unsafe and will be totally disrupted due O-2

to this project. Construction hours of 6 am till 6 pm will be disruptive not only use of the lane but also our quality of life. O-2 Cont.

I was one of the participants in the mediated efforts by the Coastal Conservancy in an attempt to resolve the public access dispute as well as develop a public access plan. In the DEIR on page 3.15-6 it implies that a public access plan was developed by everyone involved. This is not accurate. We never received nor had input into a draft plan much less a final agreed upon plan that everyone signed off on. To imply otherwise is simply false. O-3

Thank you for the opportunity to comment. I will look forward to your response.

Sincerely,

Emil Feirabend

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OAKLAND, CALIF.

Letter O Response to Comments

Response to Comment O-1

Comment noted.

Response to Comment O-2

Temporary construction staging and material storage areas will be designated within the project limits as described in DEIR section 2.5.1. Construction traffic will be temporary and limited to the duration of construction only as described in DEIR section 2.5.4.

Response to Comment O-3

Please see Master Response to Comments - Recreation & Public access and Coordination. Mr. Fierebend was a participant in the facilitated meetings and received the draft Public Access Plan.

Appendices A-G

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Appendix A – Letters of Project Support

California State Senate

SENATOR
MIKE McGUIRE
SECOND SENATE DISTRICT

October 28, 2015

Chairman Doug Bosco
State Coastal Conservancy
1330 Broadway, 13th floor
Oakland, CA 94612

Dear Chairman Bosco:

I am writing to express my support for the California Trout's (CalTrout) proposed Eel River Estuary and Centerville Slough Enhancement Project. The proposed CalTrout project would protect and enhance productive working lands while restoring fish passage and estuarine habitat along historic Centerville Slough, providing critical habitat to coho salmon and other special status fish and wildlife.

The project will expand the existing boundary beyond the ongoing effort on The Wildlands Conservancy's Eel River Estuary Preserve to address the complex issues of drainage, habitat, and ocean incursion on a landscape that is interlinked and invaluable to local agricultural, wildlife and public access interests. This type of project advances the dual goals of benefiting vibrant rural communities and viable fish populations in our Northern California rivers.

Anadromous fish restoration and recovery is very important to my district for ecological, economic and cultural purposes. This is an important project for the restoration of valuable estuarine wetlands and wildlife habitat and is a model for cooperative restoration efforts providing multiple benefits to our north coast communities.

I thoroughly support these types of fisheries restoration projects. If we can be of any assistance, please do not hesitate to call our office at (707) 445-6508.

Warmest Regards,

MIKE McGUIRE
Senator

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CHAIR: DIGITAL DIVIDE IN RURAL CALIFORNIA
CAREER TECHNICAL EDUCATION AND BUILDING A 21ST CENTURY WORKFORCE
WINE

Assembly
California Legislature

JIM WOOD
ASSEMBLYMEMBER, SECOND DISTRICT

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0002
(916) 319-2002
FAX (916) 319-2102

DISTRICT OFFICES
50 D STREET, SUITE 450
SANTA ROSA, CA 95404
(707) 576-2526
FAX (707) 576-2297

710 E STREET, SUITE 150
EUREKA, CA 95501
(707) 445-7014
FAX (707) 455-6607

200 S SCHOOL STREET, SUITE D
UKIAH, CA 95482
(707) 462-5770
FAX (707) 463-5773

November 12, 2015

Douglas H. Bosco, Chairman
California State Coastal Conservancy
1330 Broadway, 13th floor
Oakland, CA 94612

Re: Eel River Estuary and Centerville Slough Enhancement Project

Dear Chairman Bosco,

I am supportive of California Trout's request to the Coastal Conservancy to fund the development of CEQA and permitting materials for the proposed Eel River Estuary and Centerville Slough Enhancement Project ("ERECS Project"). The proposed project would protect and enhance productive working lands while restoring fish passage and estuarine habitat along historic Centerville Slough. These funds will augment existing funds from the California Department of Fish and Wildlife's Fisheries Restoration Grants Program and the Coastal Conservancy to expand the project boundary beyond the ongoing effort on The Wildlands Conservancy's Eel River Estuary Preserve and to address the complex issues of drainage, habitat, and ocean incursion on a landscape that is interlinked and invaluable to local agricultural and wildlife and public access interests.

The project area enjoys some of the most productive agricultural land in the state. But this area is threatened by ocean incursion and is heavily impacted by floodwater and drainage problems. Without action, we can expect dune overwash to convert pasture to pickleweed salt marsh, and sediment loads from headwater streams to clog important drainage waterways, thereby exacerbating existing drainage problems. In addition to the protection of agriculture land use, the restoration and enhancement of our state's estuarine resources is of immediate concern for the benefit of multiple state and Federally listed species, such as coho and Chinook salmon as well as Steelhead. Restoration of California's estuaries is of vital importance to the recovery of wild fish and the sport fishing industry.

I strongly support CalTrout's efforts to solve complex resource issues and urge your favorable consideration of the Eel River Estuary and Centerville Slough Enhancement Project. Feel free to contact my office with any questions.

Respectfully,

JIM WOOD
Assemblymember, 2nd District

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1655 Heindon Road
Arcata, California 95521-4573

NOV 1 2 2015

Douglas H. Bosco, Chairman
California State Coastal Conservancy
1330 Broadway, 13th floor
Oakland, CA 94612

Re: Eel River Estuary and Centerville Slough Enhancement Project

Dear Chairman Bosco,

NOAA's National Marine Fisheries Service (NMFS) is writing to express our support for CalTrout's request to the Coastal Conservancy to fund the development of California Environmental Quality Act and permitting materials for the proposed Eel River Estuary and Centerville Slough Enhancement Project (Project). The Project is a collaborative effort to restore fish passage and estuarine habitat along Centerville Slough while providing for the continued use of productive working lands. The requested funds will augment existing funds from the California Department of Fish and Wildlife's Fisheries Restoration Grants Program and the Coastal Conservancy to expand the project boundary beyond the ongoing effort on The Wildlands Conservancy's Eel River Estuary Preserve and to address the complex issues of drainage, habitat, and ocean incursion on a landscape managed for multiple objectives.

We support the Project because restoration and enhancement of the Eel River estuary is of immediate importance for the recovery of threatened salmonids, and because the Project is consistent with the strategies and priorities described in the Final Recovery Plan for Southern Oregon / Northern California Coast Coho Salmon and the Coastal Multispecies Public Draft Recovery Plan which includes the Chinook salmon and steelhead of the Eel River. CalTrout has a track record of effective project management on the north coast, and we look forward to our continued collaboration in this effort to restore valuable habitat necessary for the recovery of listed salmonids.

We appreciate this opportunity to share our enthusiasm and support for CalTrout's request, and we encourage the Coastal Conservancy to prioritize this important work and select it for funding. If you have additional questions, please feel free to contact Zane Ruddy at (707) 825-5173 or zane.ruddy@noaa.gov.

Sincerely,

Justin Ly
Acting South Coast Branch Chief
Northern California Office

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COASTAL CONSERVANCY
OAKLAND, CALIF

cc: Darren Mierau – CalTrout
Michael Bowen – State Coastal Conservancy

J. RUSS RANCH
Premium Grass Fed Beef
HUMBOLDT COUNTY GROWN

Douglas H. Bosco, Chairman
California State Coastal Conservancy
1330 Broadway, 13th floor
Oakland, CA 94612

November 2, 2015

Re: Support for Eel River and Centerville Slough Enhancement: sea level rise resiliency, salmonid habitat restoration, and protection of working lands

Dear Chairman Bosco,

As a landowner in the southern Eel River whose property will be included in the Eel River Estuary and Centerville Slough Enhancement Project (Project), I write in support of California Trout's request to the Coastal Conservancy for $175,000 to fund the development of CEQA and permitting materials for this important landscape enhancement effort. The project will protect and enhance productive working lands as well as restore fish passage and estuarine habitat along historic Centerville Slough. The project will also help provide CEQA coverage for future activities on our land that are proposed as part of the project. These funds will augment existing funds from the California Department of Fish and Wildlife's Fisheries Restoration Grants Program and the Coastal Conservancy to expand the project boundary of an ongoing effort that will address the complex issues of drainage, habitat, and ocean incursion across a broad landscape that is invaluable to local agricultural and wildlife interests.

Land in the project area is very productive, but it is threatened by a combination of ocean incursion, annual significant sediment deposits (geology) and subsequent drainage problems. Without action, we can expect continued dune breach and over wash to sand -in existing drainage waterways, and sediment loads from headwater streams, Russ and Shaw Creek to remain uncontrolled, thereby reducing the productivity of our pastures and diminishing habitat value. While we are primarily interested in maximizing productive agricultural land, we also are working towards ways this can be done in concert with habitat enhancement as the project proposes. Without managing the sediment from these tributary drainages this poses a threat to the Eel River estuary.

The Eel River Estuary and Centerville Slough Enhancement Project is an expansion of the boundaries for a restoration and enhancement project that was initiated in 2013. As currently proposed, this expanded project is a more comprehensive approach that connects watercourses and drainage features across property lines. The 2013 project produced preliminary designs based on hydrologic and environmental supporting studies that indicate a project can be conducted to improve conditions on property to the north of our land. Our interest is to fully maximize the design the of previous smaller project components, which must extend onto our property and thereby extend project benefits. The expanded project area encompasses a lower watershed system therein making for a more practical, feasible and logical agricultural and ecological management area.

We support the environmental and supporting studies that enable a CEQA analysis for this broader, more comprehensive project. I, representing Russ Ranch and Timber and Jack and Linda Russ strongly support CalTrout's efforts to address these complex resource issues while balancing the needs of human uses and habitat, urging your favorable consideration of this important project.

Sincerely,

Jay Russ

THE WILDLANDS CONSERVANCY

Douglas H. Bosco, Chairman
California State Coastal Conservancy
1330 Broadway, 13th floor
Oakland, CA 94612

Re: Eel River Estuary and Centerville Slough Enhancement Project

Dear Chairman Bosco,

The Wildlands Conservancy (TWC), as a project partner and landowner at the site, is writing to express support for the Eel River Estuary and Centerville Slough Enhancement Project (ERECS Project).

TWC purchases and restores landscapes, and builds visitor facilities to welcome the public back to the land. We also fund more outdoor education programming at no cost to participants than any other nonprofit provider in California

The Wildlands Conservancy, with California Trout and other partners, are determined to design a project that will protect and enhance productive working lands while restoring fish passage and estuarine habitat along historic Centerville Slough.

The project will also provide key public access to extend the coastal trail and showcase wildlife & nature viewing. We see the public access offering combined with the fish restoration effort as creating new opportunities for the local economy and adding to the enjoyment of outdoor recreation in one of California's most beautiful natural places.

Whether the metric is preserving traditional agricultural practices while restoring native species habitats, or expanding recreational opportunities for a growing tourist economy, this is an effort we can support. We appreciate the Board's consideration of this, and urge your approval.

All the best,

Dan York

Vice President, The Wildlands Conservancy

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www.wildlandsconservancy.org

AGENDA ITEM NO.
D-2

COUNTY OF HUMBOLDT

For the meeting of: November 17, 2015

Date: November 5, 2015

To: Board of Supervisors

From: Supervisor Rex Bohn

Subject: Letter of Support for Cal Trout's request to the Coastal Conservancy for funding for an Eel River Estuary and Centerville Slough Enhancement Project.

RECOMMENDATION(S): That the Board of Supervisors authorize the Chair to sign letter of support.

SOURCE OF FUNDING: N/A

DISCUSSION: California Trout has request a letter to the California State Coastal Conservancy in support of funding for their Eel River Estuary and Centerville Slough Enhancement Project. The proposed project would protect and enhance productive working lands while restoring fish passage and estuarine habitat along historic Centerville Slough. If approved, these funds will augment existing funds from the California Department of Fish and Wildlife's Fisheries Restoration Grans Program and the Coastal Conservancy to expand the project boundary beyond the ongoing efforts on the Wildlands Conservancy's Eel River Estuary Preserve. The project will address the complex issues of drainage, habitat, and ocean incursion on a landscape that is interlinked to local agriculture, public access, and wildlife interest.

FINANCIAL IMPACT: N/A

OTHER AGENCY INVOLVEMENT:

ALTERNATIVES TO STAFF RECOMMENDATIONS: Board discretion.

ATTACHMENTS: Project Description and Letter of Support.

Prepared by Kathy Hayes Signature

REVIEW:
Auditor _____ County Counsel _____ Personnel _____ Risk Manager _____ Other _____

TYPE OF ITEM:
X Consent
_____ Departmental
_____ Public Hearing
_____ Other _____

PREVIOUS ACTION/REFERRAL:

Board Order No. _____

Meeting of: _____

BOARD OF SUPERVISORS, COUNTY OF HUMBOLDT
Upon motion of Supervisor Sundberg Seconded by Supervisor Bass
Ayes Sundberg, Lovelace, Fennell, Bohn, Bass
Nays
Abstain
Absent

and carried by those members present, the Board hereby approves the recommended action contained in this Board report.

Dated: Nov. 17, 2015
By: _____
Kathy Hayes, Clerk of the Board

CALIFORNIA TROUT

"Solving complex resource issues while balancing the needs of wild fish and people."

Re: Eel River Estuary and Centerville Slough Enhancement Project

Organization seeking support
California Trout
360 Pine Street, 4th Floor
San Francisco, CA 94104
(415) 392-8887
Tax ID#: 23-7097680

Description of project for which support is sought
California Trout (CalTrout) seeks support for a grant from the California State Coastal Conservancy for a total of $175,000 to fund the development of CEQA and permitting materials for the Eel River Estuary and Centerville Slough Enhancement Project ("ERESC Project"). The proposed project would protect and enhance productive working lands while restoring fish passage and estuarine habitat along historic Centerville Slough. These funds will augment existing funds from the California Department of Fish and Wildlife's Fisheries Restoration Grants Program and the Coastal Conservancy to expand the project boundary beyond the ongoing effort on The Wildlands Conservancy's Eel River Estuary Preserve. The project will address the complex issues of drainage, habitat, and ocean incursion on a landscape that is interlinked and invaluable to local agricultural, public access, and wildlife interests.

The ERECS Project is an expansion of the boundary for a restoration and enhancement project that had been under development since 2013, The Eel River Estuary Preserve Restoration and Enhancement Project. Since that time the area landowners have worked together to develop a mutually beneficial project that will protect and enhance the area's vibrant agricultural economy now and in the future, while also achieving historic benefits for natural resources. By working closely with all adjacent landowners, CalTrout, The Wildlands Conservancy and the project team have helped develop a more broad design solution for protection against ocean incursion, improved drainage and productivity of agricultural lands and restoration of fish access and estuarine habitat. The majority landowner, The Wildlands Conservancy, is an organization dedicated to providing recreational and outdoor education opportunities on their preserves, and their intent is that the Eel River Estuary Preserve will be an additional destination point for the expanding tourist economy of the North Coast.

The project area enjoys some of the most productive agricultural land in the state. But this area is threatened by ocean incursion and is heavily impacted by floodwater and drainage problems. Without action, we can expect dune overwash to convert pasture to pickleweed salt marsh, and sediment loads from headwater streams to clog important drainage waterways, thereby exacerbating existing drainage problems. In addition to the protection of agriculture land use, the restoration and enhancement of our state's estuarine resources is of immediate concern for the benefit of multiple state and Federally listed species, such as coho and Chinook salmon as well as Steelhead. Restoration of California's estuaries is of vital importance to the recovery of wild fish and the sport fishing industry.

Describe CalTrout's leadership – permitting – public comment.
CalTrout has pioneered fishery enhancement work in California for 42 years. The organization has managed several Department of Fish and Wildlife Fisheries Restoration Grants for comparable work, and

currently manages multiple grants from the Coastal Conservancy and CDFW, including the ongoing EREP Project that is proposed for expansion. CalTrout has demonstrated the technical and procedural competence necessary to manage and complete the proposed work. Additionally, CalTrout and the project team have sought and now have won the support of neighboring landowners. The alliance of this diverse group of stakeholders, to forge consensus and broad commitment to the realization of these important restoration efforts is a landmark effort in the lower Eel River.

The project team will prepare an Environmental Impact Report and will comply with CEQA.

What is the timeline?
Position letters and support letters will be presented at the California State Coastal Conservancy on December 3rd, 2015. We would appreciate receiving the letter by November 20th.

The proposed project will join the ongoing planning and design effort on The Wildlands Conservancy's Eel River Estuary Preserve and has a project completion date of February 2017.

Who is being asked to support your request?
U.S. Congressman Jared Huffman, State Senator Mike McGuire, Assemblyman Jim Wood, Humboldt County, and other community organizations and individuals.

Please indicate how much the project will cost and who would most directly be affected by it.

	Eel River Estuary and Centerville Slough Enhancement Project
CA State Coastal Conservancy – Dec. 3rd	$175,000
CDFW FRGP – current funding	$700,233
CA State Coastal Conservancy – current funding	$336,950
Total	**$1,214,430**

The Eel River Estuary and Centerville Slough Enhancement Project addresses the health and well-being of the local coastal community, fisheries, and regional communities that depend upon the recovery of salmonid populations and the protection of productive agricultural lands. Sportfishing is of ever-increasing importance to the local and State economy while coastal salmonid populations are increasingly at risk from human and climate induced alterations of habitat and water quality. Recovering coastal salmon populations to sustainable levels is of national interest, and California can play a major role in this effort. Reopening historic habitat and providing recreational and educational opportunities while improving agricultural land use where advisable is an excellent way to achieve this goal.

Please cc: this letter to the following recipients. Telephone numbers are provided below to answer questions about information supplied on this form.

Darren Mierau – CalTrout North Coast Program Director
(707) 825-0420; dmierau@caltrout.org; 615 11th Street, Arcata, CA 95521
Michael Bowen– State Coastal Conservancy Project Manager
(510) 286-0720; mbowen@scc.ca.gov; 1330 Broadway, 13th floor, Oakland, CA 94612

BOARD OF SUPERVISORS

COUNTY OF HUMBOLDT

825 5TH STREET

EUREKA, CALIFORNIA 95501-1153 PHONE (707) 476-2390 FAX (707) 445-7299

November 17, 2015

Douglas H. Bosco, Chairman
California State Coastal Conservancy
1330 Broadway, 13th floor
Oakland, CA 94612

Re: Eel River Estuary and Centerville Slough Enhancement Project

Dear Chairman Bosco,

On behalf of the Humboldt County Board of Supervisors, I am writing in full support of California Trout's request to the Coastal Conservancy to fund the development of CEQA and permitting materials for the proposed Eel River Estuary and Centerville Slough Enhancement Project ("ERECS Project"). The proposed project would protect and enhance productive working lands while restoring fish passage and estuarine habitat along historic Centerville Slough. These funds will augment existing funds from the California Department of Fish and Wildlife's Fisheries Restoration Grants Program and the Coastal Conservancy to expand the project boundary beyond the ongoing effort on The Wildlands Conservancy's Eel River Estuary Preserve and to address the complex issues of drainage, habitat, and ocean incursion on a landscape that is interlinked and invaluable to local agricultural, wildlife and public access interests.

The ERECS Project is an expansion of the boundary for a restoration and enhancement project that had been under development since 2013, The Eel River Estuary Preserve Restoration and Enhancement Project. Since that time the area landowners have developed a working relationship and a mutually beneficial project that will protect and enhance the area's vibrant agricultural economy now and in the future, while also achieving historic benefits for natural resources. By working closely with all adjacent landowners, CalTrout, The Wildlands Conservancy and our project team have helped develop a more broad design solution for protection against ocean incursion, improved drainage and productivity of agricultural lands and restoration of fish access and estuarine habitat. The majority landowner, The Wildlands Conservancy, is an organization dedicated to providing recreational and outdoor education opportunities on their preserves, and their intent is that the Eel River Estuary Preserve will be an additional destination point for the expanding tourist economy of the North Coast.

The project area enjoys some of the most productive agricultural land in the state. But this area is threatened by ocean incursion and is heavily impacted by floodwater and drainage problems. Without action, we can expect dune over wash to convert pasture to pickleweed salt marsh, and sediment loads from headwater streams to clog important drainage waterways, thereby exacerbating existing drainage problems. In addition to the protection of agriculture land use, the restoration and enhancement of our state's estuarine resources is of immediate concern for the benefit of multiple state and federally listed species, such as Coho and Chinook salmon as well as Steelhead. Restoration of California's estuaries is of vital importance to the recovery of wild fish and the sport fishing industry.

Our Board strongly support CalTrout's efforts to solve complex resource issues and urge your favorable consideration of the Eel River Estuary and Centerville Slough Enhancement Project.

Sincerely,

Estelle Fennell, Chair
Humboldt County Board of Supervisors

EF:kh

Appendix B – Conceptual Design Memo

Kamman Hydrology & Engineering, Inc.
7 Mt. Lassen Drive, Suite B250, San Rafael, CA 94903
Telephone: (415) 491-9600
Facsimile: (415) 680-1538
E-mail: Greg@KHE-Inc.com

March 25, 2013

Mr. Michael Bowen, Coastal Project Manager
California Coastal Conservancy
1330 Broadway, 11th Flood
Oakland, CA 94612

Subject: Preliminary Draft Project Alternative
Ecosystem Restoration and Flood Hazard Reduction Planning and Feasibility Assessment, Eel River Preserve, O'Rourke Foundation, and Russ Family Property Vicinity

Dear Michael:

This letter presents a Preliminary Draft Project Alternative for ecosystem restoration and flood hazard reduction for the Eel River Preserve ("EREP"), O'Rourke Foundation Property (ORFP), and Russ Family Property ("RFP") vicinity ("project area")outside of Ferndale, California. This Draft Project Alternative was prepared in response to input received during and after the Project Partners/Technical Team meeting held in Ferndale, California on January 16, 2013. At this meeting, KHE presented a progress report and findings associated with the Feasibility Assessment. Productive discussions during the meeting and a follow up site visit provided most of the direction in developing the Draft Project Alternative. This Alternative is considered a preliminary working draft and is intended to evolve and change following further review and input from all project partners.

During the January 16, 2013 meeting, three primary project design objectives were provided:

1. Do not adversely impact existing flood storage capacity provided behind the primary levee and dune system that defines the boundary of the project area.
2. Enlarge and improve salmonid habitat capacity without adversely impacting existing aquatic species such as tidewater goby.
3. Improve drainage and reduce sedimentation problems associated with Russ and Shaw Creeks, which flow northward to the Salt River via a complex drainage network through the EREP and ORFP properties.

The Draft Project Alternative is illustrated in Figure 1, which is attached to this letter report. Descriptions of the key elements that comprise the Alternative are presented below, including a brief summary of the opportunities and constraints of each element in satisfying the design objectives listed above. This plan does not address public access.

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PROPOSED PROJECT DESIGN ELEMENTS

A. Muted tidal exchange through the existing Army Corps tide gate

This design element is intended to introduce muted tidal exchange and fish passage from the Eel and Salt Rivers into Cuttoff Slough upstream of the existing Corps tide gates located on Cutoff Slough between the EREP and the ORFP (Control Structure #1 in Figure 1). Currently, maximum summer (i.e., non-flood) water levels in Cutoff Slough behind the Corp tide gates reach 2.5' in elevation (NAVD88). A new tide gate structure would likely be installed within one of the existing 6 tide gate "doors", which would close when outer water levels reached 2.5' in elevation. The extent of maximum tidal inundation (water level 2.5') would extend almost to Angels Camp via the Western Drainage Ditch. Slough water levels would display daily diurnal tidal fluctuations between an elevation of 0.5' and 2.5', similar to current conditions, and remain within existing channels. Salinities within the ditches and channels south of the Corp tide gate, including Western Drainage Ditch, would vary seasonally between fresh and marine.

An area approximately 150 acres in size and located northwest of Control Structure #1 is known hereafter as the EREP "Closed Cell". In order to preclude tidal flooding into the EREP Closed Cell due to the introduction of muted tidal exchange, the culverts at Control Structure locations 2 and 3 (Figure 1) would need to be removed and the intervening berm would be filled in between the Slough and Closed Cell. Similarly, the Control Structures at locations 4, 5 and 6 would need to be maintained and/or improved to continue to provide the current level of water restrictions or exchange between the ORFP property and Cutoff Slough. It is assumed that the new bridge slated for installation at Control Structure location 7 would be in-place at the time the Proposed Alternative project goes to construction.

B. Introduction of muted tidal exchange to the EREP "Closed Cell"

In order to improve tidal wetland and salmonid rearing habitat on the EREP, tidal exchange would be reintroduced into the Closed Cell. Tidal exchange would be introduced from a new gated culvert (control structure #9 on Figure 1) installed through the Army Corps levee along the north boundary of the Closed Cell. The tide gate would need to limit maximum water levels in the Closed Cell. Currently the berm segregating the Closed Cell from Cutoff Slough is 5.0' in elevation or higher, which would set the maximum water surface elevation within the Closed Cell without significant berm improvements. A relatively limited amount of work would be required to raise the entire berm to an elevation of 8.0', allowing for a greater volume of tidal exchange and greater daily water depths. Like Cutoff Slough, the Closed Cell would experience daily diurnal tidal fluctuations, but over a greater range of elevations, from a minimum of 0.5' to a potential maximum of 5.0' to 8.0'. It's important to note that the inundation areas illustrated on Figure 1 depict the maximum areas of inundation – water levels and inundation areas would be lower than this for the majority of time (summer water levels equal or exceed 5.0' in elevation approximately 25-percent of the time, while summer water levels are greater than 8..0' less than 1-percent of the time. The Outboard Marsh serves as a good reference to how the Closed Cell wetland would look and function on a

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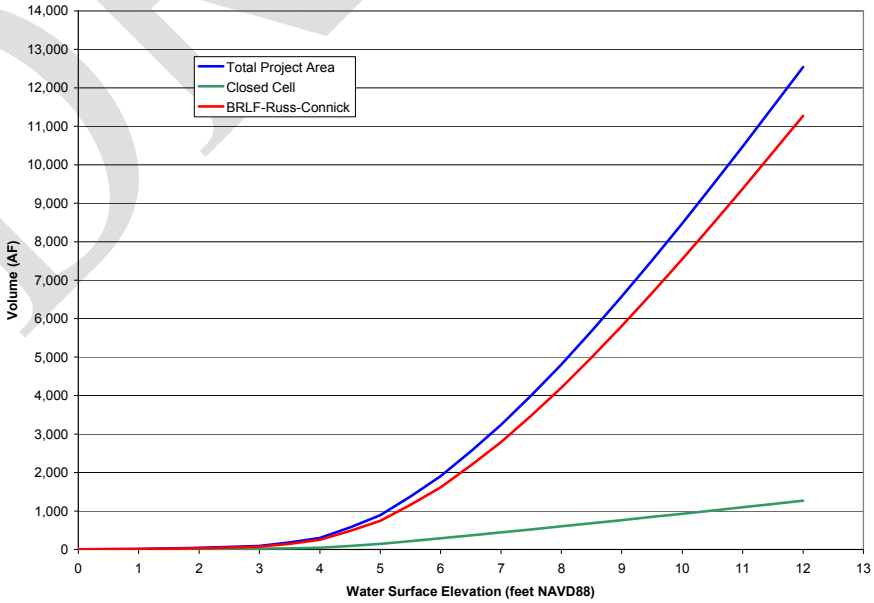
daily and long-term basis. Similar to the Outboard Marsh, salinities in the Closed Cell would vary seasonally between fresh and marine.

A significant constraint to implementation of the Closed Cell wetland is the loss of flood storage capacity to the surrounding and interconnected project area - mostly the ORFP and RFP lands as well as EREP outside of the Closed Cell. The loss of flood storage arises from berming off the Closed Cell from flood waters that are typically routed to the Closed Cell via the existing culverts at Control Structure locations 2 and 3

In order to quantify the potential impact of the Proposed Alternative to flood storage within the Closed, KHE completed some water budget and modeling exercises. Two Closed Cell scenarios were evaluated - minimum berm heights of 5.0' and 8.0', respectively. These analyses required developing flood storage capacity estimates for the entire project area (from the project terrain maps) with and without the Closed Cell available for storage. Stage[1]-volume relationships for the various areas were developed and representative 24-hour floods were routed through the project to quantify changes in storage. The resulting stage-volume relationships are presented in Figure 2. The total volume of water contributed from direct rainfall and Wildcat tributary creeks is provided in Table 1. The analyses assume no flood waters overtop or breach through the outer perimeter levee system. Nor do the analyses consider contributions from dune overwash. The analyses calculate storage capacity assuming no drainage through any existing or proposed tide gates. This is probably a reasonable assumption since flood backwater from the Eel River prohibits drainage via the tide gates during large storms. The analyses also assume synchronous introduction of flood waters with tides at or above the maximum Closed Cell water levels, thus eliminating the associated storage capacity.

FIGURE 2: Stage-Volume Relationships for Project Areas



[1] For this study, stage is defined as the water surface elevation reference to the NAVD88 vertical datum.

TABLE 1: Estimated freshwater inflows to project area during various flood events.

Storm Return Period	Total Direct Rainfall (AF)	Total Runoff Inflow (AF)	Total Flood Volume (AF)
2-yr	912	549	1462
5-yr	1129	785	1914
10-yr	1297	977	2274
25-yr	1507	1224	2732
50-yr	1657	1405	3061
100-yr	1799	1579	3378

The results of the water storage capacity analyses are summarized in Tables 2 and 3. Table 2 presents the water level elevations within the main project area (outside or the Closed Cell) for existing and project conditions. Similarly, Table 3 presents the inundated project area outside of the Closed Cell under Existing and Project Conditions. The differences in water surface elevation and inundation area between existing and project conditions are also provided on these tables.

TABLE 2: Estimated water surface elevations in project area under existing and project conditions.

Storm Return Period	Existing Condition Water Level (ft)	Project Condition Water Level (ft)	Difference (inches)
2-yr	5.54	5.81	3.2
5-yr	5.97	6.25	3.3
10-yr	6.28	6.57	3.5
25-yr	6.65	6.95	3.6
50-yr	6.90	7.21	3.8
100-yr	7.12	7.44	3.9

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TABLE 3: Estimated inundated project areas under existing and project conditions.

Storm Return Period	Existing Condition Inundation Area (acres)	Project Condition Inundation Area (acres)	Difference (acres)
2-yr	1068	1156	87
5-yr	1206	1288	83
10-yr	1298	1377	79
25-yr	1397	1473	76
50-yr	1459	1533	74
100-yr	1512	1584	72

The loss of storage capacity for a Closed Cell wetland having a minimum berm height of 5.0' results in a 132 acre-foot (AF) reduction in overall project area storage capacity. However, all of the flood events evaluated result in water levels above 5.0' in elevation, meaning that floodwaters for the 2- thorough 100-year events would overtop a perimeter berm of 5.0', flooding the Closed Cell and filling any unused capacity not already filled with tidal waters. A Closed Cell with minimum berm heights of 8.0' offers a more clear-cut loss of storage capacity, as all simulated flood levels remain below 8.0'. As indicated in Table 2, the Closed Cell results in water levels within the project area 3.2- to 3.9-inches higher than under exiting conditions. These increased water levels translate to increased inundated areas – between 72- and 87-acres more depending on flood magnitude. However, when considering the entire inundated project area (approximately 1580-acres), the incremental increase in inundated area is relatively small (5%) and distributed across a very broad area. Figures 3 through 5 depict the resulting inundation areas for the selected 2-, 10-, and 100-year flood events under existing and project conditions. The narrow margins of lighter color shading in these figures depict the increased inundation areas under project conditions.

Under the proposed project, inundated areas will likely remain inundated for shorter periods of time due to the additional drainage capacity from the project area associated with installation of the new culvert in the northern Corps levee. As discussed in the January 16th meeting, an additional offset to the loss of storage capacity is the installation of a gated culvert (control structure #10 in Figure 1) that allows project area floodwaters to move into the Closed Cell without tidal waters backing up from the north. This culvert would provide some relief from lost storage capacity, as it would allow flood waters to move into the Closed Cell during lower tides and speed drainage from the entire project area through the new additional north levee culvert at location #9 (Figure 1).

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FIGURE 3: Inundation areas for existing and project conditions during the 2-year flood.

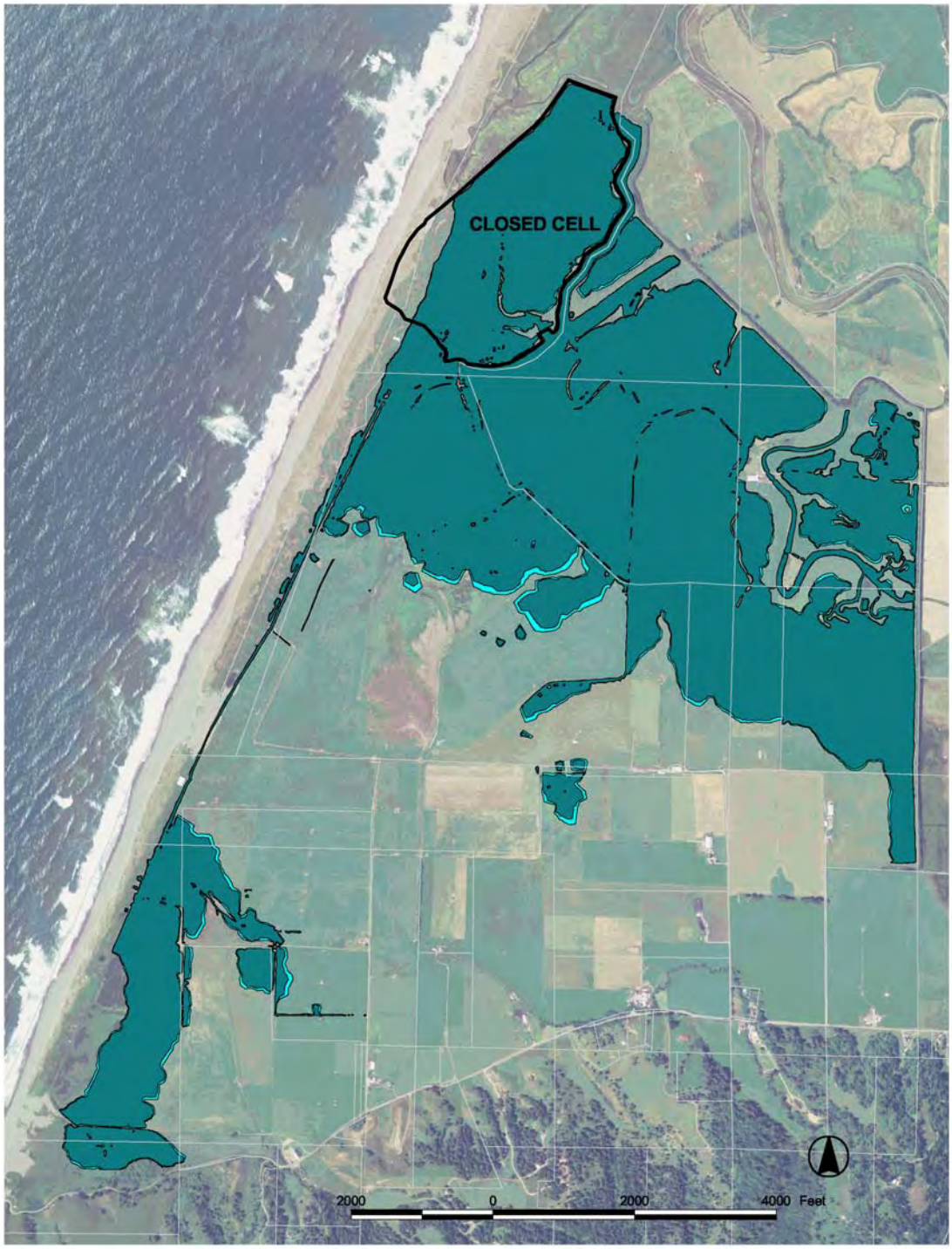


FIGURE 4: Inundation areas for existing and project conditions during the 10-year flood.

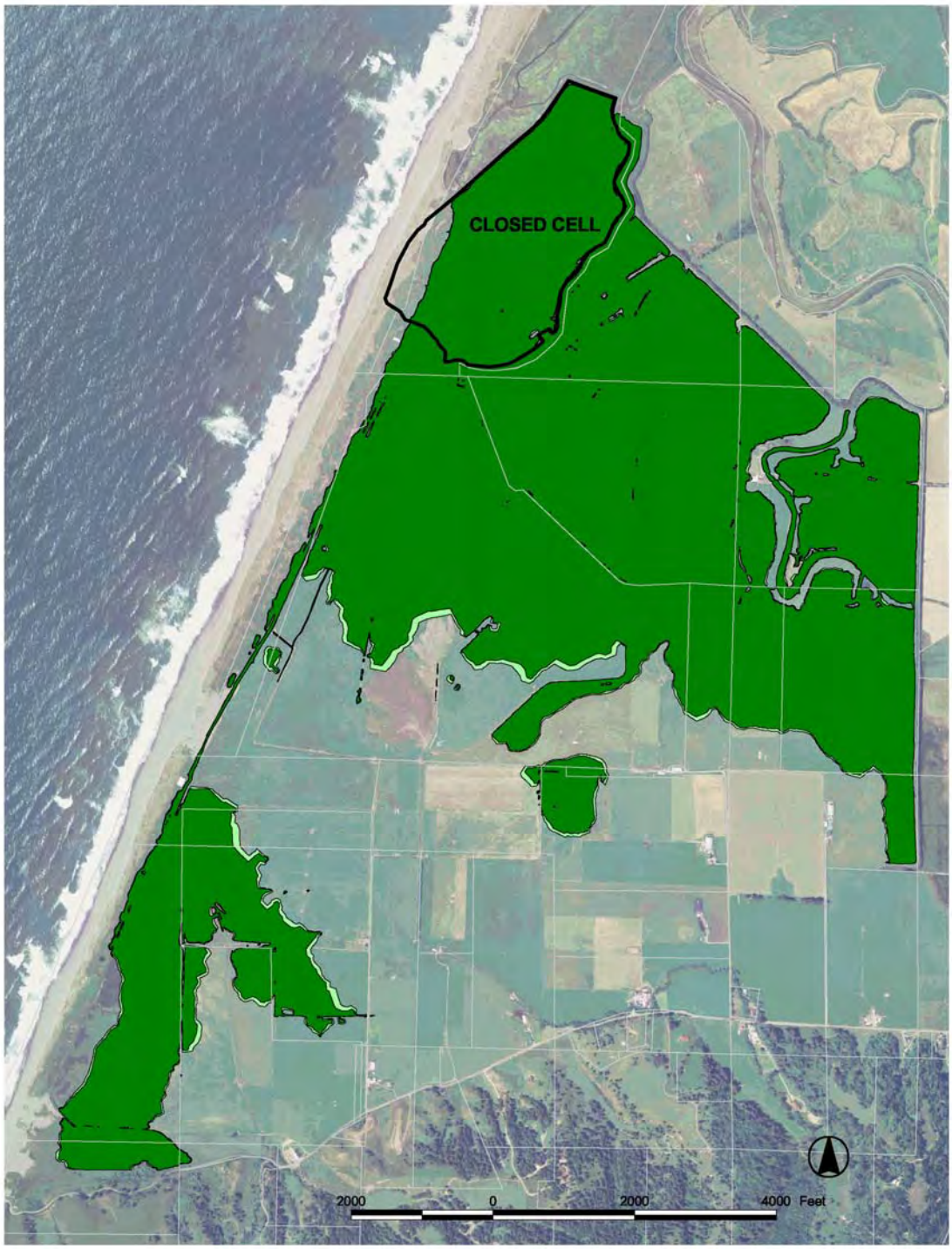
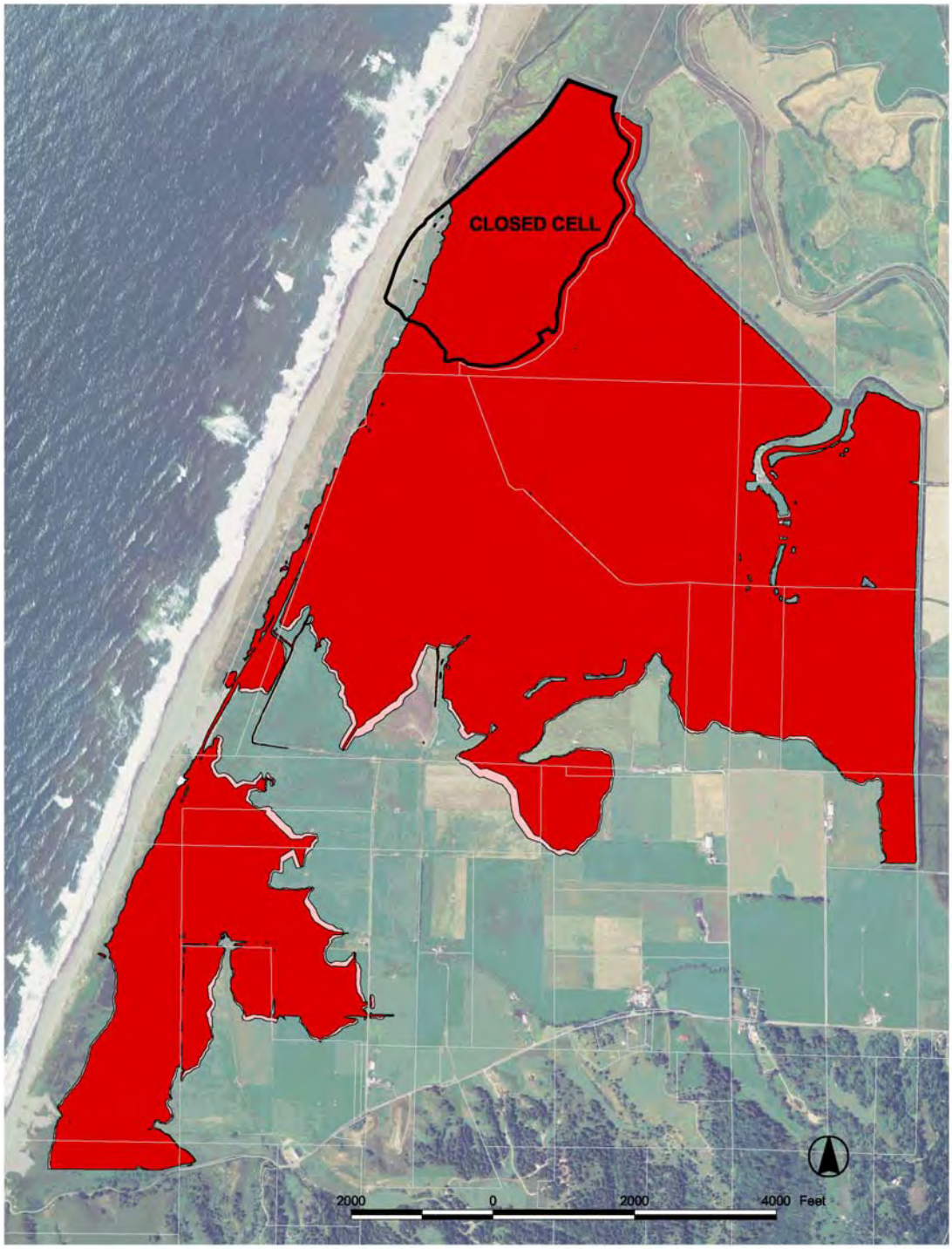


FIGURE 5: Inundation areas for existing and project conditions during the 100-year flood.



C. Stabilization and Restoration of the Central Dune Blowout
Currently, there is an expanding dune blowout/overwash area located in the central portion of the dune bordering the project area. Sand from this dune area is migrating eastward and filling the Western Drainage Ditch, inhibiting channel connectivity within the project area, as well as drainage from the south (including Angels Camp, Shaw Creek, and Creamery Ditch). Maintaining drainage through the Western Drainage Ditch is a necessity in managing upstream lands for grazing/agricultural purposes, and for providing enhanced aquatic habitat within the project area. The Ditch is currently the only pathway for tidal waters and associated aquatic organisms to move from north to south through the project area and vise-versa. Therefore, the project includes efforts to stabilize the dunes through large- and small-scale efforts aimed at trapping and retaining sand in a manner that rebuilds the dune to former and surrounding heights. Likely approaches to this work include placing large wood structures and strategic placement of snow/sand fence to reinforce sand buildup in, around and on-top of the large wood. Other dune stabilization strategies that would be implemented include: revegetation and stabilization of dunes using native dune plants; restriction of ORV traffic; and implementation of a long-term monitoring and management program (likely through TWC staff).

D. Controlled retreat from evolving wetlands in the Angels Camp area
The largest dune breach/overwash in the project area is located adjacent to Angels Camp. The breach has been moving steadily northward since 1998, allowing large volumes of sand and water to invade eastward into adjacent pasture lands. Due to significant ponding of salt water that overwashes the dunes, which can not drain due to infilling of the Western Drainage Ditch, large portions of the Angels Camp area have reverted to salt marsh vegetation and standing water. Prior to 1990, all of this area was free of flooding and actively grazed. In order to restrict further eastward migration of the evolving salt marsh and associated loss of pasture land, the project proposes constructing a low relief berm (crest height of 8.0') along the alignment depicted in Figure 1. This work will require retaining an existing gated culvert (location #8) which drains existing pasture to the west. The berm would tie-into adjacent 8.0' grades. The berm and intervening former pasture would buffer more productive grazing lands from the adverse effects of salt water overwash and thwart the eastward migration of wetland. The former pasture land located west of the berm would likely continue to evolve into a dynamic mix of fresh, brackish and salt marsh and provide habitat for associated species. It is anticipated that the berm would be revegetated with wetland plant communities.

E. Restoration of Centerville Slough
Historically, Centerville Slough was the primary western waterway connecting Angels Camp area to Cutoff Slough. Over time it has filled in and the Western Drainage Ditch has replaced it as the primary north-south drainage way. In order to increase aquatic habitat and enhance the movement of water and wildlife between north and south, the project proposes to restore Centerville Slough along its historic alignment by excavating a functional channel. Because Centerville Slough was located further east than the existing Western Drainage Ditch, it will be less susceptible to filling from dune sand (the

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restoration of the central dune blowout will also reduce sand supply to drainages lying immediately east). Material excavated from the channel will be reused on site to construct any new or refurbished berms. The new slough channel would convey muted tides from Cutoff Slough as well as be the primary water course receiving and conveying runoff from Russ Creek, Shaw Creek and the Creamery Ditch. It would also improve the opportunity for fish passage to the tributary creeks.

F. Russ and Shaw Creek Realignment and Sediment Management

Historically, Russ and Shaw creeks deposited large sediment loads onto the Eel plain in the form of large alluvial fans. At least three historical creek configurations are readily apparent near the point at which Russ Creek leaves the Wildcat Hills and enters the Eel plain. Currently, Russ and Shaw Creeks continue to disperse large volumes of sediment and water on top of low-relief alluvial fan lobes, which have built up over time. Much of the winter creek flow is dispersed across broad flat fans resulting in unconcentrated sheet flow. In an effort to concentrate flow and improve the fluvial and geomorphic character of the Creeks, this element of the project includes redirecting the creeks along steep, more sustainable alignments and converging the flows (including Creamery Ditch) into a single release at the upstream end of Centerville Slough. This realignment will require installation of a new gated culvert (at location #11 on Figure 1) through the new berm. Based upon review of historic maps and site topography, this appears to be a more historic and natural alignment than that currently in place. This work is also intended to increase the amount of freshwater introduced into Centerville Slough with the intent of improved water quality and habitat conditions. Currently, flows that are dispersed across broad and distal pasture areas can acquire poor water quality characteristics before entering a channel.

An important component over the sustainability of the creek realignment is the development and implementation of a Sediment Management Plan, which focuses on capturing sediment and decanting off clean water prior to discharging to Cutoff Slough. Within the proposed realignment of the creeks, there is a large low lying area where the creeks and Creamery Ditch converge off of steeper gradients. This Sediment Management Area is well suited for the establishment features that capture sediment. Pending approval from the land owner and other stake holders, a more detailed sediment management plan and engineering design of this area will be prepared. It is envisioned that this sediment management plan would, like the Salt River Project, provide for prior and predictable permitting of maintenance activities in conformance with a pre-approved plan.

If you have any questions regarding the information presented above, please feel free to contact me.

Sincerely,

Greg Kamman
Principal Hydrologist

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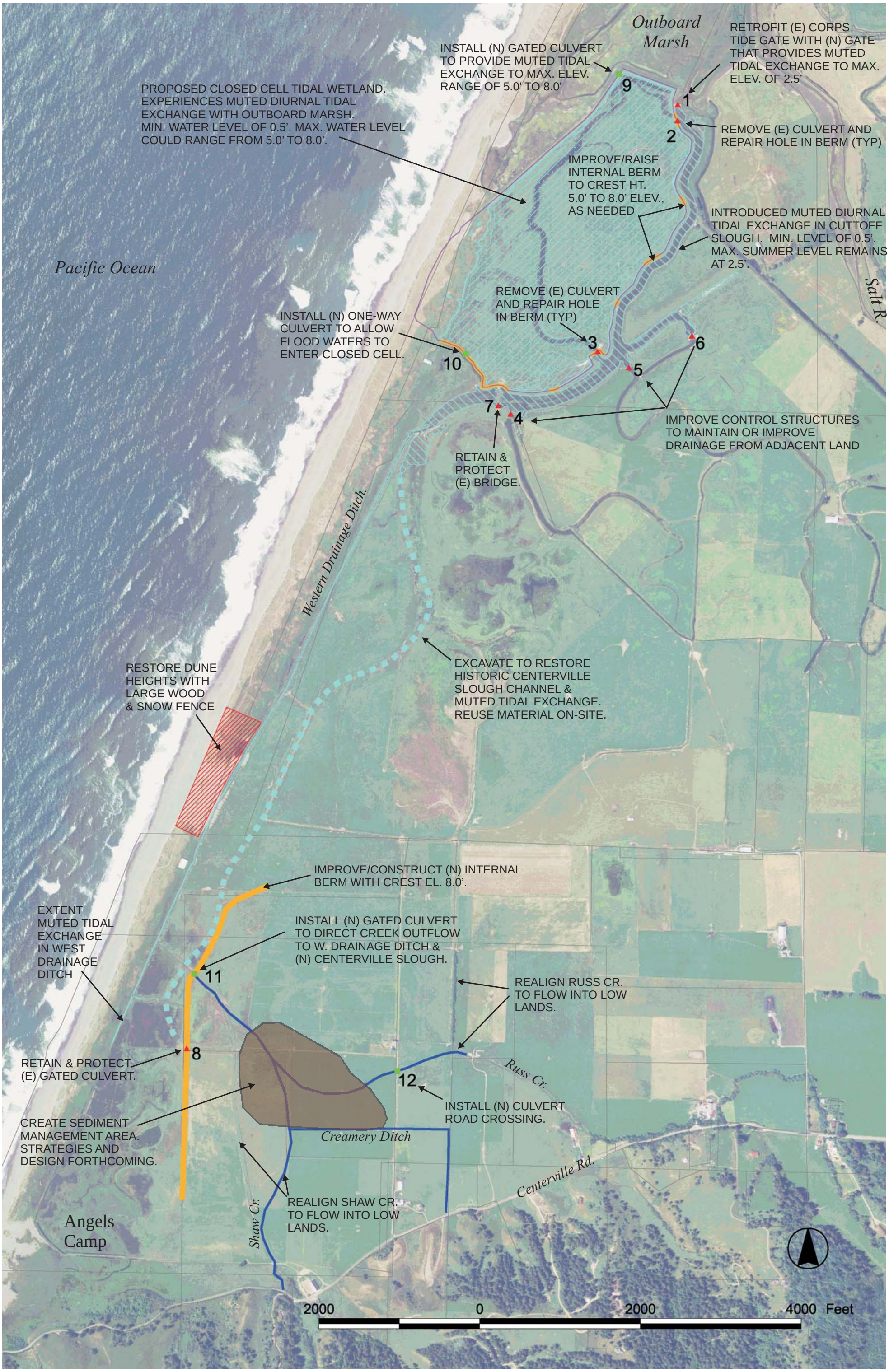

KAMMAN HYDROLOGY & ENGINEERING, INC.
7 Mount Lassen Dr., Ste. B250
San Rafael, CA 94903
(415) 491-9600

PRELIMINARY DRAFT PREFERRED ALTERNATIVE

Ecosystem Restoration and Flood Hazard Reduction Planning and Feasibility Assessment
Connick and Russ Family Property Vicinity

FIGURE 1

Appendix C – Inoperative Reclamation Districts

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STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

PUBLICATIONS OF THE
DIVISION OF WATER RESOURCES

BULLETIN No. 37

FINANCIAL AND GENERAL DATA

PERTAINING TO

IRRIGATION, RECLAMATION AND OTHER PUBLIC DISTRICTS IN CALIFORNIA

PREPARED UNDER THE DIRECTION OF

CALIFORNIA IRRIGATION AND RECLAMATION FINANCING AND REFINANCING COMMISSION

By HARMON S. BONTE, Consultant

MEMBERS OF COMMISSION

WILL C. WOOD, Chairman
CHARLES L. CHILDERS
W. P. JEFFRIES
EDWARD HYATT, Secretary
FRED W. KIESEL
CHARLES E. MACLEAN
U. S. WEBB

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HISTORICAL SUMMARY OF LEGISLATIVE ACTION LEADING TO PRESENT GENERAL RECLAMATION DISTRICT LAWS

Arkansas act.

Reclamation is one of the earliest forms of public improvement in this State and by far the largest single type of lands included in reclamation districts are the segregated swamp and overflowed lands granted to the State by the so-called "Arkansas Act" passed by the Congress of the United States on September 28, 1850. Section 2 of this act provides that the proceeds from the sale of these lands be applied to the purpose of reclaiming said lands by means of levees and drains.

Early State legislation.

The first State of California legislation in 1855 provided for the sale of these lands at $1 per acre and limited each purchaser to 320 acres. An act passed in 1858 repealed the act of 1855 and provided that the purchase price of $1 per acre should be placed in a swamp land fund. In 1859 the act of 1858 was amended, increasing the limit from 320 to 640 acres but making no provision for reclamation.

Swamp Land Commissioners.

A State Board of Swamp Land Commissioners was created in 1861. An appropriation of $200,000 out of the Swamp Land Fund previously created was made by this act for the use of the commission. Upon petition of the owners of one-third of any tract of land "susceptible to one mode or system of reclamation," the commissioners were authorized to appoint an engineer to plan the reclamation of the tract; but the act provided no way by which lands could be reclaimed by the board if the cost were more than $1 per acre. Accordingly the first annual report of the Swamp Land Commissioners, dated December 15, 1861, recommended "the passage of a law for taxing the land in each district enough to complete its reclamation, when the sum of $1 per acre will not do it." Here we find the first official suggestion for taxing the land to pay for the works of reclamation.

First report of board.

This first annual report noted that applications had been made to the board for the reclamation of twenty-eight districts located in eleven different counties in the Sacramento and San Joaquin valleys and San Francisco Bay area.

Assessments provided.

On April 11, 1862, in accordance with the recommendation of the Board of Swamp Land Commissioners in their first annual report, an

act was passed supplementing the act of 1861. This supplementary act provided for an assessment levy by the County Board of Supervisors to complete reclamation upon petition of the owners of one-third of the land in the district. A special swamp land fund was then provided for each district.

Second report of board.

From the second annual report of the Swamp Land Commissioners, dated December 11, 1862, we learn that the provision for assessments was not successful due to disagreement among the landowners. The commission, therefore, recommended that the law be amended so as to authorize the levy of a tax without petition. It is rather interesting to note from this report the recognition for necessity of centralized responsibility in view of anticipated colonization after the close of the Civil War. Up to the date of this report, thirty-eight swamp land districts had been established, containing 485,252 acres of swamp lands, and $78,890.64 had been spent out of the $200,000 appropriation.

1862 flood.

Although no mention is made of the 1862 flood in any of the reports of the Swamp Land Commissioners, it was the topic of widespread newspaper comment and extensive flood statistics were published in the report of Surveyor General Houghton of December 15, 1862. General Houghton urged the expediency of a survey of the country between Knights Ferry and Denverton with reference to the eventual construction of a canal (two embankments about half a mile apart) between these points for the drainage of the western portion of the Valley of the Sacramento and reclamation of the large body of swamp lands therein, this plan being the forerunner of the present by-pass system.

1863 amendment.

The act of 1861 was amended April 23, 1863. New commissioners were appointed with reduced salaries and provision was made for the employment of engineers. District No. 2 was exempted from the provisions of the amendment.

Third report of board.

The third report of the Board of Swamp Land Commissioners for the years 1864 and 1865, dated November 15, 1865, discloses that 45 districts had been formed and that moneys received into the Swamp Land Fund (of the State) had been set apart and separately appropriated to the reclamation of fourteen districts under the distinctive designations, Swamp Land District Funds Nos. 1, 2, 4, 5, 7, 8, 16, 17, 18, 38, 39, 41, 45 and 46. The condition of these funds and work accomplished will be referred to later.

County supervisors substituted for commissioners. State Board of Swamp Land Commissioners abolished.

On April 2, 1866, the act of 1861 was again amended. By this amendment the Board of Swamp Land Commissioners was abolished,

all their district engineers discharged and all the swamp and overflowed funds belonging to the State, together with all the moneys having accrued from the sale of such lands, were thereby granted to the various counties, respectively, to hold in trust for the purpose of constructing necessary levees and drains to reclaim the same, and the county surveyor of each county was made engineer of the districts within that county.

Reclamation obligation transferred to counties.

Thus was lost all semblance of unified, systematic direction of the reclamation of these lands, and the obligation for their reclamation was shifted from the State to the counties, and the Board of Supervisors of each county was given the same powers and required to perform the same duties as were theretofore imposed upon the Board of Commissioners created by the act of 1861.

Only higher lands sold under 640 acre limit.

Under these laws restricting the amount of land which could be purchased to 640 acres, only those portions of the land upon which families could camp or settle were sold, leaving all of the deep tule land, which it would be impossible for anyone to occupy, still in the hands of the State.

Acreage limit removed.

In order to permit the acquisition of these lands in sufficiently large bodies to attract capitalists to undertake their reclamation, an act was passed in 1868 repealing all the laws just reviewed, but reenacting their general terms and adding provisions for the formation of districts and the election of trustees thereof and the levying and collecting of assessments, and placing no limit whatever upon the amount of land which anyone might purchase.

Three years' successful cultivation secured patent to lands.

This act also provided that upon the completion of the reclamation work contemplated, the county treasurer was to pay to the trustees of the district any money which he might have credited to the purchasers on full payment for the land; and that three years after the completion of the reclamation works, upon examination and certification by a commission of three persons that the lands of the district had been reclaimed as evidence by their having been successfully cultivated for three years, the purchasers should be credited with payment in full and should each be entitled to a patent therefor.

Assessments without petition of owners.

This act increased the required signatures of owners upon petition for the formation of a district, from one-third to one-half the acreage of the district. The requirement of a petition for the levying of an assessment was omitted and the board of supervisors was required to levy an assessment upon the presentation to them of plans and estimates by the trustees of the district.

The act of 1872.

This law, enacted in 1872, is the foundation upon which the present reclamation code is based. Since this date many changes and additions have been made and the present code of reclamation district laws has been evolved by revision and amendments designed to foster and encourage agricultural development and in its general application has been found to be sound in fundamentals. The statutes of 1895 contain an act entitled "An act to provide for issuing bonds by reclamation districts and the disposal thereof for reclamation and other purposes and their payment by taxation upon property situated in such reclamation districts."

The present code.

The California reclamation district laws were enacted for the purpose of enabling the holders of title to lands susceptible to one mode of reclamation to organize a district empowered through its board of trustees to secure the necessary rights of way for reclamation, drainage and irrigation works, to acquire the necessary water rights, to construct or acquire the works required for reclamation, drainage and irrigation of the lands within the district and for such purposes to issue warrants or bonds, to levy assessments upon the lands within the district sufficient to raise the funds necessary to meet maintenance and operation requirements and bond interest and bond principal payments and to exercise such other powers as may be authorized by law for the furtherance of reclamation, drainage and irrigation within the district. The laws prescribe and authorize the legal machinery for the proper functioning of the district; prescribe the rights of landowners and creditors of the district; and fix the penalties for failure of landowners to pay assessments as and when they become due.

Creation of reclamation board.

By an act approved December 24, 1911, a reclamation board was created and among other duties was required to "pass upon and approve plans of reclamation that contemplate the construction of levees, embankments or canals along or near the banks of the Sacramento River, or its tributaries, or connected therewith, or upon any land adjacent thereto, or within any of the overflow basins thereof." Any original plan of reclamation thereafter adopted for works upon any lands subject to overflow from the Sacramento River or its tributaries must be approved by the reclamation board before such plans could be adopted by the trustees of any district, and the construction of any such works without such approval was declared to be a public nuisance and the board empowered to prosecute any suit or suits for the prevention or abandonment of the same.

This authority did not extend to any other portion of the State. The control over the formation of districts, however, which had been originally included in the powers of the State Board of Swamp Land Commissioners, created in 1861, and in the Board of Drainage Commissioners, created in 1880, and again in the Board of Drainage Commissioners of the Sacramento Drainage District, created in 1905, was omitted from the act creating the reclamation board. This power is

still scattered and exercised by the various county boards of supervisors and the reclamation board has no jurisdiction over the internal affairs of the individual districts.

Swamp land funds.

Of more than passing interest is the final distribution of the old swamp land district funds. Following is a memorandum of the amounts as reported in 1865 by the Swamp Land Commissioners.

Swamp Land District Funds—November, 1865

District number	Receipts[1]	Expenses[2]	Balance	Construction
1	$119,095 99	$91,558 36	$27,537 63	Levee—25 miles.
2	63,503 51	59,044 40	4,459 11	Levee—77,168 cubic yards. Excavation—6,444 cubic yards.
4	10,971 95	2,424 00	8,547 95	Dam and floodgates.
5	34,661 80	31,564 94	3,096 86	Mokelumne River Levee and New Channel.
7	6,765 70	511 00	6,254 70	Levee, dam and tidegate.
8	9,764 47	2,873 74	6,890 73	Andrus Island Levee.
16	41,579 10	1,259 12	40,319 98	Surveys.
17	25,518 49	18,636 92	6,881 57	San Joaquin Levee.
18	214,343 23	90,899 02	123,444 21	Drains—25 miles. Levee—78 miles.
38	12,911 99	4,915 46	7,996 53	Staten Island Levee.
39	3,427 60	1,909 73	1,517 87	Levee—14,716 cubic yards.
41	14,285 83	7,361 73	6,924 10	Levee—19,843 cubic yards. 4 dams.
45	20,152 91	1,073 50	19,079 41	Dam, levee and ditch.
46	7,600 91	1,839 06	5,761 85	Levee—15,062 cubic yards. 7 gates.
Totals	$584,583 48	$315,870 98	$268,712 50	

[1] Cash from Swamp Land Fund. Interest and principal due from sale of lands and tax levied.
[2] Surveys, construction and superintendence.

Under an act approved March 31, 1891, the amount to the credit of each Swamp Land District Fund was paid to the county treasurer of the county in which the district was situated. Following is a statement of these funds as reported at that time:

Fund	Amount	Counties
Swamp Land District No. 1	$142 49	Sacramento
Swamp Land District No. 2	883 30	Sacramento
Swamp Land District No. 17	8 00	San Joaquin
Swamp Land District No. 18	1,144 02	Yolo and Solano
Swamp Land District No. 41	44	Solano
Swamp Land District No. 45	9 85	Tulare
Swamp Land District No. 46	5 24	San Joaquin
Swamp Land District No. 49	18 70	Sacramento
Swamp Land District No. 51	34 08	Solano
Swamp Land District No. 59	27 29	San Joaquin
Total returned to counties	$2,273 41	

The various county treasurers with whom county swamp land funds are now deposited report amounts on hand December 1, 1930, as follows:

COUNTY SWAMP LAND FUNDS

County	*Amount*
Alameda	$1,813 35
Butte	None
Colusa	None
Contra Costa	None
Fresno	10,335 94
Glenn	None

County	*Amount*
Humboldt	$6,032 49
Inyo	None
Kern	2,081 84
Kings	None
Lake	2,908 44
Lassen	None
Madera	None
Marin	None
Mendocino	None
Merced	430 70
Modoc	None
Monterey	1,278 25
Napa	560 65
Plumas	None
Sacramento	640
San Diego	None
San Joaquin	1,652 49
San Luis Obispo	None
San Mateo	75 19
Santa Barbara	None
Santa Clara	221 95
Santa Cruz	None
Shasta	40 00
Sierra	None
Siskiyou	6,911 70
Solano	1,650 19
Sonoma	None
Stanislaus	None
Sutter	347 37
Tehama	None
Trinity	None
Tulare	659 11
Yolo	None
Yuba	None
Total	$37,639 66

DISTRICT ORGANIZATION

Reclamation district organization in California dates back to the year 1861 and its activities may be divided roughly into three periods:

First period (1861–1866)—

Formation under the Board of Swamp Land Commissioners.

Second period (1867–1911)—

Formation under the boards of supervisors of the various counties. (The year 1911 is somewhat arbitrarily fixed as the date of commencement of standardized methods of reclamation construction.)

Third period (1911–1930)—

Formation still under the various boards of supervisors but with certain areas under the partial jurisdiction of the State Reclamation Board.

First period (1861–1866).

During the year 1861, 28 districts filed organization petitions, were numbered consecutively and embraced some 465,000 acres of land in eleven counties in the Sacramento and San Joaquin valleys and San Francisco Bay area. Two of these districts (Nos. 3 and 17) are still active and approximately all of the districts organized in the Sacramento and San Joaquin valleys during the period 1861–1866 are now included within the boundaries of active districts of the present. Up to the time of the abolishment of the State Board of Swamp Land Commissioners in 1866, 54 districts had petitioned for organization, of which number 45 were actually organized and active at the time. These districts were all confined to areas within the counties of Marin, Napa, Sacramento, San Joaquin, San Mateo, Solano, Sonoma, Sutter, Tulare, Placer and Yolo.

The affairs of the districts organized under the old Swamp Land Commission were apparently thoughtfully and earnestly administered. There follows a brief summary of the progress made up to 1865 by fifteen of the most active of these original districts.

District No. 1.

District No. 1 included the entire American Basin extending from the American to the Bear River. The following is quoted from the report of the Swamp Land Commissioners:

> Great natural difficulties exist in the way of a thorough reclamation. During the higher stages of the Sacramento and American rivers it seems impossible to effect drainage for the waters of the small streams which discharge from the east directly into the tule (American) basin, which forms the nucleus of the district. These waters must find their outlet through the channel of the Sacramento and can only do so when the river level is low enough to allow their egress.

Up to November 15, 1865, 26 miles of river levee, containing 292,000 cubic yards of material and 20 miles of drains, involving 105,000 cubic yards of excavation, had been constructed. These figures are of interest as offering a basis of comparison between the river levee cross-section of that period and those of Districts Nos. 1000 and 1001 of today, which districts now occupy the area within the original District No. 1. An average of 2 cubic yards per running foot is indicated by the figures above, whereas the existing levees contain approximately 60 cubic yards per lineal foot.

District No. 2—Sacramento Basin.

Within the boundaries of District No. 2, 47,195 acres were recognized as swamp and overflowed land which could be reclaimed. According to the report of the district engineer, reclamation could be accomplished by the construction of levees and flood gates at a cost of $32,345. In the third report the commissioners realized that the reclamation of the district was practicable, there being quite sufficient fall for purposes of drainage, "but the cost will be large, and the means of the district were so greatly reduced by expenditures for former surveys and appropriations for the benefit of the city of Sacramento, that the owners of lands have refused to tax themselves to make up the deficiency in a single year, and under present laws the entire amount must be levied against the assessment of some one single year, or not at all. It is necessary that the sum of $88,000 be furnished by taxation or otherwise to reclaim the district."

District No. 3.

Comprising all of Grand Island, Sacramento County. Apparently little work had been accomplished up to 1865. This is the first district formed which has maintained its existence to date.

District No. 4—Tyler Island.

In Sacramento County. Included portions of townships 3, 4 and 5 north, ranges 3 and 4 east, M. D. B. and M. A dam and floodgate had been constructed, but the proposed improvements could not be made unless means were furnished by a tax for reclamation purposes.

District No. 5.

In San Joaquin County. Embraced all the swamp and overflowed lands lying between the Mokelumne River and Sycamore Slough, in townships 3, 4 and 5 north, ranges 4 and 5 east, M. D. B. and M. The plan of reclamation contemplated for this district included the opening of a new outlet for the flood waters of the Mokelumne on the northeast, conducting the same by canal through the interior and discharging at Beaver Slough. It was thought that the lands would be benefited by the deposit of sediment. At the date of the third report, the new channel was nearly completed and a levee along the bank of the Mokelumne, a distance of 32 miles, was projected and in progress of construction.

District No. 7.

In Solano County, bounded by the Sacramento River, Cache and Linda sloughs and the high land on the west, and comprised portions of townships 4 and 5 north, ranges 2 and 3 east, M. D. B. and M. Contracts for the works of reclamation, consisting of levees, dams and tide gates, were awarded in April, 1865, at a cost of $6,118.

District No. 8.

Andrus Island, in Sacramento County, in portions of townships 3, 4 and 5 north, ranges 3 and 4 east, M. D. B. and M. The improvements made included 645 lineal rods of levee and the filling of four large sloughs.

District No. 16.

In Tulare County, near Visalia, and comprising portions of townships 17, 18, and 19 south, ranges 22, 23, 24 and 25 east, M. D. B. and M. Organized in 1861 and contracts let for the works of reclamation in September, 1865.

District No. 17.

In San Joaquin County on the east side of the San Joaquin River in township 1 north and townships 1 and 2 south, range 6 east, M. D. B. and M., comprising a tract ten miles long by an average width of one and three-fourths miles. The first contracts were completed in January, 1864, and consisted of a levee extending along the river frontage and from the river to the high land, at either extremity of the district. Subsequently, by an amendment approved March 31, 1866, the board of supervisors of San Joaquin County was authorized "to levy a special tax of one dollar on each and every acre of real estate within the limits of Swamp Land District Number Seventeen, and one cent on each hundred dollars of valuation of improvements thereon." The district is still active.

District No. 18—Yolo Basin.

Included the entire Yolo Basin and was the largest district organized to the date of this report. The plan of reclamation contemplated, first, the drainage of flood waters by the construction of a canal through the middle of the tule land, which was completed in November, 1864, and, second, the construction of levees along the Sacramento River and Sutter Slough from Knights Landing south a distance of 78 miles. About half of the levee had been constructed at the time of the report and about $90,000 had been expended.

District No. 38.

"Staten Island," formed by the separation and reunion of the waters of the Mokelumne River, comprising portions of townships 3 and 4 north, ranges 4 and 5 east, M. D. B. and M. The plan of reclamation contemplated the exclusion of flood and tide waters by a levee around the island and drainage by tide gates at the principal sloughs.

District No. 39.

On the right bank of the Cosumnes River in township 5 north, range 5 east, M. D. B. and M. The greater portion of the levee had been constructed prior to formation.

District No. 41.

The eastern portion of an island in Solano County formed by Miner, Sutter, Cache and Merritt sloughs, and comprising portions of townships 4 and 5 north, range 3 east, M. D. B. and M. Contracts for the works of reclamation were awarded in June, 1865, and 19,843 cubic yards of levee embankment and four large dams had been constructed up to the date of the third report of the commission.

District No. 45.

Situated in Tulare County, fifteen miles southeast from Visalia, comprising portions of townships 20 and 21 south, ranges 25, 26 and 27 east, M. D. B. and M. Concerning this district, the commission stated:

> The condition of the lands is peculiar. The flood of 1862 cut a new channel, through which the Tule River, which formerly flowed through and caused the overflow of the district, now finds its way by a shorter cut to Tulare Lake. This channel, which commences above and does not touch the district at any point, conveys so large a portion of the waters which formerly flowed in the old channel, that during the dry season the lands are left parched and barren from drought. It is proposed, first, to construct a levee and dam across the low lands and old channel below the new channel so as to entirely protect the district from possible overflow at any time from floods; and, second, to convey water for purposes of irrigation by a ditch, commencing above the dam and levee and running along the northern verge of the district at a sufficient elevation.

District No. 46.

In San Joaquin County, comprising a portion of township 3 north, range 5 east, M. D. B. and M. The entire work of reclamation, consisting of ten miles of levee, five dams and fourteen flood and tide gates, was under contract and progressing at the time of the third report of the commission.

Second Period (1867-1911).

Although that portion of the act delegating the duties and powers of the former swamp land commissioners to the county supervisors relating to susceptibility "of one mode of reclamation" was practically taken "verbatim" from the original act, it is apparent that the supervisors did not take the same broad interpretation of the intent of the Legislature as had the swamp land commissions, who had invariably insisted that each district should include all of the land susceptible of reclamation as a unit, whereas the supervisors permitted the formation of districts of various shapes and sizes, overlapping and frequently containing the property of single owners without regard to natural boundaries. Thus hundreds of districts were organized during the ensuing years without system, fixed policy or regard to the feasibility of the project. While many of the districts organized during this period were legitimate reclamation projects, or at least sincere in purpose, yet great numbers were organized to merely qualify before a

complacent board of supervisors for the collection of the per acre allowance for completed reclamation from the swamp land fund. This qualification was often accomplished by the simple expedient of throwing a single plough furrow around the designated boundaries.

Simplicity of preorganization requirements undoubtedly led to many formations which upon further study were abandoned. Many small districts were organized for the sole purpose of avoiding inclusion in major districts and the responsibility for the payment of assessments, even though reclaimed and benefited by the works constructed. Seven hundred seventy-two districts were organized during this period and only 86 are upon the active list today.

Third period (1911–1930).

The districts organized during this period were in the main intelligently planned after careful and exhaustive studies of the problems involved.

In 1904 the "Dabney Commission" had made its complete and comprehensive report to the State upon reclamation and flood control of the Sacramento and lower San Joaquin valleys.

In 1911 the "Jackson Report" on the control of floods in the river systems of the Sacramento Valley and the adjacent San Joaquin Valley was presented to Congress. Based upon the "Jackson Report" the Sacramento and San Joaquin Drainage District was formed and placed under the management and control of the State Reclamation Board.

With the creation of the Reclamation Board in 1911 there was again attempted to restore to a centralized authority jurisdiction over reclamation works for at least that portion of the State affected by the Sacramento River and its tributaries.

Of the districts organized during this period, 76 were located in the basins and deltas of the Sacramento and San Joaquin rivers.

About 1914 there began an intensive program of reclamation in the basin of Tulare Lake in Kings County. The continued encroachment upon the lake area by the new reclamations necessitated the construction of high and massive levees. This competition in levee building has now ceased through the organization of Tulare Lake Basin Water Storage District, which prescribes a uniform levee crest elevation for all reclamations within its boundaries. Twenty-six active reclamation districts are located in the basin of Tulare Lake.

One hundred nineteen districts were organized during 1911–1930, of which number 94 are now active.

Summary.

Following is a list of the reclamation districts organized in California during the period 1860 to 1930.

Number	County	Date of petition or formation	Acreage	Status
1	Sacramento-Placer-Sutter	May 29, 1861	57,309	Inoperative
1	Contra Costa	Aug. 12, 1873	2,474	Inoperative
1	Lake	May 1, 1877	193	Inoperative
1	Sacramento	April 28, 1909	677	Active
2	Sacramento	May 1861	41,790	Inoperative
2	Contra Costa	Early 60's	8,448	Inoperative
3	Sacramento	June 1861	17,100	Active
4	Sacramento	July 1861	8,000	Inoperative
5	San Joaquin	July 1861	20,000	Inoperative
5	Sutter	Early 60's	98,513	Inoperative
6	Tulare	June 1861	6,500	Inoperative
7	Solano	June 1861	4,580	Inoperative
8	Sacramento	July 1861	7,642	Inoperative
9	Solano	July 1861	1,925	Inoperative
10	Solano	July 1861	1,228	Inoperative
10	Yuba	May 1913	11,300	Active
11	San Joaquin	July 1861	1,487	Inoperative
12	San Joaquin	July 1861	*	Inoperative
13	Sacramento	August 1861	8,400	Inoperative
14	Napa and Sonoma	August 1861	1,243	Inoperative
15	Sacramento	August 1861	800	Inoperative
16	Tulare	August 1861	34,765	Inoperative
17	San Joaquin	Sept. 1861	12,000	Active
18	Solano and Yolo	Sept. 1861	116,338	Inoperative
19	San Mateo	Sept. 1861	2,700	Inoperative
20	Sutter	Oct. 1861	10,000	Inoperative
21	Marin	Oct. 1861	2,615	Inoperative
22	San Joaquin	Oct. 1861	6,218	Inoperative
23	San Mateo	Oct. 1861	5,228	Inoperative
24	Yolo and Solano	Nov. 1861	1,841	Inoperative
25	Marin	Nov. 1861	2,100	Inoperative
26	Marin	Nov. 1861	2,000	Inoperative
27	Solano	Nov. 1861	1,100	Inoperative
28	Solano	Nov. 1861	4,220	Inoperative
38	Sacramento	Nov. 1864	9,173	Inoperative
39	Sacramento	Jan. 1864	2,680	Inoperative
40	Solano	Jan. 1864	2,680	Inoperative
41	Solano	May 7, 1872	9,170	Inoperative
42	Sacramento	1864	160	Inoperative
44	Solano	1864	480	Inoperative
45	Tulare	Mar. 18, 1865	15,380	Inoperative
46	San Joaquin	Jan. 1865	5,700	Inoperative
47	Solano	1865	2,802	Inoperative
48	Tulare	April 1865	11,730	Inoperative
49	Sacramento	1865	10,900	Inoperative
50	Sacramento	July 1865	6,020	Inoperative
50	Sacramento	July 29, 1868	3,429	Inoperative
51	Solano	Aug. 1865	3,200	Inoperative
52	San Joaquin	Oct. 1865	3,100	Inoperative
53	San Joaquin	Oct. 1865	1,300	Inoperative
54	Sacramento	Oct. 12, 1865	7,468	Inoperative
57	San Joaquin	Feb. 20, 1872	3,803	Inoperative
58	San Joaquin	Nov. 25, 1873	2,300	Inoperative
59	San Joaquin	Mar. 18, 1873	2,400	Inoperative
61	San Joaquin	Nov. 3, 1871	3,954	Inoperative
63	San Joaquin	May 22, 1873	1,920	Inoperative
67	Colusa	Aug. 7, 1868	5,640	Inoperative
68	Sutter	Dec. 3, 1868	2,840	Inoperative
69	Sutter	Dec. 3, 1868	8,720	Inoperative
70	Sutter	Dec. 15, 1868	22,090	Active
71	Sacramento	Dec. 17, 1868	3,477	Inoperative
72	San Joaquin	Feb. 25, 1873	6,953	Inoperative
73	Sacramento	Feb. 2, 1869	174	Inoperative
74	Sacramento	April 10, 1869	525	Inoperative
75	Sacramento	April 10, 1869	3,543	Inoperative
76	Sacramento	May 7, 1869	1,957	Inoperative
77	Colusa	July 20, 1869	9,475	Inoperative
78	Tulare	Aug. 2, 1869	9,120	Inoperative
79	Fresno	Aug. 10, 1869	160	Inoperative
80	Fresno	Aug. 10, 1869	8,160	Inoperative
81	Tulare	Aug. 10, 1869	9,200	Inoperative
82	Alameda	Aug. 12, 1869	17,659	Inoperative
83	San Joaquin	Aug. 23, 1869	1,037	Inoperative
84	Solano	Nov. 16, 1869	6,490	Inoperative
85	San Joaquin	Dec. 7, 1869	1,207	Inoperative
86	Merced	Feb. 10, 1870	602	Inoperative
87	Colusa	Feb. 19, 1870	4,840	Inoperative
88	Fresno	Feb. 19, 1870	12,740	Inoperative
89	Sacramento	Mar. 28, 1870	1,155	Inoperative

* No record of acreage—apparently embraced one of the delta islands.

Number	County	Date of petition or formation	Acreage	Status
90	Colusa	Mar. 22, 1870	600	Inoperative
91	Colusa	Mar. 22, 1870	9,475	Inoperative
92	Colusa	Mar. 22, 1870	960	Inoperative
93	Colusa and Glenn	Mar. 22, 1870	23,440	Inoperative
94	Colusa	Mar. 22, 1870	1,640	Inoperative
95	Santa Clara	Mar. 24, 1870	3,227	Inoperative
96	Lake	May 10, 1870	834	Inoperative
97	Lake	May 10, 1870	4,103	Inoperative
98	Fresno	May 14, 1870	730	Inoperative
99	Contra Costa	May 18, 1870	320	Inoperative
100	Contra Costa	May 18, 1870	191	Inoperative
101	Contra Costa	May 18, 1870	2,594	Inoperative
102	Contra Costa	May 18, 1870	2,528	Inoperative
103	Contra Costa	Aug. 12, 1870	1,390	Inoperative
104	Solano	Aug. 12, 1870	1,117	Inoperative
105	Solano	Sept. 3, 1870	12,056	Inoperative
106	Contra Costa	Sept. 24, 1870	1,158	Inoperative
107	Contra Costa	Sept. 1870	21,000	Inoperative
108	Colusa and Yolo	Oct. 4, 1870	57,994	Active
109	San Joaquin	Oct. 8, 1870	51,000	Inoperative
110	San Joaquin	Oct. 8, 1870	3,261	Inoperative
111	Kern	Oct. 27, 1870	28,000	Inoperative
112	Contra Costa	Nov. 16, 1870	374	Inoperative
113	Merced	Nov. 22, 1870	644	Inoperative
114	Marin	Dec. 29, 1870	5,462	Inoperative
115	Colusa	Jan. 3, 1871	16,247	Inoperative
116	Kern	Jan. 17, 1871	58,320	Inoperative
117	Sacramento	Feb. 11, 1871	3,608	Inoperative
118	Contra Costa	Mar. 15, 1871	11,440	Inoperative
119	Lassen	Mar. 24, 1871	400	Inoperative
120	Kern	May 22, 1871	17,460	Inoperative
121	Kern	May 22, 1871	58,320	Inoperative
122	Merced	Aug. 15, 1871	5,672	Inoperative
123	Solano	Aug. 19, 1871	876	Inoperative
124	Colusa	Oct. 11, 1871	2,060	Inoperative
125	Fresno	Oct. 20, 1871	79,103	Inoperative
126	Solano	Oct. 23, 1871	994	Inoperative
127	Solano	Nov. 10, 1871	692	Inoperative
128	Colusa	Nov. 17, 1871	6,445	Inoperative
129	Sacramento	Nov. 22, 1871	670	Inoperative
130	San Joaquin	Nov. 22, 1871	3,419	Inoperative
131	Merced	Nov. 27, 1871	1,[illegible]07	Inoperative
132	Merced	Nov. 27, 1871	640	Inoperative
133	Fresno	Dec. 1, 1871	920	Inoperative
134	Napa	Dec. 1, 1871	2,142	Inoperative
135	Tulare	Dec. 20, 1871	1,194	Inoperative
136	Sacramento	Jan. 5, 1872	439	Active
137	Solano	Jan. 22, 1872	3,528	Inoperative
138	Contra Costa	Feb. 9, 1872	160	Inoperative
139	Merced	Feb. 1872	1,000	Inoperative
139	Solano	Feb. 16, 1872	3,528	Inoperative
140	San Joaquin	Mar. 20, 1872	193	Inoperative
141	Yolo	Mar. 26, 1872	5,600	Inoperative
142	Sacramento	April 16, 1872	839	Inoperative
143	San Diego	June 3, 1872	532	Inoperative
144	San Joaquin	June 6, 1872	4,683	Inoperative
145	Solano	Feb. 5, 1872	991	Inoperative
146	Yolo	June 4, 1872	6,040	Inoperative
147	Yolo	July 2, 1872	4,300	Inoperative
148	Sacramento	Aug. 7, 1872	8,233	Inoperative
149	Sacramento	Aug. 9, 1872	8,400	Inoperative
150	Yolo	Nov. 10, 1870	4,986	Active
151	Contra Costa	Nov. 1872	178	Inoperative
152	Tulare	Nov. 12, 1872	5,000	Inoperative
153	Tulare	Nov. 16, 1872	4,560	Inoperative
154	Tulare	Nov. 16, 1872	1,120	Inoperative
155	Tulare	Nov. 16, 1872	780	Inoperative
156	Tulare	Nov. 12, 1872	2,360	Inoperative
157	San Joaquin	Dec. 2, 1872	3,922	Inoperative
158	Tulare	Feb. 17, 1873	7,190	Inoperative
159	Tulare	Feb. 17, 1873	24,640	Inoperative
160	Contra Costa	Feb. 17, 1873	3,114	Inoperative
161	Contra Costa	Feb. 17, 1873	320	Inoperative
162	San Joaquin	Feb. 25, 1873	4,350	Inoperative
163	San Joaquin	Feb. 25, 1873	1,628	Inoperative
164	Contra Costa	April 10, 1873	661	Inoperative
165	Contra Costa	May 12, 1873	321	Inoperative
166	Contra Costa	May 12, 1873	698	Inoperative
167	Tulare	May 22, 1873	450	Inoperative
168	Tulare	May 1873	3,040	Inoperative
169	San Joaquin	June 9, 1873	756	Inoperative

Number	County	Date of petition or formation	Acreage	Status
170	Tulare	Sept. 22, 1873	16,600	Inoperative
171	Plumas	Sept. 22, 1873	1,084	Inoperative
172	Plumas	Sept. 22, 1873	2,433	Inoperative
173	Plumas	Sept. 22, 1873	1,017	Inoperative
174	Contra Costa	Feb. 14, 1869	1,783	Inoperative
175	Sacramento	Nov. 6, 1873	1,934	Inoperative
176	Contra Costa	Nov. 6, 1873	827	Inoperative
177	Yolo	Nov. 1873	*	Inoperative
178	Plumas	Nov. 17, 1873	6,383	Inoperative
179	Tulare	Nov. 22, 1873	5,268	Inoperative
180	Tulare	Nov. 22, 1873	2,005	Inoperative
181	Tulare	Nov. 22, 1873	912	Inoperative
182	Tulare	Nov. 22, 1873	3,116	Inoperative
183	Contra Costa	Nov. 24, 1873	2,107	Inoperative
184	Kern	Nov. 26, 1873	31,155	Inoperative
185	Kern	Nov. 26, 1873	21,452	Inoperative
186	Solano	Jan. 20, 1874	11,998	Inoperative
187	Solano	Jan. 20, 1874	1,481	Inoperative
188	Solano	Jan. 20, 1874	486	Inoperative
189	San Joaquin	Feb. 4, 1874	835	Inoperative
190	San Joaquin	Mar. 20, 1874	1,229	Inoperative
191	Plumas	May 11, 1874	120	Inoperative
192	Plumas	May 11, 1874	1,795	Inoperative
193	Plumas	May 16, 1874	1,840	Inoperative
194	Plumas	May 16, 1874	639	Inoperative
195	Lassen	May 15, 1874	2,880	Inoperative
196	Solano	June 16, 1874	2,080	Inoperative
197	Tehama	June 20, 1874	1,120	Inoperative
198	Tehama	June 20, 1874	1,720	Inoperative
199	Tehama	June 20, 1874	1,400	Inoperative
200	Tehama	June 20, 1874	400	Inoperative
201	Tehama	July 10, 1874	520	Inoperative
202	Sonoma	Aug. 19, 1874	1,537	Inoperative
203	Sacramento	Sept. 12, 1874	3,573	Inoperative
204	Sonoma	Oct. 3, 1874	4,994	Inoperative
205	Sacramento	Oct. 12, 1874	7,483	Inoperative
206	Glenn	Oct. 17, 1874	3,200	Inoperative
207	Plumas	Nov. 16, 1874	400	Inoperative
208	Kern	Nov. 16, 1874	7,160	Inoperative
209	San Joaquin	Nov. 18, 1874	902	Inoperative
210	San Joaquin	Nov. 23, 1874	1,008	Inoperative
211	Plumas	Dec. 7, 1874	560	Inoperative
212	Plumas	Dec. 7, 1874	120	Inoperative
213	Sacramento	Dec. 11, 1874	2,418	Inoperative
214	Humboldt	Dec. 11, 1874	77	Inoperative
215	Sacramento	Jan. 8, 1875	582	Inoperative
216	Tulare	Jan. 8, 1875	2,080	Inoperative
217	Solano	Jan. 11, 1875	1,359	Inoperative
218	Solano	Feb. 3, 1875	7,388	Inoperative
219	Tehama	Mar. 6, 1875	120	Inoperative
220	Colusa	Mar. 13, 1875	2,645	Inoperative
221	San Joaquin	Mar. 13, 1875	3,907	Inoperative
222	Plumas	April 16, 1875	1,328	Inoperative
223	San Joaquin	May 27, 1875	52,700	Inoperative
224	Colusa	June 17, 1875	2,170	Inoperative
225	Sutter	June 18, 1875	6,910	Inoperative
226	Tulare	June 25, 1874	2,720	Inoperative
227	Tulare	June 25, 1874	1,120	Inoperative
228	Tulare	June 25, 1874	120	Inoperative
229	Tulare	June 25, 1874	80	Inoperative
230	Tulare	June 25, 1874	120	Inoperative
231	Tulare	June 25, 1874	80	Inoperative
232	Tulare	June 25, 1874	*120	Inoperative
233	Tulare	June 25, 1874	40	Inoperative
234	Tulare	June 25, 1874	160	Inoperative
235	Tulare	June 25, 1874	120	Inoperative
236	Tulare	June 25, 1874	200	Inoperative
237	Tulare	June 25, 1874	80	Inoperative
238	Tulare	June 25, 1874	280	Inoperative
239	Tulare	June 25, 1874	120	Inoperative
240	Tulare	June 25, 1874	1,160	Inoperative
241	Tulare	June 25, 1874	560	Inoperative
242	Tulare	June 25, 1874	920	Inoperative
243	Inyo	July 3, 1875	80	Inoperative
244	Inyo	July 3, 1875	160	Inoperative
245	Inyo	July 3, 1875	400	Inoperative
246	Sonoma	July 31, 1875	2,127	Inoperative
247	Sonoma	Aug. 5, 1875	482	Inoperative
248	Tulare	Aug. 4, 1875	3,384	Inoperative
249	Tulare	Aug. 4, 1875	1,380	Inoperative
250	Tulare	Aug. 4, 1875	1,430	Inoperative
251	Tulare	Aug. 4, 1875	14,280	Inoperative

* No record of acreage.

Number	County	Date of petition or formation	Acreage	Status
252	Sacramento	Aug. 6, 1875	2,328	Inoperative
253	Colusa	Aug. 13, 1875	6,445	Inoperative
254	Sacramento	Aug. 25, 1875	16,634	Inoperative
255	Lassen	Aug. 21, 1875	8,560	Inoperative
256	Solano	Sept. 22, 1875	1,666	Inoperative
257	Sacramento	Oct. 7, 1875	7,483	Inoperative
258	Solano	Oct. 27, 1875	19,544	Inoperative
259	Plumas	Nov. 10, 1875	160	Inoperative
260	Tulare	Nov. 12, 1875	80	Inoperative
261	Tulare	Nov. 12, 1875	160	Inoperative
262	Tulare	Nov. 12, 1875	160	Inoperative
263	Tulare	Nov. 12, 1875	80	Inoperative
264	Tulare	Nov. 12, 1875	80	Inoperative
265	Tulare	Nov. 12, 1875	200	Inoperative
266	Kern	Nov. 23, 1875	7,041	Inoperative
267	Lassen	Dec. 10, 1875	4,400	Inoperative
268	Plumas	Dec. 15, 1875	1,159	Inoperative
269	Fresno	Dec. 21, 1875	1,211	Inoperative
270	Plumas	Dec. 27, 1875	696	Inoperative
271	Merced	Feb. 2, 1876	31,682	Inoperative
272	Lassen	Feb. 14, 1876	1,240	Inoperative
273	Shasta	Feb. 17, 1876	8,180	Inoperative
274	Sacramento	April 4, 1876	230	Active
275	Colusa	April 27, 1876	120	Inoperative
276	Solano	May 2, 1876	1,618	Inoperative
277	Fresno	May 8, 1876	632	Inoperative
278	Plumas	June 30, 1876	240	Inoperative
279	Tulare	Aug. 4, 1876	6,541	Inoperative
280	Plumas	Aug. 9, 1876	360	Inoperative
281	Plumas	Aug. 9, 1876	340	Inoperative
282	San Joaquin	Aug. 23, 1876	3,100	Inoperative
283	Modoc	Aug. 23, 1876	10,025	Inoperative
284	Lassen	Sept. 9, 1876	120	Inoperative
285	Lassen	Sept. 9, 1876	1,240	Inoperative
286	Sacramento	Sept. 19, 1876	461	Inoperative
287	Sacramento	Sept. 25, 1876	2,255	Inoperative
288	Plumas	Oct. 6, 1876	160	Inoperative
289	Plumas	Oct. 6, 1876	1,517	Inoperative
290	Plumas	Oct. 6, 1876	549	Inoperative
291	Solano	Nov. 17, 1876	875	Inoperative
292	Plumas	Nov. 17, 1876	240	Inoperative
293	Solano	Feb. 1, 1876	962	Inoperative
294	Solano	Mar. 17, 1876	27,122	Inoperative
295	Lassen	April 23, 1876	1,224	Inoperative
296	Lassen	May 16, 1876	2,040	Inoperative
297	Plumas	May 18, 1876	120	Inoperative
298	Plumas	May 18, 1876	7,760	Inoperative
299	Tulare	June 15, 1876	1,960	Inoperative
300	Tulare	June 28, 1876	2,485	Inoperative
301	Tulare	June 28, 1876	2,188	Inoperative
302	San Joaquin	Aug. 15, 1876	48,187	Inoperative
303	San Joaquin	Aug. 15, 1876	3,513	Inoperative
304	Tulare	Aug. 16, 1876	4,760	Inoperative
305	Lassen	Sept. 14, 1876	680	Inoperative
306	Lassen	Sept. 15, 1876	717	Inoperative
307	Yolo	Sept. 18, 1876	5,941	Active
308	Solano	Sept. 22, 1876	3,250	Inoperative
309	Merced	Oct. 8, 1876	1,458	Inoperative
310	San Diego	Oct. 22, 1876	39,789	Inoperative
311	Humboldt	Oct. 23, 1876	1,000	Inoperative
312	Tulare	Dec. 22, 1876	3,040	Inoperative
313	Solano	Feb. 7, 1878	2,363	Inoperative
314	Plumas	Feb. 13, 1876	280	Inoperative
315	Fresno	Feb. 18, 1878	409	Inoperative
316	Lassen	Feb. 18, 1878	2,000	Inoperative
317	Sacramento	Mar. 27, 1878	3,448	Active
318	Plumas	Mar. 13, 1878	560	Inoperative
319	San Joaquin	June 10, 1878	550	Inoperative
320	Lassen	July 30, 1878	440	Inoperative
321	Lassen	July 30, 1878	240	Inoperative
322	Plumas	Aug. 12, 1878	240	Inoperative
323	Modoc	Aug. 16, 1878	160	Inoperative
324	Plumas	Nov. 9, 1878	680	Inoperative
325	Plumas	Nov. 9, 1878	480	Inoperative
326	Lassen	Nov. 19, 1878	2,320	Inoperative
327	Colusa	Nov. 26, 1878	280	Inoperative
328	Humboldt	Jan. 25, 1879	48	Inoperative
329	Lassen	Feb. 11, 1879	323	Inoperative
330	Lassen	Feb. 11, 1879	240	Inoperative
331	Solano	Feb. 15, 1879	805	Inoperative
332	Plumas	Feb. 15, 1879	1,120	Inoperative

Number	County	Date of petition or formation	Acreage	Status
333	Modoc	Feb. 19, 1879	1,920	Inoperative
334	Modoc	Feb. 19, 1879	889	Inoperative
335	Colusa	Mar. 6, 1879	680	Inoperative
336	Colusa	Mar. 6, 1879	3,160	Inoperative
337	San Joaquin	Mar. 13, 1879	5,817	Inoperative
338	Plumas	May 10, 1879	200	Inoperative
339	Modoc	May 13, 1879	839	Inoperative
340	Solano	May 22, 1879	643	Inoperative
341	Sacramento	June 17, 1879	10,305	Active
342	Modoc	Aug. 13, 1879	200	Inoperative
343	Merced	Sept. 27, 1879	1,015	Inoperative
343	Merced	Sept. 1879	1,766	Inoperative
344	Merced	Sept. 29, 1879	120	Inoperative
345	Sierra	Nov. 14, 1879	480	Inoperative
346	Tulare	Nov. 18, 1879	9,680	Inoperative
347	Tulare	Nov. 18, 1879	1,920	Inoperative
348	San Joaquin	Dec. 2, 1879	10,000	Active
349	Sacramento	Feb. 3, 1880	2,550	Active
350	Sonoma	Feb. 5, 1880	1,655	Inoperative
351	Solano	Feb. 17, 1880	340	Inoperative
352	Plumas	Feb. 18, 1880	240	Inoperative
353	Tulare	Mar. 31, 1880	1,280	Inoperative
354	Humboldt	April 13, 1880	280	Inoperative
355	Modoc	May 24, 1880	520	Inoperative
356	Modoc	May 24, 1880	280	Inoperative
357	Modoc	May 24, 1880	640	Inoperative
358	Merced	June 9, 1880	75	Inoperative
359	Merced	June 9, 1880	583	Inoperative
360	Merced	June 9, 1880	90	Inoperative
361	Merced	June 9, 1880	1,308	Inoperative
362	Sacramento	June 8, 1880	1,189	Inoperative
363	Solano	July 24, 1880	381	Inoperative
364	Sacramento	Aug. 6, 1880	730	Active
365	Plumas	Aug. 9, 1880	320	Inoperative
366	Sacramento	Aug. 11, 1880	1,454	Inoperative
367	Sacramento	Aug. 14, 1880	683	Inoperative
368	Plumas	Sept. 2, 1880	936	Inoperative
369	Sacramento	Sept. 21, 1880	554	Active
370	Sacramento	Sept. 21, 1880	553	Inoperative
371	Sacramento	Sept. 21, 1880	1,649	Inoperative
372	Lassen	Oct. 12, 1880	468	Inoperative
373	Lassen	Oct. 12, 1880	251	Inoperative
374	Humboldt	Oct. 19, 1880	1,590	Inoperative
375	Plumas	Oct. 26, 1880	160	Inoperative
376	Plumas	Oct. 26, 1880	280	Inoperative
377	Plumas	Nov. 15, 1880	160	Inoperative
378	Plumas	Nov. 15, 1880	2,118	Inoperative
379	Humboldt	Nov. 22, 1880	1,590	Inoperative
380	Plumas	Dec. 18, 1880	160	Inoperative
381	Modoc	Dec. 27, 1880	424	Inoperative
382	Modoc	Dec. 27, 1880	160	Inoperative
383	Modoc	Dec. 27, 1880	382	Inoperative
384	Modoc	Dec. 27, 1880	80	Inoperative
385	Sonoma	Jan. 17, 1881	244	Inoperative
386	Sacramento	Jan. 21, 1881	820	Inoperative
387	Plumas	Feb. 21, 1881	680	Inoperative
388	Lassen	Mar. 1, 1881	1,080	Inoperative
389	Tulare	Mar. 17, 1881	1,919	Inoperative
390	Colusa	April 2, 1881	360	Inoperative
391	Modoc	May 14, 1881	880	Inoperative
392	Lassen	May 25, 1881	240	Inoperative
393	Lassen	May 2, 1881	200	Inoperative
394	Modoc	June 11, 1881	1,120	Inoperative
396	Modoc	Aug. 9, 1881	160	Inoperative
397	Modoc	Aug. 9, 1881	120	Inoperative
398	Plumas	Aug. 17, 1881	560	Inoperative
399	Plumas	Aug. 17, 1881	560	Inoperative
400	Plumas	Aug. 17, 1881	360	Inoperative
401	Siskiyou	Aug. 29, 1881	120	Inoperative
402	Lassen	Aug. 30, 1881	1,080	Inoperative
403	San Joaquin	Oct. 7, 1881	1,576	Active
404	San Joaquin	Nov. 18, 1881	2,045	Active
404	Lassen	Nov. 19, 1881	80	Inoperative
405	Plumas	Nov. 23, 1881	360	Inoperative
406	Plumas	Dec. 19, 1881	880	Inoperative
407	Sacramento	Jan. 10, 1882	1,737	Active
408	Plumas	Feb. 13, 1882	280	Inoperative
409	Modoc	Feb. 23, 1882	80	Inoperative
410	Siskiyou	Mar. 6, 1882	520	Inoperative
411	Lassen	Mar. 13, 1882	80	Inoperative
412	Plumas	Mar. 24, 1882	2,264	Inoperative

Number	County	Date of petition or formation	Acreage	Status
413	Plumas	Mar. 24, 1882	120	Inoperative
414	Plumas	April 21, 1882	2,254	Inoperative
415	San Mateo	May 18, 1882	10,979	Inoperative
416	Lassen	May 25, 1882	11,052	Inoperative
417	Fresno	June 6, 1882	160	Inoperative
418	Sacramento	July 11, 1882	113	Inoperative
419	Plumas	July 17, 1882	160	Inoperative
420	Plumas	July 17, 1882	720	Inoperative
421	Lassen	Aug. 17, 1882	120	Inoperative
422	Merced	Sept. 4, 1882	171	Inoperative
423	Merced	Sept. 4, 1882	159	Inoperative
424	Merced	Sept. 4, 1882	319	Inoperative
425	Lassen	Oct. 4, 1882	2,240	Inoperative
426	Modoc	Nov. 21, 1882	117	Inoperative
427	Lassen	Nov. 22, 1882	120	Inoperative
428	Sacramento	Nov. 25, 1882	401	Inoperative
429	Plumas	Nov. 28, 1882	1,000	Inoperative
430	Kern	Dec. 23, 1882	10,000	Inoperative
431	Sacramento	Jan. 2, 1883	110	Inoperative
432	Sacramento	Jan. 2, 1883	80	Inoperative
433	Sacramento	Jan. 2, 1883	138	Inoperative
434	Marin	Feb. 12, 1883	1,127	Inoperative
435	Sonoma	Feb. 19, 1883	3,330	Inoperative
436	Modoc	Feb. 21, 1883	200	Inoperative
437	Plumas	Feb. 26, 1883	120	Inoperative
438	Sacramento	April 14, 1883	75	Inoperative
439	Sacramento	April 14, 1883	151	Inoperative
440	Sacramento	April 14, 1883	151	Inoperative
441	Sacramento	April 14, 1883	62	Inoperative
442	Marin	May 16, 1883	443	Inoperative
443	Mendocino	May 28, 1883	120	Inoperative
444	Mendocino	July 7, 1883	80	Inoperative
445	Merced	Aug. 9, 1883	180	Inoperative
446	San Joaquin	Aug. 15, 1883	2,046	Inoperative
447	Colusa	Aug. 23, 1883	3,040	Inoperative
448	Modoc	Sept. 12, 1883	4,476	Inoperative
449	Sonoma	Sept. 12, 1883	1,347	Inoperative
450	Modoc	Sept. 15, 1883	106	Inoperative
451	Modoc	Sept. 15, 1883	360	Inoperative
452	Modoc	Sept. 15, 1883	640	Inoperative
453	Lassen	Nov. 12, 1883	1,801	Inoperative
454	Kern	Feb. 14, 1884	11,760	Inoperative
455	Tulare	Feb. 15, 1884	640	Inoperative
456	Lassen	April 2, 1884	320	Inoperative
457	Kern	April 22, 1884	8,960	Inoperative
458	Kern	April 22, 1884	7,598	Inoperative
459	Lassen	May 13, 1884	8,900	Inoperative
460	Tulare	May 13, 1884	200	Inoperative
461	Humboldt	May 26, 1884	2,081	Inoperative
462	Colusa	June 25, 1884	22,007	Inoperative
463	Solano	July 8, 1884	29,913	Inoperative
464	Modoc	Aug. 20, 1884	280	Inoperative
465	Modoc	Aug. 20, 1884	200	Inoperative
466	Modoc	Aug. 20, 1884	400	Inoperative
467	Colusa	Sept. 18, 1884	6,418	Inoperative
468	Merced	Oct. 27, 1884	4,284	Inoperative
469	Lassen	Nov. 15, 1884	1,200	Inoperative
470	Modoc	Feb. 19, 1885	1,280	Inoperative
471	Plumas	Mar. 5, 1885	640	Inoperative
472	Napa	Mar. 24, 1885	1,951	Inoperative
472	Yolo	April 1885	549	Inoperative
473	Mendocino	April 14, 1885	1,080	Inoperative
474	Shasta	April 15, 1885	200	Inoperative
475	Humboldt	May 11, 1885	310	Inoperative
476	Lassen	July 15, 1885	1,040	Inoperative
477	Lsssen	July 15, 1885	1,200	Inoperative
478	Siskiyou	July 20, 1885	433	Inoperative
479	Colusa	July 29, 1885	6,505	Active
480	Modoc	Aug. 5, 1885	120	Inoperative
481	Lassen	Sept. 16, 1885	640	Inoperative
482	Tulare	Jan. 12, 1886	320	Inoperative
483	Modoc	Jan. 22, 1886	2,000	Inoperative
484	Tulare	April 21, 1886	5,167	Inoperative
485	Lassen	May 7, 1886	240	Inoperative
486	Lassen	May 13, 1886	240	Inoperative
487	Humboldt	June 18, 1886	648	Inoperative
488	Solano	July 8, 1886	1,167	Inoperative
489	Modoc	July 26, 1886	80	Inoperative
490	Lassen	Aug. 6, 1886	160	Inoperative
491	Colusa and Glenn	Aug. 19, 1886	32,487	Inoperative
492	Lassen	Oct. 11, 1886	315	Inoperative

Number	County	Date of petition or formation	Acreage	Status
493	Tulare	Nov. 11, 1886	760	Inoperative
494	Tulare	Dec. 27, 1886	633	Inoperative
495	Shasta	Jan. 26, 1887	360	Inoperative
496	Tulare	Jan. 26, 1887	1,269	Inoperative
497	Lassen	Mar. 22, 1887	531	Inoperative
498	Shasta	Mar. 25, 1887	520	Inoperative
499	Lassen	April 15, 1887	40	Inoperative
500	Lassen	May 21, 1887	2,949	Inoperative
501	Solano	June 16, 1887	11,978	Active
502	Modoc	July 16, 1887	640	Inoperative
503	Solano	Sept. 30, 1887	534	Inoperative
504	Tulare	Oct. 18, 1887	640	Inoperative
505	Plumas	Oct. 21, 1887	640	Inoperative
506	Plumas	Dec. 17, 1887	120	Inoperative
507	Modoc	Jan. 20, 1888	160	Inoperative
508	Modoc	Jan. 20, 1888	155	Inoperative
509	Tulare	Jan. 20, 1888	1,832	Inoperative
510	Lassen	Mar. 22, 1888	218	Inoperative
511	Modoc	July 21, 1888	1,820	Inoperative
512	Modoc	July 21, 1888	1,218	Inoperative
513	Modoc	July 21, 1888	320	Inoperative
514	Modoc	July 21, 1888	240	Inoperative
515	Siskiyou	Aug. 2, 1888	640	Inoperative
516	Lassen	Aug. 23, 1888	390	Inoperative
517	Lassen	Aug. 23, 1888	400	Inoperative
518	Kern	Jan. 10, 1889	3,237	Inoperative
519	Kern	Jan. 11, 1889	16,539	Inoperative
520	Lassen	April 1, 1889	160	Inoperative
521	Butte	May 14, 1889	4,405	Inoperative
522	Colusa	May 24, 1889	4,875	Inoperative
523	Humboldt	June 3, 1889	2,262	Inoperative
524	San Joaquin	Nov. 11, 1889	19,776	Active
525	Plumas	Nov. 12, 1889	400	Inoperative
526	Lassen	Nov. 26, 1889	221	Inoperative
527	Yolo	April 25, 1890	6,146	Inoperative
528	Lake	July 17, 1890	4,457	Inoperative
529	Modoc	Aug. 16, 1890	1,560	Inoperative
530	Yolo	Nov. 13 1890	2,720	Inoperative
531	Kings	Nov. 20, 1890	9,335	Active
532	Sacramento	Feb. 11, 1891	2,033	Active
533	Tulare	June 8, 1891	960	Inoperative
534	Marin	June 26, 1891	762	Inoperative
535	Sacramento	Aug. 8, 1891	5,000	Active
536	Solano	Sept. 11, 1891	8,933	Active
537	Yolo	Sept. 28, 1891	3,033	Active
538	Marin	Oct. 1, 1891	145	Inoperative
539	Yolo	Oct. 15, 1891	5,076	Inoperative
540	Fresno	Jan. 25, 1892	189	Inoperative
541	Lassen	Mar. 3, 1892	1,115	Inoperative
542	Butte	April 1, 1892	5,723	Inoperative
543	San Mateo	July 26, 1892	4,593	Inoperative
544	San Joaquin	Aug. 4, 1892	7,474	Active
545	Fresno	Sept. 19, 1892	640	Inoperative
546	Marin	Oct. 4, 1892	273	Inoperative
547	Marin	Oct. 4, 1892	469	Inoperative
548	San Joaquin	Nov. 16, 1892	10,608	Active
549	Tulare	Dec. 16, 1892	7,720	Inoperative
550	Fresno	Mar. 10, 1893	353	Inoperative
551	Sacramento	May 11, 1893	8,800	Active
552	Fresno	May 15, 1893	883	Inoperative
553	Fresno	May 15, 1893	311	Inoperative
554	Sacramento	Aug. 25, 1893	699	Active
555	Shasta	Sept. 6, 1893	2,188	Inoperative
556	Shasta	Sept. 12, 1893	330	Inoperative
556	Sacramento	Sept. 12, 1893	2,378	Active
557	Lassen	Oct. 9, 1893	5,216	Inoperative
558	Modoc	Oct. 20, 1893	200	Inoperative
559	Sacramento	Oct. 21, 1893	1,639	Inoperative
560	Tulare	Dec. 9, 1893	7,538	Inoperative
561	San Joaquin	Feb. 16, 1894	1,402	Inoperative
562	Shasta	Mar. 9, 1894	505	Inoperative
563	Sacramento	May 7, 1894	4,616	Active
564	Shasta	May 16, 1894	240	Inoperative
565	Merced	Aug. 13, 1894	915	Inoperative
566	Merced	Aug. 13, 1894	160	Inoperative
567	Merced	Aug. 13, 1894	101	Inoperative
568	Merced	Aug. 13, 1894	244	Inoperative
569	Merced	Aug. 13, 1894	6,823	Inoperative
570	Merced	Aug. 13, 1894	2,104	Inoperative
571	Merced	Aug. 13, 1894	40	Inoperative
572	Merced	Aug. 13, 1894	2,557	Inoperative

Number	County	Date of petition or formation	Acreage	Status
573	Merced	Aug. 13, 1894	800	Inoperative
574	Merced	Aug. 13, 1894	143	Inoperative
575	Merced	Aug. 13, 1894	160	Inoperative
577	Merced	Nov. 24, 1894	627	Inoperative
578	Merced	Nov. 24, 1894	139	Inoperative
579	Merced	Nov. 24, 1894	265	Inoperative
580	Merced	Nov. 24, 1894	36	Inoperative
581	Merced	Nov. 24, 1894	122	Inoperative
582	Merced	Nov. 24, 1894	33	Inoperative
583	Merced	Nov. 24, 1894	86	Inoperative
584	Merced	Nov. 24, 1894	154	Inoperative
585	Merced	Nov. 24, 1894	46	Inopera ive
586	Merced	Nov. 24, 1894	109	Inoperative
587	Merced	Nov. 24, 1894	52	Inoperative
588	Merced	Nov. 24, 1894	84	Inoperative
589	Merced	Nov. 24, 1894	640	Inoperative
590	Merced	Nov. 24, 1894	480	Inoperative
591	Merced	Nov. 24, 1894	29	Inoperative
592	Merced	Nov. 24, 1894	71	Inoperative
593	Merced	Nov. 24, 1894	17	Inoperative
594	Merced	Nov. 24, 1894	19	Inoperative
595	Merced	Nov. 24, 1894	264	Inoperative
596	Merced	Nov. 24, 1894	32	Inoperative
597	Merced	Nov. 24, 1894	20	Inoperative
598	Merced	Nov. 24, 1894	39	Inoperative
599	Merced	Nov. 24, 1894	16	Inoperative
600	Merced	Nov. 24, 1894	69	Inoperative
601	Merced	Nov. 24, 1894	960	Inoperative
602	Merced	Nov. 24, 1894	54	Inoperative
603	Merced	Nov. 24, 1894	107	Inoperative
604	Merced	Nov. 24, 1894	104	Inoperative
605	Merced	Nov. 24, 1894	75	Inoperative
606	Merced	Nov. 24, 1894	289	Inoperative
607	Humboldt	Dec. 6, 1894	464	Inoperative
608	Merced	Dec. 13, 1894	360	Inoperative
609	Merced	Dec. 13, 1894	47	Inoperative
610	Merced	Dec. 13, 1894	20	Inoperative
611	Merced	Jan. 11, 1895	72	Inoperative
612	Merced	Jan. 11, 1895	3,963	Inoperative
613	Humboldt	Jan. 19, 1895	468	Inoperative
614	Merced	Mar. 7, 1895	71	Inoperative
615	Madera	Jan. 28, 1895	205	Inoperative
616	Madera	Mar. 28, 1895	14	Inoperative
617	Madera	Mar. 28, 1895	28	Inoperative
618	Madera	Mar. 28, 1895	2,338	Inoperative
619	Madera	Mar. 28, 1895	415	Inoperative
620	Madera	Mar. 28, 1895	140	Inoperative
621	Madera	Mar. 28, 1895	36	Inoperative
622	Madera	Mar. 28, 1895	234	Inoperative
623	Madera	Mar. 28, 1895	22	Inoperative
624	Madera	Mar. 28, 1895	381	Inoperative
625	Madera	Mar. 28, 1895	46	Inoperative
626	Madera	Mar. 28, 1895	160	Inoperative
627	Madera	Mar. 28, 1895	44	Inoperative
628	Madera	Mar. 28, 1895	165	Inoperative
629	Madera	Mar. 28, 1895	63	Inoperative
630	Madera	Mar. 28, 1895	476	Inoperative
631	Fresno	April 12, 1895	2,593	Inoperative
632	Fresno	April 12, 1895	40	Inoperative
633	Fresno	April 12, 1895	277	Inoperative
634	Fresno	April 12, 1895	100	Inoperative
635	Fresno	April 12, 1895	158	Inoperative
636	Fresno	April 12, 1895	214	Inoperative
637	Fresno	April 12, 1895	375	Inoperative
638	Fresno	April 12, 1895	79	Inoperative
639	Fresno	April 12, 1895	69	Inoperative
640	Fresno	April 12, 1895	68	Inoperative
641	Fresno	April 12, 1895	718	Inoperative
642	Fresno	April 12, 1895	136	Inoperative
643	Fresno	April 12, 1895	120	Inoperative
644	Fresno	April 12, 1895	639	Inoperative
645	Fresno	April 12, 1895	40	Inoperative
646	Humboldt	April 24, 1895	706	Inoperative
647	Madera	April 26, 1895	4,973	Inoperative
648	Madera	April 26, 1895	40	Inoperative
649	Madera	April 26, 1895	40	Inoperative
650	Merced	May 9, 1895	40	Inoperative
651	Merced	May 9, 1895	63	Inoperative
652	Merced	May 9, 1895	184	Inoperative
653	Merced	May 9, 1895	21	Inoperative
654	Merced	May 9, 1895	78	Inoperative

Number	County	Date of petition or formation	Acreage	Status
655	Merced	May 9, 1895	72	Inoperative
656	Merced	May 16, 1895	30	Inoperative
657	Merced	May 16, 1895	59	Inoperative
658	Merced	July 5, 1895	68	Inoperative
659	San Joaquin	Aug. 13, 1895	10,540	Inoperative
660	Stanislaus	Oct. 14, 1895	68	Inoperative
661	Stanislaus	Oct. 14, 1895	986	Inoperative
662	Stanislaus	Oct. 14, 1895	157	Inoperative
663	Stanislaus	Oct. 14, 1895	867	Inoperative
664	Stanislaus	Oct. 14, 1895	708	Inoperative
665	Stanislaus	Oct. 14, 1895	86	Inoperative
666	Stanislaus	Oct. 14, 1895	346	Inoperative
667	Stanislaus	Oct. 14, 1895	200	Inoperative
668	Stanislaus	Oct. 14, 1895	638	Inoperative
669	Stanislaus	Oct. 14, 1895	207	Inoperative
670	Stanislaus	Oct. 14, 1895	71	Inoperative
671	Stanislaus	Oct. 14, 1895	214	Inoperative
672	Stanislaus	Oct. 14, 1895	274	Inoperative
673	Sacramento	Nov. 20, 1895	3,099	Active
674	Tulare	Dec. 17, 1895	625	Inoperative
675	Tulare	April 10, 1896	142	Inoperative
676	Humboldt	May 13, 1896	123	Inoperative
677	Kings	June 23, 1896	240	Active
678	Kings	June 23, 1896	80	Active
679	Modoc	July 20, 1896	120	Inoperative
680	Plumas	July 21, 1897	174	Inoperative
681	Plumas	July 21, 1897	800	Inoperative
682	Plumas	Sept. 23, 1897	160	Inoperative
683	Humboldt	Oct. 1, 1897	827	Inoperative
684	San Joaquin	Oct. 8, 1897	10,659	Active
685	Kings	Nov. 6, 1897	4,349	Active
686	Kings	Jan. 7, 1898	5,079	Active
687	Plumas	Sept. 22, 1898	160	Inoperative
688	Stanislaus	Nov. 10, 1898	128	Inoperative
689	Stanislaus	Nov. 30, 1898	252	Inoperative
690	Kings	Nov. 30, 1898	2,294	Active
691	San Joaquin	Feb. 21, 1899	4,568	Inoperative
692	Kings	July 5, 1899	27,957	Active
693	Plumas	July 22, 1899	581	Inoperative
694	Plumas	July 22, 1899	379	Inoperative
695	Lake	Nov. 21, 1899	844	Inoperative
696	Merced	Dec. 19, 1899	192	Inoperative
697	Lassen	Feb. 5, 1900	120	Inoperative
698	Lake	April 26, 1900	792	Inoperative
699	Merced	May 26, 1900	180	Inoperative
700	Humboldt	Aug. 21, 1900	26	Inoperative
701	Modoc	Aug. 28, 1900	201	Inoperative
702	Modoc	Aug. 28, 1900	455	Inoperative
703	Plumas	Dec. 4, 1900	40	Inoperative
704	Modoc	Dec. 4, 1900	154	Inoperative
705	Kings	Dec. 20, 1900	909	Active
706	Kings	Jan. 31, 1901	1,988	Inoperative
707	Modoc	Mar. 7, 1901	237	Inoperative
708	Modoc	Mar. 7, 1901	156	Inoperative
709	Modoc	July 20, 1901	70	Inoperative
710	Modoc	July 20, 1901	60	Inoperative
711	Modoc	July 20, 1901	160	Inoperative
712	Trinity	July 20, 1901	240	Inoperative
713	Merced	July 20, 1901	50	Inoperative
714	Merced	July 20, 1901	48	Inoperative
715	Merced	July 20, 1901	172	Inoperative
716	Merced	Aug. 14, 1901	184	Inoperative
717	Merced	Aug. 14, 1901	86	Inoperative
718	Plumas	Aug. 29, 1901	720	Inoperative
719	Plumas	Aug. 29, 1901	479	Inoperative
720	Merced	Nov. 27, 1901	65	Inoperative
721	Merced	Nov. 27, 1901	90	Inoperative
722	Merced	Nov. 27, 1901	43	Inoperative
723	Merced	Jan. 27, 1902	21	Inoperative
724	Merced	Jan. 27, 1902	40	Inoperative
725	Merced	Jan. 27, 1902	28	Inoperative
726	Merced	Jan. 27, 1902	72	Inoperative
727	Merced	Jan. 27, 1902	51	Inoperative
728	Merced	July 15, 1902	281	Inoperative
729	Modoc	July 15, 1902	489	Inoperative
729	Yolo	Sept. 17, 1902	27,000	Inoperative
730	Yolo	Dec. 16, 1902	4,497	Active
731	San Joaquin	Feb. 2, 1903	6,120	Inoperative
732	Lassen	Mar. 17, 1903	680	Inoperative
733	Stanislaus	Mar. 17, 1903	489	Inoperative
734	Modoc	Mar. 17, 1903	420	Inoperative

Number	County	Date of petition or formation	Acreage	Status
735	Merced	May 14, 1903	37	Inoperative
736	Merced	May 14, 1903	204	Inoperative
737	Modoc	May 15, 1903	76	Inoperative
738	Shasta	June 6, 1903	160	Inoperative
739	Kings	June 6, 1903	7,300	Active
740	Modoc	June 23, 1903	76	Inoperative
741	Yolo	Aug. 1, 1903	4,497	Inoperative
742	Yolo	Aug. 5, 1903	549	Inoperative
743	Kings	Aug. 6, 1903	3,840	Inoperative
744	Sacramento	Sept. 11, 1903	1,618	Active
745	Sacramento	Sept. 25, 1903	136	Active
746	Sacramento	Oct. 24, 1903	135	Active
747	Yolo	Nov. 12, 1903	5,223	Inoperative
748	Kings	Dec. 10, 1903	1,920	Active
749	Kings	Dec. 21, 1903	19,392	Active
750	Kings	Dec. 28, 1903	775	Active
751	Kings	Jan. 23, 1904	1,280	Active
752	Yolo	Feb. 5, 1904	230	Active
753	Kings	Feb. 9, 1904	3,793	Active
754	San Mateo	July 14, 1904	4,410	Inoperative
755	Sacramento	July 25, 1904	408	Active
756	San Joaquin	Oct. 11, 1904	6,006	Active
757	Kings	Oct. 14, 1904	9,454	Inoperative
758	Yolo	Oct. 4, 1904	687	Inoperative
759	Kings	Dec. 12, 1904	825	Active
760	Kings	Dec. 12, 1904	13,108	Active
761	Kings	Dec. 12, 1904	27,028	Active
762	Yolo	Jan. 5, 1905	387	Inoperative
763	Sutter	Feb. 11, 1905	3,391	Inoperative
764	Sutter	Feb. 11, 1905	2,485	Inoperative
764	Kings	Feb. 16, 1905	2,676	Inoperative
765	Yolo	April 22, 1905	1,322	Active
766	Kings	Aug. 7, 1905	320	Active
767	Kings	Aug. 7, 1905	320	Active
768	Humboldt	Aug. 7, 1905	1,524	Inoperative
769	Modoc	Dec. 4, 1905	120	Inoperative
770	Kings	Feb. 14, 1906	13,729	Active
771	Kings	July 23, 1906	2,200	Active
772	Stanislaus	Oct. 15, 1906	121	Inoperative
773	San Joaquin	Jan. 15, 1907	7,195	Active
775	Stanislaus	Jan. 31, 1907	65	Inoperative
776	Fresno	June 4, 1907	8,000	Active
777	Sutter	July 25, 1907	12,453	Active
778	Yolo	Aug. 30, 1907	2,925	Inoperative
779	Fresno and Kings	Aug. 30, 1907	19,277	Active
780	Kings	Oct. 14, 1907	29,683	Active
781	Fresno	Dec. 6, 1907	5,714	Active
782	Yolo	April 8, 1908	364	Inoperative
783	Sutter	April 17, 1908	420	Inoperative
784	Yuba	May 6, 1908	19,580	Active
785	Yolo	May 18, 1908	2,974	Active
786	Lassen	July 13, 1908	1,641	Inoperative
787	Yolo	Aug. 20, 1908	9,453	Active
788	Contra Costa	Nov. 24, 1908	648	Active
789	Modoc	Dec. 9, 1908	164	Inoperative
790	Stanislaus	Jan. 18, 1909	152	Inoperative
791	Sacramento and Sutter	Jan. 20, 1909	53,952	Inoperative
792	Sutter	Jan. 28, 1909	1,444	Inoperative
793	Sutter	Feb. 8, 1909	4,933	Inoperative
794	Sutter	Feb. 8, 1909	2,436	Inoperative
795	Yolo	Feb. 13, 1909	5,223	Inoperative
796	Sutter	Feb. 15, 1909	1,406	Inoperative
798	Santa Barbara	June 17, 1909	35,289	Inoperative
799	Contra Costa	July 15, 1909	2,907	Active
800	Sacramento	Mar. 14, 1907	2,180	Active
800	Contra Costa	July 29, 1909	6,319	Active
801	Fresno	Sept. 28, 1909	10,904	Active
802	Contra Costa	Oct. 18, 1909	3,363	Active
803	Sutter	Dec. 13, 1909	2,000	Active
804	Sutter	Dec. 13, 1909	9,880	Inoperative
805	Fresno	Jan. 5, 1910	2,830	Active
806	Stanislaus	Jan. 14, 1910	105	Inoperative
807	Sacramento	April 7, 1910	202	Active
808	Kings	May 23, 1910	3,360	Inoperative
809	Kings	May 23, 1910	16,160	Inoperative
810	Sutter	June 10, 1910	181	Inoperative
811	Yolo	Aug. 18, 1910	1,069	Active
812	Kings	Sept. 6, 1910	10,202	Active
813	Sacramento	Sept. 10, 1910	2,550	Active
814	Kings	Sept. 12, 1910	1,049	Inoperative
815	Colusa	Sept. 14, 1910	4,240	Inoperative
816	Colusa	Oct. 13, 1910	252	Active

Number	County	Date of petition or formation	Acreage	Status
817	Yuba	Nov. 9, 1910	3,120	Active
818	Sutter	Nov. 28, 1910	9,080	Inoperative
819	Yolo	Jan. 26, 1911	884	Active
820	Yolo	Feb. 16, 1911	820	Active
821	Yolo	April 8, 1911	1,250	Active
822	Yolo	April 8, 1911	370	Inoperative
823	Sutter	Aug. 17, 1911	2,801	Active
824	Sacramento	Sept. 15, 1911	463	Active
825	Kings	Oct. 9, 1911	16,589	Active
826	Kings	Dec. 12, 1911	3,549	Inoperative
827	Yolo	Jan. 4, 1912	1,225	Active
828	San Joaquin	Mar. 20, 1912	695	Active
829	Kings	April 10, 1912	25,468	Inoperative
830	Contra Costa	Mar. 11, 1911	3,557	Active
832	Butte and Sutter	April 8, 1911	17,400	Active
833	Butte	April 8, 1911	38,027	Active
900	Yolo	June 16, 1913	10,811	Active
999	Yolo and Solano	May 22, 1913	26,136	Active
1000	Sacramento and Sutter	April 8, 1911	55,129	Active
1001	Sutter	April 8, 1911	31,192	Active
1002	Sacramento	May 7, 1912	6,860	Active
1003	Fresno	May 9, 1912	1,615	Active
1004	Colusa	July 12, 1919	23,282	Active
1005	Colusa	Oct. 31, 1912	587	Active
1006	Stanislaus	Dec. 6, 1912	4,271	Inoperative
1007	San Joaquin	Mar. 12, 1913	6,039	Active
1008	Lassen	Mar. 12, 1913	1,253	Inoperative
1009	Yolo	Mar. 22, 1913	442	Active
1010	Kern	Mar. 22, 1913	1,763	Inoperative
1011	San Luis Obispo	July 21, 1913	913	Inoperative
1012	San Mateo	Aug. 6, 1913	385	Inoperative
1400	Sacramento	June 13, 1913	469	Inoperative
1500	Sutter	April 30, 1913	67,850	Active
1600	Yolo	May 26, 1913	6,924	Active
1601	Sacramento	Jan. 12, 1914	3,630	Active
1602	Stanislaus	Jan. 21, 1914	1,494	Active
1603	Humboldt	Jan. 27, 1914	106	Inoperative
1604	Stanislaus	Feb. 11, 1914	3,960	Active
1605	Fresno	Mar. 13, 1914	19,033	Active
1606	Fresno	May 9, 1914	18,750	Active
1607	Solano	May 28, 1914	2,361	Active
1608	San Joaquin	July 13, 1914	990	Active
1609	Sacramento	July 29, 1914	1,886	Active
1610	Modoc	Aug. 13, 1914	40	Inoperative
1611	Modoc	Aug. 22, 1914	3,539	Inoperative
1612	Modoc	Aug. 24, 1914	4,760	Inoperative
1613	Modoc	Oct. 29, 1914	4,560	Inoperative
1614	San Joaquin	Oct. 14, 1915	1,773	Active
1615	Kings	Jan. 18, 1915	819	Active
1616	Kings	July 9, 1914	1,920	Inoperative
1617	Kings	Aug. 3, 1914	1,920	Inoperative
1618	Kings	Aug. 7, 1914	14,532	Active
1619	Contra Costa	Feb. 16, 1915	3,404	Active
1620	Kings	Feb. 17, 1915	8,960	Inoperative
1660	Sutter	June 1, 1915	15,704	Active
1661	Solano	Dec. 6, 1915	875	Active
1662	Kings	Feb. 8, 1916	7,186	Active
1663	Santa Clara	Aug. 7, 1916	1,125	Active
1664	Madera and Merced	Aug. 14, 1916	88,633	Active
1665	Monterey	Sept. 8, 1916	4,705	Active
1666	Lassen	Oct. 31, 1916	480	Inoperative
1667	Solano	Jan. 2, 1917	2,478	Active
1668	Lassen	Jan. 9, 1917	512	Inoperative
2020	Sacramento and San Joaquin	May 26, 1917	1,728	Active
2021	San Joaquin	Oct. 2, 1917	1,237	Active
2022	Sacramento	Oct. 22, 1917	467	Active
2023	San Joaquin	Mar. 13, 1918	3,843	Active
2024	Contra Costa	April 15, 1918	3,749	Active
2025	Contra Costa	April 15, 1918	4,294	Active
2026	Contra Costa	April 15, 1918	5,523	Active
2027	San Joaquin	Mar. 21, 1918	5,438	Active
2028	San Joaquin	Mar. 21, 1918	5,625	Active
2029	San Joaquin	Mar. 21, 1918	3,708	Active
2030	San Joaquin	Mar. 21, 1918	6,142	Active
2031	Stanislaus	July 22, 1919	5,030	Active
2032	Solano	Mar. 3, 1919	1,428	Active
2033	San Joaquin	April 7, 1919	4,728	Active
2034	Solano	April 7, 1919	1,523	Active
2035	Contra Costa	April 8, 1919	20,805	Active
2036	Contra Costa	May 5, 1919	2,464	Active
2037	San Joaquin	May 6, 1919	6,836	Active

Number	County	Date of petition or formation	Acreage	Status
2038	San Joaquin	May 6, 1919	5,739	Active
2039	San Joaquin	May 6, 1919	6,288	Active
2040	San Joaquin	July 9, 1919	7,313	Active
2041	San Joaquin	June 3, 1919	1,260	Active
2042	San Joaquin	June 3, 1919	3,055	Active
2043	Solano	Aug. 4, 1919	433	Active
2044	San Joaquin	Aug. 5, 1919	3,260	Active
2045	Modoc	Aug. 15, 1919	396	Inoperative
2046	Modoc	Nov. 28, 1919	320	Inoperative
2047	Colusa and Glenn	Dec. 16, 1919	230,185	Active
2048	Kings	June 5, 1920	4,295	Active
2049	Santa Cruz	Feb. 2, 1920	318	Active
2050	Santa Cruz	April 23, 1918	396	Active
2051	Merced	Dec. 6, 1920	43,128	Active
2052	Alameda	Jan. 26, 1921	977	Inoperative
2053	Merced and Fresno	Mar. 7, 1921	103,790	Active
2054	Sutter and Butte	May 3, 1921	12,911	Active
2055	Kern	May 3, 1921	85,892	Active
2056	Sutter and Butte	Aug. 2, 1921	9,120	Active
2057	Modoc	Nov. 3, 1921	1,360	Inoperative
2058	San Joaquin	Nov. 7, 1921	8,500	Active
2059	Contra Costa	Nov. 21, 1921	2,159	Active
2060	Solano	Jan. 3, 1922	7,396	Active
2061	Sonoma	May 8, 1922	2,929	Active
2062	San Joaquin	July 3, 1922	4,709	Active
2063	Stanislaus	Aug. 15, 1922	1,752	Active
2064	San Joaquin	April 3, 1923	5,075	Active
2065	Contra Costa	April 2, 1923	1,363	Active
2066	Sutter	Feb. 4, 1924	607	Active
2067	Sacramento	Mar. 24, 1924	7,262	Active
2068	Solano	April 7, 1924	13,640	Active
2069	Kings	Nov. 21, 1924	2,449	Active
2070	Lake	Feb. 16, 1925	846	Active
2071	Kings	April 7, 1925	5,221	Active
2072	San Joaquin	July 30, 1926	2,245	Active
2073	Tehama	Dec. 28, 1926	2,012	Active
2074	San Joaquin	Mar. 3, 1927	1,798	Active
2075	San Joaquin	Mar. 23, 1927	5,930	Active
2076	Yolo	April 11, 1928	22,023	Active
2077	Sacramento	June 12, 1929	1,540	Active

By counties* formation has taken place as follows:

County	Number of districts Formed	Active
Alameda	2	--
Butte	4	2
Colusa	28	6
Contra Costa	36	13
Fresno	39	9
Glenn	2	--
Humboldt	17	--
Inyo	3	--
Kern	16	1
Kings	43	30
Lake	7	1
Lassen	57	--
Madera	20	1
Marin	10	--
Mendocino	3	--
Merced	95	1
Modoc	62	--
Monterey	1	1
Napa	3	--
Plumas	66	--
Sacramento	84	33
San Diego	2	--
San Joaquin	74	33
San Luis Obispo	1	--
San Mateo	6	--
Santa Barbara	1	--
Santa Clara	2	1
Santa Cruz	2	2
Shasta	9	--
Sierra	1	--
Siskiyou	4	--
Solano	50	10

County	Number of districts Formed	Active
Sonoma	9	1
Stanislaus	24	3
Sutter	26	12
Tehama	7	1
Trinity	1	--
Tulare	73	--
Yolo	38	18
Yuba	3	3
Totals	931	182

* Where a district lies in two or more counties, county embracing greater area listed.

Numerical designation.

From the foregoing, it will be noted that the highest numbered and most recently formed reclamation district, i.e., No. 2077, is by no means an indication of the total number of such districts hitherto organized in this State. A perusal of the organization list will show duplications, as well as omissions, in numbers.

A list of duplications follows:

4 districts numbered 1
2 districts numbered 2
2 districts numbered 5
2 districts numbered 10
2 districts numbered 50
2 districts numbered 139
2 districts numbered 343
2 districts numbered 404
2 districts numbered 472
2 districts numbered 556
2 districts numbered 729
2 districts numbered 764
2 districts numbered 800
} Accounting for 15 districts not indicated by consecutive numbers.

Numbers omitted prior to 1894 may undoubtedly be accounted for by their reservation for districts which had filed organization petitions and which for some reason did not complete organization. Numbers omitted from this cause follow:

Nos. 29 to 37, inclusive, 43, 55, 56, 60, 62, 64, 65, 66, 395.
} Accounting for 18 missing numbers.

Other missing numbers follow:

No. 576—Voided,
No. 774—Act of creation failed to pass,
No. 797—Assigned to Legislature—never used,
No. 831—Act of creation repealed;

thus accounting for four missing numbers.

The Legislature arbitrarily assigned Nos. 830, 832, 833, 900, 999, 1000 and 1001; consequently the Register omitted certain numbers and resumed numbering with No. 1002. Again the Legislature assigned Nos. 1500, 1600 and 1660. Numbers thus omitted follow:

Nos. 834 to 899, inclusive
Nos. 901 to 998, inclusive
Nos. 1013 to 1399, inclusive
Nos. 1401 to 1499, inclusive
Nos. 1501 to 1599, inclusive
Nos. 1621 to 1659, inclusive
Nos. 1669 to 2019, inclusive
} Accounting for 1139 missing numbers.

The total of missing numbers is 1161.

Summary

Last number issued by register	2,077
Plus duplications	15
	2,092
Less omissions	1,161
Total districts organized	931
Less active districts	182
Inoperative districts	749

The active list of reclamation districts in reality accounts for much of the area originally embraced within the boundaries of the inoperative reclamation districts through consolidations and inclusions. Under the provisions of section 3489 of the Political Code, originally enacted in 1873, consolidations were effected, and the consolidated district became known by the number of the district containing the greatest area of land. Special acts of creation by the Legislature usually provided for the dissolution of all other districts lying wholly or partially within the designated boundaries. Inoperative districts now included within the boundaries of active reclamation districts are shown in the table following:

Consolidations and inclusions within boundaries of present active districts:

Recl. Dist. No.	*Consolidations and inclusions*
1	Portion of original No. 1
3	366–370–371–431–438–439–440–441
70	763
108	92–94–467–729
150	177
307	147
317	Portion of 148
341	54–252
348	Portions of 5 and 337
364	175
403	163
404	446
407	Consolidation of 8 and portion of 148
479	67–467
501	41
524	Consolidation of 110–209–302, includes portions 109–223
532	4
535	Portion of 287
536	7–291–308
544	Portions of 109 and 223
548	46–58–169–210
551	205–257–362–367
556	8
563	386
673	203
684	659, portions of 109 and 223
685	808
739	Portion of 1615
744	Portion of 254
745	Portion of 254
746	418
749	Consolidated with 757
753	Consolidated with 706
756	22–66
759	Portion of 750
761	Consolidated with 1620, portion of 748
765	Portion of 472
773	Portion of 282
780	Consolidated with 814
785	Consolidated with 778 and 782
799	Portions of 99–103–161–165
800	Portions of 99–161–107
811	Portions of 539
813	433, portion of 254
825	Portion of 826
827	762
830	164
833	Portion of 521
900	Consolidated with 742, portion of 539

Recl. Dist. No.	*Consolidations and inclusions*
999	Portions of 146 and 472
1000	Portion of original No. 1 and 791, consolidated with 1100
1001	Portion of original No. 1, all 818, portion of 791
1004	Portions of 68–87–115–225–253
1500	69–792–793–796–804–810
1601	117–559
1607	313
1608	162–221
1609	Portion of 71
1614	561
1615	739
1618	Consolidation of 743–1616–1617
1619	Portions of 102–107–183
1660	Portions of 792
1662	764, portion of 692
1667	217
2022	Portion of 254
2023	Portion of 57
2025	Portion of 107
2026	Portions of Contra Costa 2 and 160
2027	130
2028	53
2029	83–189–190
2030	319 and portions of 109–223
2031	663
2033	72 and portion of 169
2037	Portions of 60 and 221
2038	Portions of 109 and 223
2039	Portions of 109 and 223
2040	282
2042	Portions of 61–63–691
2044	691
2047	77–91–124–275–335–336–390–447–491–522–857
2054	Portion of 831
2056	Portion of 831
2059	Portions of Contra Costa 2 and 160
2060	84–218
2065	107
2067	74–76–129 and portion of 148
2072	Portion of 53

Appendix D – Attempted Vested Rights Claim for Russ Ranch & Timber

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET • SUITE 200
EUREKA, CA 95501-1865
VOICE (707) 445-7833
FACSIMILE (707) 445-7877

December 7, 2010

Charles Holthaus, RPF #2727
Western Timber Services, Inc.
P.O. Box 1136
Arcata, CA 95518

The Law Offices of Thomas M. Herman
P.O. Box 395
Fortuna, CA 95540

SUBJECT: Review of Vested Rights Claim (VRC) Application No. 1-10-038-VRC for Russ Ranch & Timber Co., LLC

Dear Mr. Holthaus & Mr. Herman:

We have reviewed the claim of vested rights you submitted on November 30, 2010 on behalf of your client, Russ Ranch & Timber Co., LLC. As submitted, the claim is incomplete. The additional information that is needed to complete the claim is described below.

Section 30608 of the Coastal Act exempts from coastal development permit requirements any development for which a "vested right" had been acquired: "*No person who has obtained a vested right in a development prior to the effective date of this division or who has obtained a permit from the California Coastal Zone Conservation Commission pursuant to the California Coastal Zone Conservation Act of 1972…shall be required to secure approval for the development pursuant to this division. However, that no substantial change may be made in any such development without prior approval having been obtained under this division*."

To complete the claim of vested rights, the following information is needed:

1. <u>Specific Description of Development Claimed to be Exempt</u>

Item 3 of the claim form requests that you describe the development claimed to be exempt, including all incidental improvements, and identify its location. The item also requires that you attach a site plan, development plan, grading plan, and construction or architectural plans. Your response to item #3 states in part that "The construction, repair, maintenance, operation and management of all land reclamation appurtenances under current and historic ownership by the Russ family in the portions of Sections 4, 5, 6 and 7 and T2N, R2W, HBM and the portions of Sections 20, 21, 28, 29, 30, 31, 32 and 33, T3N, R2W, HBM that lie within the Coastal Commission jurisdictional boundaries shall be included in this claim of vested rights exemption…" Your response further states that the excavation of +-600 feet in lower Russ Creek that transpired in 2010 and is subject of Violation File Number V-1-10-014 (Russ) was a routine maintenance operation that is necessary for the continued operation of the surrounding agricultural lands in their reclaimed state. The intent of this claim of vested rights is to continue the ongoing 134 old agriculture operations and management of these reclaimed lands…"

Please describe in detail the specific development activities (e.g., "routine maintenance operations") that are claimed to be exempt from coastal development permit requirements under this vested rights claim. As the "Preliminary Reclamation Structure Map" submitted with the claim shows various drainage ditches, levees, tide gates, crossings and other features, describe in detail the specific development (e.g., maintenance) activities for each specific feature claimed to be vested (e.g., volume of material to be dredged from drainage ditches and placed on berms, frequency of dredging, etc.). Furthermore, describe the methods that have been used to perform each of the activities claimed to be vested and the dates that each activity was commenced and completed. Finally, provide a written description, including substantiating evidence and supplemented with exhibits where necessary, of how the operation that is claimed to be vested has changed from year to year since operations have commenced. In particular, you must demonstrate that the scope of activities claimed to be exempt were within the scope of pre-existing authorizations as of February of 1973, the date when coastal development permit requirements became effective at this location.

2. Clarification on Your Client's Authority to Conduct Vested Development Activities

Your response to item #3 of the claim form states in part that "Initial reclamation developments on these properties began in the late 1880's as permitted by the creation of Reclamation Districts #461 and #487 as recorded and numbered by the register of the State Land Office on May 24, 1884 and June 18, 1886 respectively (Section 3483 of the Political Code). Since the inception of these reclamation districts, the Russ family has assumed the responsibility of all land reclamation activities on these properties…" Please explain the authority of your client to conduct the activities associated with the vested rights claim on behalf of the named reclamation districts.

3. Transcripts of Appendices A and B of the Claim Submittal

Your vested rights claim submittal included two appendices containing documentation apparently relating to the two named reclamation districts. However, the submitted documents are virtually indecipherable due to poor copy quality and the hand-written nature of the documents. Therefore, please provide a typed transcript of these documents so we can understand their contents and relevance to the vested rights claim.

4. Governmental Approvals

Item #5 of the claim form requests a list of all governmental approvals which have been obtained and the date of each final approvals. Your response states that "All prior developments on these properties were permitted under the 1850 Swamp and Overflowed Lands Act and more formally documented and permitted as Reclamation Districts #461 and #487 as recorded and numbered by the register of the State Land Office on May 24, 1884 and June 18, 1886 respectively (Section 3483 of the Political Code)." Item #6 of the claim form requests a list of any governmental approvals which have not yet been obtained, and their anticipated dates of approvals. Your response states that "…Maintenance, repair and or replacement of existing structures and appurtenances will be necessary and is anticipated in the future. The need to obtain permits for any of these future maintenance activities will be dependant on the outcome of this vested rights determination."

The information and materials submitted with the claim do not appear to address the question of whether the activities claimed to be exempted were conducted in accordance with all applicable governmental approvals or permits. If it is your position that certain approvals, including local, state, and federal approvals were not previously necessary, please submit a statement from the

applicable government agency which supports that position. We understand, for example, that Department of Fish and Game approvals may be necessary for some of the drainage maintenance activities presumably proposed under this vested rights claim. Is this correct? Please specify what federal, state, and local agency approvals were required for each element of the project as of February of 1973, the date when coastal development permit requirements became effective at this location. Please submit evidence that any such required approvals had been obtained and that any subsequently required approvals had been obtained. Include copies of all governmental approvals that have been granted for the project and, as requested in item #7 of the claim form, any conditions attached to those approvals and evidence of the date those conditions were satisfied.

5. <u>Information Related to the Nature & Extent of the Work in Progress or Completed</u>

Item #8 of the claim form requests various pieces of information related to the nature and extent of the work in progress or completed. Your response does not provide the requested information, although your response notes that some of the requested information is unknown. Please submit the information requested in item #8 that is available.

6. <u>Description of Future Work</u>

Item #9 of the claim form requests a description of those portions of development remaining to be constructed. Your response states that "No portions of development remain to be constructed. Maintenance of existing structures will be necessary to preserve the integrity of the existing land reclamation activities." As discussed above in #1, please provide a detailed description of the specific development activities that are claimed to be exempt from coastal development permit requirements under this vested rights claim.

7. <u>Additional Information on Item Nos. 11-13</u>

Item #11 requests the expected total cost of the development, and item #12 asks if the development is planned as a series of phases or segments, and if so, to explain. Your response to both of these items states "No development is anticipated on these properties." Item #13 asks when it is anticipated that the total development would be completed. Your response states "All development was completed prior to January 1, 1972." If your client is claiming a vested right in "maintenance of existing structures" on the subject property, please revise your answers to these questions to address any necessary future work as described in #6 above.

The above information is needed to complete your application. The application must be completed before we can schedule your claim of vested rights for a hearing before the Commission. If you have any questions or concerns, please contact me at 707/445-7833.

Sincerely,

Melissa B. Kraemer
Coastal Planner

Cc: Russ Ranch & Timber Co., LLC, applicant
Nancy Cave, Northern California Supervisor of Enforcement, CCC

Appendix E – Draft Memorandum of Understanding

Memorandum of Understanding

A Cooperative Approach to the Enhancement of Habitat and Agricultural Productivity in the Centerville Slough-Lower Salt River Complex

I. Potential Parties to MOU

Entered into between:

Russ Ranch and Timber, L.L.C., P.O. Box 1437, Ferndale, CA 95536 - (707) 786-4895

Lane & Lisa Russ (address and telephone number)

Renee Jackson (address and telephone number)

Kathy Christiansen (address and telephone number)

Joe & Karen Russ (address and telephone number)

Jay Russ (address and telephone number)

Jack & Linda Russ (address and telephone number)

The O' Rourke Foundation, 229 Trident Lane, Ferndale, CA 95536 - (707) 786-9236

Don Hindley (address and telephone number)

Fern Cottage (address and telephone number)

The Wildlands Conservancy, 37611 Oak Glen Road, Building 12, Oak Glen, CA 92399 – (661) 858-1115

Agencies?

Hereafter referred to as "Parties".

II. Involved Area

The "Involved Area" would be those portions of the Eel River Estuary shown in Exhibit A attached hereto, which have yet to be defined. For example,

A) The area on the south side of the estuary circumscribed by historic dikes constructed during the Reclamation era on TWC property, O'Rourke Foundation property, Fern Cottage property, and Russ family property; or
B) The project area as identified on TWC property and Russ Ranch and Timber property; or
C) ?

III. Problem Statement

A coordinated and comprehensive strategy to achieve cooperative land management regardless of ownership is fundamental to enhancement of habitat for wildlife and for ensuring the continued agricultural viability of the area in the context of drainage challenges, potential sea level rise or other factors. The Parties, a consortium of private landowners and public entities, share the desire to promote habitat enhancement and protect and enhance agricultural resources.

IV. Background

The entire Eel River Estuary including the Involved Area was extensively altered over the last 150 years in order to expand agricultural production in the region. Nineteenth and early twentieth century reclamation efforts converted the Eel River Delta from salt marsh to productive pastures. Levees, tide gates, dikes, and berms were installed to reduce tide-water volume, to reclaim wetlands for agricultural conversion, and to better manage high water events.

Among the many bridges, tidegates and other control structures, the residents constructed a major tidegate on Cutoff Slough by the late nineteenth century. A more durable structure was built in 1916. This tidegate, known as the Cutoff Slough Tidegate, or sometimes as the "Occidental Tidegate," had deteriorated considerably by the mid-20th century, and was replaced by a consortium of adjacent property owners in 1979.

Exacerbating drainage challenges, the tributaries to the Centerville Slough complex and Salt River contribute large quantities of sediment. Historically this sediment load was effectively managed to maximize the agricultural potential of the area. This management entailed establishment of "cells" ranging from 20-40 acres in size by constructing small levees of 1-2' in height, and then directing Russ Creek flow into the cell, where sediment could settle. This practice continued until transfer of the property to TWC in 2008.

The direct manipulation of the alluvial fan of Russ Creek had three major effects. First, Russ Creek was entirely altered from its historic configuration. Second, Centerville Slough, once the primary extension of the Salt River was, apart from a short stretch, entirely filled. The Centerville Slough channel, once navigable and equal in size to the Salt River ceased to exist. Drainage patterns were significantly altered through the removal of basic hydraulic processes such as tidal exchange.

Certain parcels south and east of the Eel River Estuary Preserve (EREP) that did not benefit from the historic pasture raising approach are now at a lower elevation than the EREP. This configuration poses a challenge for routing the flows of Russ Creek, Shaw Creek and Creamery Ditch north towards the Eel. Parcels to the south of the Project area facing this challenge now find this trouble compounded by more frequent wave overwash from the sand dunes, continued infilling of key drainage components such as the Western Drainage Ditch (WDD), levee deterioration and sea level rise. In an increasingly challenging environment, those parcels appear to be dependent on flow from Russ Creek, Shaw Creek and Creamery Ditch being directed through the EREP. Traditionally, this has been accomplished via routine maintenance of WDD.

V. Purpose

This MOU is intended to contribute to the privately led but mutually beneficial management of the Involved Area for the purposes of habitat enhancement and the protection and enhancement of agricultural productivity by promoting cooperation among private landowners and public entities on habitat enhancement and agricultural improvement projects.

VI. Mission, Goals, and Objectives of the Parties

Mission

The mission of the Parties is to enhance habitat and improve agricultural productivity in the Involved Area.

Goal

Collectively manage drainage and water movement on private land properties identified as the Involved Area to provide benefits to fish and wildlife and improve agricultural productivity.

To achieve the mission and goal, the Parties will:

- Improve coordination of existing agency programs and private sector activities across jurisdictions to improve the timeliness and cost-effectiveness of enhancement efforts.
- Facilitate cooperation and coordination, and communication among state, federal and local agencies, researchers, restoration contractors, landowners and other interested stakeholders on enhancement programs and projects.
- Expedite implementation of on-the-ground projects by identifying and addressing institutional barriers.
- Seek additional funding sources for enhancement projects within the geographic scope of the Involved Area and administer a strategic funding program to further the mission once funding is secured.

Objectives

1. Establish a resource to coordinate and manage communication and other activities to balance natural resource and agricultural benefits.
    - Work together to determine the best cooperative management structure to facilitate collaborative management of drainage structures and flow patterns.
    - Form a team comprised of landowners and key agency staff, to plan, develop, and review drainage improvements within the Area.
    - Establish dates and times for regular meetings and sharing of information throughout the year.
    - Gain a common understanding of responsibilities and cooperative management of the Cutoff Slough tide gate and associated Dikes.
    - Provide specificity to existing drainage agreements that would promote better common understanding of roles and responsibilities for land management.

2. Gain a common understanding of existing drainage patterns, landowner and drainage constraints and issues in the south Eel River estuary.
    - Identify how this will be accomplished. What are the data needs? Who will collect data and how will it be shared? Who will compile and synthesize data as it becomes available?

3. Develop a plan for how to manage and/or prevent potential saltwater intrusion onto agricultural grazing lands.

4. Develop the basic concepts of a drainage management plan for the Involved Area in preparation for implementation of project elements on TWC lands and also those that may occur on adjacent properties.
    - Develop a coordinated adaptive management plan based on data and information collected that relies on and identifies specific conditions for areas where drainage can be collectively managed.

5. Develop a coordinated adaptive management plan based on data and information collected that relies on and identifies specific conditions whereby drainage can be collectively managed.

6. Gain a common understanding of existing fish, wildlife and agricultural values of the properties.
    - Work with fish and wildlife biologists and agricultural productivity expertise and landowners to assemble available information, identify critical data gaps and determine how best to obtain information.

7. Develop a short and long term monitoring plan that facilitates measurement of flood up and post–flooding drainage patterns across ownerships for the long term. Use this plan to guide adaptive management of drainage infrastructure. This plan would also need to consider existing and changing fish, wildlife and agricultural values.

8. Allow for new projects to integrate well with the existing landscape and infrastructure such that new efforts are complimentary and can improve the existing condition for fish, wildlife, and agriculture.

9. Work cooperatively to find agency programs that have private landowner incentives to best fit landowner objectives while benefitting natural resources such as Safe Harbor Agreements or other mechanisms.
    - Work with agencies to apply for these programs as applicable.

10. Continue to work cooperatively to address concerns regarding public access to the TWC property and potential impacts of public access to agricultural management on adjacent landowner properties.

11. Work with agencies and other partners to assess and understand the Russ Creek watershed and how it functions currently. Identify funding sources to help with further study of Russ Creek to help determine how best to improve and manage this system for fish, wildlife and agriculture into the future.

12. Work with agencies and other partners to assess, understand, and monitor the dynamics of dune formation and dune loss along the southern portions of the Eel River Estuary extending to the Wildcat Mountains. Work cooperatively to determine the feasibility of restoring dune formation processes in the area.

13. Seek state and federal permit coordination and efficiencies.

14. Coordinate funding mechanisms to achieve these objectives

15. . Facilitate plans to monitor and evaluate project effectiveness to ensure accountability.

VII. Management

The Parties will work to advance efforts that define this MOUs name, purpose, geographic scope, working groups, documentation of decisions and work products. All efforts will be consensus driven and every effort will be made to achieve full consensus on any potential project elements. It is recognized, however, that individual property owners are free to make land management decisions on their property independent of this MOU.

VIII. Support of Principal Signatories

All signatories will participate in the MOU to implement the actions described above and will undertake projects consistent with the above objectives. They will participate in the MOU to prepare and implement work plans. As part of the ongoing cooperative effort to coordinate activities that began before the development of this MOU, the signatories will undertake the following activities that are consistent with MOU goals and objectives and are within their abilities, funding and staffing constraints.

VIII. Other Provisions and Agreements

This agreement is intended to be in furtherance of mutual goals for protecting watershed and agricultural resources. This MOU is intended to embody general principles, and does not create contractual relationships, rights, obligations, duties or remedies between or among signatories. Any contractual relationship will be subject to a separate legally binding definitive agreement.

Agency actions are subject to statutory authority and regulatory requirements. Nothing in this MOU is intended to expand or limit the legal authority or responsibilities of any signatory agency, entity or organization.

Nothing in this MOU shall limit the participating agencies in carrying out their individual statutory responsibilities.

This MOU does not modify or supersede other existing agreements, programs, MOUs, plans, regulations or executive orders.

Nothing herein alters the existing authorities or responsibilities of any party nor shall be considered as obligating any party in the expenditure of funds or the future payment of money or providing services. The expressions of support by state and federal agencies under this MOU are subject to the requirements of the federal Anti-Deficiency Act and to the availability of appropriated funds. The parties acknowledge that this MOU does not require any agency to expend its appropriated funds unless and until an authorized officer of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

Consistent with federal law, nothing in this document constrains the discretion of the President or his or her successor from making whatever budgetary or legislative proposals he or his successors deem appropriate or desirable.

This MOU is not intended to, and does not, create any other right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, the State of California, any agencies thereof, any officers or employees thereof, or any other person.

X. Principal Signatory Agencies

Any party may withdraw from this MOU upon 30-days notice to the other parties. This MOU may be amended only upon the written prior approval of each signatory. Other entities may execute this MOU and thereby become a Party.

This agreement is executed as of the date of the last signature and is effective through December 31st, 2020, at which time it will expire unless extended.

Appendix F – Letter from Thomas Connick

THOMAS CONNICK

5404 Shallows Place West
Santa Rosa, California 95409
(707) 538-4245

April 25, 2013

Chairman Bosco,

As former owners of Connick Ranch, now the Eel River Estuary Preserve, my wife, Patty, and I support the State Coastal Conservancy's grant to The Wildlands Conservancy for drainage enhancements and public access improvements.

We have noted that the board voted to amend the staff recommendation to include a facilitated discussion with those who oppose a plan for public visitation to the property. Let me state during the Russ lease of the property under Connick ownership, the Russes allowed and tolerated public access across the property as witnessed during my numerous stays on the ranch. This included not only access to the sand dunes, but also the loading and unloading, of horses in the potato barn/corral area as a starting point for rides through the ranch, in the same general areas that Wildlands has proposed for their access to the north end of the property. Further Russ Lane is ungated not only to this ranch but to other properties as well. There is a gate at the end of the Russ Lane easement (the start of the what is now the Eel River Estuary Preserve) that has historically remained open and unlocked except during livestock operations. The White Dairy (Renee Jackson and Kathy Christiansen property) and Fern Cottage land abuts Russ Lane and this easement. I am unaware of any conflicts caused by "public access" to either livestock operation.

My wife and I would like the board to know that we made a deliberate decision to sell the ranch to The Wildlands Conservancy because of their demonstrated ability to manage agricultural uses with public access. This type of stewardship is what we are all striving for – enhancement of the environment while preserving agriculture. Both are beneficial while not being mutually exclusive. To put this concern about public access in perspective, we had ample opportunity to sell this property to other groups whose main objective was to then resell to a state or federal agency. These agencies do not have the resources, management or inclination to undertake the Wildlands projects. Managed public access was one of our many considerations and concerns. Uncontrolled public access was unacceptable.

This "concern about the impact to agriculture from public access" is overstated. The question that should be asked is who among those raising these concerns has taken the time to visit any of Wildlands other preserves? This is about controlled and supervised access not uncontrolled public access as is the case with Centerville Beach.

We agree with counsel Tom Becker. We believed then and still do, that when we sold the property the road easement grant deeds state for non-exclusive use and are therefore adequate to allow this type of "public access". This easement has functioned as an

unimpeded extension of Russ Lane for years. Russ Lane is a public road and fenced on both sides, and likewise the road easement portion from the pavement to the potato barn/corral area has always been fenced and separated from grazing operations and adjacent landowners. The "new" line fences between the White Dairy, the road easement and Eel River Estuary Preserve reflect this. The Russes, when lessee, were aware of Wildlands objectives and intent when the ranch was sold and had ample opportunity to raise objections and concerns at that time over public access, but did not. There now appears to be perhaps another agenda.

One of our goals in selling to TWC was to create a legacy for our family. Public access was a big part of that so that visitors might come and enjoy nature, and stroll along a spectacular stretch of California Coast.

TWC staff patrols the preserve during hours of visitation. They have already stopped illegal off-road vehicle trespass that had been eroding sensitive dune habitat and exposing the property to ocean intrusion for years prior to the sale.

Traditional agricultural uses will remain and be improved by the dollars that TWC is bringing to re-engineer and enhance existing drainage structures. These proposed improvements would be beneficial not only to this ranch, but also those properties the dikes, sloughs and floodgates currently protect.

It seems to us that everybody wins: agriculture, the public, and the shops, inns and storefronts of Ferndale. Economic diversity is good for everyone.

Thank you for your continued consideration and support of this worthy project.

Sincerely,

Tom Connick

Appendix G – Memos to NRCS/USFWS Requesting Technical Assistance on behalf of Russ Ranch & Timber

Memorandum

4 January 2016

To	Paula Golightly and Conor Shea, USFWS Jon Shultz and Robert Smith, NRCS		
From	Jeremy Svehla, Project Manager	Tel	707 443 8326
Subject	Eel River Estuary and Centerville Slough Enhancement Project Request for Technical and Cost Share Assistance	Job no.	84/10882/
Copy To	Darren Mierau, Caltrout Michael Bowen, State Coastal Conservancy Greg Kamman, Kamman Hydrology & Engineering		

Hello,

Thank you for your continued involvement and collaboration in the Eel River Estuary and Centerville Slough Enhancement Project (Project). As you're aware the Project has expanded in the last several months as depicted in the revised Notice or Preparation (NOP). During previous Project meetings we discussed various options for developing permit applications for the project. Jay and Lane Russ expressed a strong desire to combine project components on Russ and The Wildlands Conservancy (TWC) properties into a single project for permit applications with each agency, just like the combined single project is being analyzed under CEQA. For many reasons this approach makes sense, and would facilitate our coordination with regulatory agencies. This is excellent news, but it presents some logistical challenges for which we're seeking guidance from your agencies. In an attempt to define roles and responsibilities moving forward, we have summarized our understanding associated with two questions we're seeking responses to from USFWS/NRCS:

<u>Question 1</u> - Can USFWS/NRCS Provide Engineering Designs for the Russ Property project components depicted on the Revised NOP Project Graphic? Specifically and in the short-term, can USFWS/NRCS develop 65% design plans for the Russ project components by April 1, 2016?

Background - Based on our December 17, 2015 Project meeting, we understand NRCS can provide technical design assistance for Russ project components within and access to the Wetland Reserve Easement (WRE) parcel prior to the WRE being formally approved. This would include the replacement of the Shaw Creek crossing, berm and Centerville Slough improvements. We understand USFWS may be willing to provide design assistance on the remaining components including Russ Creek, floodplain swales, dune enhancements and Creamery Ditch. All of these project components would need to be combined into a single set of design plans reflecting the NOP Project. The 65% design plans should have adequate detail to convey the design intent and be appropriate for permit applications. 65% plans typically include construction notes, plan views, cross-sections, profiles, details, and typical drawings of the elements and generally comprised of the following:

1. Construction Preparation Sheets: Abbreviations, sheet index, construction phasing, water bypass, staging areas, haul routes, sensitive area exclusions/avoidance and general notes.

GHD Inc.
718 Third Street Eureka CA 95501 USA
T 1 707 443 8326 **F** 1 707 444 8330 **E** eureka@ghd.com **W** www.ghd.com

2. Civil Sheets: Clearing/grubbing/grading limits, habitat element location and typical details, culverts/tidegates, sediment reuse and/or off-haul volume, fencing

3. Revegetation/Erosion Control Sheets: Seed/Mulch/Revegetation areas/species and planting palette table with calculated proposed habitat types and upland/wetland conversion areas

Once the 65% design plans are submitted to the agencies, the project team can then decide if future Russ property design submittals (i.e. 95%, 100%) will remain on the same submittal schedule as the TWC property. This will be a function of regulatory agency feedback/requests, USFWS/NRCS available staff time, bidding and implementation funding.

GHD and KHE anticipate providing the hydrodynamic model, draft basis of design report and proposed 10% conceptual grading layout with habitat types and wetland/upland conversion to USFWS/NRCS by mid-January 2016.

Question 2 – Can USFWS/NRCS provide cost-share assistance to supplement existing project team budgets for expanding permit applications and supporting documents for the Russ property?

Background – The FRGP/SCC grants currently covers the consulting fees associated with developing permit applications and supporting documents for TWC components only. While many of the proposed Russ property components are similar to TWC components, some additional effort is anticipated to expand the permit coverage. The table below lists the permits and supporting documents with the requested additional consulting fee to include the Russ property components. We propose starting the permit applications in February 2016 and therefore are requesting Project partners initiate discussions soon regarding prospect funding. We want to avoid a delay in developing the permit applications which could otherwise adversely impact the overall project schedule.

Task 5 – Prepare Permit Applications & Supporting Documents		**Requested Additional Fee**
5.1	General Project Management	$1,460
5.2	Env/Design Team Meetings	$6,831
5.3	USACE Section 404	$2,066
5.4	NCRWQCB 401 Water Quality Certification	$1,446
5.5	CDFW Consistency Determination	$2,747
5.6	CDFG 1602 Agreement	$1,480
5.7	Coastal Commission Coastal Development Permit (CDP)	$6,600
5.8	Humboldt County Conditional Use Permit (CUP)	$1,270
5.9	Humboldt County Grading Permit and Flood Cert.	$0
5.10	State Lands Commission Lease Application	$1,162
5.11	Federal Biological Assessment (BA)	$5,768
5.12	Habitat Mitigation & Monitoring Plan (HMMP)	$3,234
5.13	Adaptive Management Plan (AMP)	$8,056
5.14	State Historic Preservation Office (SHPO) consultation	$918
5.15	Invasive plant removal and rare plant mitigation/monitoring plan	$0
5.16	Permit condition database	$0
	Task 5 Total Requested Additional Fee	**$43,038**

We are open to discussing the above reproach or discussing other arrangements to get this work completed and keep the project on schedule. We are seeking responses to the above questions by the next Project monthly meeting (Thursday January 14, 2016).

If you have any questions, please don't hesitate to contact me.

Regards,

Jeremy Svehla, PE
Project Manager

13 April 2016

To	Paula Golightly and Conor Shea, USFWS Jon Shultz and Robert Smith, NRCS
From	Darren Mierau, CalTrout
Subject	Eel River Estuary and Centerville Slough Enhancement Project Request for Assistance
Copy To	Jeremy Svehla, GHD Michael Bowen, State Coastal Conservancy Chris Ramsey, California Department of Fish & Wildlife Greg Kamman, Kamman Hydrology & Engineering Jay and Lane Russ

Thank you for your continued involvement and collaboration in the Eel River Estuary and Centerville Slough Enhancement Project (Project). As you are aware, the Project has expanded as depicted in the revised Notice or Preparation (NOP) and will be analyzed in the CEQA EIR. During previous Project meetings we discussed options for developing permit applications for the expanded project. Jay and Lane Russ expressed support for combining project components on RR&T and The Wildlands Conservancy (TWC) properties for permit applications with each agency, similar to our combined CEQA analyses. For many reasons this approach makes sense, and would facilitate our coordination with regulatory agencies. However, this approach presents some challenges for which we're seeking assistance from RR&T and from your agencies. In an attempt to define roles and responsibilities for upcoming project actions, GHD provided a memo dated January 5, 2016 requesting technical design support and cost share assistance for Russ property components, and inquired about funding availability for expanding the permit applications; neither of these efforts were scoped in the original CalTrout grant agreements. We would like to revisit these questions with you based on our current project schedule.

<u>Question 1</u> - On behalf of the Russ Property, we're inquiring if USFWS/NRCS can provide 65% design plans for Russ Property project components depicted on the Revised NOP Project Graphic by July 1, 2016?

Background - On March 9, 2016 we provided KHE's draft basis of hydraulic design report for your review and requested comments be returned by April 1, 2016. We understand comments are forthcoming from both agencies. KHE would like to incorporate your comments and finalize the report very soon. Based on previous discussions we understand NRCS can provide technical design assistance for Russ project components within and access to the Wetland Reserve Easement (WRE) parcel prior to the WRE being formally approved. This would include the replacement of the Shaw Creek crossing, berm and Centerville Slough improvements. We understand USFWS is willing to provide design assistance on the remaining components including Russ Creek, floodplain swales and Creamery Ditch. All of these project components would need to be combined into a single set of design plans reflecting the NOP Project. The 65% design plans should have adequate detail to convey the design intent and be appropriate for permit applications. 65% plans typically include construction notes, plan views, cross-sections, profiles, details, and typical drawings of the elements and generally comprised of the following:

1. Construction Preparation Sheets: Abbreviations, sheet index, construction phasing, water bypass, staging areas, haul routes, sensitive area exclusions/avoidance and general notes.

2. Civil Sheets: Clearing/grubbing/grading limits, habitat element location and typical details, culverts/tidegates, sediment reuse and/or off-haul volume, fencing

3. Revegetation/Erosion Control Sheets: Seed/Mulch/Revegetation areas/species and planting palette table with calculated proposed habitat types and upland/wetland conversion areas

Once the 65% design plans are submitted to the agencies, the project team can then decide if future Russ property design submittals (i.e. 95%, 100%) will remain on the same submittal schedule as the TWC property. This will be a function of regulatory agency feedback/requests, USFWS/NRCS available staff time, bidding and implementation funding.

<u>Question 2</u> – On behalf of the Russ Property, we're inquiring if USFWS/NRCS can provide cost-share assistance to supplement existing project budgets for expanding permit applications and supporting documents to include the RR&T property?

Background – The FRGP/SCC grants currently covers the consulting fees associated with developing permit applications and supporting documents for TWC components only. While many of the proposed RR&T property components are similar to TWC components, additional effort is anticipated to expand the coverage of the permit applications. The table below lists the permits and supporting documents with the requested additional consulting fee to include the Russ property components. At the January 2016 meeting we heard from both USFWS and NRCS that funding for this effort was likely not available in the short-term. We want to raise the question again in the event funding opportunities have become available and in an attempt to avoid a delay which could otherwise adversely impact the overall project schedule.

Task 5 – Prepare Permit Applications & Supporting Documents		**Requested Additional Fee**
5.1	General Project Management	$1,460
5.2	Env/Design Team Meetings	$6,831
5.3	USACE Section 404	$2,066
5.4	NCRWQCB 401 Water Quality Certification	$1,446
5.5	CDFW Consistency Determination	$2,747
5.6	CDFG 1602 Agreement	$1,480
5.7	Coastal Commission Coastal Development Permit (CDP)	$6,600
5.8	Humboldt County Conditional Use Permit (CUP)	$1,270
5.9	Humboldt County Grading Permit and Flood Cert.	$0
5.10	State Lands Commission Lease Application	$1,162
5.11	Federal Biological Assessment (BA)	$5,768
5.12	Habitat Mitigation & Monitoring Plan (HMMP)	$3,234
5.13	Adaptive Management Plan (AMP)	$8,056
5.14	State Historic Preservation Office (SHPO) consultation	$918
5.15	Invasive plant removal and rare plant mitigation/monitoring plan	$0
5.16	Permit condition database	$0
	Task 5 Total Requested Additional Fee	**$43,038**

We look forward to discussing the design and permitting tasks needed to get this work completed and keep the project on schedule. We will include this item in the next Project monthly meeting (Thursday April 14, 2016).

If you have any questions, please don't hesitate to contact me.

Regards,

Darren Mierau
North Coast Director
California Trout

Attachment B – Adaptive Management Plan

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The Wildlands Conservancy

Eel River Estuary Preserve Project Management Plan

December 2016

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1. Introduction

1.1 Purpose of this Report

Operations and maintenance, adaptive management, and mitigation monitoring are facets of work that will begin upon completion of the Eel River Estuary Project's core construction work. Some aspects of these activities are interrelated, nested, or dependent upon each other, yet they belong to fundamentally distinct categories of action. For this reason, they are presented as a single document composed of discrete sections: Water Levels Management, Habitat Mitigation and Monitoring, and the Adaptive Management Plan.

The Water Level Management Plan (WLMP) outlines the observations and operational activities that primarily determine the operating water levels within the Eel River Estuary Preserve. The Habitat Mitigation and Monitoring Program (HMMP) describes required mitigation measures and monitoring protocols to ensure that any habitat impacts or impacts to special status species are adequately mitigated. The specifics of the Habitat Mitigation and Monitoring Program will cover requirements of the Army Corps of Engineers (Section 404 Permits) and the Regional Water Quality Control Board (Section 401 Permit) for wetland dredge and fill, the Coastal Commission for impacts related to the Coastal Act, the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration- Fisheries for impacts to species under their jurisdictions. The construction documents and implementation plans for the Eel River Estuary Project are developed with professional standards of care and are expected to perform to achieve the project's main goals. Regardless, once construction is completed, field conditions may arise that threaten the performance of project features or would result in short comings of the project goals. The Adaptive Management Plan (AMP) has been developed to anticipate potential changes and prescribe pre-permitted interventions allowing The Wildlands Conservancy to take action as needed. Some issues may arise that go beyond the scope of the Adaptive Management Plan. These would need to be addressed through regular permitting procedures. This Adaptive Management Plan is not to be confused with the Adaptive Management section of the HMMP, while they are compatible, the Adaptive Management section in the HMMP only covers the mitigated habitats through the period the habitats achieve the defined success criteria. The Adaptive Management Plan covers areas beyond these mitigation habitats.

This suite of Plans, presented here as the EEL RIVER ESTUARY PRESERVE MANAGEMENT PLANS (EMP), will be submitted to the permitting resource agencies, for permitting of The Wildlands Conservancy portion of the project (and not the Russ Properties portion). The following flowchart depicts the EMP framework and is subject to renewal 10 years following permit issuance. The plan seeks to combine both complex regulatory requirements and relatively simple, directed tasks for field staff in one document. A successful plan must have legibility in the field, yet adequately demonstrate compliance with state and federal environmental regulations. It is desirable to achieve these together in order to prevent confusion in translation and ensure that regulatory agencies have the fullest understanding of how information is conveyed in the field. It is the expectation that this document achieves both.

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1.2 Scope and Limitations

Each section, a plan in its own right, is developed to cover specific aspects of managing the Eel River Estuary Preserve. Each plan is limited in scope to the specific aspect of management represented. While every attempt is made to be comprehensive in scope, every possible condition or need cannot be foreseen. Additionally, costs related to management cannot be foreseen.

1.3 Responsible Parties

The Wildlands Conservancy is the owner and manager of the EREP and will oversee implementation of the EMP.

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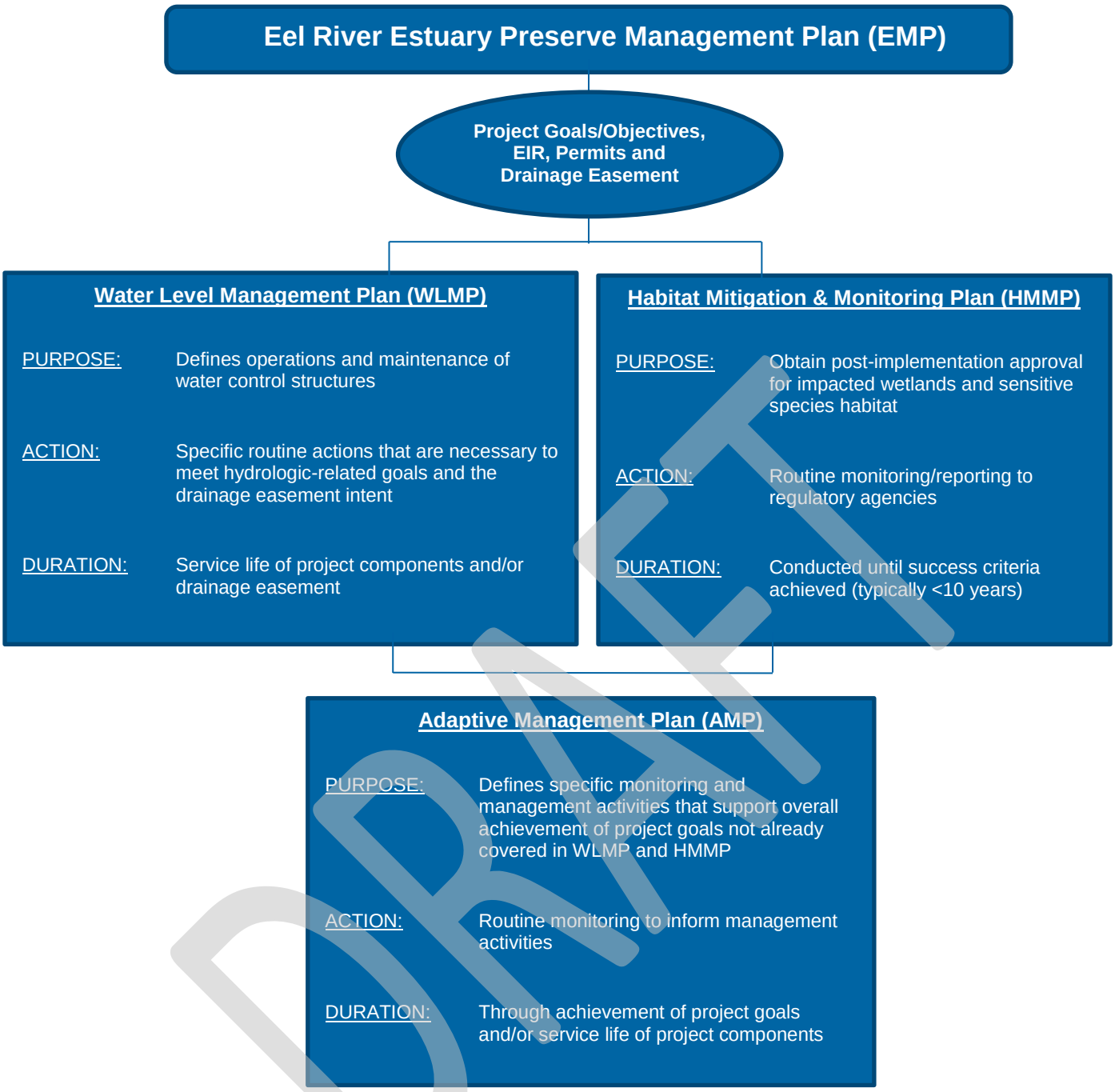
Figure 1-1: Primary Sections of the EMP



1.4 EREP Project Participants

The California Coastal Conservancy is the lead agency under the California Environmental Quality Act (CEQA). The California Coastal Conservancy and the California Department of Fish and Wildlife are the funders for project planning. Neighbors such as the Russ and the O'Rourke Foundation (ORF) Properties have been consulted through the design process. While the Russ property has been included in the

CEQA scoping and analysis process, the project components for which this EMP applies to are located on the EREP only and therefore TWC will oversee the implementation of this plan. Given some EREP project components may necessitate an amendment to the existing drainage easement, the WLMP provides a decision making framework for water level management inclusive of the Russ and ORF properties.

1.5 Drainage Easement

A formal drainage easement burdening the EREP with TWC and ORF as grantors and Russ properties as Grantees also influences land management options. A complex system of dikes, tidegates and drainage ditches enable multiple land managers to operate successful agricultural operations both on and upstream of the EREP, on what was historically tidal marsh. Since the area generally declines in elevation as one moves from south to north, drainage moves roughly northward across numerous properties, including through EREP. The mutual interdependence of landowners upon this infrastructure is formally expressed in a drainage easement. The drainage easement was recorded October 20, 2008, shortly after the purchase of the Connick Ranch by TWC. In general, this easement allows the grantees (various Russ property owners, collectively "Russ") to enter and perform certain drainage maintenance functions on the EREP and ORF property, to the extent that these are legally permissible. Key actions include removal of sand and sediment from the Western Drainage Ditch when it becomes clogged, and maintenance of the Cut-Off Slough tidegate and perimeter dike in order to facilitate drainage when conditions in the Eel River estuary permit and as environmental regulations allow.

The easement is restrictive and dictates maintenance conditions for a hydraulic system that is overwhelmed by the dynamic nature of the area. Sand and silt may be removed from the Western Drainage Ditch from time to time due to wave overwash or avulsion events, respectively, but sand must be placed to the west of the easement, and silt to the east. Grantees are not allowed to increase the width of the 5-10 foot wide ditch (once historic Centerville Slough) through the course of these maintenance activities. In effect, the easement preserves the ability to exercise a minimal level of emergency maintenance.

The Project components proposed on EREP are in part intended to improve aquatic habitat access while not impacting drainage on adjoining properties. Once finalization of the design and prior to construction, it is understood the drainage easement may be amended.

1.6 Regulatory Agency Review

This plan has been developed with input from multiple resource and regulatory agencies. Table 1-1 summarizes the permit approvals for this project.

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Table 1-1: Project Permits and Status

Law/Regulation	Permit/ Approval	Authority	Status	Expected Approval Date
CEQA	EIR	State Coastal Conservancy/ Lead Agency	Draft EIR presented for public comment 9/11/16	12/1/16
Clean Water Act	Section 404	USACE	Application Submitted	3/1/17
Clean Water Act	Section 401	RWQCB	Application Submitted	3/1/17
CDFG Code and CESA	Incidental Take Permit	CDFW	Application Submitted	3/1/17
Fish and Game Code 1600	Streambed Alteration Agreement	CDFW	Application Submitted	3/1/17
Coastal Act	CDP	California Coastal Commission	Application Submitted	3/1/17
Humboldt County Planning and Building Codes	Grading Permit and Flood Certificate	Humboldt County	Application Submitted	1/15/17
Public Resources Code and Government Code	Application for Lease of State Lands	California State Lands Commission	Application Submitted	3/1/17
Endangered Species Act	Biological Assessment	US Fish and Wildlife Service, NOAA Fisheries	Application Submitted	3/1/17

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2. EREP Project Description

2.1 Setting and Location

The EREP Project area is approximately 1,200-acres and is located approximately four miles west of the City of Ferndale, in Humboldt County, California (Figure 1). Figure 2 shows existing components within the Project area. The Project area includes the EREP owned by TWC. The Project area includes the following APN's: 10012105, 10013104, 10014201, 10013103, 10012104, 10012101, and 10014301.

The west side of the Project encompasses the near shore dunes of Centerville Beach and extends to the Pacific Ocean. East of the dunes the Project supports a system of sloughs and pastures that comprise a portion of the Salt River watershed, itself a tributary to the Eel River estuary. The north property line borders the Eel River. The southern half of the Project area includes two perennial, tributary streams: Russ Creek and a seasonal drainage referred to as Creamery Ditch.

Much of the Project area east of and including former Centerville Slough was reclaimed and has been converted to pasture for cattle grazing. Some of this land represents diked former tidelands separated from the estuarine wetlands by a series of dikes and the Cut-Off Slough tidegates. The project area along with three neighboring landholdings comprise an historic reclamation district that operated with a largely unified vision of managing tidal inundation, as well as the Eel River and Wildcat Hill stream floodwaters.[1]

EREP includes agricultural (grazing) land, tidal salt marsh, brackish marsh, riparian scrub, sloughs/open water channels, freshwater ponds and ditches, and nearshore dune ridges and swales. A partially developed upland area occupies the eastern portion of the Project, where vehicular access is gained from Russ Lane. Few structures occur on site, but there two barns within the upland area near Russ Lane (referred to as the Potato Barn and Quonset Hut); a third barn (North Barn) located between Cut-Off Slough and the near shore dunes, approximately midway between the north and south property lines of the EREP; and a fourth barn (South Barn) located in the southwest corner of the EREP. The North and South barns are connected by unimproved roads to the Potato Barn at the Project entrance. The Potato Barn includes a ranch office, and storage for agricultural equipment. Watering troughs and extensive fencing occur throughout the central and southern portion of the Project area.

The climate is Mediterranean with precipitation most abundant in the winter months. The average annual rainfall is approximately 48.5 inches. Approximately two thirds of the year, the area is influenced by coastal fog. Prominent water features within the Project area include Russ Creek, remnant Centerville Slough, Cut-Off Slough, and the Western Drainage Ditch (which in turn conveys the flow of Shaw Creek and Creamery Ditch), as well as smaller (seasonal) slough channels and drainage ditches. The northern end of the Project area borders the mouth of the Eel River. The Project area ranges in elevation from below sea level to an approximate elevation of 30 feet. Unless noted otherwise, all elevations presented in this Project description are referenced to North American Vertical Datum 1988 (NAVD-88).

[1] This delicate balancing of conflicting forces was achieved by storing floodwaters from the Wildcat Hills to the south behind a system of levees and tidegates, and then draining that stored water northward (primarily through the Cut-Off Slough tidegate) when low tide conditions in the Eel River estuary permitted. The proposed Project adheres to this approach. Therefore, ensuring that the proposed Project does not diminish the flood storage capacity within the system of dikes is a fundamental design criterion for the Project.

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Humboldt County General Plan Land Use designation for the Project area is Agriculture Exclusive (AE). Primary uses in AE designated lands include the production of food, fiber, plants, timber, timber agriculturally related uses, and agriculture related recreational uses. Zoning for the Project area is AE-60/W, F, R, T, which means parcel sizes with a minimum of 60 acres and combining zones of coastal wetlands, flood hazard areas, streams and riparian corridor protection, and transitional agricultural lands.

A formal drainage easement burdening the EREP with TWC and the Bertha Russ Lytel Foundation (now O'Rourke Foundation, or "ORF") as grantors also influences land management options in the Project area. Within the Project area, a complex system of dikes, tidegates and drainage ditches enable multiple land managers to operate successful agricultural operations on what was historically tidal marsh. Since the area generally declines in elevation as one moves from south to north, drainage moves roughly northward across numerous properties. The mutual inter-dependence of landowners in the Project area upon this infrastructure is formally expressed in a drainage easement. The drainage easement was recorded October 20, 2008, shortly after the purchase of the Connick Ranch by TWC. In general, this easement allows the grantees (various Russ property owners, collectively "Russ") to enter and perform certain drainage maintenance functions on the EREP and ORF property, to the extent that these are legally permissible. Key actions include removal of sand and sediment from the Western Drainage Ditch when it becomes clogged, and maintenance of the Cut-Off Slough tidegate and perimeter dike in order to facilitate drainage when conditions in the Eel River estuary permit and as environmental regulations allow.

The easement is restrictive and dictates maintenance conditions for a hydraulic system that is overwhelmed by the dynamic nature of the Project area, located as it is at the mouth of California's third largest river system. Sand and silt may be removed from the Western Drainage Ditch from time to time based on wave overwash or avulsion events, respectively, but sand must be placed to the west of the easement, and silt to the east. Grantees are not allowed to increase the width of the 5-10 foot wide ditch (once historic Centerville Slough) through the course of these maintenance activities. In effect, the easement preserves the ability to exercise a minimal level of emergency maintenance.

2.2 Existing Biological Conditions

The presence of listed species in this area requires production of a biological assessment (BA) and incidental take permit (ITP) application. The BA and ITP evaluate the effects of the proposed project on these species in consultation with the U.S. Fish & Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and California Department of Fish & Wildlife (CDFW), and to achieve compliance with State and Federal Endangered Species Act (CESA and ESA). The existing environmental baseline is described in detail in the BA and ITP Application.

2.3 Project Goals and Objectives

The overall goal of the Project is to improve geomorphic and ecosystem functions that would enhance habitat for native fisheries and aquatic species, support waterfowl and wildlife species, and benefit agricultural land management by more effectively managing onsite flooding and sedimentation.

Specific objectives of the Project include:

- Improve access to restored aquatic habitats for salmonids and other aquatic dependent species by increasing or creating migratory access between estuarine and inland waters and by restoring overwintering and rearing habitat for juvenile salmonids

- Improve drainage efficiency and manage sediment loads more effectively using both passive natural processes and active management approaches, while enhancing tidal influences by reestablishing connectivity of Russ Creek, Shaw Creek and Creamery Ditch to a rehabilitated Centerville Slough
- Increasing resiliency to sea level rise and reducing salt water influences to pastures, enhancing drainage and establishing avulsion management areas for Russ Creek and Shaw Creek
- Enhance tidal processes by restoring tidal prism and improve reliability of tidegate infrastructure to provide adaptability for sea level rise and varied land management
- Enhance dune formation to increase resiliency to sea level rise
- Enhance freshwater pond habitat for waterbirds and other native aquatic dependent species
- Facilitate access for continued passive and active agricultural land management, and nature study opportunities consistent with existing conditions
- Suppress invasive species
- Establish long-term Operations, Maintenance and Adaptive Management Program.

Each component has a pivotal role in the success and long-term benefit of the project. Restoration objectives, outlined below, have been established for each project component in an effort to achieve the overall project goals. The proposed project was developed in close coordination with the neighboring property owners, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), California Coastal Commission (CCC), and other Local/State/Federal regulatory agencies. In addition, the County of Humboldt, State Coastal Conservancy, landowners, and others have played an important role in assisting TWC develop the project. The longevity of this project depends upon the successful restoration of natural ecological processes and the frequency and nature of maintenance activities, but will be heavily influenced by uncontrollable natural events within this highly altered and geologically unstable watershed.

2.4 Project Overview

The proposed activities would enhance the Project area by transitioning it from a landscape of mostly diked pasture land to a system of pastures and natural habitats including estuarine and tidal slough channels, freshwater streams, freshwater waterfowl ponds, and agricultural pastures. Critical to achieving this are: an enhancement in tidal exchange to reactivate wetland functions within the Inner Marsh and Centerville Slough; establishment of active sediment management areas; dune enhancement; and the creation of setback berms.

New muted-tidegates would be designed and installed in existing levees to re-introduce tidal prism into the Inner Marsh and Centerville Slough, enabling tidewaters to re-occupy historic tidal slough channels that have persisted despite former reclamation efforts, floods and significant tectonic activity. This would enhance aquatic organism passage from the Eel River to Centerville Slough, Shaw Creek and Russ Creek, while improving drainage efficiency. Additionally, repairing the existing tidegate structure on Cut-Off Slough through modification of the existing gates would increase infrastructural reliability and drainage efficiency, and provide an opportunity to restore fish passage into Cut-Off Slough.

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Realignment and geomorphic restoration of Centerville Slough, Russ Creek and Shaw Creek is expected to support the introduction of overwintering juvenile salmonids, waterbird habitat and drainage from the landscape, and maintain an existing drainage easement. Improved drainage and habitat conditions would be established along Russ Creek.

It is acknowledged that the formal establishment of sediment management areas presumes future passive and active management, maintenance and long-term commitment to land management goals. This is particularly true in the absence of full historic tidal and floodplain functions, which historically maintained the area in equilibrium. Just as it was necessary and actively pursued prior to the development of the proposed Project, so, too, would such work be necessary in the future. The key difference is that the work would be geographically prescribed, permitted, and, presumably, more predictable and cost effective and consistent with long-term goals of naturally elevating low lying floodplain areas in advance of sea level rise. This effort is necessary to maintain agricultural viability, agricultural land management, capacity and uses, and ecological function, Similarly, management of the flattened (breached) dune regions would include actions to protect an existing drainage ditch and agricultural resources, agricultural land management, capacity and uses, while furthering science and projects relating to passive and active dune enhancement and climate change vulnerability. As a retreat strategy to reduce agricultural land vulnerability from sea level rise, the proposed placement of set-back berms would provide increased resiliency.

The longevity of Project benefits depends upon the successful restoration of some natural ecological processes and the frequency and nature of maintenance activities. As a result, this Project would include an Adaptive Management Plan (AMP) to provide a feedback mechanism for management responses based on scientific monitoring.

2.5 Project Components

The project proposed in the CEQA document includes the EREP owned by TWC and various parcels owned by Russ Ranch and Timber, L.L.C, and Jack and Linda Russ. A phased implementation is proposed over multiple years, generally progressing from the north to the south. As such, the first phase will include implementation of project components on EREP and therefore the following project description and permit applications have been developed for the EREP only. Regulatory approvals for the Russ property components will be subsequently obtained. While the approvals and implementation timeframe for the Russ components is less defined, the proposed project in the CEQA document demonstrated the project components could be implemented and mitigated for independently between the properties. Figure 3 illustrates the proposed EREP Project components that are described in further detail below. The projected habitats for the Project are described in the HMMP.

2.5.1 Retrofit Existing Cut-Off Slough Tidegates

The existing tidal control structure in Cut-Off Slough provides the only anthropogenic conduit of drainage from the Project area into the Eel River. The structure is equipped with six top-hinge tidegates that leak and limit aquatic organism passage to/from the Eel River. The dike system and original tidal control structures were built as part of the original filed 1884 Reclamation District. The dike is approximately two miles in length and includes the aforementioned tidegate. This system protects an estimated 2,000 acres of agricultural lands. The system was built and has been maintained collectively primarily by the following entities or individuals: 1) Fern Cottage, Inc., 2) Russ Ranch and Timber Co., LLC, 3) The L.D. O'Rourke Foundation , 4) L and K Russ; 5) Connick Ranch, and; 6) The Wildlands Conservancy. An existing

drainage easement, described above, provides surrounding landowners with a right of access over the EREP for the purposes of maintaining drainage for the EREP and surrounding properties, to the extent allowed by law. The WLMP section of this report includes the proposed operations of the tidegates and may result in the revision of the current drainage easement.

During summer months, the average water surface elevation on the landward side of the tidegates is approximately 2.5 feet (NAVD-88) and sustained by groundwater influences, occasional dune over-wash, and tidegate leakage. During winter months periods of prolonged inundation and flooding occur upstream of the tidegate as the backwater influence from the Eel River prevents the gates from opening during low tide cycles and for extended periods of time. The salt tolerant vegetative communities that have established along the banks of Cut-Off Slough upstream of the tidegate structure corroborate the brackish conditions from leakage and groundwater seepage. Overland drainage from adjoining properties is collected in Western Drainage Ditch and Cut-Off Slough and ultimately drains through the existing Cut-Off Slough tidegates.

Three iterations of the Cut-Off Slough tidegate have blocked tidal exchange into the Project area and facilitated overland drainage from the Project area since the late nineteenth century. The existing concrete Cut-Off Slough tidegate structure was constructed in 1977 on the landward side of the existing earthen dike immediately west of the former tidegate structure. The construction included excavating new connector sloughs, re-contouring the existing dike with the spoil material and demolishing/burying the former tidegate built circa 1916, which in turn replaced a structure built in the 1870s. Based on review of the current tidegate construction plans and current visual observations during low tides, the exterior wall upon which the gates are attached appears in good condition with no apparent distress or visual cracking, apart from the seaward side wingwalls, which are cracked, with a major crack on the western wall. The wingwall crack has no impact on the proposed gate modifications and continued failure of the wall does not impose a threat to the overall structure, though it could result in localized dike erosion. The wood gates appeared degraded and leakage between the weathered concrete and wood is apparent through each of the six gates.

The Cut-Off Slough tidegate structure would be repaired to serve its original purpose with modified gates that would improve fish passage without significantly altering water quality and water level relative to existing conditions. The project does not propose to increase hydraulic capacity at this structure, however proposed repairs there will likely improve gate efficiency. The Project proposes to improve aquatic passage, and not adversely impact existing hydraulic conditions upstream. Repaired tidegates and/or auxiliary fish passage doors inserted into the existing structure would allow for improved, but managed, tidal function and improved drainage efficiency in Cut-Off Slough and adjoining properties, while also providing fish passage and complying with state and federal law.

The repaired or replaced gates would be steel or aluminum, side- and/or top hinged designed to meet specific hydraulic performance and installed by a gate manufacturer to the existing concrete wall with a new thimble seal. To reduce costs and minimize abrupt hydraulic changes gates may be installed or replaced individually over several years. Continued water level and water quality monitoring outlined in the WLMP would help inform the timing of replacement. The wingwall cracking would be repaired and an approximate 3-foot tall concrete parapet wall would be added to the front wall of the structure to reduce flood overtopping to an elevation equal to the adjoining perimeter dike (approximately 15-feet, NAVD-88). Additionally, rock slope protection would be placed near the existing wingwalls and over areas exhibiting active erosion.

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2.5.2 Install New Muted Tidegates to Expand Tidal Prism in Inner Marsh and Centerville Slough

Referred to as the Inner Marsh, this area is surrounded on its northern, eastern, and southern boundaries by a dike of varying elevations. Natural dunes form the western boundary. The area is hydraulically connected with culverts to Centerville Slough and Cut-Off Slough on the landward side of the Cut-Off Slough tidegate. The perimeter dike provides a setting for expanding tidal wetland habitat without threatening adjacent land uses. To achieve this, tidal access would be modified to reintroduce tidal exchange at a muted level.

To increase and improve tidal wetland and salmonid rearing habitat, tidal exchange would be reintroduced to the Inner Marsh and reestablished Centerville Slough and allow for future tidal connectivity on the Russ properties as part of the subsequent phase described in the CEQA document proposed project. A new tidegate structure connecting the Inner Marsh to Cut-Off Slough would be installed through the existing dike immediately west (outboard) and separate from the existing Cut-Off Slough tidegate structure. This new tidegate will likely have multiple gates (three or four) including a muted tidegate regulator (MTR). Strategic design and sizing of these new tidegates would restrict tidal exchange to the Inner Marsh such that tidally-controlled water levels would not raise above 2.5 feet in elevation during the winter months and 5 feet during the summer months. The new tidegate structure would be approximately 75 feet long by 100 feet wide and 20 feet tall. The WLMP includes specific tidegate settings and seasonal operation guidelines to meet the desired hydraulic conditions for the area. The existing interior Inner Marsh dike would be raised to a minimum 8.0 feet elevation, widened in discrete areas and resurfaced with gravel to improve access reliability for operation and maintenance needs. Existing failed culverts that connect the Inner Marsh to Cut-Off Slough would be removed and the dike repaired in these locations. Additionally, a reestablished Centerville Slough would be realigned into the Inner Marsh to prevent tidal flooding into Cut-Off Slough and adjoining properties.

A significant constraint associated with introduction of the muted tide above the existing average groundwater surface elevation of 2.5 feet to the Inner Marsh and reestablished Centerville Slough is the loss of flood storage capacity of the surrounding and interconnected Project area. Avoiding diminished storage capacity is a design constraint for the Project. Any reduction of flood storage above an elevation of 2.5 feet would be ameliorated through excavation of an equivalent or greater volume of sediment above 2.5 feet elevation in the reestablished Centerville Slough and implementing a seasonal operation regime for the MTR. The seasonal operation approach would involve managing tidal exchange differently based primarily on precipitation patterns that influence Eel River and Russ Creek flows. During the summer dry season, when management of floodwaters is irrelevant, the MTR would allow for a tidal amplitude up to 5.0 feet elevation. During the winter wet season, and in advance of anticipated storm events, the MTR would be adjusted to reduce tidal inflow to a maximum of 2.5 feet elevation. This reduction in tidal inflow would retain the Inner Marsh and reestablished Centerville Slough capacity to provide freshwater storage from Russ Creek runoff similar to how it now functions. The combined balance of the excavation volume and/or seasonal operation flexibility is intended to result in no net loss of available freshwater runoff storage volume during winter months relative to existing conditions, while also improving the overall hydraulic function and drainage within the Project area.

The MTR would be seasonally operated based on biologic, geomorphic, hydrologic and land use objectives with routine monitoring to inform operational scenarios. The WLMP explains floodwater management strategies, and details the proposed operations of the proposed infrastructure.

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Existing culverts connecting the Inner Marsh with Cut-Off Slough and Centerville Slough would be retrofitted with flap gates to allow one-way flow into the Inner Marsh, equipped with seasonally operated gates, or be removed and any remaining holes within the berm would be repaired. This would maintain the existing level of variation in tide flow elevations between the Inner Marsh and Cut-Off Slough.

The existing network of sloughs and terminal ponds within the Inner Marsh would provide sub- and inter-tidal habitats. A number of new small terminal ponds, earthen weirs, side channels and wood structures would be integrated into the final design to improve upon and diversify the existing channel network complexity providing low energy perennial ponding areas that emulate desirable habitat structure for the tidewater goby and juvenile salmonids. The majority of the internal slough channels will be constructed to provide adequate water depths and conditions for expansion by native eelgrass, which currently occurs in low abundance in existing channels.

Because the existing marsh plain elevations within the Inner Marsh are relatively low (3 to 5-feet), a mosaic of mudflat, low-, mid- and high-marsh habitats are anticipated to develop once the muted tidal exchange is introduced. Subtidal habitats will be restricted to the slough channels. Elevations to accommodate upland ecotone habitat will be maintained around the perimeter of the restored marsh providing a gradual gradient from the marsh plain to the top of berm. Historically, tidal wetlands transitioned into upland zones over very broad areas. As development and agricultural practices reclaimed these areas, those transition zones were lost. Most of the tidal wetlands in the Eel River estuary abut levees and then abruptly transition to grazing lands. These unique marsh-associated transitional habitats are critical components of tidal wetlands.

Based on monitoring and modeling data, the Inner Marsh and Centerville Slough are anticipated to experience very low salinity through the rainy season, transitioning through brackish conditions and into high/marine salinities by early summer through late fall, mirroring the salinity signature and seasonal cycle of the Eel River estuary. A mix of salt and brackish marsh vegetation will naturally recruit and colonize the Inner Marsh based on seasonal inundation and salinity patterns, similar to the naturally recruited vegetation colonizing Cut-off Slough.

2.5.3 Re-establish Centerville Slough and Restore Connectivity to Russ and Shaw Creek

Historically, Centerville Slough extended from its confluence with the Salt River, through present day O'Rourke Foundation property, south from Cut-Off Slough, parallel to the dune network all the way to the community of Centerville at the base of the Wildcat Mountains. Tidegate installation and the associated reduction in the tidal prism, coupled with reclamation and actively directed Russ Creek avulsions, infilled much of this historically navigable slough. The Western Drainage Ditch and Cut-Off Slough are all that remains as remnant drainage features. The Western Drainage Ditch lies in the path of disturbed dunes and is vulnerable to continued dune over wash and sedimentation. Western Drainage Ditch collects dune over wash, Creamery Ditch flow, Shaw Creek flow, and unnamed creek flow originating from the Halley property. Russ Creek once flowed into the Centerville Slough system, and was then directed to Western Drainage Ditch, but now terminates with avulsion and overland sheet flows over existing pastures on the EREP.

Re-establish and Enhance Centerville Slough

In order to increase aquatic habitat and enhance the movement of water and fish/wildlife to the north and south, the Project proposes to restore Centerville Slough by excavating a channel along its historic

alignment. The south end of the proposed Centerville Slough alignment would reconnect to Shaw Creek in the existing Angels Camp area on the Russ property. The northern end would be re-aligned into the Inner Marsh immediately upstream of the existing bridge crossing and become disconnected from Cut-Off Slough. The connectivity with the Inner Marsh would allow for an increase in summer tidal amplitude within Centerville Slough without impacting the neighboring ORF property whose levees have deteriorated to fairly low elevations. A new water control structure and/or earthen berm at or near the existing bridge would prevent high tides during the dry season from entering Cut-Off Slough downstream of the existing bridge; however, during high winter flows from Russ Creek during the winter months, the water control structure or berm would allow overland freshwater flow to be conveyed downstream of the existing bridge occupying available storage in Cut-Off Slough and on adjoining properties similar to existing conditions. As part of the final hydraulic design process a determination for use of a berm or water control structure will be made and details presented on the final design plans. A water control structure would include a channel spanning gate/flashboard structure that would be opened and allow for hydraulic exchange during the wet season (max 2.5 foot tidal exchange) then closed during the dry season to prevent max 5.0 foot tidal exchange from entering the adjoining properties.

Approximately 3,000 feet of Western Drainage Ditch, from the southern dune breech northward, would remain as a remnant side channel to the reestablished Centerville Slough. It would then be reconnected to Centerville Slough on the northern end in an area that would be enhanced for ecological benefit and drainage efficiency. The reestablishment of Centerville Slough would reconnect Russ Creek and, provide conveyance for over wash on properties to the south. In general, Centerville Slough channel has been sized to enable the slough to serve as, conveyance, and brackish aquatic habitat sharing similar tidal amplitudes as the Inner Marsh.

Because Centerville Slough was located further east than the existing Western Drainage Ditch, it would be less susceptible to filling from dune over-wash sand. Material excavated from Centerville Slough would be reused on site to construct any new or refurbished berms or reused in within the Project area. The new slough channel would convey muted tides from the Inner Marsh as well as be the primary water course receiving and conveying runoff from Russ Creek, Shaw Creek and the Creamery Ditch. It would also improve the opportunity for fish passage to the tributary creeks.

Reconnect Russ Creek to Centerville Slough

A new channel would be graded that follows an historic Russ Creek alignment to re-establish connectivity with Centerville Slough. The re-established channel would improve site drainage, create in-channel flood storage, re-establish a long tidal to freshwater ecotone and provide a wetland prism that includes freshwater wetland and/or riparian habitat. In addition, the improved Russ Creek channel would provide habitat connectivity for anadromous fish.

Develop Primary Sediment Management Area (SMA) on Russ Creek

Over time, sediment inputs to Russ Creek will be reduced by implementing erosion control and sediment trapping practices in the upper watershed. However, to maintain unimpeded flows, sediment conveyance, and improved ecosystem function along the corridor, sediment management will be required.

To accommodate natural flood processes, a sediment management area (SMA) is proposed in an avulsion prone region near the confluence of Russ Creek and Centerville Slough. The SMA will be constructed to emulate a distributary channel network within an alluvial fan by separating existing or

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created floodplain and low-lying areas with low-relief berms. Large portions of the SMA will be subject to regular inundation, sedimentation and periodic rerouting of Russ Creek through natural fluvial processes. Accumulated sediment in the SMA could be reworked (leveled or tilled), seeded and irrigated as needed to enhance agricultural productivity in those areas.

In the event the SMA performance is not capable of eliminating undesirable sediment accumulation in Russ Creek and/or Centerville Slough, or if sediment accumulation poses an undesirable threat to property or project performance, excavation may be performed on a small scale within Russ Creek and/or Centerville Slough corridor (excavating specific areas of the channel and SMA). Larger-scale excavation/removal may be necessary as well as breaches in the proposed guide berm to provide additional sedimentation capacity. Routine vegetation maintenance within the SMA will occur during late summer or early fall months when Russ Creek flows are lowest to minimize potential erosion and sediment transport and to minimize impacts to salmonid and wildlife species. Vegetation removal methods are described in the project's AMP and options include controlled flash grazing, manual removal and mechanical removal.

2.5.4 Enhance Existing and Create New Aquatic Habitat

The lack of tidal connectivity across the Project area has led to infilling and reduced availability of brackish and freshwater ponds for waterfowl and overwintering fish habitat.

Salmonid and Tidewater Goby Habitat

The introduction of muted tidal exchange introduces the opportunity to recreate historic on- and off-channel ponds and the associated wetland habitats within the historic back-dune Centerville Slough channel system. Due to the relatively low amplitudes of restored tidal action, recreating brackish marsh will necessitate lowering (excavating) down into the proposed muted tidal range. Brackish marsh/ponds will likely be sighted in relatively low, off-channel lying areas and connected to created project slough channels by excavation of relatively small connector channels. New brackish water ponds for overwintering juvenile salmonids would also be created by deepening other existing depressions in the floodplain of Centerville Slough/Russ Creek. Alcoves, terminal ponds and large wood structures would be established to provide additional habitat benefit.

Waterbird Ponds

Existing depressions in the landscape currently serve as freshwater ponds that are managed for waterfowl. These existing freshwater ponds would be deepened and re-configured with controlled inlets/outlets to enhance their habitat value and minimize long term maintenance. Seasonal rainfall would be the primary means of filling the ponds, while existing wellheads would provide backup supply.

New gated culverts and/or earthen berms would be constructed to allow water in the ponds to drain into Centerville Slough and the unnamed remnant slough to the east of the property. Expansion of the ponds and rehabilitation of the source wells are not proposed.

2.5.5 Enhance Dunes

Threats to existing habitat and land uses include; disturbances of coastal dunes, saltwater intrusion, loss of estuary-inland water connectivity, sedimentation of watercourses, subsidence and natural conversion of agricultural pasture, and invasive species.

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Sea level rise alters groundwater composition and vegetation communities. As soils become increasingly saline and brackish, salt marsh vegetation would dominate. Periodic dune breaches exacerbate this effect. This is already being observed on the EREP and Russ properties portion of the Project in the historic alignment of Centerville Slough. While some areas within the Project area are targeted for tidal wetland increases, other areas would be preserved for agricultural pasture.

Natural sand dunes are generally self-maintaining; however, their form and dynamics are influenced by vegetation, sediment recruitment, storm/wave strength, geologic changes and other factors. Non-native invasive vegetation such as Ammophila arenaria (European beachgrass) alters dune mobility and shape. Both natural and anthropogenic influences can disturb dune formation. Dunes traditionally migrate, and possess various zones of recruitment that tends to protect the leeward side of the dune system. More recently, significant disturbance has occurred at two distinct locations within the Project area, a northern area approximately 15 acres and a central area approximately 3 acres. The disturbance and movement of this sand unconfined in any remaining dune network threatens the Western Drainage Ditch with infilling, a trend that threatens the safety and land use of the Project area and properties to the south, all of whom are parties to a formal drainage easement over the Project area. This movement has also facilitated breach and wave overwash events that have inundated hundreds of acres of pasture with salt water, impacting their agricultural utility and causing conversion to salt marsh.

Re-establish Dune Configuration

This Project seeks to implement passive and active techniques in dune management aimed at increasing resiliency to sea level rise while minimizing impacts to known habitat of the Western Snowy Plover. The bulk of Project effort associated with dune enhancement would be directed towards two overwash sites, referred to as the northern and central sites and as depicted on Figure 3. Specific actions that would be taken at the overwash sites are described below, and potentially elsewhere in the dune network, and were drawn from the *Eel River Plains Coastal Dunes Assessment* developed by Kamman Hydrology and Engineering (KHE 2015). In addition to the actions proposed below at each site, restriction of ORV through signage and fencing of the immediate enhancement area and implementation of a long-term monitoring and management program will be necessary. Over time, natural wave processes and storm actions may re-shape any alterations made. Further storm events would cause scarping, potentially further inland from the mean high water mark due to the absence of stabilizing vegetation. Therefore, the Adaptive Management Plan would include performance measures and actions that track changes with time and take suggest corrective action to prevent reversal to the original situation.

The proposed work at the northern and central sites would combine discrete enhancement actions with distinct actions intended to limit land use impacts and would promote trapping and retaining sand in a manner that rebuilds the dune in overwash areas to former and surrounding heights. This combined effort would enable the dunes in their existing location to rebuild and fortify over time. In addition, the integrity of the dunefield west of the EREP would gradually reconfigure to near-historic breadth and height through these actions taken in the Project. Relinquishing the need for drainage conveyance in the Western Drainage Ditch allows for dune migration inland as part of its recovery process without conflicting with existing agricultural uses.

Proposed actions at the northern and central sites include, but are not limited to;

- Mechanical Dune Construction - The proposed Project design would include mechanically elevating and reconstructing the dunes that have been lost to overwash events. Sand skimmed from the

overwash areas and adjoining areas would be used to construct new dunes to similar heights and widths of adjoining dunes and over a total area of approximately 8 acres.

- Sand Fence Installation - Sand fence would be installed in combination with the constructed dunes, or areas prone to overwash, in order to promote the recruitment of sand for dune rebuilding purposes.
- Large Wood (Wrack) Placement - Recognizing that natural recruitment of large wood assists in the recruitment of sand on dunes, the final designs may include large wood placed at select locations in wave overwash areas to promote dune rebuilding.
- Planting Native Vegetation - Native plants capable of encouraging dune stability would be planted as part of a revegetation strategy.
- Accommodating Natural Dune Building Processes - The Project design and configuration of Project features would ensure the ability of dunes to migrate eastward, thereby facilitating the reestablishment of zones of recruitment in the dune network capable of protecting the dune system from episodic disturbance.

The proposed actions described above at the northern and central sites are intended to convert the overwash areas back to dunes thereby directly impacting known Western Snowy Plover habitat. To offset the loss of this habitat, the project proposes to create similar habitat by removal of non-native beach grass on the dune strand west of the Outer Salt Marsh. Up to approximately 10 acres of non-native beach grass will be removed from this area using a combination of mechanical, hand removal, burning and/or herbicide methods. These techniques and monitoring processes are described in the HMMP (Appendix E).

2.5.6 Enhance Agricultural Lands and Operational Access

TWC intends to preserve agricultural land productivity managed as short-grass habitat for grazed pasture, silage/hay and Aleutian cacking geese. The proposed improvements will facilitate continued agricultural land operations.

Existing set-back berms will be enhanced and new berms constructed to improve overland drainage efficiency and increase resiliency of agricultural land from wave over-wash and rising sea levels. The berms would be constructed of excavated soils with gradual side slopes to allow for grazing on the east slope, and a transitional wetland-upland ecotone on the west slope.

A new guide berm would be constructed to the east of Russ Creek at an approximate 8.0 feet elevation. The existing access roads and berms along the EREP property's eastern and southern boundaries would be improved by raising and resurfacing with gravel. Additionally, the seasonal access road on the west side of the Inner Marsh will be abandoned and relocated up to an elevation of approximately 8-feet along the back dune paralleling the existing.

Three new one-way culverts would be installed in the northern berms to allow drainage of the freshwater off-channel habitat to the Inner Marsh from Cut-Off Slough. In order to retain land management and facilitate access, two new bridges are proposed. One is located over the reestablished Centerville Slough channel at the southern end of the Inner Marsh and the second is across Centerville Slough, northeast of the South Barn. Based on existing channel alignments and size, the bridges would have a maximum length of approximately 75-feet. Rock slope protection would be placed at the base of the bridge footings

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as protection from scour. Additionally, rock slope protection would be placed along the footings of the existing bridges as preventative erosion measure.

2.5.7 Public Education and Access Improvements

TWC property is managed for agricultural production and for outdoor recreation and education opportunities. The EREP hosts an historic private duck hunting club, welcomes invited guests and docent-led group site visits, and uses the site to educate elementary school children about wetland and estuary systems and agriculture as practiced in the Coastal Zone.

Main Barn and Parking Area

Minor improvements to the Parking Area and signage limiting visitors to existing trails would educate any visitors to the EREP about the prevailing agricultural land use in the area, limitations on recreational opportunities, and seasonally or topically oriented restrictions. Signs about the cultural, agricultural and natural heritage of the area would interpret the landscape for viewers. A vault toilet would be installed to reduce impacts to the landscape.

North Barn Parking Area

Minor improvements to the North Barn Parking Area and signage limiting visitors to existing trails would facilitate TWC's outreach and education efforts while minimizing impacts to the Project area. Signs about the cultural, agricultural and natural heritage of the area would interpret the landscape for viewers. A vault toilet would be installed to reduce impacts and traffic back to the entrance. The parking area would be limited to the existing heavy-use agricultural area.

Dune Walk and Overlook

A short boardwalk and trail with an overlook would take visitors along an existing trail, near the North Barn, into an intact dunefield for birding and natural observation.

Kayak Put In and Take Out

Two kayak 'put in and take outs' would be installed around the Inner Marsh. One is proposed to be located near the proposed bridge over reestablished Centerville Slough and the second at the new muted tidegate west of the Cut-Off Slough tidegate and to the north of the Inner Marsh. The put in and take outs will consist of foot accessible ramps with all-weather gravel surfaces. Kayak access to the Inner Marsh would facilitate; post-project monitoring of the Inner Marsh, aquatic educational programs, and minor recreational use by visitors. Interpretative signage would be installed at each put in and take out informing visitors of appropriate kayaking locations and tidal conditions.

Access Improvements

Several appurtenant structures will be installed on Russ Lane such as new gates an entrance sign and suitable lighting that clearly denotes EREP hours of operation, as well as additional area and fencing to provide adequate turn-arounds and protection for livestock. Project implementation and future management would require durable yet limited access routes that minimize impacts to the Project area. Some existing access routes and culverts would be improved and maintained, while others may be decommissioned. Routes would be designed to accommodate a range of vehicle types and weight classes and culverts replaced as needed to increase access reliability for agricultural and Project operations. The public access corridor through the property is fenced, and designed to track foot, bicycle and vehicle traffic in current road alignments from the Main Barn and parking area to the proposed Dune

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Walk and Overlook, that minimally impacts grazing operations and should not result in a significant conversion of pasture land use.

2.5.8 Invasive Species Control and Removal

Freshly disturbed and newly restored sites typically provide a suitable environment for invasive species to colonize unless an active maintenance program is in place to ensure that these species do not colonize during the plant establishment period. Such an active maintenance process is described in the HMMP. Invasive species that have the potential to invade the Project area are dense-flowered cordgrass (*Spartina*), purple loosestrife, Himalayan blackberry, dwarf eelgrass and European beach grass (Amophila). Species that will be removed prior to construction or as part of construction include Spartina and Amophila. The removal techniques and post-project monitoring are described in the HMMP.

3. Water Level Management Plan (WLMP)

3.1 Purpose and Need

The Project proposes the construction, rehabilitation and operation of drainage related facilities that are intended to enhance fish and wildlife habitat and continued agricultural viability. Once implemented, the facilities will require routine operations to achieve the Project and land management goals within and adjoining the project area. This combined area is referred to as the Water Level Management Plan (WLMP) Area and defined as the area bound on the landward side of the existing perimeter dike and inclusive of TWC, ORF, Russ and other small property holdings (Figure 4). These are properties for which floodwater is frequently conveyed through or impounded on during winter months and rely on a shared drainage network and existing tidegates to provide regional drainage and prevent seawater incursion. Other smaller private landholdings such as Harville Ranch LLC Co. and Fern Cottage Inc. are also located within the area however these lands are situated at higher elevations and are not defined as Grantors/Grantees in the drainage easement.

The purpose of the WLMP is to provide a framework and process to monitor and operate the drainage facilities consistent with the intent of the drainage easement, proposed Project and land management goals. While the WLMP Area extends beyond EREP, this plan only covers the operation and maintenance of drainage facilities located on EREP and as described in the Basis of Hydraulic Design Report (KHE 2016). Given the shared drainage network, it is understood the functionality of existing and/or new drainage facilities on properties adjoining EREP within the WLMP Area could alter the drainage characteristics throughout the Area.

3.2 Background

The entire Eel River Estuary including the WLMP Area was extensively altered over the last 150 years in order to expand agricultural production in the region. Nineteenth and early twentieth century reclamation efforts converted the Eel River Delta from salt marsh to productive pastures. Levees, tide gates, dikes, and berms were installed to reduce tidal water volume, to reclaim wetlands for agricultural conversion, and to better manage high water events.

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Among the many bridges, tidegates and other control structures, residents constructed a major tidegate on Cutoff Slough in the late nineteenth century. A more durable structure was built in 1916. This tidegate, known as the Cutoff Slough Tidegate, or sometimes as the "Occidental Tidegate," had deteriorated considerably by the mid-20th century, and was replaced with a new structure funded by a consortium of adjacent property owners in 1979.

Exacerbating drainage challenges, the tributaries to the Centerville Slough complex and Salt River contribute large quantities of sediment. Historically this sediment load was effectively managed to maximize the agricultural potential of the area. Russ Creek was diverted into sediment management "cells" where small levees (1-2 foot in height) would impound the water and allow the sediment to deposit. The management of the Russ Creek sediment load altered the natural alluvial process of the creek. This practice continued until transfer of the property to TWC in 2008.

The direct manipulation of the alluvial fan of Russ Creek had three major effects. First, Russ Creek was entirely altered from its historic configuration. Second, Centerville Slough, once the primary extension of the Salt River was, apart from a short stretch, entirely filled. The Centerville Slough channel, once navigable and equal in size to the Salt River ceased to exist. Drainage patterns were significantly altered through the removal of basic hydraulic processes such as tidal exchange.

In addition to the management of sediment within Russ Creek, many of the surrounding parcels were raised in elevation to increase agricultural production. Certain parcels south and east of the EREP that did not benefit from the historic pasture raising approach are now at a lower elevation than the EREP. This configuration poses a challenge for routing the flows of Russ Creek, Shaw Creek and Creamery Ditch north towards the Eel. Parcels to the south of the Project area facing this challenge now find this trouble compounded by more frequent wave overwash from the sand dunes, continued infilling of key drainage components such as the WDD, levee deterioration and sea level rise. In an increasingly challenging environment, those parcels appear to be dependent on flow from Russ Creek, Shaw Creek and Creamery Ditch being directed through the EREP. Traditionally, this has been accomplished via routine maintenance of WDD.

3.3 WLMP Objectives

The objective of the WLMP is to:

- Define operation and maintenance activities necessary to achieve the CEQA Project goals and objectives while not adversely impacting adjoining properties within the WLMP Area; and
- Provide a framework to communicate monitoring data and management decisions following the adaptive management plan (AMP) portion of this EMP

3.4 WLMP Area Objectives

The proposed drainage-related project components have been presented above in the Project Description. For the purpose of this plan and based on differing land management goals, the WLMP Area has been divided into two sub-areas referred hereinafter as the western and eastern sub-areas (Figure 4). The western sub-area includes portions of western EREP such as the Inner Marsh and Russ properties such as Angels Camp. The eastern sub-area includes the remaining lands within the WLMP Area. Based on the overall CEQA Project goals, the following objectives have been used in developing designs and operational strategies for the drainage-related facilities in each sub-area.

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3.4.1 Design Objectives - Western Sub-Area

- Maintain pre-project (existing conditions) flood storage capacity during the **wet season** to minimize changes in frequency/duration of floodwater inundation. This will be achieved by limiting an allowable tidal amplitude inflow to 2.5ft (NAVD 88) through the proposed Inner Marsh muted tidegate.
- Improve aquatic organism passage, restore former tidal wetlands, and increase tidal circulation that better mimics dissolved oxygen (DO), salinity and temperature regimes in the Eel River Estuary. This will be achieved by allowing a maximum tidal amplitude inflow to 5.0ft (NAVD 88) through the proposed Inner Marsh muted tidegate during the **dry season**.
- Increase potential for sediment re-entrainment and transport to the Eel River Estuary
- Maintain viable agricultural operations in designated areas

3.4.2 Design Objectives - Eastern Sub-Area

- Maintain pre-project (existing conditions) flood storage capacity during the **wet season** to minimize changes in frequency/duration of floodwater inundation, therefore limiting an allowable tidal amplitude inflow to 2.5ft (NAVD 88) through the existing Cut-off Slough tidegate.
- Avoid an increase in pre-project (existing conditions) inboard tidal elevations during the **dry season**
- Improve aquatic organism passage at the existing Cut-off Slough Tidegate
- Maintain similar water quality regimes in Cut-off Slough relevant to existing conditions
- Maintain viable agricultural operations in existing areas

3.5 Seasonal Operations

The objectives presented above were utilized in the design development of the various project components described in the Project Description. The design objectives are also applied to the operations of the WLMP area. As previously described, a significant constraint associated with introduction of the muted tide above the existing groundwater surface elevation of 2.5 feet is the loss of flood storage capacity within the WLMP area. Any reduction of flood storage above an elevation of 2.5 feet would be ameliorated through excavation of an equivalent or greater volume of sediment above 2.5 foot elevation in the re-established Centerville Slough in addition to implementing a seasonal operational regime as described below.

3.5.1 Dry Season (April/May – October/November)

At the onset of the dry season when management of floodwaters is irrelevant, the proposed Inner Marsh Muted Tidegate Regulator (MTR) would be adjusted to allow for a maximum allowable tidal inflow amplitude of 5.0 foot elevation in the Western Sub-area. Concurrently, the new water control structure would be adjusted to prevent the 5.0 foot tidal amplitude from entering the Eastern Sub-area.

3.5.2 Wet Season (October/November – April/May)

At the onset of the wet season and in advance of anticipated storm events, the proposed Inner Marsh Muted Tidegate Regulator (MTR) would be adjusted to allow for a maximum allowable tidal inflow

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amplitude of 2.5 foot elevation in the Western Sub-area. Concurrently, the new water control structure would be adjusted (lowered) to maximize floodwater storage exchange between the Western and Eastern Sub-areas.

Table 3-1 summarizes the proposed wet and dry seasonal operations.

Table 3-1: Seasonal Operations

Season	Max Allowable Tidal Inflow (Approximate Elev. in ft-NAVD 88)		New Water Control Structure Setting (Approximate Elev. in ft-NAVD 88)
	Western Sub-area (New MTR)	Eastern Sub-area (Existing Tidegate)	
Wet (Oct/Nov – April/May)	2.5	2.5	<5
Dry (April/May - Oct/Nov)	5	2.5	>5

Transitions between the seasonal operations will occur over several weeks to reduce abrupt biological changes within the sub-areas. To avoid abrupt changes and/or reduced flood storage associated with unseasonably high Eel River flows, the National Weather Service website provides a real time and 5-day prediction of Eel River stage at Fern Bridge. The stage predictions can be used to monitor predicted Eel River stage during the transition between seasonal operations. Image 3-1 depicts measured water levels in the Eel River Estuary (Cut-off Slough outboard and inboard), Fern Bridge and Humboldt Bay North Spit. Image 3-1 suggests that water levels exceeding approximately 7-feet (NAVD-88) measured at Fern Bridge for an extended period begin to influence the Estuary tidal amplitudes by elevating the low tides; and therefore can be used as a general guide during the seasonal transitions to maximize the extent for which the gates are open while minimizing the risk of reduced storage capacity. As explained the in the draft Hydraulic Report, other influences such as tides, Eel River mouth conditions and Russ Creek flow also influence the frequency/duration the gates are open.

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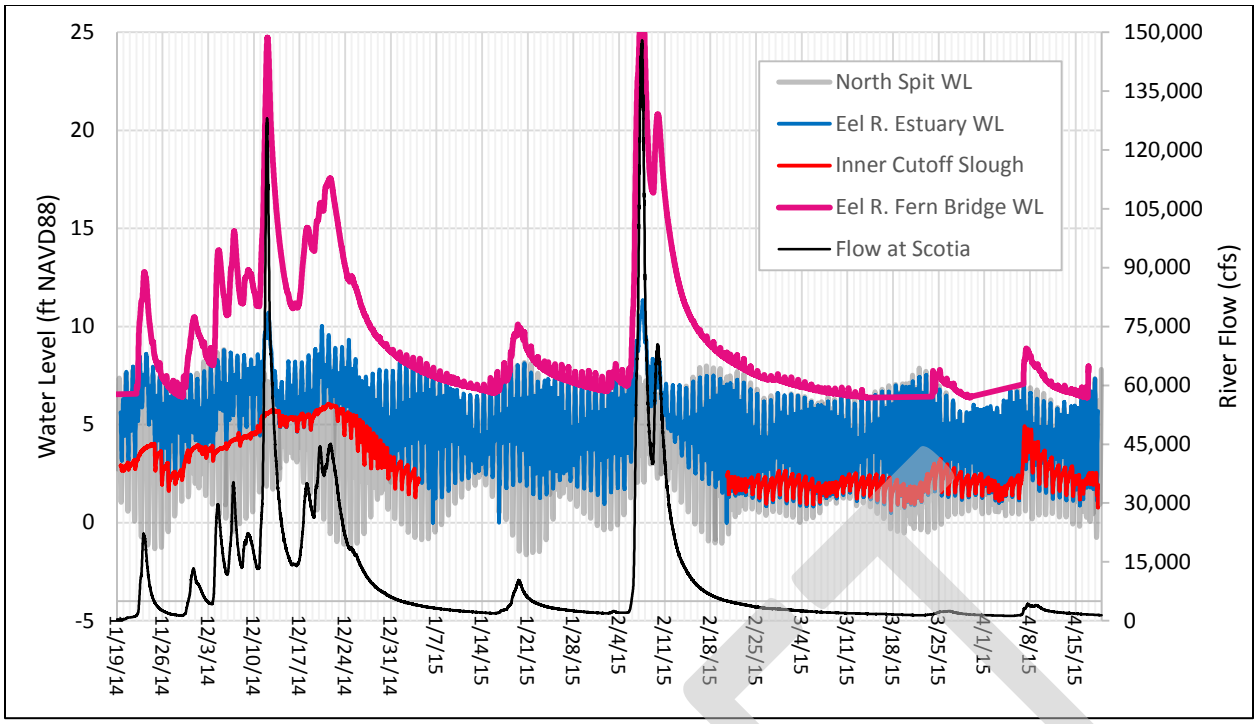

Image 3-2: Measured Water Levels.

3.6 Operations, Monitoring and Reporting

The operations will be conducted by TWC, in accordance to this WLMP and informed by ongoing water level/quality monitoring data collected as part of the AMP portion of this report. TWC will conduct ongoing monitoring as described in the AMP portion of this report and other parties to the drainage easement may also contribute. The monitoring data is intended to further inform management decisions that will facilitate achievement of Project goals and objectives. The monitoring elements relevant to the WLMP and drainage-related facilities are summarized below:

- Continuous water level monitoring within the Western/Eastern Sub-areas and out-board of the perimeter dike
- Water quality (DO, salinity, temperature) within the Western/Eastern Sub-areas and out-board of the perimeter dike
- Channel and slough cross-sectional surveys
- Visual observations/inspections of drainage-related facilities

The above information will be compiled by TWC in an annual report and shared with property owners within the WLMP Area. The monitoring data will inform continued operations of the system and any necessary changes. Given the results of the monitoring process, if needed the control structure operations may be adjusted to more effectively meet the design objectives for each sub-area as previously described.

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3.7 Maintenance and Repairs

The drainage related improvements, once constructed, are intended to reduce the current maintenance burden associated with Western Drainage, increase service life of the existing Cut-off Slough tidegate and provide a redundant drainage outlet with the new MTR. While collectively these facilities will require routine monitoring and management, the improvements are anticipated to reduce the current maintenance burden and provide a more resilient ecological and agricultural system.

As introduced in Chapter 1, the drainage easement describes some of the existing infrastructure on TWC property (ditch, flood control dike, flood control gates) and prescribes the abilities of the grantees (Russ) to cross the grantors' property (ORF, TWC) in order to maintain this infrastructure. In general, the easement expresses the mutual desire of all property owners concerned (Russ, ORF and TWC) to cooperate for the protection of existing land uses (agricultural pasture) within the Russ, ORF and TWC properties. In order to achieve this common goal, the Project proposes improvements, both new and to existing facilities within the legal description boundary of the drainage easement. These proposed improvements are not intended to conflict with the intent of the drainage easement, but rather provide an overall increase to the drainage system performance and reliability.

While TWC proposes to conduct the operations and monitoring of all project components on the EREP and in accordance to this plan, it is understood maintenance and/or repair costs of existing and new facilities located within the legal description of the drainage easement would remain consistent with Section 9 of the drainage easement or an amended easement.

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4. Habitat Mitigation & Monitoring Program (HMMP)

4.1 Summary

The EREP Project area is a landscape of mostly pasture land historically managed primarily for cattle grazing, seasonal waterfowl hunting, and drainage of neighboring properties. Incidental to this system, degraded, muted tidal wetland channels and marsh areas persisted. Over the years, tidal exchange has been reduced, infrastructure has aged and sediment from in-flowing streams has dispersed in “fan” shaped areas within the project area while other areas have subsided. A historically narrow dune system that buffers this pasture from wave action has also become compromised by overwash from large storms and is believed to lack adequate sediment supply to rapidly rebuild.

The EREP project as a whole intends to maintain the core functions of the site while enhancing tidal and geomorphic function for the benefit of aquatic, wetland, and upland habitats. The project anticipates improvements in habitat specifically for fisheries, including tidewater goby and salmonids. The project recognizes that certain levels of management must be maintained in order to honor existing legal agreements between neighboring property owners and land uses, and strategically leverages hydrologic, hydraulic, geomorphic, and aeolian processes with grading, tidegates, dikes, sediment management areas, and dune-building techniques to achieve these aims. The Project Description details the project components and changes to existing landforms and structures.

In order to make these advances, the project converts approximately 128 acres of jurisdictional agricultural wetland types to other tidal and freshwater jurisdictional wetland types. While these are all types of jurisdictional wetlands, tidal wetlands are an increasingly rare wetland type with high ecological function, value and biodiversity. The project does not propose to mitigate for wetland conversion. The project also fills approximately 4.13 acres of wetland habitats to create uplands and structures necessary to manage the complex legally-constrained drainage system. This is mitigated for by re-establishing 4.13 acres of wetlands in areas that are currently uplands. These mitigated wetlands are covered under this HMMP.

Rare, threatened or endangered plant species have been identified on the project site. Avoidance is the priority for this project and currently impacts are anticipated to one species, Lyngbye’s sedge, (*Carex lyngbyei*). The HMMP covers mitigation actions to be taken for this species and for the other special status plant species known to occur on the site if the avoidance approach cannot be achieved.

Additionally, the endangered Western Snowy Plover, (*Charadrius alexandrinus nivosus*), has been documented using a dune washover area for roosting and nesting. The project proposes activities to rebuild these dunes, which will result in a reduction in this habitat for plover. Mitigation will include establishment of suitable habitat for this species.

Finally, invasive species removal will be targeted to achieve success of the proposed mitigations in this plan.

In the interest of clarity, the EREP proposed project will be referred to as either “EREP plan” or “project” and the mitigation plan will be referred to as either the “mitigation plan” or “mitigation project.”

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4.2 Proposed Mitigation and Non-Mitigated Restoration Objectives

Only three types of mitigation are necessary for the proposed EREP project including 4.13 acres of wetland mitigation, mitigation for Western Snowy Plover habitat, and mitigation for Lyngbye's sedge. The overall objective of the EREP project is restoration, and several habitats are being restored that are not part of the project's mitigation. Restored habitats include: 125.7 acres of tidal wetlands that will be converted primarily from agricultural wetlands, 16.7 acres of aquatic habitat created with the re-establishment of Centerville Slough, 14.9 acres of dune mat habitat created in dune enhancement areas, and 3.5 acres of forested agricultural wetlands that will be established along Russ Creek. Non-mitigated restoration components are discussed below.

4.2.1 Non-Mitigated Restoration

Wetland Conversion

The proposed project results in a net zero loss of jurisdictional wetlands. Improvements to tidegates, drainage design, and channel grading do result in the conversion of some jurisdictional wetlands to other jurisdictional wetlands. The majority of the wetland conversion transitions agricultural wetlands to tidal wetlands which will have higher ecological value and function (Table 3-1).

The most significant area of wetland conversion is within the area referred to as the Inner Marsh, an area surrounded on its northern, eastern, and southern boundaries by a dike of varying elevations. Natural dunes form the western boundary. The area is hydraulically connected with culverts to Centerville Slough and Cut-Off Slough on the landward side of the Cut-Off Slough tidegate. The perimeter dike provides a setting for expanding tidal wetland habitat without threatening adjacent land uses. To achieve this, tidal access will be modified to reintroduce tidal exchange at a muted level.

Within the portion of the site referred to as the Inner Marsh, the native salt marsh species perennial pickleweed (*Salicornia pacifica*) and saltgrass (*Distichlis spicata*) occur along the margins of slough channels and in wet depressions. The slightly higher flats are dominated by a mixture of saltgrass (which is tolerant of muted tidal conditions) and creeping bentgrass (*Agrostis stolonifera*). Creeping bentgrass, a perennial nonnative grass, is an aggressive competitor with wide environmental tolerances, a long growing season, and the ability to spread vegetatively. Once established, creeping bentgrass forms a thick thatch layer that buffers it from high salinities in underlying soils; however, it does not appear to tolerate full tidal inundation. Once a tidal connection is re-established to the Inner Marsh, it is anticipated that creeping bentgrass will die back and that a mix of salt and brackish marsh species will naturally colonize channel banks and the higher flats. These species could include the natives: pickleweed, saltgrass, arrowgrass (*Triglochin maritima*), jaumea (*Jaumea carnosa*), gumplant (*Grindelia stricta*), sea lavender (*Limonium californicum*), tufted hairgrass (*Deschampsia cespitosa*), sand spurry (*Spergularia marina*), Lyngbye's sedge (*Carex lyngbyei*), and the non-native species fat hen (*Atriplex prostrata*), brass buttons (*Cotula coronopifolia*), and cordgrass (*Spartina densiflora*). Cordgrass, an invasive grass that is the target of a region wide eradication effort, achieves near mono-specific dominance in many areas of the Outer Salt Marsh. The remnant channel and depressional areas will evolve to sub-, inter-tidal and mudflat habitat types.

Increased Aquatic Habitat

To increase aquatic habitat and enhance movement of water and fish/wildlife to the north and south, the Project will re-establish Centerville slough by excavating a channel along its historic alignment. At the northern end Centerville Slough will be realigned to the inner marsh, and at the south end of the proposed

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alignment it will be reconnected to Russ and Shaw Creeks. This will also re-establish connectivity with Creamery Ditch. The channel re-establishment will increase and create migratory access between estuarine and inland waters and will restore overwintering and rearing habitat for juvenile salmonids, creating approximately 16.7 acres of new aquatic habitat.

Increased Dune Mat

The proposed project seeks to implement passive and active techniques in dune management aimed at increasing resiliency to sea level rise. Dune enhancement is planned at two overwash sites within the project area. Proposed work may include: mechanical dune construction, sand fence installation, large wood (wrack) placement, accommodating natural dune building processes, developing a strategy for beach nourishment, and planting native vegetation. The re-established dune configuration will result in the conversion of approximately 11.2 acres of beach habitat and approximately 3.7 acres of European beach grass habitat to approximately 14.9 acres of dune mat habitat. This newly created habitat will be planted with American dune grass (*Elymus mollis* ssp. *mollis*), as well as other native dune mat herbs and shrubs.

Increased Forested Agricultural Wetland

In order to provide riparian cover and habitat diversity to the re-established Russ Creek channel, approximately 3.5 acres of agricultural wetlands will be planted and seeded in a narrow strip between the channel and the berm. This area will be seasonally grazed and will be seeded with the freshwater wetland seed mix described in Table 4-7. A revegetation plan will be developed utilizing a combination of pole cuttings and container stock. Suggested tree species include: Sitka willow (*Salix sitchensis*), coastal willow (*Salix hookeriana*), and Sitka spruce (*Picea sitchensis*) with some shore pine (*Pinus contorta* ssp. *contorta*). Suggested shrub species include: California wild rose (*Rosa californica*), California wax myrtle (*Morella californica*), salmonberry (*Rubus spectabilis*) and Pacific ninebark (*Physocarpus capitatus*).

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Table 4-1: EREP Project Habitat Conversion

Change in Habitat Area (Acres)	Existing	Proposed	Change
Agricultural	692.2	563.5	
Pasture and/or Agricultural Wetland	608.6	495.1	-113.5
Freshwater Emergent Herbaceous	82.9	64.3	-18.6
Forested Agricultural Wetland	0.7	4.2	3.5
Non-Agricultural	543.9	672.5	
Ammophila	117.0	93.8	-23.2
Aquatic	44.3	61.0	16.7
Bare Ground	0.8	0.6	-0.2
Beach	56.4	64.8	8.4
Developments	1.4	1.4	0.0
Dominant Invasive	14.5	0.1	-14.4
Dune Mat	44.3	59.2	15.0
Forested Riparian	10.6	10.4	-0.1
Levee/Berm	20.1	20.8	0.7
Road	7.3	7.3	0.0
Tidal Wetland (Saltmarsh/Brackish Herbaceous/Mudflat)	207.3	333.0	125.8
Scrub Shrub	20.0	20.0	0.0
Unmapped	1.6	1.6	0.0
Approximate Total	1237.6	1237.6	0.0

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It should be noted from Table 4-1 that the following areas undergo acreage reductions: pasture/agricultural wetlands, freshwater emergent herbaceous wetland managed for agriculture, non-native European beachgrass (*Ammophila*), bare ground, other dominant invasive species, and forested riparian. Over 113 acres of agricultural wetland are converted to tidal wetlands, which increase by over 125 acres. Additionally, there is an increase in forested agricultural wetland that exceed the loss of forested riparian habitat, and increases in dune mat and beach habitats. Increases in levee and berms are necessary for the overall functionality of the project, and represent a relatively small part of the land use change approximately 0.7 acre. Existing habitats at the Project site are shown in Figure 5 and proposed habitats are shown in Figure 6.

4.2.2 Mitigation Wetlands

Establishment of new guide berms is critical to the success of the EREP project, and requires the filling of some wetland areas. While new wetland channels are being graded and tidal exchange improved, most of these new wetland channels are counted under the wetland conversion discussion (4.2.1).

To mitigate for filled wetlands, existing upland spoils piles and sections of existing berms will be removed to re-establish wetlands. These mitigation wetlands will be adjacent or contiguous to existing wetlands, some of which will undergo conversion as muted tidal inflows up to 5' are implemented. Mitigation wetlands are planned to be of the same wetland type as the adjacent or contiguous wetlands under the new hydrologic regime. Locations of areas to be filled are shown in Figure 7.

As noted in Section 4.1, mitigation for impacts is proposed as follows:

- Wetlands will be mitigated at a ratio of 1:1

4.2.3 Special Status Species Mitigation

Special status plant surveys identified populations of rare, threatened, or endangered species that occur at the project site, or that are likely to occur on site. The special-status terrestrial plant species include: the federally and state endangered beach layia (*Layia carnosa,* FE; SE; CRPR 1B.1), Lyngbye's sedge (*Carex lyngbyei*; CRPR 2B.2), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*; CRPR 1B.2), dark eyed gilia (*Gilia millefoliata*; CRPR 1B.2), and sand spurrey (*Spergularia canadensis* var. *occidentalis*; CRPR 2B.1). The aquatic species eel-grass (*Zostera marina*) was also observed during surveys. Location of special status plants are shown in Figure 8. In addition to the species that were observed, the Project site contains high quality habitat for the federally and state endangered Menzies' wallflower (*Erysimum menziesii* spp. *menziesii*; FE; SE: CRPR 1B.1). This species was not found during surveys but has a high likelihood of occurring within the Project site. In accordance with the Project's Environmental Impact Report, strategies to protect these species follows CEQA Mitigation Measures, including:

Mitigation Measure BIO-2a: Mitigate Impacts to Beach Layia

Mitigation Measure BIO-2b: Mitigate Impacts to Sensitive-Listed Plant Species

Mitigation Measure BIO-3a: Mitigate Impacts to Sensitive Listed Habitats Through Avoidance and Re-establishment.

Mitigation Measure BIO-3b: Mitigate Impacts to Sensitive Listed Habitats Through Control of Invasive Species.

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Mitigation Measure BIO-4: Mitigate Temporary and Short-Term Impacts to Sensitive Habitats Including Wetlands Through Construction Minimization and Avoidance Measures

In keeping with Mitigation Measure BIO-3a, the project design attempts to avoid known populations of sensitive species Figure 8 juxtaposes proposed areas of cut and fill with mapped rare plant occurrences. As can be seen in this figure, grading activity is concentrated away from known populations of rare plants. A known exception is an area of Lyngbye's sedge, which is discussed below.

Some of the species noted above are part of the dune mat community. Dune mat is an Environmentally Sensitive Habitat Area (ESHA) under the Coastal Act. While most of the habitat within the project site's coastal strand is dominated by the non-native invasive European beachgrass, dune mat is present along the backdune against a narrow fringe of brackish and saltmarsh wetlands. The small patches of intact dune mat vegetation will be protected through avoidance.

A special status plant survey has not occurred yet in the Snowy Plover mitigation area. This survey will be completed prior to construction and any potential impacts to special status species will be avoided or minimized. While it is the intention of the project to avoid special status plant species, previously unrecorded populations may become apparent within the areas of the project's ground disturbance, or ground disturbance may result in indirect impacts such as dune erosion or new deposition that disturbs the dune mat community. In such cases, one or more of the following mechanisms will be employed:

Pre-construction and maintenance surveys prior to ground disturbing work

- Protective wooden fencing to shelter the sensitive vegetation community from shifting sand,
- Replacement plantings at a 2:1 planting ratio, with plants propagated from local genetic material (within project site or elsewhere within Eel River dunefields).
- Seed banking of genetically local seed in the event indirect impacts occur
- If necessary, planting and/or seeding or other remedial measures may occur to augment natural recruitment and/or to increase the diversity of species using an adaptive management approach.

Special Status Plant Species

In addition to the general measures mentioned above, the following mitigation guidelines have been developed for the special status species that are known to occur at the project site. Lyngbye's sedge is the only species to be impacted by the proposed project. Mitigations for the other special status species known to occur on the site are discussed below as a precautionary measure.

Lyngbye's sedge

Lyngbye's sedge is a rhizomatous herb that requires intact coastal brackish reaches of estuaries, where it can form dense mono-specific stands and is often the first colonizer of open mudflats. At EREP, the main threat to the existing population of Lyngbye's sedge is the continued encroachment of invasive cordgrass. Within the Project site, Lyngbye's sedge was mapped north of the dike separating the Outer Salt Marsh from the Inner Marsh in a population estimated to contain >5,000 individuals in an area of 10.1 acres. A small portion of the Lyngbye's sedge population that was mapped will be impacted by the current Project design. This area is adjacent to the new tidegate that will be installed on Cut-off Slough and is anticipated to be 0.051 acres, or 2,222 square feet.

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In order to mitigate for impacts to Lyngbye's sedge, a preconstruction survey of the known impact area will occur. The absolute cover of Lyngbye's sedge will be assessed and mapped for the area where impacts are anticipated. The proposed Project will likely create new habitat where this species will thrive in the tidal wetland. Both the area of impact and the tidal wetland will be monitored for five years after Project construction to determine if Lyngbye's sedge is recruiting enough to replace the population impacted by construction. Both area occupied and absolute cover of Lyngbye's sedge will be mapped in the tidal wetland and in the area of impact, and the total area and mean absolute cover will be compared to the area and cover of the population impacted by the project.

If by June of year five, Lyngbye's sedge has not recruited to an area and cover that is equal to or greater than the pre-Project impact population size, seed shall be collected from Lyngbye's sedge at the other robust populations that occur at the Project site. Adaptive management efforts, including planting (from rootstock of mature plants collected from local area, or from plugs propagated from local seed) shall be undertaken in year six. Planting efforts would be monitored annually for five additional years. Additional adaptive management will occur over this timeframe as needed to ensure success of re-establishment.

Humboldt Bay owl's-clover

Humboldt Bay owl's-clover was mapped at EREP in five populations along the north portion of the dike separating the Outer Salt Marsh from the Inner Marsh in a narrow band of slightly higher elevation marsh in association with salt grass, cordgrass, pickleweed, and jaumea (GHD 2014). More than 10,000 individuals of this hemi-parasitic herb were mapped. No impacts to Humboldt Bay owl's clover are anticipated.

However, if the Project impacts Humboldt Bay owl's clover, a qualified botanist shall collect and conserve seed from local (preferably on-site, or from the immediate region if on-site sources are insufficient) populations of Humboldt Bay owl's clover. These seeds would be used to replant a population of this species to mitigate for the population lost to construction impacts at a 2:1 ratio. The Project area would be monitored for five years and compared with a reference population to determine whether replanting and natural recruitment resulted in population numbers equal to or greater than those present before Project implementation. If the population did not appear to have reestablished during the five-year period, seed would be collected from elsewhere and additional attempts would be made to reestablish the population. These attempts would be monitored for two years.

Beach layia

Beach layia was mapped at EREP in the near-shore dunes in approximately 10 distinct populations ranging from 10 to 100 individuals. The majority of the mapped populations occur in areas adjacent to where the dike separating the Outer Salt Marsh and Inner Marsh meets the nearshore dunes; smaller populations were also found further south in the vicinity (300 to 800 ft south by south west) of the North Barn. No impacts to beach layia are anticipated.

However, if unavoidable Project impacts were to occur to beach layia, primarily as a result of dune building or European beachgrass removal associated with Western Snowy Plover habitat mitigation, the following mitigation measures would be implemented:

- Beach layia seed would be collected from the site and/or at nearby known occurrences so that replacement plants could be grown out at a nursery and transplanted to a stable portion of the site at a 2:1 planting ratio. If plant replacement, or relocation is deemed necessary (whether through relocation and/or replanting) annual monitoring for two years would be required, with no net loss of

number of individual plants. If replanting is employed, a 2:1 planting ratio includes built in overplanting in order to meet success criteria and no net loss.

- Seed collection for seed banking might also occur if indirect impacts occurred as a result of the dynamic coastal environment. The triggering mechanism for seed banking would be if this plant species is identified within 100 feet in a downwind direction of dune establishment, and/or 50 feet in any other direction, or within the footprint of the proposed Western Snowy Plover mitigation area.
- Plant relocation and or preparation of a sensitive species management plan (SSMP) that provides further details about the above options in cooperation with USFWS as to which mechanism(s) are the preferred option(s) would also occur before the time of impact. If an SSMP is deemed appropriate by jurisdictional agencies, the report would lay out specific timing and details of seed collection, mitigation site identification (within EREP), substrate preparation, monitoring and maintenance.

Western sand spurrey

A single population of 10 western sand spurrey plants were mapped in a nearshore swale adjacent to the brackish marsh supporting a large population of Lyngbye's Sedge. In California, western sand spurrey is largely limited to coastal marshes and saline swamps. This annual herb is known to occur in both natural and disturbed marsh habitats from California to Alaska. However, its distribution is limited in California with documented observations geographically limited to the Humboldt Bay Area on Calflora.

Project impacts to this species are not anticipated as the population will be avoided. However, if possible Project impacts occur to any western sand spurrey on site, a qualified botanist shall collect and conserve seed from local (preferably from the immediate region) populations of western sand spurrey. These seeds would be used to replant a population of this species to mitigate for the population lost to construction impacts at a 2:1 ratio. The Project area would be monitored for five years to ensure the mitigation was successful. If the population did not appear to have reestablished during the five-year period, seed would be collected from elsewhere and additional attempts would be made to reestablish the population. These attempts would be monitored for two years.

Dark-eyed gilia

A single population of dark-eyed gilia, consisting of approximately 50 individuals, was mapped near where the dike separating the Outer Salt Marsh from the Inner Marsh meets the dune mat habitat type (GHD 2014b). In California this species is largely limited to the coastal strand and stabilized dune habitats. Project impacts are not anticipated to this species, and the population will be avoided. However, if possible Project impacts occur to any dark-eyed gilia, mitigation measures similar to those stated above for western sand spurrey will be implemented.

Pacific eel-grass

Eel-grass habitat is protected by federal and state regulation under the Clean Water Act and the California Coastal Act. CDFW has a no-net loss policy for eel-grass habitat in state waters and eel-grass habitat is considered Essential Fish Habitat by NOAA-Fisheries. No direct or indirect impacts are anticipated to eel-grass. Within the Project eel-grass has been qualitatively mapped along the Cutoff Slough south of the Cutoff Slough tidegate and no changes are proposed in this area. The population density in this area is greatest toward the existing tidegate where it reaches approximately 15 percent cover, thinning out gradually to zero percent cover approximately 2,500 feet south of the tidegate.

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Hydrodynamic modeling and adversion/dispersion modeling of salinity suggest no significant changes in existing Cut-off and Centerville Sloughs.

Restoration of estuarine conditions inside of the tidegates on TWC property are likely to promote expansion of eel-grass beds into the Project area. Additionally, the proposed re-established Centerville Slough and the re-connected tidal channels within the Inner Marsh are anticipated to provide suitable habitat for natural recruitment of eel-grass thus enhancing eel-grass habitat within the Project area. The extent of eel-grass populations within the Project site in the future will be qualitatively reported in annual monitoring reports. Since no direct or indirect impacts are anticipated this species will not be mapped or quantitatively monitored.

If at final design phase any direct or indirect impacts to eel-grass are anticipated then any existing populations that would be impacted would be mapped prior to construction and natural recruitment would be quantitatively monitored annually for five years to determine whether eel-grass is naturally recruiting in the areas where it was impacted as well as in newly created channels. If eel-grass did not establish in an area equal to or greater than that lost due to Project impacts by year five then eel-grass would be actively planted to offset any lack of natural recruitment, using the most current scientific methods and following NMFS guidance.

Invasive Species Removal

Invasive species pose a risk to the successful recruitment of plant communities and individual species in newly constructed areas, and in the maintenance of healthy existing communities. Targeted invasive species removal and management will focus on ensuring that mitigated species and mitigated plant communities establish successfully. Mitigation Measure BIO-3b provides guidance for this activity.

Invasive weed removal shall be conducted both as part of mitigation, and as a project goal, for dense-flowered cordgrass. Invasive species removal related to mitigation is discussed in more detail in Section 4.9.2. Weed removal techniques may include manual, mechanical, and/or approved chemical means (including mowing, cutting, pulling, grinding, and/or excavation and burial) as discussed in the and as approved by jurisdictional agencies. Heavy equipment will be required to be clean and weed-free before entering the site.

Dense-Flowered Cordgrass

Dense-flowered cordgrass was found in and adjacent to the Project footprint, north of the tidegates. In order to reduce the likelihood of cordgrass colonizing the restored tidal wetlands, the existing population will be controlled prior to construction using manual, mechanical, and/or approved chemical methods, in compliance with the appropriate methods analysed and disclosed in the Regional Invasive Spartina Management Plan and the associated EIR. The cordgrass population within the Project footprint will be controlled during the ten-year operation period of the Project under the Adaptive Management Plan. Colonization of the Inner Marsh or other portions of the Project footprint by cordgrass will be controlled in collaboration with the region-wide eradication program.

Special Status Animal Species

The proposed project implements actions to expedite dune recovery in an area of washover that has become habitat for nesting and roosting Snowy Plover. This mitigation plan includes actions to address this impact. Please see the Biological Assessment and Incidental Take Permit for other state and

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federally listed species within the project boundary that do not require inclusion in the mitigation and monitoring plan.

Snowy Plover Habitat Mitigation

Western Snowy Plover is a federally listed threatened species. It is a small, 6 inch long shorebird, with black legs, dark bars on either side of its breast, a dark fore-crown, dark eye patch, and brown to gray back. Snowy Plover nests from early March through mid-September and prefer to nest above the high tide line on sand spits, dune-backed beaches, lagoon and estuary salt pans, and beaches near river estuary mouths, and river gravel bars. While habitat loss and coastal development are the main contributors to their decline, predation by species associated with human development (i.e. corvids) and pesticides/inorganic compounds have also impacted the species. In northern California, predation by ravens and off-highway vehicle use on Eel River gravel bars has crushed nests and disturbed nesting plovers.

In accordance with the Project's Environmental Impact Report, strategies to protect this species follows CEQA Mitigation Measures, including:

> Mitigation Measure BIO-1c: Avoid, Minimize, and Mitigate for Potential Impacts to Western Snowy Plover

This mitigation measure details activities to reduce potential impacts to this species of special concern, including:

- Limiting dune re-establishment construction between September 1 and March 1, outside the plover nesting season
- Habitat enhancement at a suitable location at a 1.5:1 ratio (the CEQA mitigation measure requires a minimum of 1.1:1), consisting of removal of European beach grass and bi-annual maintenance (in the winter before breeding season and in the fall after breeding season) for a period of two years post-construction.
- Timing of initial removal effort concurrent to timing of construction impact in order to ensure no temporal or net loss.

The selected mitigation site is located on Wildlands Conservancy property. The area is relatively remote, approximately 3.9 miles from the Centerville Beach parking lot, a staging ground for much off-road vehicle activity and associated disturbances, and is near the Eel River mouth and the shore.

4.3 Mitigation Goals and Objectives

The overall project's goal is to improve geomorphic and ecosystem functions that would enhance habitat for native fisheries and aquatic species, support waterfowl and wildlife species, and benefit agricultural land management by more effectively managing onsite flooding and sedimentation. Project objectives also include designing and planning for future climate scenarios and sea level rise in relation to agricultural land management, capacity and uses, dune enhancement, and vegetative communities.

The project's mitigation goals are supportive of the project's larger goals, but are narrower in focus to impact areas and sensitive species.

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4.3.1 Mitigation Goals

Approach

Restoration of habitat functions and structures drives the wetland and Snowy Plover habitat elements of the mitigation plan. The precautionary principle (a risk management strategy that puts burden of proof that an action is not harmful on those taking the action) dictates an avoidance and relocation approach to special status plant species. Figure 9 shows the proposed mitigation plan with a breakdown of types and amount of mitigation area created.

Wetlands impacted by the proposed project include a range of habitat types with mitigation requirements that may vary according to the regulations that govern each agency's review process:

Corps Jurisdictional Wetlands

- Agricultural Wetland/Pasture (PEM1C)
- Palustrine Emergent Wetland (PEM1C)
- Estuarine Saltmarsh (E2EM1P)

Environmentally Sensitive Habitat Areas (ESHA)

- Snowy Plover habitat (dune mat, beach)
- Endangered plant species

Wetland Mitigation Approach

As described elsewhere, primarily agricultural wetlands (pasture) will be filled and converted to uplands, while uplands consisting of existing spoils piles and berms will be removed and graded to become re-established wetlands. The levees to be removed were built in the early 1900s, and were part of a system that altered an extensive saltmarsh for agricultural uses. Tidal activity was controlled in these areas, confined to narrow channels between diked and protected lands. Tidegates were designed to minimize tidal inflow, which in recent years has been mostly incidental leakage due to the age and deterioration of existing tidegates. Persisting saltmarsh vegetation behind these dikes is largely attributable to saline soils, while some areas support agricultural or freshwater emergent wetlands. Spoils piles have resulted from the creation and maintenance of the western drainage ditch which is visible in aerial photos from the early 1960s. Removal of sediment and sand from the western drainage ditch is a historical and ongoing maintenance practice that is described in the drainage easement.

The EREP plan will restore muted tidal flows into the former salt marsh areas, and these areas are expected to support restoration of brackish and saltmarsh habitats. The existing berms that will be removed as part of mitigation is also expected to re-establish tidal wetlands with new tidal exposure. The mitigation wetlands from spoils piles, that will be graded to the same elevation as adjacent wetlands are expected to recruit either freshwater or brackish or saltmarsh vegetation, depending on their proximity to tidal fluctuation, and where they are influenced by groundwater or freshwater inflows. These areas are expected to perform comparably to the existing adjacent EREP project wetlands.

Snowy Plover Approach

Snowy Plover habitats described in Section 4.2.3 are indicative of a geomorphically active area in which episodic disturbance events periodically remove vegetation, prevent the establishment of a dune system, and maintain relatively flat and unvegetated plains near high tide activity. The mitigation plan for Snowy

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Plover locates an area subject to active disturbance near the Eel River mouth. Mitigation activities focus on establishment of ideal vegetation conditions to be subsequently maintained by natural processes.

Special Status Species Approach

As indicated elsewhere, the driving approach for special status plant and animal species is avoidance. Maintaining viable, reproducing populations of these species depends on minimal interference with existing habitats. Should this not be possible, relocation and plant replacement at suitable sites within the project site will be implemented.

Mitigation Goal

The mitigation project shall compensate for filled jurisdictional wetlands, maintain or enhance existing levels of habitat integrity, and be functionally and ecologically seamless with other aspects of EREP.

4.3.2 Mitigation Objectives

Project objectives provide quantifiable targets of the mitigation plan, and form the basis for evaluating success.

The Eel River Estuary Preserve Project Mitigation Project shall:

- Balance filled wetlands with re-established wetlands
- Eliminate upland barriers within existing wetlands
- Protect populations of special status plant and animal species.

Table 4-2: General Mitigation Concepts and Targets

Current Use/ Existing Habitat	Proposed Habitat	Proposed Action	Location
Fill (Levees and spoils piles)	Agriculture Wetland/Pasture, Palustrine Emergent Wetland, Tidal Wetland	Remove fill; grade for estuarine, palustrine and muted tidal processes. Re-establish wetland vegetation through seeding.	Figure 7
Disturbed dune/coastal strand	Snowy Plover habitat	Remove European beachgrass	Figure 10
Special Status Plant Communities/Habitats	Special Status Plant Communities/Habitats	Avoidance; if needed, relocation and replanting	Figure 8

4.4 Determination of Credits

4.4.1 General

Impacts and mitigation credits are measured in acres, and mitigation will be applied at the following ratios: 1:1 for wetland mitigations, 1:1 for impacts to Lyngbye's sedge, and 1.5:1 for Snowy Plover mitigation. Ratios above 1:1 are intended to compensate for permanent impacts, temporal lag, or uncertainty of success.

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4.4.2 Mitigation Credits

The EREP Project proposes substantial improvements to saltmarsh habitat, tidal function, and anadromous fisheries. It also converts over 125 acres of agricultural wetland and other lower functioning habitats to estuarine wetlands. The mitigation plan also re-establishes freshwater and tidal wetlands.

Given the broad ecological benefits of the project as a whole, and the immediate recruitment of mitigated wetland habitats anticipated, wetland mitigation for this project is focused on a “no net loss” approach with a 1:1 mitigation ratio. See details in Table 4-3 below.

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Table 4-3: USACE and California Coastal Commission Jurisdictional Wetlands[2] Permanently Impacted and/or Created (all units in acres)

Overall PROJECT (acres)				
Existing Wetland	Wetland Fill	Wetland Creation	Excess Wetland	Creation Ratio[7]
1255	4.3[4,5]	4.3[6]	1251.2	1:1

[1] Totals are approximate due to rounding of individual acreage amounts.
[2] Eel River Estuary Preserve Ecosystem Enhancement Project Delineation of Uplands, July 2014
[4] Native fill from the channel excavation will be placed on approximately 4.8 acres of wetlands of which 4.3 ac will be permanently converted from wetlands to uplands. The permanently impacted area is associated with the new north and south berms, two agricultural bridge crossings of Centerville Slough and the new tide gate. The area has been calculated as the area above 1ft above the existing ground elevation on either side of the fill.
[5] Accounts for two agricultural bridge crossings across Centerville Slough and a new tide gate.
[6] Creation of 4.3 acres of wetlands through lowering of site levees and mapped uplands.
[7] Creation Ratio defined as total acres **Created** to total acres **Filled**

Mitigation for impacts to Snowy Plover habitat is timed to prevent temporal losses. The proposed mitigation ratio for Snowy Plover habitat is 1.5:1.

Table 4-4: Proposed Western Snowy Plover Mitigation

Impact	Jurisdiction			Impact Area (AC)	Mitigation Ratio	Mitigation Area (Ac)	Mitigation Type
	USACE	CCC	USFWS				
Snowy Plover Habitat		■	■	TBD	1.5:1	TBD	n/a

As discussed elsewhere, avoidance is the primary strategy for protecting special status species. Lyngbye's sedge is expected to incur an impact to approximately 0.05 acres (2,221 square feet). As sedges are rhizomatous plants that spread rapidly, the mitigation plan proposes to monitor for recovery and to replant if this recovery is not successful. Similarly, a 1:1 mitigation ratio will be followed for Pacific eel-grass should unanticipated and unavoidable impacts occur. Where avoidance is not possible for Humboldt Bay owl's-clover, beach layia, western sand spurrey, or dark eyed gilia a combination of relocation and replanting to achieve a ratio of 2:1 is proposed with the development of a Sensitive Species Mitigation Plan. These mitigation ratios are indicated in Table 4-5.

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Table 4-5: Proposed Mitigation for Sensitive Plant Species

Impact	Jurisdiction				Impact Area (AC)	Mitigation Ratio	Mitigation Area (Ac)	Mitigation Type
	CDFW	NOAA-Fisheries	CCC	USFWS				
Lyngbye's sedge[1]	■		■		0.051	1:1	0.051	Natural recruitment in impacted area; replanting if necessary
Humboldt Bay owl's-clover[2]	■		■		0	2:1	0	Salt marsh
Beach layia[2]	■		■	■	0	2:1	0	Dune mat
Pacific eel-grass[2]	■	■	■		0	1:1	0	Estuarine

1 The project proposes to monitor for recovery and mitigate through replanting only if recovery is unsuccessful upon completion of five years of monitoring.

2 The project proposes avoidance and therefore has not calculated impact areas. Mitigation ratios are provided in the event that avoidance is not successful and relocation or replanting is necessary.

4.4.3 Wetland Area Calculations

Wetland mitigation has been calculated from the restoration design plans through area calculations in computer aided drafting (CAD) and imported into Geographical Information System (GIS) mapping software. Where levees and berms exist or are being built, an additional calculation is needed to account for the effect of water ponding or a high water table on the slopes of the levee. The USACE wetland definition provides the basis for this calculation, indicating that flooding, ponding, or a water table within 12 inches of the soil surface must be present over a fourteen day consecutive period for an area to be considered to have wetland hydrology. The project has assumed a typical levee cross-section, with 3:1 slopes on the tidal side of the levee, and 7:1 slope on the freshwater side of the levee. Areas of levee or berm that would result in wetland habitat formed by this definition were also included in the wetland area calculation Figure 4.1.

The fill of wetlands is also accounted for when berm elevations are raised and the overall footprint of the berm is expanded, as also denoted in Figure 4.1. This has been included in the wetland fill calculations. Detailed information on permanent and temporary impacts to wetlands is provided in Table 4-6.

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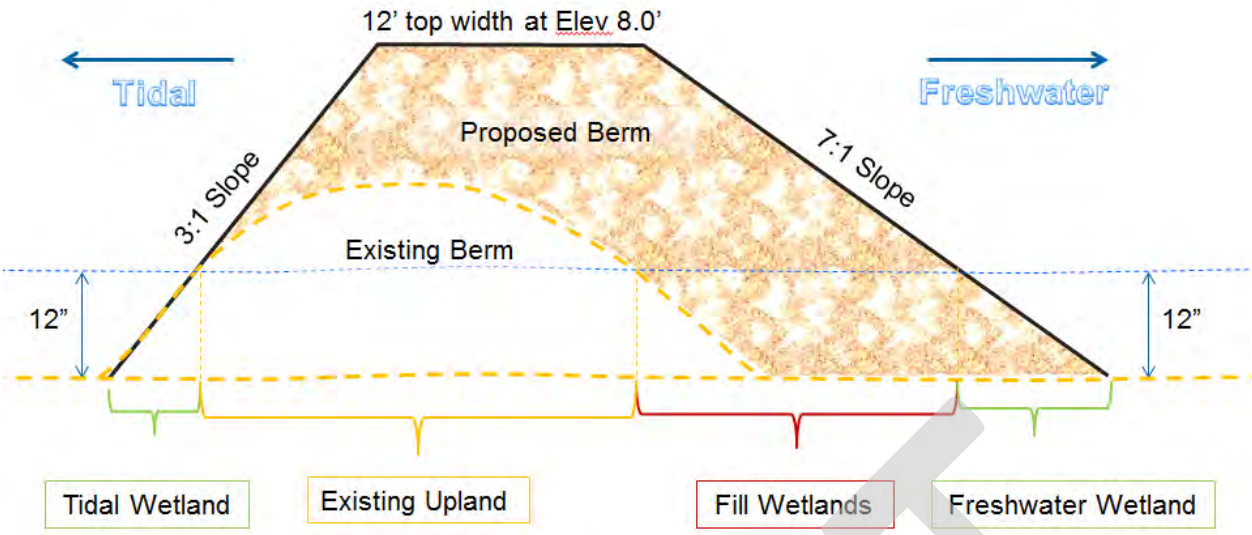

The U.S. Army Corps of Engineers (USACE 2005)
Fourteen (14) or more consecutive days of flooding or ponding, or a water table 12 in. (1 feet) or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability)

Figure 4-1: Wetland Fill Calculations at Existing and New Levees/ Berms

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Table 4-6: Type of Permanent and Temporary Impacts to USACE, NCRWQCB, and California Coastal Commission Jurisdictional Wetlands or Waters of the U.S./State[1]

TYPE OF IMPACT (PERMANENT[2] AND TEMPORARY[3])						
Eel River Estuary Preserve						
Habitat Type	Permanent Fill and/or Dredge			Temporary Fill and/or Dredge		
	CY	AC	LF	CY	AC	LF
Channel (Dredge Native)[6]	135,00	19.3	15,850	Approximately 2,000 CY of temporarily placed gravel, rock, sheet-pile, soil[7,8]	<1	ND[4]
Sediment Management Area (Dredge Native)[6]	150,000	69.8	-			
Internal Slough Enhancement (Dredge Native)[6]	-	14.1	6,7100			
Berm (Fill Native)	14,000	3.5	7,040			
Raise Inner Marsh (Fill Native)	-	1.3	1,490			
Bridge and Water Control Structure (Fill)	70	0.04	-			
Area Access Road (Fill)[5]	-	1.5	4,160			
Rock Slope Protection at Existing and New Structures (Fill)	600	0.2	-			

[1] Eel River Estuary Preserve Ecosystem Enhancement Project Delineation of Uplands, July 2014.

[2] Permanent impact areas are defined as areas that will experience permanent dredge/fill.

[3] Temporary impact areas are areas where temporary construction disturbance could occur and are within the project area. These areas will be utilized for haul roads, staging areas and stockpiling areas and will be restored back to pre-construction conditions. These areas exclude soil amendment areas on agriculture lands.

[4] Not Definable due to variable haul routes and coffer dam placement determined by the contractor and construction manager within the project limits of disturbance.

[5] Accounts for to new bridge crossings of Centerville Slough and improvements to the existing access roads within the EREP

[6] Excavation area within the EREP that is currently mapped as Jurisdictional Wetlands/Waters.

[7] Temporary fill for construction access and coffer dam placement in sloughs/channels.

[8] Does not include area within project limits and outside of permanent disturbance area that will be temporarily disturbed for construction access and material hauling. This area will be de-compacted and restored back to pre-construction conditions

4.5 Mitigation Site Selection

4.5.1 Candidate Mitigation Site Descriptions and Analysis

Mitigation Wetlands

This proposed mitigation locations are contiguous to, part of, and complementary to, the EREP Project. The mitigation wetlands will become part of the overall functioning ecosystem of the site. Offsite mitigation sites were not considered for this reason. Wetland mitigation project design deliberately focused on the identification of suitable uplands for conversion to wetlands that would fit with the project's overall restoration goals.

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Snowy Plover Habitat

Similar to the mitigation wetlands, mitigation of Snowy Plover habitat was desired to fit within the functioning ecosystem of the overall project site. Recognizing the limitations of European beachgrass removal within a dune ecosystem, and the likely recolonization of this invasive weed, locating the project in an area where the episodic disturbance regime maintains ideal Snowy Plover habitat was recognized as desirable. This attribute will better support the perpetuation of the site for the benefit of plover. This reduced potential candidate sites to existing wave overwash areas, and areas near the Eel River mouth. Some existing wave overwash areas posed issues due to a variety of factors:

- Proximity to Centerville Beach and the higher use areas by off-road vehicles
- Some overwash areas were not within Wildland Conservancy property
- Some overwash areas expose agricultural lands to storm vulnerabilities and may require intervention that disturbs Snowy Plover habitat
- Some overwash areas within TWC were already inhabited by Snowy Plovers

Given these considerations, a site near the Eel River mouth was selected.

Other Special Status Species Sites

At this time, mitigation sites for other special status species have not been identified. Avoidance and monitoring are the primary mitigations. Should relocation or replanting be deemed necessary, the guidelines described in Section 4.2.3 will be followed. Suitable sites will be determined at that time.

4.5.2 Selected Mitigation Site

Mitigation Wetlands

The selected mitigation sites are filled areas of uplands (remnant spoils piles and existing berms) that will not be needed to maintain drainage operations under the new EREP plan. Additionally, they are obstructions to the wetland matrix that will be re-established under the plan. Some of these uplands are currently surrounded by dune mat and estuarine saltmarsh, others by palustrine emergent wetlands (including agricultural wetlands). In addition to these features, the shoulders will be rocked on a small section (0.36 acres) of the main access road.

Snowy Plover Habitat

The existing Snowy Plover habitat site lies at the northern end of the Eel River's south spit, where the dunefield's heights are lower and broader than dunes to the south end of the spit. Native dune mat vegetation is sparse; vegetation is primarily non-native European beachgrass. The site is close to the Pacific Ocean and the Eel River mouth, (Figure 9), posing ideal conditions for Snowy Plover nesting and roosting. Restoration of this project site for mitigation also expands an area documented as currently in use by Snowy Plover for these purposes.

4.5.3 Reference Site

Mitigation Wetlands

Reference sites for wetlands are the existing mosaic of wetlands within the larger EREP project site and are described broadly below. For the purpose of assessing the success of wetland re-establishment, specific reference sites will be chosen that are within 20 feet of six of the re-established mitigation

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wetlands. Three specific reference locations will be chosen for the tidal wetlands and three for the freshwater wetlands. Each reference site will be approximately 400 square feet.

The mitigation and overall project site is part of a working agricultural landscape with ecological influences from upstream and upwind sources of non-native weed species, sediment and water supplies, and migratory animals that may be vectors of weed transmission. Existing freshwater wetlands at the site were classified during a wetland delineation (GHD 2013) as predominately palustrine emergent seasonal wetlands (National Wetlands Inventory Code PEM1Cd; Federal Geographic Data Committee 2013). A large percent of the freshwater wetlands at the Project are considered agricultural or pasture wetlands and are actively managed for grazing.

Vegetation data from the wetland delineation provides reference descriptions of the dominant vegetation in the freshwater wetlands managed for agriculture. Dominant species included the non-native pasture species: creeping bent grass (*Agrostis stolonifera*), perennial rye grass (*Festuca perennis*), white clover (*Trifolium repens*), and bird's foot trefoil (*Lotus corniculatus*). The native wetland species silverweed cinquefoil (*Potentilla anserina*) and salt grass (*Distichlis spicata*) were present, as were several invasive species: (*Plantago lanceolata*), hairy cat's ear (*Hypochaeris radicata*), curly dock (*Rumex crispus*), and bull thistle (*Cirsium vulgare*).

The specific vegetation communities that will re-establish in the 1.8 acres of mitigated tidal wetlands will be determined by the changing hydrologic conditions. Mitigated tidal wetlands may re-establish to support a range of vegetation communities from mudflats to high salt marsh (tidal wetlands). These wetlands will likely resemble the tidal salt marsh and brackish marsh communities described in the DEIR which provide habitat for native species such as: pickleweed (*Sarcocornia pacifica*), saltgrass (*Distichlis spicata*), gumplant (*Grindelia camporum*), tufted hairgrass (*Deschampsia cespitosa*), Lyngbye's sedge (*Carex lyngbyei*), jaumea (*Jaumea carnosa*), and arrow grass (*Triglochin maritima*).

Special Status Plant Species:

A large population of Lyngbye's sedge occurs at the Project site and only a small percent to the population will be impacted by construction. In other areas of the Project site, Lyngbye's sedge is well established. These undisturbed areas will serve as reference sites with consideration given to the fact that it will take time for new populations to achieve the same density as that which occurs at existing reference sites.

4.6 Site Protection Instrument

The Wildlands Conservancy owns the mitigation sites. It is the intent of the Wildlands Conservancy to maintain the mitigation areas in perpetuity as wetlands and conservation lands, subject to relief in the event of catastrophic events as may be negotiated.

4.7 Mitigation Site Environmental Baseline

4.7.1 Wetland Mitigation Sites

The mitigation sites are berms that are being removed and rebuilt elsewhere. These sites are shown on Figure 10. The remnant spoils piles and existing berms where wetlands will be re-established are approximately six to eight feet high. These areas were described in an upland delineation as two parameter uplands because they lack wetland hydrology and hydric soils (GHD 2013). These areas are often dominated by vegetation classified as facultative using the USACE classification system. The

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upland delineation identified these areas as problematic due to the current and historic agricultural land use history. The pasture grasses rye grass (*Festuca perennis*) and creeping bent grass (*Agrostis stolonifera*), both facultative, are often dominant in upland areas that are spoils piles. Both of these species are abundant in adjacent pastures. From a statistical perspective, facultative species are those that have an equal likelihood of occurring in uplands or wetlands, (a 34-66% chance). It was determined that on the spoils piles dominant species are not growing as hydrophytes and thus these areas were classified as two parameter uplands (GHD 2013). The facultative wetland species salt grass, (*Distichlis spicata*), was also present to varying degrees of abundance on the upland spoil piles. The presence of this species on spoils piles is likely attributable to the fact that the soil it is growing on was recently excavated from the surrounding drainage channels.

The mitigation project's goal is to mitigate for the impacted wetlands at a ratio of 1:1. This mitigation plan estimates approximately 2.3 acres of freshwater wetland creation and 1.8 acres of estimated estuarine wetland creation based upon adjacent wetland conditions and new tidal inflows. However, hydrologic conditions may vary resulting in differences in the final acreages of each type of wetland. The Project commits to no net loss of wetlands, and seeks to predict the acreage of each type of wetland that will be mitigated, but recognizes that the final acreages of each re-established wetland may differ from predicted targets.

4.7.2 Snowy Plover Mitigation

The mitigation site is an area of low, gently undulating dunes and beach, characterized by European beach grass and to a lesser extent, sand verbena (*Abronia latifolia*). Woody debris adds complexity to the site. It is expected that with the removal of European beachgrass, the site's topography will become lower and smoother.

4.8 Mitigation Work Plan

4.8.1 Mitigation Area

Wetland mitigation will occur at remnant spoils piles sites and at an existing berm removal site. Snowy Plover habitat mitigation will occur on TWC property near the Eel River mouth. These sites are shown in Figure 10 and have been discussed in Sections 4.5 and 4.7. Special status species avoidance is also discussed here although, as previously indicated, avoidance is the principal approach and any mitigation will occur should an impact happen.

4.8.2 Work Plan

The wetland mitigation concept is based on the removal of upland fill that currently interrupts the surrounding wetland matrix. The Snowy Plover habitat mitigation is based on the removal of European beachgrass to create a suitable nesting/roosting site.

Construction Phases and Methods

Grading for wetland mitigation will occur in tandem with excavating the existing channels and with berm construction. Snowy Plover habitat mitigation will occur prior to or in tandem with dune rebuilding so as to ensure no temporal loss of habitat.

Wetland Mitigation

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For the re-established freshwater and tidal wetland areas, native seed mixes will be obtained from a regionally appropriate source prior to commencement of grading activities. Seed will be installed in late September post grading using hand-held equipment. Certified weed free rice straw will be applied by hand on top of seeded areas. Newly seeded areas will be taken into consideration with regard to tidegate operation during the first few months post seeding.

The stormwater pollution prevention plan will also be implemented to protect adjacent Waters of the State and of the United States from runoff impacts. Erosion control measures will be installed as fill is removed to prevent hydrological activity (tidal action, precipitation, or runoff) from damaging grading and seeding.

The wetland mitigation sites will be cleared and grubbed using a combination of equipment and machinery. Removal of spoils piles and the levee section will require the use of heavy equipment such as excavators and dump trucks. Equipment that distributes its weight over a larger surface area, with tracks instead of tires, reduces compaction impacts and will be a preferred specification of equipment used on site. A stockpiling area will be situated so as not to impact the mitigation sites. Dump truck movement will be limited to moving between the spoils piles and levee to be removed and the dump site. This project component will use the same access routes as the overall project for construction equipment.

Erosion control measures will be installed. Environmental monitors will observe the growth and expanding coverage of wetland plantings. These erosion control measures will be removed when coverage of the re-established wetland areas achieves ≥ 70 percent.

Upon completion of implementation, a five-year monitoring and adaptive management period will begin. Invasive species management for target invasive species will be conducted in conjunction with quarterly inspections and management activities during the five year post-construction monitoring period.

Snowy Plover Habitat Mitigation

European beachgrass will be removed using either hand or mechanical methods, or herbicide, with a preference for hand or mechanical methods, including the digging of trenches and burial of the beachgrass.

Upon completion of implementation of all mitigation projects, a five-year monitoring and adaptive management period will begin. Invasive species management for target invasive species will be conducted in conjunction with quarterly inspections and management activities during the five year post-construction monitoring period. Quarterly inspections to assess European beachgrass invasion will be sensitive to Snowy Plover breeding season using techniques such as assessment by binoculars as necessary to avoid any Plover populations during the breeding season (March through September). Maintenance work will occur outside of the breeding season.

Special Status Species Avoidance

Pre-construction surveys will be conducted prior to commencement of construction to ensure that any special status species are not within the project area.

Construction Timing and Sequence

Subject to the availability of funding, the project will begin in May of 2017, the following timeline is an estimate, contingent upon receipt of funding.

Wetland mitigation

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- Preconstruction surveys, seed collection: January-August 2017
- Erosion control, equipment mobilization and site preparation: May 2017
- Construction: May-October 2017
- Clean up and demobilization: October 2017
- Implement mitigation: May-October 2017
- Monitoring of restoration: October 2017-October 2022
- Ongoing maintenance: October 2017-October 2022, or as mandated by permit conditions. The Wildlands Conservancy will be responsible for maintenance through the monitoring period.

Snowy Plover mitigation

- Special status plant survey: Spring 2017
- Preconstruction surveys: August 2017
- Erosion control, equipment mobilization and site preparation: September 2017
- Implement European beachgrass removal: September-October 2017
- Clean up and demobilization: October 2017
- Monitoring of restoration: October 2017-October 2022
- Ongoing maintenance: October 2017-October 2022, or as mandated by permit conditions. The Wildlands Conservancy will be responsible for maintenance through the monitoring period.

Special Status Species Avoidance

- Preconstruction surveys, January-April 2017
- Mitigation Planting and/or Relocation (if needed), January 2017-January 2018
- Monitoring (if needed): January 2018-January 2023
- Ongoing maintenance: January 2018-January 2023, or as mandated by permit conditions. The Wildlands Conservancy will be responsible for maintenance through the monitoring period.

Planting Plan

The following seed mixes will be used to seed the mitigation sites:

Table 4-7: Freshwater Wetland Seed Mix (40 lbs/ac)

Common Name	Scientific Name	**Quantity Lbs/Acre**
Tufted hairgrass	Deschampsia cespitosa	5.0
Slender hairgrass	Deschampsia elongata	5.0

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Common spikerush	Eleocharis macrostachya	2.0
Meadow barley	Hordeum brachyantherum	8.5
Creeping wild rye	Leymus triticoides	8.5
Vancouver wildrye	Leymus vancouverensis	11.0
	Total	40

Table 4-8: Tidal Wetland Seed Mix (40 lbs/ac)

Common Name	Scientific Name	Quantity Lbs/Acre
Tufted hairgrass	Deschampsia cespitosa	6.5
Saltgrass	Distichlis spicata	6.5
Regreen hybrid wheatgrass	Elymus x triticum	11.0
Gumplant	Grindelia stricta	2.0
Meadow barley	Hordeum brachanytherum	4.0
Jaumea	Jaumea carnosa	1.0
Marsh rosemary	Limonium californicum	0.5
arrowgrass	Triglochin maritima	8.5
	Total	40

4.9 Maintenance Plan

4.9.1 Maintenance

The mitigated habitats have been designed to be as self-sustaining as possible. However, natural ecosystems are dynamic and subject to change over time. Natural processes that create dynamic environments include flood, drought, fire, fog, wind, burrowing animal activity, climate change and grazing. Well-planned mitigation areas will respond to these natural processes with similar levels of resilience as adjacent naturally-evolved ecosystems. Anthropogenic (human-caused) disturbances can interrupt the functioning of both naturally-evolved and manmade ecosystems. Maintenance activities shall focus on promoting plant establishment and intervention to limit anthropogenic impacts such as invasive species, trespass, and illegal dumping.

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The Wildlands Conservancy will be responsible for ongoing establishment, maintenance and monitoring upon completion of the construction project. Monitoring typically occurs for five years, unless activities such as replanting are required, which may re-set the establishment timeframe.

4.9.2 Inspection Activities and Frequencies

Inspection will occur quarterly throughout the mitigation monitoring timeframe, or less as needed after year one if plant success exceeds targets. Field notes will document if conditions are normal or abnormal, and the annual monitoring report will recommend remedial adaptive management actions to address any significant issues, as deemed necessary. In addition to the annual monitoring criteria listed above, annual monitoring will also note whether the following conditions are observed:

- Is there any presence of new or re-established populations of target invasive species?
- Is there a distinct pattern of plant die-off?

Inspections shall be documented in a maintenance logbook as to the date, time, site conditions, general observations, type of work to be done, and equipment used or required for follow-up maintenance. Inspection frequency may be altered depending on ambient conditions or the amount of work required at the site and overall success. The logbook will be submitted on an annual basis with the annual monitoring report.

Table 4-9: Schedule for Wetland Inspection and Maintenance During the Monitoring Period

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Revegetation Inspection and Maintenance	I, M			I	M*	M*	I,M*	M*		I		

I = Inspection, M = Maintenance.
* Maintenance will prioritize removal of invasive cordgrass flowers and seeds as they are first forming (May-August).

4.9.3 Maintenance Activities and Schedules

Maintenance shall be conducted throughout the five year monitoring period. Maintenance activities may include supplemental planting, invasive plant control, and herbivory control.

Maintenance shall occur at the most seasonally appropriate time depending on the activity. For example if dense-flowered cordgrass is becoming established on site, the maintenance shall occur prior to the flowering and setting of seed. Table 4-9: Schedule for Wetland Inspection and Maintenance During the Monitoring Period provides a guide for determining when to visit the mitigation sites for inspections and maintenance during the monitoring period.

Maintenance will be conducted to ensure revegetation out-planting is becoming established.

- Supplemental planting will occur in areas that have deficiencies in the seeding, when plants become damaged by maintenance activities, or to fill the niche for areas where target invasive plants are removed (may be in-kind, or if a particular species is not doing well at the sites, a suitable replacement species can be supplemented for original plant species)

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Invasive Species Management

Non-native and invasive plant competition is a major factor to consider throughout the mitigation timeframe and extending into the long-term management timeframe. Control of targeted non-native invasive plant species is critical for the success of Project mitigation areas, including the mitigated wetlands, mitigated Snowy Plover habitat, and the area where Lyngbye's sedge will re-establish, as well as any areas of mitigation that may be necessary due to unanticipated impacts to special status plant species. As mentioned previously, control of dense-flowered cordgrass will be a priority throughout the Project. Since control of this species is not tied to a specific mitigation site, its control will be addressed in the Adaptive Management Plan. Additionally, control of European beach grass will be critical to the success of the Snowy Plover mitigation area and would also be critical for any potential mitigation areas for special status plant species that might occur in dune habitats (for currently unanticipated impacts).

Control of invasive species becomes more complex for the wetland mitigation areas. While a portion (1.8 acres) of the wetland mitigation will re-establish as tidal wetlands, the majority of the 2.3 acres that will re-establish as freshwater wetlands will eventually be managed as pasture. Vegetation data from the Project area shows that existing agricultural/pasture wetlands are currently composed of many non-native species. These wetlands will also continue to be managed for agriculture and non-native pasture species may eventually be seeded or brought in by cattle. Many of the non-native pasture species that currently surround several of the freshwater wetland mitigation areas will likely establish once the wetlands are re-established. Therefore, invasive species control in mitigated areas for wetlands will focus on the most ecologically harmful, target non-native invasive species and will tolerate non-native species that are already established in the working agricultural landscape. Other species in Table 4-10 below will be exempt from mitigation success criteria as they have naturalized in California and/or locally in Humboldt County and are not considered to impact the ecological function of the proposed restored habitats.

The following are sources of information about weed species within the region, and are referenced for the development of this section.

- California Invasive Species Council (Cal-IPC)
- Humboldt County Weed Management Area (HWMA) Strategic Management Weed List
- Final Programmatic Environmental Impact Report (PEIR) for the Humboldt Bay Regional Spartina Eradication Plan

Table 4-10 below lists invasive plant species observed within Project sites based on special-status plant surveys (GHD 2014b), habitat mapping (GHD 2013), and upland delineations (GHD 2014a). Himalayan blackberry (*Rubus armeniacus*) and purple loosestrife (*Lythrum salicaria*) are included on the list of target invasive non-native species as they are problematic invasives that have been observed in the adjacent Salt River watershed (H.T. Harvey & Associates 2012).

Although not known from the project site, dwarf eelgrass (*Zostera japonica*), is also included on this list as it has been found in McNulty Slough in the Eel River estuary (Cal-IPC 2016). This species can rapidly colonize intertidal marine and estuarine habitats, particularly unvegetated mudflats. Colonization by dwarf eelgrass can alter physical habitat structure and alter the densities and richness of resident fauna (H.T. Harvey & Associates 2012). Early detection of dwarf eelgrass is difficult as it is typically found at tides of 2.0 ft MLLW (mean lower low water) or lower, the narrow blades of the eelgrass make it difficult to detect, and surveys are difficult to conduct in intertidal mudflat areas (H.T. Harvey & Associates 2012). If this species is found at EREP the populations will be reported to the Eureka offices of California Sea

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Grant and the California Department of Fish and Wildlife and documented in monitoring reports. Both purple loosestrife and dwarf eelgrass are on the red alert list (the early detection, rapid response action category) for the Humboldt County Weed Management Area.

Reed canarygrass (*Phalaris arundinaceae*) has not been included on the list of invasive non-native species below. This species has been found in the Salt River Watershed but is not known from inside the project boundary at EREP. The most current version of The Jepson Manual (Baldwin et al. 2012) lists reed canarygrass as a native species. There is currently confusion regarding the status of this species in North America as native or non-native , and native populations may have been exposed to gene flow from non-native strains (Waggy 2010). Humboldt State University is currently conducting research on the genotype of the population of reed canary grass at Salt River. Reed canarygrass has the ability to trap sediment and can lead to constriction of waterways. If it is found at EREP, the population will be observed and documented in monitoring reports. While not currently a known problem at EREP it is possible that this species could impact restoration goals. Targeted plants for control are indicated in the column at the far right of the table.

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Table 4-10: Invasive Non-native Species at Project Site Targeted for Control

Scientific Name	Common Name	Cal-IPC Rating	Humboldt WMA Ranking	Target Species: Yes or No
SHRUBS				
Rubus armeniacus	Himalayan blackberry	High	High	Yes
HERBS				
Agrostis stolonifera	creeping bent	Limited	High	No
Ammophila arenaria	European beach grass	High	High	Yes
Arctotheca calendula	cape weed	Moderate	Monitor/Research	No
Cakile maritima	sea rocket	Limited	Not Listed	No
Cirsium vulgare	bull thistle	Moderate	High	Yes
Cirsium arvense	Canada thistle	Moderate	High	Yes
Conium maculatum	poison hemlock	Moderate	Moderate	No
Cotula coronopifolia	brass-buttons	Limited	Not Listed	No
Cynosurus echinatus	bristly dogtail grass	Moderate	Not Listed	No
Dactylis glomerata	orchard grass	Limited	Not Listed	No
Erodium cicutarium	redstem filaree	Limited	Not Listed	No
Festuca arundinacea	tall fescue	Moderate	Monitor/Research	No
Festuca myuros	rattail sixweeks grass	Moderate	Not Listed	No
Festuca perennis	rye grass	Moderate	Not Listed	No
Foeniculum vulgare	fennel	High	High	Yes
Geranium dissectum	cranesbill	Limited	Not Listed	No
Helminthotheca echioides	bristly ox-tongue	Limited	Not Listed	No
Hirschfeldia incana	short pod mustard	Moderate	Moderate	No
Holcus lanatus	common velvet grass	Moderate	Moderate	No
Hypochaeris radicata	rough cat's-ear	Moderate	Not Listed	No
Lythrum salicaria	purple loosestrife	High	Red Alert	Yes
Mentha pulegium	pennyroyal	Moderate	Not Listed	No
Phalaris aquatica	Harding grass	Moderate	High	Yes
Plantago lanceolata	English plantain	Limited	Not Listed	No
Ranunculus repens	buttercup	Limited	Not Listed	No
Raphanus sativus	wild radish	Limited	Not Listed	No
Rumex acetosella	sheep sorrel	Moderate	Moderate	No
Senecio glomeratus	fireweed	Moderate	Not Listed	No
Silybum marianum	milk thistle	Limited	Not Listed	No
Spartina densiflora	cordgrass	High	High	Yes
Zostera japonica	dwarf eelgrass	Moderate	Red Alert	No

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All mitigation areas, including wetland mitigations will be monitored and controlled for target non-native invasive plants (as shown in Table 4-9) during the mitigation timeframe. Various weed management techniques, including but not limited to, mowing, weed whacking, removal by weed wrench or extractigator, hand pulling, or use of equipment such as a Marshmaster may be employed. Invasive species targeted for control are discussed in more depth below.

Invasive plant inspections and maintenance will be conducted quarterly. Managers will need to take into consideration access, the potential for mobilizing wetland soil and the need for repeat/follow-up removal when selecting appropriate techniques.

The following general principles apply to maintenance activities for invasive species management:

- Where invasive and weedy plants have been removed, maintenance activities shall ensure they do not readily re-propagate within the mitigated habitats by filling the open niche with supplemental planting.
- Target invasive plant removal includes manual and mechanical methods to the extent practicable.

Snowy Plover Habitat Target Invasive Species

European beachgrass is a highly invasive perennial grass that reproduces through seed and spreads through rhizomes which enables it to quickly colonize bare sand. It has been used historically to stabilize beach and dune environments near settlements or infrastructure, and has become a pest species that reduces biodiversity, natural dune processes and resilience, and habitat.

Control methods range from hand removal, herbicidal control, and mechanical methods such as digging of deep trenches and burial. Beachgrass control would occur outside of the nesting season for Snowy Plovers. Removal would occur between September and March. Follow up management is often needed. Control of this species will be limited to the area designated for Snowy Plover habitat mitigation or any potential, presently unanticipated mitigations for sensitive plant species that might occur in dune habitats.

Wetland Mitigation Target Invasive Species

Target invasive species for the wetland mitigation areas include purple loosestrife (*Lythrum salicaria*), a species classified as a wetland obligate by USACE classification, Canada thistle (*Cirsium arvense*) and Himalayan blackberry (*Rubus armeniacus*) which are both classified as facultative species (equally likely to occur in wetlands and non-wetlands). Bull thistle (*Cirsium vulgare*), harding grass (*Phalaris aqutica*), and fennel (*Foeniculum vulgare*) are other invasive species known from the project area that are probably less likely to be problematic in the re-established wetlands given their classification as facultative upland species, however if any of the targeted invasive species occur in the re-establishing wetland areas they will be controlled. Although it is not a targeted invasive species in the mitigation plan, it is anticipated that once a tidal connection is re-established to the Inner Marsh, creeping bentgrass will die back and a mix of salt and brackish marsh species will naturally colonize channel banks and the higher flats. Methods for control of these species are briefly outlined below.

Purple Loosestrife: Purple loosestrife in a non-native perennial that competes with wetland plants and its vigorous growth forms dense colonies which can choke freshwater wetland areas. Established populations of purple loosestrife can dominate the seedbank of invaded areas. Purple loosestrife has been found in the Eel River area in Humboldt County; as with most invasive species, it is difficult to remove once established. Management recommendations include monitoring areas not yet infested and hand-pulling newly discovered seedlings to prevent its spread. Mechanical removal (mowing) before the

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seeds mature may help reduce its spread but cut stems may re-root. Neither burning nor flooding has been shown to be an effective control method (Bossard et al. 2000; DiTomaso and Healy 2003). Chemical control is currently not an option for treatment in Humboldt County. Herbicide treatment had been previously proposed to treat populations along the Eel River in Humboldt County, but the planned spraying has been halted until a full environment impact report is prepared under the guidelines of the California Environmental Quality Act. Another option for control is the use of a biocontrol agent to eradicate and limit the spread of purple loosestrife. Biocontrol has been used with some success in the eastern United States. The Illinois Department of Natural Resources has been using three beetle species since 1994 to feed on the roots, leaves and growing tips of purple loosestrife. Reductions in up to 95% of the plant's biomass have been observed (Blossey 2011).

Harding grass: This perennial grass spreads by seed (produced May-September) and also by rhizome. Seeds last between 1-3 years. The best time to control this weed is in the dry summer months of June and July. Before this time it is difficult to distinguish this grass and after this window the grass has already gone to seed. This species grows in large clumps along the coast and can be found invading grasslands and other habitats including waterways. Hand pulling small clumps is feasible for small populations. Larger populations must be controlled by cutting around the base clump with a Pulaski and digging out all roots longer than 2 inches. Mulching is recommended to discourage re-sprouts. Repeated mowing and herbicide are other techniques used for control of this species. Mowing is only a control however, and will not eradicate this species.

Bull thistle: Bull thistle is a biennial or perennial species which invades a range of habitats usually favoring recently or repeatedly disturbed areas such as pastures. This species thrives in moist conditions. Bull thistle reproduces solely by seed and can be controlled by manual methods before flowering. The taproot should be removed to prevent flowering in subsequent years. Combinations of mechanical, cultural, and chemical methods are more effective than any methods used alone. All methods of control require persistence and care.

Canada thistle: Canada thistle is a perennial species that forms dense colonies spreading by its extensive root system and by seed. Canada thistle will grow in moist soils but does not survive in saturated soil. The most effective control of this species will depend on the extent of infestation. Care must be taken when implementing control for this species as it may sprout from any small root fragments left in the soil.

Fennel: Fennel is an erect perennial herb which can alter the composition of several plant communities including wetlands. Fennel reproduces from both the root crown and by seeds. Seeds production is prolific, generally occurring in May, and seed maturation may continue through early November. Management of small stands can be done by hand. Individual plants should be dug out. Cutting, mowing, or chopping reduces the height of plants but leaves roots alive that will support the regrowth of shoots. Repeated cutting may help reduce denser stands over time, but time between cutting should be short as fennel recovers quickly from cutting.

Himalayan blackberry: Himalayan blackberry is a sprawling, evergreen shrub that occurs along disturbed areas and streambanks. It is commonly found in riparian areas, where it forms dense thickets. It can tolerate periodic inundation in both fresh and brackish conditions. It also can readily colonize disturbed areas. Once it is established, it can form impenetrable thickets that shade and outcompete native vegetation, including native blackberry. Mechanical removal or burning are potential methods of removing the plants, but these methods require persistent treatment to be successful. Removing only the

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aboveground growth will stimulate the growth of root sprouts. Repeated cutting, particularly while the plant is flowering can help in exhausting the root stores. The canes and the roots also need to be removed as Himalayan blackberry can easily resprout from any remaining roots, in addition to regenerating from seed.

4.10 Performance Standards

4.10.1 Overview

Performance standards are based upon the mitigation project's goals and objectives for habitat function and abundance, as well as designated mitigation ratios.

4.10.2 Mitigation Site

Tidal Wetland Mitigation Site

Mitigation site hydrology shall be within ranges that maintain suitable wetland habitat as defined by the Army Corps of Engineers (2005). Fourteen (14) or more consecutive days of flooding or ponding, or a water table 12 in (1 foot) or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability).

4.10.3 Vegetation Criteria

Tidal Wetland Mitigation Areas

Tidal wetland post-planting shall meet the annual criteria described in Table 4-1.

Table 4-11: Tidal Wetlands Mitigation Sites Success Criteria

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Table 4-11: Tidal Wetlands Mitigation Sites Success Criteria

Estuarine Wetland Success Criteria	
Year 1	50 percent (≥) absolute cover of native wetland species, of which: No more than 15 percent absolute cover of target non-native invasive plants.
Year 2	50 percent (≥) absolute cover of native wetland species, of which: No more than 12 percent absolute cover of target non-native invasive plants.
Year 3	55 percent (≥) absolute cover of native wetland species, of which: No more than 10 percent absolute cover of target non-native invasive plants.
Year 4	55 percent (≥) absolute cover of native wetland species, of which: No more than 10 percent absolute cover of target non-native invasive plants.
Year 5	60 percent (≥) absolute cover of native wetland species, of which: No more than 10 percent absolute cover of target non-native invasive plants.
All Years	• Native wetland species consist of OBL/FACW/FAC species. • No large non-vegetated bare spots (greater than 25 percent) or erosional area and no permanent inundation during five year monitoring period
	Absolute cover refers to the ratio of named plant species relative to entire site, including bare ground, open water, etc. Target non-native invasive species are identified in Table 4-10.

Palustrine Emergent Wetland Mitigation Areas

Freshwater marsh and agricultural wetland post-planting shall meet the annual criteria described in Table 4-12 below. This criteria is based on existing condition of agricultural wetlands on the site and the continued management of these wetlands for agricultural purposes. See discussion of non-natives and potential for seeding with pasture species in these areas in 4.9.3.

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Table 4-12: Freshwater Wetland Mitigation Sites Success Criteria

Palustrine Emergent Wetland Success Criteria	
Year 1	50 percent (≥) absolute cover of native wetland species, of which: No more than 20 percent absolute cover of non-native species, of which < 10 percent absolute cover is target non-native invasive species.
Year 2	40 percent (≥) absolute cover of native wetland species, of which: No more than 35 percent absolute cover of non-native species, of which < 10 percent absolute cover is target non-native invasive species.
Year 3	30 percent (≥) absolute cover of native wetland species, of which: No more than 45 percent absolute cover of non-native species, of which < 10 percent absolute cover is target non-native invasive species.
Year 4	20 percent (≥) absolute cover of native wetland species, of which: No more than 55 percent absolute cover of non-native species, of which < 10 percent absolute cover is target non-native invasive species.
Year 5	10 percent (≥) absolute cover of native wetland species, of which: No more than 65 percent absolute cover of non-native species, of which < 10 percent absolute cover is target non-native invasive species.
All Years	• Native wetland species consist of OBL/FACW/FAC species. • No large non-vegetated bare spots (greater than 25 percent) or erosional area and no permanent inundation during five year monitoring period
	Absolute cover refers to the ratio of named plant species relative to entire site, including bare ground, open water, etc. Target non-native invasive species are identified in Table 4-10.

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Snowy Plover Habitat Mitigation Areas

Snowy Plover habitat mitigation shall meet the criteria specified in Table 4-13.

Table 4-13: Snowy Plover Habitat Mitigation Site Success Criteria

Snowy Plover Habitat Mitigation Success Criteria	
All Years	• ≤ 10 percent absolute cover of target on-native invasive plants • ≥ 80 percent absolute cover bare ground
	Absolute cover refers to the ratio of named characteristic relative to entire site, including plants, bare ground, open water, etc. Target non-native invasive species are identified in Table 4-10.

4.11 Monitoring

4.11.1 Reference Sites

As described in section 4.5.3 reference sites for wetlands will be chosen that are within 20 ft of six of the re-established mitigation wetlands. Three specific reference locations will be chosen for the tidal wetlands and three for the freshwater wetlands. No data will be collected from the reference sites unless any unusual conditions are observed at mitigated wetland locations. In this case, the reference sites would be monitored to assess the extent of the unexpected conditions. Examples of unusual conditions might be large deposits of sand, or patterns of plant mortality.

Reference sites for Lyngbye's sedge will be the large existing population at the site that will not be impacted by construction. As stated in section 4.5.3, consideration will be given to the fact that it will take time for new populations of Lyngbye's sedge to achieve the same density of that which occurs at existing reference sites.

4.11.2 Wetland Monitoring

The following wetland monitoring activities are applied to each of the mitigation areas in accordance with Table 4-14.

Table 4-14: Monitoring Activities by Mitigation Area

	Wetland Mitigation Sites	Snowy Plover Mitigation Area	Lyngbye's sedge Re-establishment
Vegetative Cover	■	■	■
Non-native Invasive Plant Monitoring	■	■	■
Photo Monitoring Stations	■	■	■

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Sample Size

Power analysis

The appropriate number of sampling plots will be determined for each wetland mitigation area annually using the following methodology. Power analyses will be used in both an *a priori* and *post hoc* manner to evaluate the efficacy of sampling efforts to detect target plant cover changes that correspond to success criteria. Year 1 sampling efforts (i.e., sample size) will be determined using perceived variability of plant cover across the landscape, balanced by the logistical constraints of the initial field effort. In general, an initial sampling effort of 40 or more sample plots is recommended, a sample size of 30 should be considered the minimum effort.

Following year 1 sampling, a *post hoc* power analysis will be conducted to evaluate the probability of detecting the observed change in plant cover given the observed variability among sample points. These values will inform the year 2 sampling effort while also evaluating the adequacy of the year 1 effort. The year 2 sampling effort will be determined by the *a priori* constraints of the power analysis resulting from the data from year 1. These constraints include: 1) the target effect size (year 2 success criteria minus year 1 success criteria), 2) the desired significance level (e.g., a *P*-value of 0.05, 95% confidence), and 3) the desired power (e.g., 80% likelihood of detecting the desired effect size when it is real). In subsequent years, continued *a priori* power analyses will be used to determine the ongoing monitoring efforts and will be tied directly to the success criteria of each subsequent year.

Annual Vegetation Sampling

Monitoring data will be collected using a randomized plot based sampling approach. Placement of sampling plots for each wetland will be determined using the ESRI “Create Random Points” tool on maps of mitigated wetland areas prior to data collection. Quantitative data will be collected within 1 meter square quadrats inside the boundaries of the re-establishing wetlands.. Attribute data collected for each plot will include:

- Absolute cover of all plant species in each plot should be estimated, including native, non-native, and target non-native invasive species. Estimates will include all bare earth or surface water within each plot.
- The wetland indicator status of each plant in the sample plots will be recorded.

Year Five Wetland Delineation

In addition to the year five annual vegetation sampling, monitoring efforts in year five will include a wetland delineation to determine whether the 4.33 acres of mitigated wetlands re-established successfully.

Non-native Invasive Plant Monitoring

During spring or early summer of in years one through five, target non-native invasive plant cover will be calculated from the data collected, as described above. In addition to this monitoring, areas with greater than ten percent cover of the target non-native plant species will be mapped using GPS as long as areas are safely accessible. Maintenance activities to control non-native invasive species will focus on these areas. Each year the acreage of mapped target non-native invasive species will be reported.

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Photo Monitoring Stations

Permanent photo-documentation points will be established within the project site. A minimum of one photopoint is required for each monitored re-established wetland. GPS coordinates will be collected at each photopoint, and the point will be included on a map of the sites.

Photographs will be taken throughout the monitoring period at each monitoring event. Photographs will be taken from each monitoring point and the cardinal direction will be recorded for repeatability. Photos will be taken with a digital camera with a moderate wide angle lens (approximately 35mm focal length if a full-frame sensor, approximately 24mm focal length if a DX sensor, at the widest setting if a consumer-level digital camera with a built in zoom). The make and model of camera and type and focal length of lens will be noted in monitoring documentation. Photographs will be taken from about five feet in height, ideally from a tripod with the height noted, consistent from year to year.

4.11.3 Monitoring Schedule

Monitoring results will be submitted in an annual report for a total of five monitoring reports over the five-year monitoring period. In addition to the quarterly inspections described in Section 4.9.2, wetland monitoring will occur annually for five years in June or July. Some flexibility to account for annual variation in weather conditions is acceptable. The Snowy Plover habitat mitigation area will be monitored quarterly. Quarterly observations will be summarized in an annual monitoring report. Qualitative data will also be noted at monitoring sites including any notable conditions such as patterns of invasion of target non-native invasive species, vitality of plant survivorship, erosion, or illegal dumping or trespass. The re-establishment areas for Lyngbye's sedge will also be monitored annually and total re-established acreage and density will be reported. Annual monitoring reports for all mitigation sites should describe any maintenance activity occurring at mitigation sites. In addition, annual reports should include descriptions of dense-flowered cordgrass control.

4.12 Long Term Management

Long-term management is a strategy for managing the site once the performance standards are achieved (assumed to be after five years of monitoring) to ensure the long-term post monitoring viability of the resource. While the site has been designed to restore self-sustaining ecological processes and functions and to perform in perpetuity, there will still be a need to make occasional inspections and if necessary, perform maintenance tasks to assure the viability of the mitigation site. The site is private property and will remain under the management of the Wildlands Conservancy.

Wildlands Conservancy staff will work in-house and as needed with maintenance crews to attend to the state of the mitigation areas, including periodic trash removal, erosion of wetland areas, and observations of invasions of non-native plants. Should failure of the wetlands or invasive species incursions occur, the Wildlands Conservancy will refer to the Adaptive Management Plan to aid in formulating a forward practical approach.

As noted in Section 4.6, the mitigation project will remain in The Wildlands Conservancy ownership. Long term management will be conducted by The Wildlands Conservancy, or through contracted agents acting on their behalf. Any ongoing management activities will be scheduled by The Wildlands Conservancy at that time and are not expected to require reporting to agencies. However, the Water Levels Management Plan (WLMP) and Adaptive Management Plan (AMP) contained within the project's Eel River Estuary

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Preserve Management Plans (EMP) document serve as guiding references that are subject to periodic regulatory agency review and reporting.

4.13 Adaptive Management for HMMP

Adaptive management is a tool used to cope with the inherent changes and instability fundamental to natural resources and the ecological processes that encompass them. It is a process derived from a collection of practical methods based in research and monitoring. As a philosophy, it holds that conservation and restoration programs should be designed in ways that accumulate knowledge as quickly and accurately as possible so that the management plan can be adapted promptly to better management efforts. This approach allows managers to learn by experience within site specific environments and apply lessons learned to remedy deficiencies using a controlled and scientific approach.

Adaptive management procedures will be recommended on a case-by-case basis, to address any issues identified at the sites during monitoring or maintenance activities. Adaptive management actions could include one or more of the following activities (not exclusive) if success criteria are not met:

1. Adjusted weeding methods to reduce weeds around mitigation sites;
2. Supplemental planting for areas that have deficiencies in the seeding or planted material stock;
3. Supplemental replacement (may be in-kind, or if a particular species is not doing well at the site, a suitable replacement species can be supplemented for original plant species);
4. Supplemental watering (for non-performing plants that required supplemental planting);
5. Additional erosion control; and/or;
6. Hydrologic modification or minor regarding.

Unpredictable natural changes could alter the mitigation area and consequently necessitate changing the goals, objectives, strategies, and actions set forth in this plan. These changed conditions include but are not limited to:

1. Unusual weather patterns, such as extended drought or excessive rainfall;
2. Change in species composition, such as through invasion of a new invasive plant or wildlife species to the site, or increase in spread of existing target non-native invasive plants as listed in Table 4-10, or any new invasive plant species not considered in this document which exhibit similar adverse characteristics of a plant ranked as high, or a change in the ranking of invasive plants;
3. Change in the listing of species status species that could occur or have potential to occur in the habitat mitigation area, or;
4. Erosion or deposition of sediments.

4.13.1 Initiating Procedures

Adaptive management may be implemented if:

- The absolute percent cover of native plants in any monitoring year (averaged over sample plots) is 15 percent below the target level described under “Annual Success Criteria,” or if absolute cover of target non-native invasive species is more than 15 percent over target in monitoring years three, four or five; or if additional final criteria are not met.

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- Performance criteria are not met for three consecutive years, and monitoring indicates that conditions are not improving.

If adaptive management is determined to be necessary, a report shall be prepared analysing the cause of failure and, if necessary, proposing remedial action. A meeting will then be scheduled with the appropriate resource agencies, depending on the specific issue(s), and consensus reached on the best method(s) to address the issue.

Revegetation

Vegetation monitoring surveys may reveal the poor survival rates of seeded or planted stock or inadequate natural recruitment. Replanting will be recommended if monitoring reveals that plant success is failing to meet target thresholds and if it is thought to be the best procedure to attain success criteria. The recommended thresholds for reseeding or replanting are the same criteria listed above for initiating adaptive management.

Reseeding or replanting may also be deemed appropriate to replace dead plants. Plants should be replaced during the next rainy season. This should be considered throughout the monitoring period. If revegetation is initiated and irrigation is required for those plants to become established then the monitoring period shall be extended by one year for each year of additional irrigation and the monitoring period will be reset to year one (in these specific locations) to ensure the plants are self-sustaining, based on Regional Water Quality Control Board recommendations.

Additional adaptive considerations include:

- If a particular species has poor success throughout the site it may be replaced with a different species better suited to actual conditions in the mitigation areas.
- If selected areas are receiving too much or too little water, the system may be modified accordingly.
- Use of weed mats or mulch as remedial action to reduce invasive plant recruitment.

Invasive Species Control

An early detection rapid response mechanism should be in place for weed management throughout the year. Control of invasive plants should occur throughout the year as needed. Invasive species control will likely require repeated effort for at least several years and possibly throughout the monitoring period. Specific needs will be identified based on each year of monitoring, and documented in annual reports. Appropriate control methods will be utilized depending on the species, the abundance and distribution of the species, and the location within the site relative to wetlands or other sensitive resources. With dense-flowered cordgrass, removal shall follow the procedures established in the Final Programmatic Environmental Impact Report for the Humboldt Bay Regional Spartina Eradication Plan and related Mitigation and Monitoring Plan.

- Reducing target invasive non-native plants should occur throughout the year if needed.
- When new control methods are released that are more effective than a previously employed method for control and removal the plan should accommodate the new techniques for the remainder of the monitoring period.
- Target invasive non-native plants will be removed extending three to five feet into areas surrounding the re-established habitat.

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- Routine weeding will be implemented as part of the maintenance.

4.14 Financial Assurances

The Wildlands Conservancy is committed to ensuring the success of the mitigation projects described herein, and has successfully demonstrated its commitment to ecological restoration at multiple preserves throughout the state of California. The Wildlands Conservancy manages its funds to adequately cover costs of the mitigation and monitoring period, which come from its general operating funds, and targeted fundraising activities.

Given its track record, The Wildlands Conservancy requests that no financial assurances, such as a performance bonds, irrevocable trusts, escrow accounts, letters of credit, etc. be required as a part of this project.

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5. Adaptive Management Plan (AMP)

5.1 Adaptive Management Approach

The purpose of the Adaptive Management Plan (AMP) is to provide guidance to property managers in the event that the project fails to meet design targets and goals, or that other unforeseen events occur that threaten the success of the project. It is not intended to be a “catch-all” for disaster management or to supplant activities under the HMMP or regular, principally-permitted, land management activities. This plan does have some overlap with the HMMP, however. The HMMP will include monitoring of mitigation areas through an establishment period of five years. Adaptive management techniques are a standard section of the HMMP to troubleshoot mitigation establishment. This AMP governs areas not covered by the HMMP during the establishment period, and governs both mitigation and non-mitigation areas post-establishment as well as informing the operations described in the WLMP. The HMMP Adaptive Management section and this AMP share approaches and strategies.

The AMP assumes that natural processes drive habitat structure and function, and that habitats exhibit resilience and adaptation to significant disturbance events. Adaptive management therefore should be called for when environmental or human influences negatively affect project goals or designed elements do not exhibit the same level or resilience or adaptability as the natural system.

5.2 Rationale for Adaptive Management

This project will benefit from an adaptive management plan for a number of reasons. The watershed is situated in a region with a combination of a relatively active tectonic regime, highly erodible soils, high rates of annual precipitation, frequent flood events, a strong tidal influence and frequent wave incursion. This creates an extremely dynamic natural system in which to work. Given the large scale of the EREP Project, the variety of habitats and hydrologic conditions, the high initial disturbance to the ecosystem, interactions with agricultural land uses, and typical level of uncertainty associated with the evolution of ecosystem restoration projects, this project will benefit from an adaptive management plan. Additionally, in light of the technical challenges involved in maintaining the restored channel, and resultant complexity of the associated monitoring program, this AMP has been developed as the most effective and flexible management tool.

Adaptive management is a systematic and iterative process that provides for feedback between monitoring and management actions. The feedback mechanism is engaged when monitoring data are analyzed, and the results are utilized to adjust project operations in a manner that optimizes the achievement of project goals.

Adaptive management employs a structured approach, yet it is also a flexible tool that can adjust to a dynamic environment and an evolving project. Adaptive management can thereby keep a project ‘on track’ toward meeting its goals and objectives, despite the variability inherent in dynamic, natural systems over spatial and temporal scales. Adaptive management assists managers in responding to unanticipated changes in the various components of a project such as hydrology, sedimentation, target habitat development, or changes in the species’ response along a restoration trajectory (NRC 2004).

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5.3 Adaptive Management Participants

While there are many agencies, stakeholders, and participants involved in the planning, implementation and management of the EREP Project, the primary land managers are The Wildlands Conservancy or their designees. Given the volatility of weather, ocean and seismic events in the area, and subject to spending caps that may be negotiated with funders and agencies in the context of catastrophic events or Acts of God which may damage or severely impact the goals and objectives of the project, TWC is responsible for ensuring that the project goals and objectives are met. This includes day-to-day and long-term decision-making and ensuring that adaptive management decisions are implemented. TWC is also responsible for ensuring that adequate funding is available to ensure that project goals and objectives are met, which includes funding for implementation, restoration, monitoring and adaptive management, maintenance, and daily operations. They will also be responsible for any ongoing communication that needs to be distributed to the rest of the Adaptive Management Participants. Table 5-1: Management Roles describes the relationship between TWC and parties to the drainage easement for roles and responsibilities of management.

Table 5-1: Management Roles

TASK	PARTICIPANT ROLES	
	Project Components Defined in Current and Assumed to be Amended Drainage Easement	All Other Project Components
1. Monitoring	TWC in accordance to this plan and optional for parties to Drainage Easement	TWC in accordance to this plan
2. Reporting	TWC in accordance to this plan and optional for parties to Drainage Easement	
3. Operations	TWC in accordance to this plan	
4. Maintenance	Parties to the Drainage Easement in accordance to this plan	
5. Fundraising	Parties to the Drainage Easement	
6. Advisory	Technical (Consultants, Outside Reviewers, Independent Experts), Regulatory and other Stakeholders	

5.4 Adaptive Management Process

Two key elements of this AMP are 1) a description of the Participants that will implement the adaptive management participants (Table 5-1), and 2) the conceptual model of the adaptive management process itself (Figure 5-1). This AMP also provides descriptions of the monitoring activities, management triggers and actions, and other elements that together constitute a functional AMP. This AMP is a companion document to the project's CEQA document, the Habitat Mitigation and Monitoring Plan (HMMP), Water Level Management Plan (WLMP) and the other various technical documents that are incorporated into the project's regulatory permits, such as the Biological Opinions (BO).

Monitoring activities, including simple observation that is part of daily management, may identify triggers for specific adaptive management activities. The triggers are organized around the natural processes that

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shape habitats and specific constructed elements of the project. If project monitoring determines that a trigger has been “activated” then there are 3 possible response pathways:

1. Determine that more data is required and continue (or modify) monitoring,
2. Identify and implement a remedial action, or
3. Modify project goals and objectives (this option would only be considered as a last resort and upon careful consideration by and consensus of TWC

There may be multiple management action options when a particular trigger or threshold is activated, depending on a variety of factors such as how far the project is from achieving a specific goal, whether the situation is an imminent threat to local infrastructure, ecosystem services/functions or site stability, etc. The adaptive management process applies to the project as a whole, but management actions can be identified and implemented on individual reaches or sub-reaches, as needed. The process is flexible as it allows for a wide range of management actions but just as importantly it imposes a structured approach as management actions must derive from monitoring results. The adaptive management process also accommodates different physical and temporal scales for management actions. The annual procedures are depicted in Figure 5-2.

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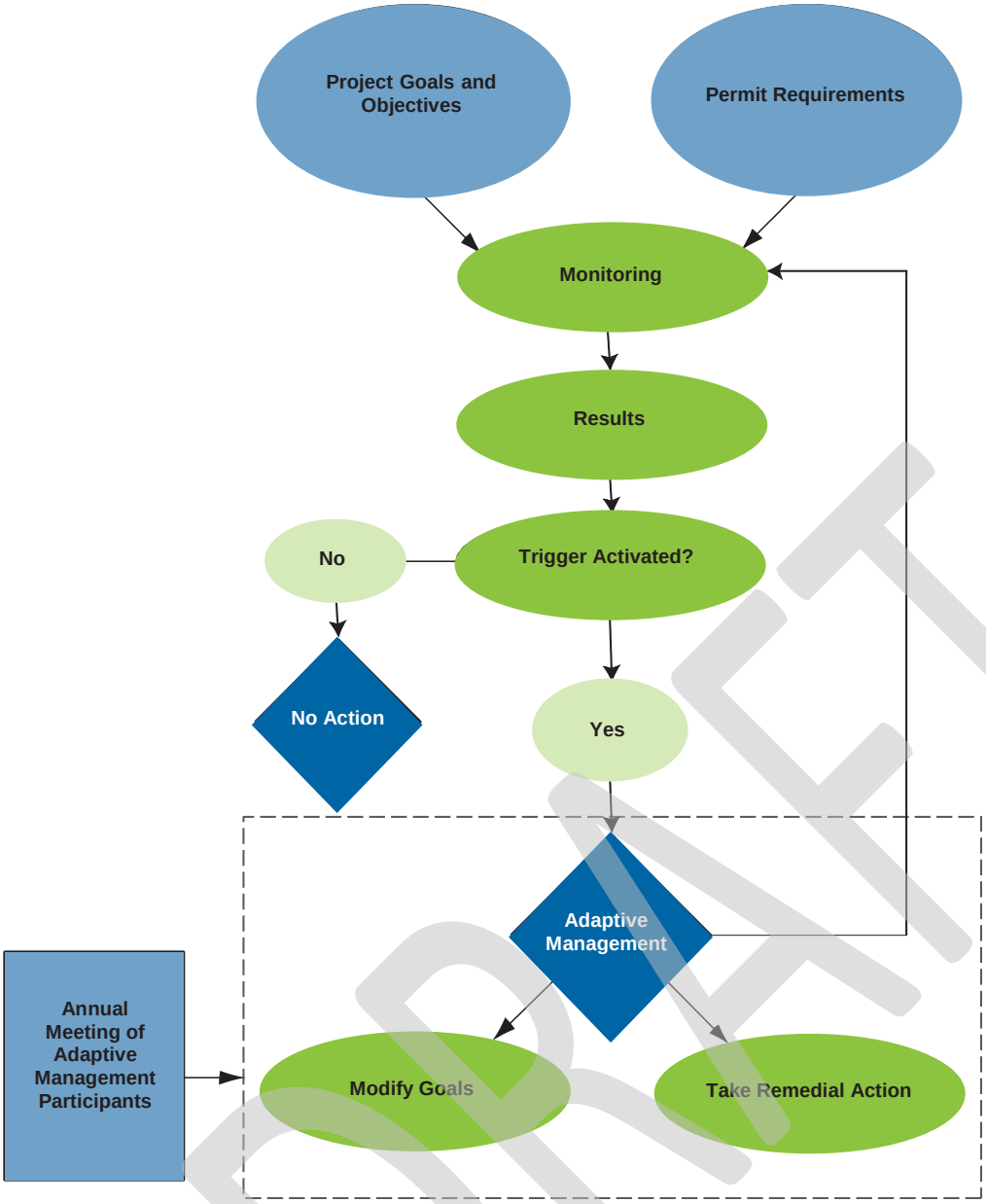

Figure 5-1: Adaptive Management Conceptual Model

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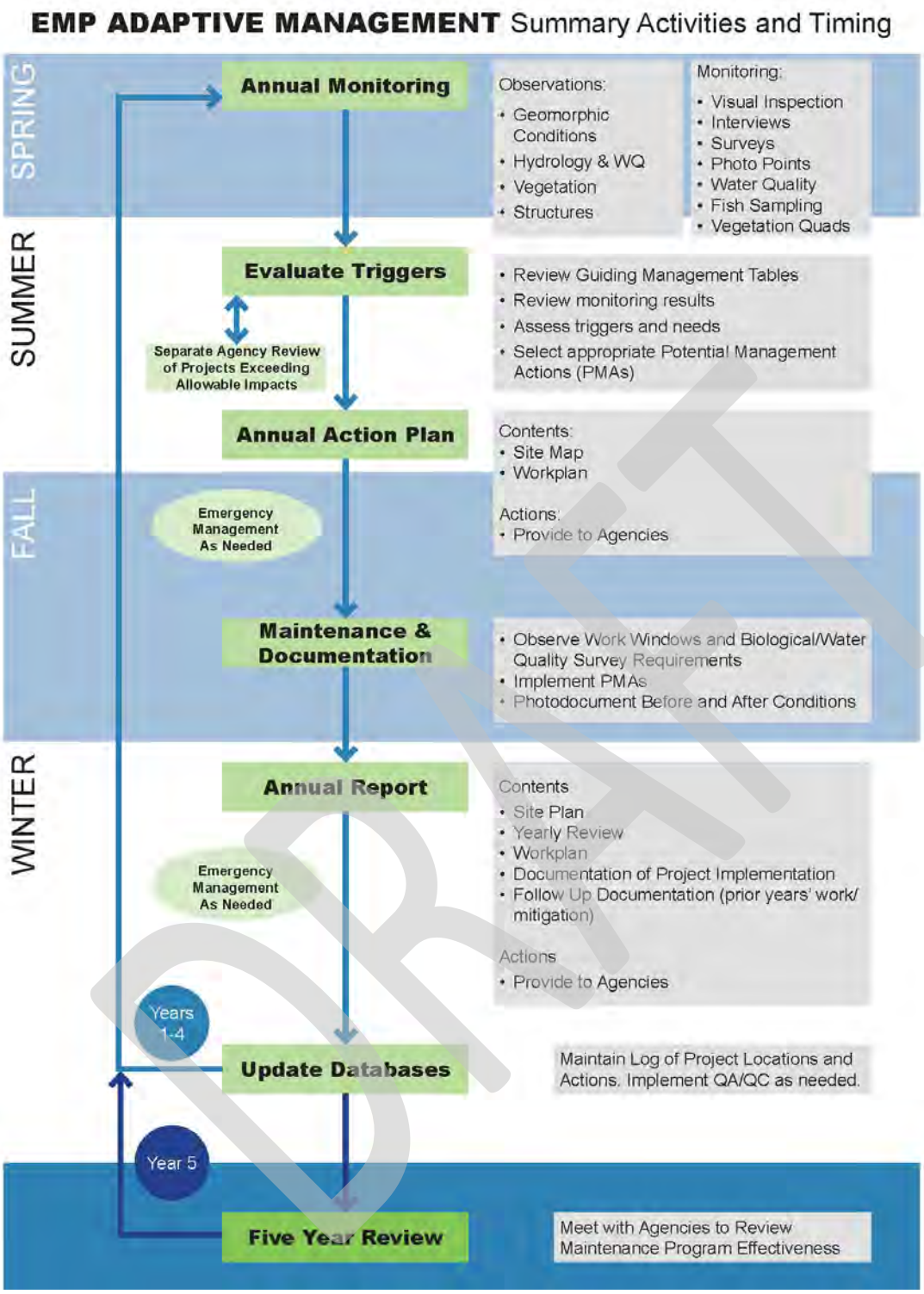

Figure 5-2: Annual Adaptive Management Process

5.4.1 Data Collection, Analysis and Storage

Data analysis will be conducted as soon as possible following collection of field data. Minimizing delays between data collection and analysis will provide an opportunity to return to the project area to verify any discrepancies encountered during analysis and to conduct further field sampling if necessary. Data analysis will be conducted using standard spreadsheet, database, and statistical software as applicable. Any field notes, photos, datasheets and numerical or statistical data shall be stored in raw data format for 10 years after current monitoring year or until the completion of the project or for such terms as may be required by permits or funders. All electronically stored data shall be kept for at least 10 years after the completion of the project.

5.4.2 Review and Assess Monitoring Results

Monitoring results will be assessed in context of the project objectives and will be compared to the success criteria outlined in this AMP, the HMMP, the project's permit requirements, Biological Opinions (BO's), and other documents. This assessment will evaluate the original criteria and objectives given current knowledge to determine if the project is progressing along a trajectory toward meeting the project's success criteria and objectives. This assessment will evaluate whether the system is functioning as designed and whether or not the original criteria and objectives are reasonable and attainable at this point in time.

5.4.3 Quality Assurance/Quality Control (QA/QC)

Quality control (QC) is a system of routine checks to ensure the integrity, correctness, and completeness of the project data. This system may include spot-checks on methods, data acquisition, calculations, and appropriate use of any statistical analyses. Quality control is expected to be performed by the entity conducting the monitoring, and will include a careful review by the Program Coordinator of the data input and analysis, project documentation, and data storage.

Quality assurance (QA) provides for a system of review procedures conducted by individuals/entities no directly involved I the collection/compilation of monitoring data. Quality assurance will be performed after the data is finalized and the quality control is performed. Additional QA and QC will occur during review of the Annual Report.

5.4.4 Reporting and Report Distribution

Monitoring results will be compiled into an annual report and distributed to the regulatory agencies and parties of the drainage easement for review and comment.

5.4.5 Evaluate Triggers

Monitoring results will be reviewed by TWC and compared with management triggers to determine whether project objectives are being met. If the management triggers are activated, TWC will suggest potential management actions that will be discussed during the annual meeting or any necessary follow-up meetings.

5.4.6 Annual Meeting/Adaptive Management Decision-Making

Each year, the Adaptive Management Participants group, consisting of TWC, the regulatory agencies and parties to the drainage easement will meet to review the status of the project. TWC will give a project

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update and present the results of the annual monitoring. The monitoring results will be compared with the project goals and objectives, the HMMP and the AMP and determine any potential required management actions.

5.5 Adaptive Management Elements

Natural ecosystems are dynamic and subject to change over time. This is especially true within the EREP project area where physical processes such as flow, tidal exchange, dune migration and sediment transport influence habitat function and value. Adaptive management may be necessary to help the project meet the long-term goals. The project goals and objectives that could require adaptive management were consolidated to fit into the following three elements and related to the geographic or technical focus of specific long-term management actions.

Element 1: Geomorphic, Erosion/Sedimentation Monitoring and Adaptive Management

Element 2: Hydrology/Water Quality Monitoring and Adaptive Management

Element 3: Habitat Development, Vegetation Management and Invasive Species Monitoring and Adaptive Management

The three elements are further described below and section 5-6 contains the actual monitoring methods, triggers and management action for each element.

5.5.1 Element 1: Geomorphic, Erosion/Sedimentation Monitoring and Adaptive Management

Channel design criteria for the EREP project that relate to erosion and sediment deposition monitoring and adaptive management are to reestablish connectivity of Russ Creek to Centerville Slough in a highly sedimentation prone area that is anticipated to form alluvial fans and distributary channels.

The adaptive management triggers for erosion and sediment deposition control in the Russ Creek channel that will dictate the necessity and/or scale of adaptive management actions include: threats to adjoining property, excessive sediment deposition in the channel/floodplain corridor, excessive sediment deposition in an adjacent Sediment Management Area, excessive bank or bed erosion in the channel, large debris dams, failure to extend the tidal prism in Centerville Slough, severely muted tides in up gradients tidal wetlands, portion of the channel, road and stream crossings and culverts that are not functioning due to excessive sedimentation, impeded fish passage at high and/or low flows, and failure or excessive maintenance of sediment management areas.

A degree of erosion and deposition is expected along the Russ Creek channel as it naturally reshapes to reach a state of equilibrium after construction, and some limited erosion is expected upstream as the channel profile adjusts. Significant erosion requiring adaptive management would include: erosion that undermines the integrity of the restored channel banks and causes a significant loss of existing and planted stream-side vegetation; and erosion that threatens infrastructure such as bridge foundations and road beds. In most cases, significant erosion, deposition, or debris plugs would be anticipated to take place during the winter rainy season. Unless an emergency situation arose as a result, no action would be taken until the dry season. Management actions will be determined based on an analysis of the effects of the event on overall function. This analysis will be based on monitoring data, such as the annual channel cross sections and longitudinal profiles. Examples of an emergency situation requiring immediate action include erosion or deposition that threatens the integrity of infrastructure such as bridges, culverts,

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and roads, or a massive debris jam that plugs the entire creek/slough, thereby threatening the hydraulic and sediment transport performance.

Periodic maintenance/sediment removal within the channel and specified project Sediment Management Areas will be required to maintain design width and depth and to maintain the flow and sediment transport capacity and a functional tidal prism. The accumulation of excess sediment in the Sediment Management Areas is due to high sediment loading from Russ Creek. Major geomorphic modifications would be deemed necessary only if it is determined that no other procedure could be used to ensure achievement of the target restoration goals.

Sediment capture and removal (sediment management) will be integral to the success of the project to help sustain hydraulic conveyance and ecologic function. A major goal of the design effort is to minimize the frequency and need for excavation of the majority of the channels/slough through strategic design of the Sediment Management Area. In addition, the project will facilitate an amendment to the existing drainage easement.

Upslope sediment reduction activities are also ongoing at Russ and Shaw Creek watersheds. These activities will be defined on a project-by-project basis and may include stream bank stabilization and road drainage improvements. Adaptive management for these individual activities is not included in this document as these individual activities have not been fully defined at this time. Even with upslope sediment reduction activities, periodic removal of deposited sediments from lower, near-river Sediment Management Areas and possibly the Russ Creek/Centerville Slough channels will be required to maintain the restored geomorphology.

Short-Term Erosion and Sediment Control

Erosion and sediment control during construction will be conducted in accordance with the construction documents and project permits, including a Stormwater Pollution Prevention Plan (SWPPP) administered by the State General Permit for Storm Water Discharges associated with Construction and Land Disturbance Activities (Order No. 2009-0009 DWQ, NPDES No. CAS000002). The SWPPP shall be developed by a Qualified SWPPP Developer (QSD) and implemented by a Qualified SWPPP Practitioner (QSP) to ensure the receiving waterbodies are not impacted as a result of erosion and sedimentation during construction activities and until the disturbed areas are stabilized and sheet and rill erosion potential are minimized and a Notice of Termination of the general permit has been filed with the Regional Board.

The SWPPP will detail the location and type of erosion and sediment control Best Management Practices (BMPs) for the project area. These BMPs may shift and require short-term adaptive management to find the best solutions to control effects from sediment sources during and immediately following construction. Sediment source control BMPs that may be applicable for this project include, but are not limited to: silt fencing, fiber rolls, rock slope protection, turbidity curtain, controlled dewatering and handling of turbid water, sediment management areas, and check dams. These measures will be implemented prior to and during grading activities and removed once the site has stabilized. Applicable erosion control BMPs including seeding, mulching, erosion control blankets, plastic coverings and geotextiles. Erosion control BMPs describing seed mixes and possible seeding techniques and mulching requirements are covered in the HMMP.

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Erosion and Sediment Deposition Monitoring of Russ Creek and Centerville Slough

Quantification of the geomorphic and hydrologic functions will allow TWC to determine whether the objective of sustaining a dynamic corridor with optimal flow and sediment conveyance is being met. Monitoring to quantify the geomorphic and hydrologic function will include a preliminary visual reconnaissance of the corridor channel to identify potential areas of concern, followed by physical surveys (topographic measurements to include channel cross-sections and a longitudinal thalweg profile) throughout Russ Creek and Centerville Slough. The preliminary visual reconnaissance will be conducted in the early to mid-spring, at the termination of the wet season high flows. The physical surveys will help to quantify the height/depth of erosion or sedimentation within the channel and floodplain as well as quantify any changes in channel flow conveyance area. Prior to the Year 1 monitoring, locations for the cross-sections will be determined once construction is complete and will be focused on areas where erosion or sedimentation events have the greatest potential to occur. Pending findings from the annual visual channel reconnaissance, cross-section locations may be relocated or added to best address altered areas. Physical surveys of the channel will be completed annually for the first 5 years, and then biannually through Year 10. End points of all cross-sections shall be monumented pursuant to standard methods in order to replicate surveys during future surveys. All survey elevations shall be reported in the NAVD88 vertical datum. The longitudinal thalweg profile survey along the entire project reach shall be completed annually, with thalweg elevations shot at least every 200 feet (ft), at a minimum. If there are significant changes in elevations at survey locations or locations identified during the visual reconnaissance as a result of storm damage, excessive accumulation of vegetation and sedimentation, corrective actions will be evaluated and, if determined appropriate, a solution will be proposed to the regulatory agencies. Frequency of surveys beyond Year 10 will be determined by TWC.

Photos will be taken to document channel conditions during the annual visual reconnaissance visits and during winter and summer baseflow conditions at permanently marked photo-documentation points. The number and location of these photo-documentation points will be determined after the construction is complete and will be selected with the long-term monitoring in mind. The locations and orientations of the photo-documentation points will be included in the Record Drawings for the project. These photos will document any changes occurring along the channel. Additional photos shall be taken during/after 2-year storm events to record any damage from flooding or erosion. Photos will be included in annual reports and also used in conjunction with other long-term monitoring methods to determine whether adaptive management actions are warranted.

Sediment Management Areas (SMA)

As described in Chapter 1, to accommodate natural floodplain processes, a sediment management area (SMA) is proposed in an avulsion prone region near the confluence of Russ Creek and Centerville Slough. The SMA will be constructed to emulate a distributary channel network within an alluvial fan by separating existing or created floodplains and low-lying areas with low-relief berms. Large portions of the SMA will be subject to regular inundation, sedimentation and periodic rerouting of Russ Creek through natural fluvial processes. Accumulated sediment in the SMA will be reworked (leveled or tilled), seeded and irrigated as needed to enhance agricultural productivity in those areas.

In the event the SMA performance is not capable of eliminating undesirable sediment accumulation in Russ Creek and/or Centerville Slough, or if sediment accumulation poses an undesirable threat to property or project performance, excavation may be performed on a small scale within Russ Creek and/or Centerville Slough corridor (excavating specific areas of the channel and SMA). Larger-scale excavation/removal may be necessary as well as breaches in the proposed guide berm to provide

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additional sedimentation capacity. Routine vegetation maintenance within the SMA will occur during late summer or early fall months when Russ Creek flows are lowest to minimize potential erosion and sediment transport and to minimize impacts to salmonid and wildlife species. Monitoring and adaptive management activities are tabulated in the subsequent section of this AMP, as well as vegetation removal methods such as controlled flash grazing, manual removal and mechanical removal.

Bridge, Culvert and Tidegate Monitoring/Inspections

Bridge, culvert crossings and tidegates will be monitored to ensure that flow pathways are maintained free of blockages or sedimentation and that erosion around these structures is minimal. Cross-section surveys at these crossings will be conducted annually for the first 5 years, and then biannually through Year 10 to determine if any significant changes are occurring and whether any adaptive management actions may be required. The elevations will be compared to the elevations on the Record Drawings. Qualitative surveys will consist of visual inspections following flood flow events exceeding a 1-year recurrence. Adaptive management may consist of pre- and post- storm maintenance such as clearing or excavating sediment from these locations or may require repair of any failed or damaged road or stream crossings. Frequency of surveys beyond Year 10 will be determined by TWC in consultation with the parties to the drainage easement. Regular maintenance and monitoring will follow procedures outlined in the project's BO to protect fish species such as salmonids and tidewater goby.

Channel and Marshplain Evolution of Inner Marsh

The Inner Marsh portion of the project is designed primarily to reestablish muted tidal exchange to the 125-acres. The increase in tidal prism will also increase sediment re-entrainment potential to help maintain the width and depth of the restored sloughs and maintain optimal tidal exchange between estuary and restored wetlands. This tidal connectivity will also allow for the natural evolution of intertidal mudflat, salt and brackish tidal marshes, and shallow water habitats.

The adaptive management triggers for erosion and sediment deposition within the tidal wetlands include lack of tidal prism establishment, severely muted tides, evidence of erosion on the constructed setback berm, sediment deposition in marsh channels, indications that existing and constructed berms are not functioning as designed or are at risk for failure, and erosion and/or stagnant waters that are contributing to low vegetation establishment. This section of the AMP includes measures to monitor and adaptively manage erosion.

Numerous existing drainage ditches will be filled on site and new, more sinuous, tidal channels will be excavated to enhance the habitat function and quality of the restored marshplain. Monitoring of the geomorphic and hydrologic function of the Inner Marsh wetlands will include an annual preliminary visual reconnaissance of the wetland to identify potential areas of concern, followed by physical surveys (topographic measurements to include combined marshplain/channel cross-sections and longitudinal channel profiles). Surveys will be based on the conditions described in the Record Drawings completed for the project after construction is complete. The preliminary visual reconnaissance will be conducted during low tide in the early to mid-spring, at the termination of the wet season high flows. The physical surveys will help to quantify the height/depth of erosion or sedimentation within the slough channels and marshplain as well as quantify any changes in channel tidal exchange capacity. Pending findings from the annual visual channel reconnaissance, cross-section locations will be sited to best address the project conditions and potential problem areas.

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Physical surveys within Inner Marsh will be completed annually for the first 5 years, and then biannually through Year 10. If there are significant changes in elevations at survey locations or locations identified during the visual reconnaissance as a result of tidal scour, or excessive accumulation of vegetation and sediment, corrective actions will be evaluated and, if determined appropriate, a solution will be proposed to the regulatory agencies. Frequency of surveys beyond Year 10 will be determined by The Wildlands Conservancy.

Photos will be taken to document channel conditions during the annual visual reconnaissance and during spring and summer at permanently marked photo-documentation points. These photos will document any changes occurring within the tidal marsh, the berms, the filled drainage ditches, the salt marsh/upland ecotone, and along the channel. Additional photos shall be taken during/after large storm events to record any damage from flooding or erosion. Photos will be included in annual monitoring reports and will also be used in conjunction with other long-term monitoring methods to determine whether adaptive management actions are warranted.

Setback Berm Maintenance

A new guide berm will be constructed from sediments excavated from Centerville Slough and Russ Creek. The setback berm is designed with a varying interior slope (7H:1V and 3H:1V) to minimize impacts to existing wetlands, minimize wave erosion and create salt marsh/upland ecotone transition habitat. The berm is designed with a crest elevation of approximately 8.0 ft NAVD88 and an anticipated top width of approximately 12 ft. The design includes culverts with radial or tide gates to provide drainage for the outboard ditch, access ramps; and a wide surface for maintenance access, and protection of adjacent grazing lands, roads and structures from tidal flooding. The base of the outboard slope will host cattle exclusion fencing to prohibit erosion from livestock access. All berm slopes will be well vegetated to provide erosion protection.

The setback berm is designed to operate without extensive maintenance. Monitoring will consist of qualitative monitoring including visual inspections performed annually and after major storm and high tide events by an individual qualified to perform these inspections. Monitoring will look for evidence of obvious flooding and erosion or erosion resulting from wind generated waves. If significant erosion or signs of potential failure are observed, engineering surveys will be performed to determine whether any structural repairs are needed.

Dune Reconfiguration

The project seeks to implement passive and active techniques in dune management aimed at increasing resiliency to sea level rise while minimizing impacts to the Western Snowy Plover. Techniques that will be used to re-establish dune configuration are listed in the HMMP and are also described in the DEIR. The design and configuration of Project features will ensure the ability of dunes to migrate eastward, facilitating the re-establishment of zones of recruitment in the dune network capable of protecting the dune system from episodic disturbance. Additionally, relinquishing the need for drainage conveyance in the Western Drainage Ditch allows for dune migration inland as part of its recovery process. Restriction of off road vehicles through signage and fencing of the immediate enhancement area will be implemented to limit use of these areas.

Natural sand dunes are generally self-maintaining, however their form and dynamics are influenced by vegetation, sediment recruitment, storm/wave length, geologic changes and other factors. Both natural and anthropogenic influences can disturb dune formation. Over time natural processes and storm actions

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may re-shape any alterations that are made. Further storm events could cause scarping, potentially further inland from the mean high water mark due to the absence of stabilized vegetation. Performance measures and actions are necessary for tracking changes with time, as are plans for corrective action to ensure the success of the re-established dune configuration.

The areas where dunes will be reconfigured will be monitored to assess the success of re-establishment efforts. Monitoring techniques include: visual inspections, transect surveys, and photo point monitoring. Monitoring will occur along transects established in locations based on final designs that will allow for an assessment of the success of dune building processes. Transect monitoring will include monitoring of vegetation to describe general trends in overall vegetative cover and percentages of native and non-native species. Qualitative observations will be recorded in areas that are planted, to assess the success of establishment. Photos will be taken to document the changing conditions during annual reconnaissance visits at permanently marked phot-documentation points. Dune monitoring will be conducted in collaboration with the Climate Ready Grant Program funded by the State Coastal Conservancy and administered by the USFWS. See the HMMP for specific monitoring details for Snowy Plover Mitigation.

5.5.2 Element 2: Hydrology/Water Quality Monitoring and Adaptive Management

Short-term water quality monitoring and adaptive management measures are covered in the Stormwater Pollution Prevention Plan (SWPPP) (to be prepared). The SWPPP identifies potential sources of pollution that may affect the quality of water discharged from the project area during and immediately after construction. The SWPPP proposes best management practices to minimize the effects of pollution on water quality and outlines short-term adaptive management measures should water quality be adversely affected. It is anticipated that the SWPPP adaptive management measures will apply to the project until such time as the soils at the site stabilize and the grasses begin to establish (approximately 6 months after construction).

Tidal Exchange and Water Level Monitoring

Salinity in the project reaches is primarily controlled by estuary salinity, thus, salinity in the project area will show more temporal change than lateral change. It is anticipated that the majority of the project area (Inner Marsh and Centerville Slough in particular) will have marine salinity in the summer and freshwater salinity in the winter. Multi-parameter water level and salinity recorders will be used to determine seasonal changes in the tidal salinity gradient. In order to quantify and evaluate tidal and salinity exchange up Centerville Slough, a network of 5 multi-parameter recorders (measuring water level, temperature, salinity) are proposed in the Inner Marsh, Centerville Slough, Cut-off Slough and outboard Eel River Estuary. The recorders shall be installed at the following locations: 1) outboard of the tidegates; 2) inboard of MTR; 3) inboard of existing Cut-off Slough tidegate; 4) Centerville Slough near confluence with Russ Creek and 5) Centerville Slough near southern Russ property boundary. Water surface elevation monitoring shall be completed to verify the design intent is being achieved per the WLMP operations. In addition to these measurements, dissolved oxygen monitoring is proposed during July/August when seasonal freshwater flows are low, temperatures are high, and DO levels are anticipated to be at their lowest concentration as well as during the operational transition periods (October/November and April/May). Dissolved oxygen monitoring will consist of hourly measurements using a DO probe at each of the recorder sites over a 2-week tidal cycle. Dissolved oxygen measurements shall be collected within and near the bottom of the water column. The initiation of monitoring will be weather dependent and instruments shall not be installed until after the threat of high flows but initiated early enough to capture

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the transition from freshwater to marine conditions in the estuary and project wetlands associated with the seasonal flow recession.

Additionally groundwater monitoring wells will be installed to measure water levels in areas preserved for agricultural use. Well locations will be determined upon completion of construction and placed in similar locations where pre-project monitoring occurred.

As part of data analysis and reporting, all water levels shall be reported in elevations tied to the NAVD88 datum and compared to Pacific Ocean tide ranges as reported by NOAA at their Humboldt Bay, North Spit tide gauge. If it is determined that anticipated tidal exchange has not been established in the project area (compared to model projections or design capacity), water surface elevation monitoring shall continue in conjunction with any adaptive management required to correct problems with tidal exchange. If no adverse tidal exchange conditions are identified during the first 5 years, and the parties to the drainage easement no longer see the need, then Tidal Exchange Monitoring shall be eliminated unless channel capacity monitoring indicates changes that would likely affect tidal exchange. The above described monitoring data shall be utilized to confirm no abrupt changes in water quality will occur during the transitions between seasonal operations and as further described in the Biological Opinion (BO).

Water Quality

Long-term water quality elements that will be adaptively managed include dissolved oxygen, temperature, and salinity. The objective of the dissolved oxygen monitoring will be to meet the water quality standards as set out in the North Coast Regional Water Quality Control Plan (NCRWQCB 2007) and to achieve dissolved oxygen levels suitable to support salmonids and the tidewater goby. The temperature objective is designed to maintain a temperature range that supports salmonids. The salinity objective is designed to inform whether the saline, brackish, and freshwater tidal areas of the project are located near to where they were predicted.

Dissolved Oxygen. Adequate dissolved oxygen (DO) is a necessary component of good water quality and a healthy biotic system and dissolved oxygen concentrations can determine the suitability for aquatic plant and animal life. For example, relatively high DO is associated with fish reproduction and rearing and low DO levels can cause stress or death for many aquatic organisms. Dissolved oxygen concentration can vary with water depth and with the flow rate of the water. The NCRWQCB standards recommend minimum DO concentrations of 7.0 mg/L. DO is unlikely to be low where there is good tidal circulation; however, in created backwater habitats for tidewater goby, DO could become low. DO is usually lowest in the early morning before aquatic plant photosynthesis begins and in the summer when the temperatures are highest. Continuous monitoring of DO is proposed over a 2-week tidal cycle during the summer (July/ August) at habitats created for tidewater goby. Monitoring shall be performed within and near the bottom of the water column. This monitoring shall provide information on whether conditions in these created habitats are approaching levels of concern for tidewater goby or salmonids.

Temperature. Water temperature may be a concern during the summer, when it is possible that temperatures could become warm enough to affect aquatic species. Water temperature in Russ Creek and Centerville Slough will be monitored from June 1 to October 1 to ensure that it does not limit or control the aquatic species that will inhabit the channel. Water temperature monitoring can also be used to assess the significance of other water quality parameters, such as the amount of oxygen that can dissolve in water, salinity, and conductivity. Water temperature monitoring locations and approach are described above under the Section heading, “Tidal Exchange Monitoring”.

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Salinity. Slight changes in salinity can have substantial effects on aquatic plant and animal life. The project will create saline, brackish, and freshwater tidal areas along the channel accommodating salt and brackish marsh plant species as well as freshwater riparian plant species. These habitats will support wildlife species that depend on specific salinity ranges including tidewater goby and salmonid species. Continuous water surface elevation and salinity monitoring will be conducted as described above under the Section heading, "Tidal Exchange Monitoring".

5.5.3 Element 3: Habitat Development, Vegetation Management and Invasive Species Monitoring and Adaptive Management

The HMMP covers specific monitoring, reporting and success criteria for mitigation created habitats. The AMP elements pertaining to habitat development address the broader issues of long-term adequacy and sustainability in attaining project goals and objectives for non-mitigation created habitats. Adaptive management elements presented here address long-term adequacy in obtaining goals and objectives to improve habitat for specific plant and wildlife species.

Salmonid and Tidewater Goby (Eucyclogobius newberryi*) Habitat*

The restored Centerville Slough, Inner Marsh and Russ Creek will create Essential Fish Habitat (EFH) and has in part been designed to provide a migration corridor for adult salmonids and rearing habitat for juvenile salmonids, especially cutthroat trout, coho salmon, chinook salmon and steelhead. Habitat types will include off-channel habitat, large woody material, and freshwater-tidal ecotone habitat. Studies in nearby Salt River Ecosystem Restoration Project indicate the relevance of tidal freshwater habitat for salmonid rearing (HCRCD 2016). Restoration of Inner Marsh and Centerville Slough shall provide overwintering rearing habitat for juvenile salmonids as well as habitat important for fish transitioning between the ocean and freshwater stream habitats; e.g., adults moving upstream from the ocean to upstream freshwater spawning habitat and juveniles moving downstream from freshwater rearing habitat to coastal marine habitats (e.g., during smoltification). Tidewater goby habitat creation and enhancement is targeted through the creation of tidal marsh, off-channel and tidal channel habitat. Tidewater goby require habitat that allows them to complete their annual life cycle (e.g., adult spawning to pelagic larval phase to benthic juveniles/adults). Tidewater goby have been found to tolerate water quality conditions varying from nearly fresh to hypersaline, and with very low dissolved oxygen; however, conditions that are likely to be more favorable for tidewater goby include well-oxygenated water with salinities <15 ppt (Stillwater Sciences 2006).

Control of Target Non-native Invasive Species

Control of target non-native invasive species shall be performed in the Western Snowy Plover and wetland mitigation areas per the HMMP during the five year establishment period. If the abatement procedures for target non-native invasive species have not been successful (see success criteria in HMMP), The Wildlands Conservancy will continue to perform control of these species on a regular basis to ensure to ensure that these species do not dominant mitigation areas. This maintenance shall continue until weedy species no longer present a detriment toward maintaining self-sustaining habitat for snowy plover, or mitigated wetlands (see HMMP for assessment standards).

*Dense-flowered Cordgrass (*Spartina densiflora*)*

Dense-flowered cordgrass (*Spartina densiflora*) is a non-native invasive perennial that competes with native salt marsh species and typically invades bare mudflat and pickleweed habitats to replace native salt marsh habitat with dense monospecific stands. Dense-flowered cordgrass is a perennial grass that

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reproduces through seed and spreads by tillers. Colonization by dense-flowered cordgrass in channel areas can also result in increased sedimentation. Dense-flowered cordgrass is difficult to eradicate and current eradication techniques being used with some success in Humboldt County include mowing and hand-digging.

Cordgrass has infested an estimated 90% of salt marshes in Humboldt Bay and the adjacent Eel and Mad River estuaries (USFWS 2015). The Outer Marsh north of the Inner Marsh is dominated by invasive cordgrass as is much of the northern Eel River estuary. Discrete isolated patches of cordgrass also exist within Centerville Slough and Cut-Off Slough. The Humboldt Bay Regional Spartina Eradication Plan (Regional Plan) and corresponding Programmatic Environmental Impact Report (PEIR) describe a programmatic approach for eradicating invasive cordgrass at a regional scale (H.T. Harvey & Associates 2012). The proposed Project does not include activities within the Outer Marsh and therefore removal of cordgrass in this area will be subject to available funding and implemented over-time in accordance with the Regional Plan.

Some patches of cordgrass are present south of the dike inside the inner marsh, within the Project footprint. In order to reduce the likelihood of dense-flowered cordgrass (Spartina) colonizing tidal marsh, existing populations in and adjacent to (north of the tidegates) the Project footprint shall be controlled prior to construction using manual, mechanical, and/or approved chemical methods, and in compliance with appropriate methods analysed and disclosed in the Regional Plan and the associated PEIR. Cordgrass located on the edges of Centerville and Cut-Off Sloughs on ORF property will be removed on a site-by-site basis in coordination with the O'Rourke Foundation. This area is less than one acre in size.

Colonization of the Inner Marsh and other portions of the Project footprint by cordgrass will be monitored and controlled for ten years in collaboration with the region-wide eradication program. Invasive weed removal shall be conducted as part of Project maintenance. Weed removal techniques may include manual, mechanical, and/or approved chemical means (including mowing, cutting, pulling, grinding, and/or excavation and burial) as approved by jurisdictional agencies. Heavy equipment would be required to be cleaned and weed-free before entering the site.

It is anticipated that ongoing long-term maintenance will be required to continue to eradicate *Spartina* unless it is controlled throughout all of Humboldt Bay. During the first 10 years of the project, the project site will be monitored annually. If new areas of *Spartina* colonization are mapped within the project footprint they will be flagged for eradication. Eradication of any newly establishing *Spartina* shall be performed at least once a year using current methods in the Humboldt Bay Regional Spartina Eradication Plan. These methods may include manual, mechanical, and/or any approved chemical methods. After the initial 10-year monitoring period, a funding mechanism shall be set in place by the The Wildlands Conservancy to provide long-term maintenance and monitoring to ensure that invasive *Spartina* does not re-invade within the project area.

5.6 Adaptive Management Summary Tables

A series of Adaptive Management Summary tables have been developed to provide descriptions of how the AMP process will be used to evaluate progress toward individual goals and objectives and permitting requirements. The tables are summarized as follows:

Table 5-2: Project Elements and Objectives

Table 5-3: Monitoring Methods and Frequency

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Table 5-4: Management Triggers and Actions

5.6.1 Project Elements and Objectives

Table 5-2 describes the basic project elements that have been identified per the project goals and objectives and spelled out in the various project permits or supporting documents. Individual objectives within each table, linked to specific elements, represent outcomes that can be measured, and help define progress towards the overall project goals.

Table 5-2: Guiding Management Table - Restoration Project Elements and Objectives

Project Elements	Objectives	Monitoring Methods
1. Geomorphology/ Sediment Management/ Structural Integrity	Minimize areas of excessive sediment deposition in Shaw Creek, Russ Creek and Centerville Slough channels Minimize bank erosion and/or threats to public infrastructure Increased tidal prism helps maintain the channel geomorphology and conveyance Minimize cost, frequency, and extent of sediment management maintenance activities Establish complex tidal channel network Minimal maintenance of new channels or filled areas or ditches Create a template of naturally evolving tidal drainage network to benefit target fish and wildlife species. Support aeolian dune building process and re-establishment of dune form Protect adjacent grazing lands, roads, and structures from flooding Achieve stable berm with minimal erosion and maintenance	Visual Inspections Photo-point Monitoring Informal Interviews Cross Sectional and Longitudinal Surveys Engineered Structure Surveys/Inspections
2. Hydrology and Water Quality	Inform seasonal operations of tidegates Maintain channel flow and control flow to minimize erosion Integrate sediment management actions to help sustain hydraulic conveyance and ecological function Maintain drainage of selected properties	Visual Inspections Photo-point Monitoring Water Level/Quality Monitoring

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Project Elements	Objectives	Monitoring Methods
	around project area Meets water quality standards for Dissolved Oxygen (DO) as found in the North Coast Regional Water Quality control plan (NCR WQCB 2007) Supports dissolved oxygen levels in an acceptable range for salmonids and tidewater goby Temperature range supports salmonids and tidewater goby	
3. Habitat	Establish diverse tidal wetland habitat Restore and enhance aquatic habitat Avoid and minimize stranding of fish species in sediment management areas Saline, brackish, and freshwater tidal areas are located where projected, and marsh habitats are created Salinity levels to support tidewater goby and salmonid species, including freshwater tidal habitat during the summer Create habitat and water quality conditions that support salmonids and tidewater goby Restore and expand transition zone between tidal wetland and riparian/upland habitat by creating a salt marsh/riparian upland ecotone along the constructed setback berm Control of invasive species Vegetation maintenance does not contribute to erosion	Visual Inspections Photo-point Monitoring Fish Surveys Vegetation Surveys

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5.6.2 Monitoring Methods and Frequency

The purpose of monitoring is to observe and document progress towards meeting the project's goals and objectives, and to observe the progress of desired habitat establishment and structures. The success of constructed elements, such as tidegates, graded channels, etc, also require observation to ensure proper function. In cases where the constructed elements are natural features such as graded channels,

monitoring is to ensure that natural processes smoothly complete the design process begun by human action.

For each management element, a proposed monitoring method has been chosen that is the most effective way to assess change with respect to the monitoring targets. Details of specific monitoring methods may be more fully described in other documents, such as the project's Biological Opinion (BO), the HMMP, and permit documents. Table 5-3 summarizes the variables to be measured and the general monitoring approach (i.e., cross-sections, qualitative evaluations, etc). The table also contains the monitoring frequency which is based on the temporal scales of the success criteria for each individual management objective. The frequency is determined as the period in which adverse change could realistically be detected and in which management actions could be implemented if the project is not meeting specific goals or to avoid adverse environmental impacts. The monitoring frequency is subject to change, depending upon achievement of project goals and objectives and may vary between project objectives. For example, annual monitoring may be sufficient to determine whether plant survival is within acceptable limits, but more frequent monitoring may be required to ensure that the channel hydrology is functioning as designed while the channel is reaching an equilibrium condition. Some monitoring may be relevant over longer temporal scales (i.e., determining that restoration of the riparian forested community is on a successful trajectory after Year 5 may only require monitoring every 2-3 years).

Table 5-3: Guiding Management Table – Monitoring Methods and Frequency

Monitoring Methods	Monitoring detail	Monitoring Frequency
Visual Inspection	Inspection of marsh/channel development Inspect all culverts, tidegates, bridges, and other conveyance and levee/berm structures, including natural channels and sediment management area connection to channel, for evidence of erosion, uneven settlement, cracking, flow obstructions. Sediment Management Area (SMA): • Sediment accumulation or erosion, damage, or other maintenance. Inspect inflow, outflow, floodplain, channel, sediment removal access points and haul routes. • Inspect vegetation growth in and around sediment management areas.	Time marsh inspections with tidal monitoring: Low tide in early to mid-spring, at termination of wet season high flows. At completion of project, then annual for Years 1-5,Years 7,9,10 and after major storm events or extreme high tides. SMA: Year 1: monthly during rainy season, after storms. Year 2 onward: After storms, and once annually Vegetation: in summer, annually, for life of

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Monitoring Methods	Monitoring detail	Monitoring Frequency
		project
	Dune Reconfiguration: Inspect dune fencing for dune capture progress and/or hazards.	Year 1: monthly Years 2-5: quarterly Years 6-10: biannually
Informal Interviews	Consult with neighboring landowners and other stakeholders	Periodically
Cross-Section/Transects and longitudinal profile surveys	Sloughs, Inner Marsh, Russ Creek: A minimum of 12 cross-sections through Cut-off Slough, Inner Marsh, Centerville Slough and Russ Creek. Include denotation of vegetation locations and type. A longitudinal thalweg profile survey of Centerville Slough and Russ Creek. Additional locations to be determined upon completion of As-Built Drawings.	Annually for Years 1-5, then Year 7, 9, 10. Surveys will only be conducted after Year 10 if annual qualitative assessments indicate excessive erosion or sedimentation is occurring.
	Dune Reconfiguration: Locations to be determined upon completion of As-Built Drawings. Observations will include height and structure of dunes, characteristics of dune building or erosional processes will be described.	Annually for Years 1-5, then Year 7, 9, 10. Surveys will only be conducted after Year 10 if annual qualitative assessments indicate excessive erosion or accretion is occurring.
Photo-point monitoring	Establish photo-points to document areas of potential erosion or sedimentation. Record GPS coordinates for these points for future use.	Photo point monitoring during preliminary visual reconnaissance and during winter and summer baseflows concurrent with channel surveys.

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Monitoring Methods	Monitoring detail	Monitoring Frequency
	Dune Reconfiguration: Establish photo-points to document areas of dune formation, vegetative recovery or invasion by non-native species. Record GPS coordinates for these points for future use.	Years 1-5: biannually Year 6-10: As needed to document changes or potential issues
Water Level/Quality Monitoring	Measure: Surface- and groundwater levels Salinity/conductivity. Monitor at same locations as tidal water levels, DO, and temperature following same criteria. Dissolved oxygen: Measure over two week tidal cycle when DO is expected to be lowest. Monitor at bottom of channel, in range of conditions including tidewater goby habitat. Compare to Pacific Ocean tide ranges as reported by NOAA at their Humboldt Bay, North Spit tide gauge and conditions in Eel River estuary. Temperature: Monitor at same time and locations as tidal water levels and DO. Monitor at range of conditions including tidewater goby habitat. Monitoring locations as previously described and to be verified upon completion of As-Built Drawings.	Continuous Minimum during transitional periods between seasonal operations Salinity: Annually for Years 1-5, every other year if no adverse tidal exchange conditions and no large flood events on Eel River DO: Annually in summer (July-August) Temp: In warmest months of summer(i.e. July/August),for at least 60 days, concurrent with salinity and DO
Structure Surveys	Survey inverts of bridges, culverts, and other drainage structures. Note: Cross-sectional and longitudinal surveys covers this for channels.	Initial survey upon completion of construction. Periodic surveys (every 3-5 years) afterwards.
Fish Surveys	Tidewater goby and salmonids: Beach seine or dip net surveys at locations to be determined upon completion of As Built Drawings. Follow USFWS protocol for gobies in habitats specifically created to support gobies. For juvenile salmonids, use baited traps or	Years 1-5: TWG: one event in spring; one event in summer. Years 6+ - if gobies present every year in

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Monitoring Methods	Monitoring detail	Monitoring Frequency
	beach seining as per Wallace and Allen (2009). In addition to the monitoring described herein, monitoring may also prescribed per the HMMP and the project Biological Opinion/Biological Assessment, including: • Channel geomorphology monitoring • Vegetation monitoring per the HMMP • Invasive species monitoring • Fish monitoring • Water quality monitoring	Y1-5, no need for further monitoring. Juvenile salmonids: At least one monitoring event in summer, coinciding with temperature and DO monitoring.
Vegetation Surveys	Mitigated wetlands: sampling as described in HMMP. Non-mitigation wetland conversion: Collection of vegetation data along three elevational bands with 10 plots per band. Plot locations randomly generated in GIS. Absolute cover of all species will be estimated along with absolute cover of bare ground and water. Dike and channels will be excluded from sampling. Vegetation characteristics including cover of native and non-native species and species diversity will be assessed annually years 1-5 and in years 7 and 10. Annual monitoring for dense-flowered cordgrass.	Mitigation Wetlands: Annually Years 1-5, unless success criteria are not met, and as described in HMMP Non-Mitigation Wetland: Annually Years 1-5, then years 7 and 10
	Dune Reconfiguration: Areas of native and non-native vegetation cover. Qualitative observations of planted areas.	Dune reconfiguration: Years 1-5: Annually; Years 6-10: every other year or as needed.

5.6.3 Management Triggers and Actions

Every year TWC will review monitoring logs and compare to identified triggers to determine the need for adaptive management action. Some observations may result in a finding of monitoring with increased frequency, while others may result in the need to take action. This will be determined through the evaluation of triggers and goals. Management triggers define the specific point or a range of values where monitoring data indicate that the project may be developing along an unexpected or unfavorable

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trajectory and where management actions may be necessary to ensure that the project meets habitat and regulatory performance goals. Table 5-4 contain management triggers and actions.

Management triggers may also include emergency maintenance items such as log jams and tree falls that may threaten channel and floodplain conditions or hydraulic functions. Triggers will be analysed based on effects of the event on overall habitat and channel function and management actions will be determined based on monitoring data, such as the annual channel cross sections and longitudinal profiles. Examples of emergencies requiring immediate action include erosion or deposition that threatens private property or human health/safety. Management triggers are activated at a point before a significant adverse environmental impact occurs. The triggers are purposely set at a low threshold to ensure that adaptive management will be triggered before adverse impacts occur. If assessment of monitoring results determines that no management trigger has been activated, then no management action is required.

The first step in evaluating a management trigger is to determine whether it is a result of the project or of outside factors (i.e., climate change, large-scale regional flooding, or adjacent landowner practices). If it is determined that the trigger has been activated as a result of the project, specific management actions will be applied based on the prescriptions spelled out in this AMP, the HMMP, project permits and documents.

Once a management trigger is activated, there are a range of possible management options. For example, 1) it may be determined that no management action is indicated or that additional (or modified) monitoring may be required to make a decision on whether or not remedial action is required, 2) monitoring results indicate that remedial action is required, or 3) careful consideration of monitoring results (likely over several years) indicate that the original goal was unrealistic or unattainable and that the goal may need to be modified. In the case of the latter this is considered a last resort and would require careful consideration and consensus by TWC, parties to the drainage easement and the regulatory agencies.

Potential management actions listed in the table are not intended to be an exhaustive list. Rather, they represent a likely range of options given the current knowledge of the system and anticipated management actions. Actual actions may deviate from this list given unforeseen monitoring results and/or site performance. Additionally, the details on the timing and degree of each of these actions are equally dependent upon the monitoring results. Final decisions of a course of action will be made annually with TWC, parties to the drainage easement and regulatory agencies. TWC will make the final decision on the appropriate actions to be taken in a given year, and the proposed activities will be reviewed by the regulatory agencies to ensure compliance with existing permits.

Table 5-4: Guiding Management Table – Triggers and Actions

Observation Issue/Area	Trigger	Potential Management Action

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Observation Issue/Area	Trigger	Potential Management Action
Erosion or sedimentation (Channels, Sloughs and Inner marsh)	Channel geometry has been reduced or enlarged by ≥25% compared to as-built conditions.	Follow up assessment of rates/causes of erosion or sedimentation, evaluation of effects relating to structure and function of channel. Site specific BMPs such as soil bioengineering, revegetation, or vegetative revetments. Increased monitoring. Excavation of sediment Regrading of channel profile, and/or re-fill or unplug distributary channels to improve hydrologic connectivity and fluvial processes. Plan and implement sediment management areas in upslope tributary watersheds.
	Surveys show excessive flood/marshplain erosion or deposition that deviates from the habitat design intent (≥20% from baseline)	
	Erosion or deposition: • channel bed and/or banks • bar development • drainage outfalls, Erosion can include knick-point formation or head cuts.	
	Bank erosion visible in vegetation removal areas or areas of bare soil that could promote erosion	Seeding or revegetaion. Apply erosion control fabrics, coconut fiber rolls, or other BMPs to redirect or reduce the energy of flows over erosion area. Look for potential causes of erosion (upstream effects, backwatering, obstructions)
	Erosion or aggradation that threatens infrastructure such as: • bridges • levees/berms • culverts • roads	Observe patterns of erosion and hydraulic conveyance to ascertain causes. Target solution to address sources of erosion where possible. Repair damaged structures. Conduct pre- or post-storm maintenance to remove excess sediment Remove obstructions Repair failed or damaged culverts, channel

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Observation Issue/Area	Trigger	Potential Management Action
	• or tidegates	crossings, or bridges.
	Bridges or culverts are damaged by erosion or are not conveying flows as designed	Rebuild damaged levees/berms, maintain repair access ramps and road atop berm. Excavate plugged culverts, or replace or enlarge culverts as needed Erosion control measures upstream and along channel (protecting bare soil, stabilizing banks, armoring, geotechnical bank protection, dissipating concentrated flows) Implement site specific erosion control BMPs to protect bridge and culvert functions while minimizing channel and wetland habitat benefits.
Sediment Management Area	SMA obstructions (log jams, debris flow, sediment slug) prevent alluvial fan formation Sediment is depositing in downstream channels, not in SMA	Remove obstruction to maintain flow conveyance or eliminate scour related to the obstruction. Excavation sediment management area and deposit excavated sediment at designated reuse areas Trim or remove undesirable vegetation Implement site specific erosion control BMPs such as soil bioengineering and vegetative revetments as need to reduce streambank mass wasting while maintaining channel function and riparian habitat value. Remove obstructions. Install or modify instream structures such as Large Woody Debris (LWD) to re-direct flow and, within SMA, to direct sediment deposition. Remove existing berms to allow additional sedimentation areas to form. Re-visit sediment management area design and re-design individual feature as needed to adequately direct and collect sediment

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Observation Issue/Area	Trigger	Potential Management Action
	Fish found during beach seine or dip net surveys in SMA	Collect and relocate fish to appropriate habitat; analyze whether modifications to sediment management areas are necessary to limit potential for fish stranding.
Vegetation/ Wetland Habitat	Non-mitigated wetland conversion: Tidal wetlands are not establishing in areas as projected. This would be determined by proposed habitat map and results of vegetation sampling along wetland elevation bands. Specific triggers (assessed through vegetation sampling) are invasive species, lack of species diversity, lack of diverse habitats, or drying vegetation (not seasonal senescence).	Review tidal exchange data to assess adequate water for plant survival Test soil to determine if soil characteristics are limiting target plant establishment; amend soils if required. Monitor recolonization, replant if necessary Evaluate in years 1-5 addressing invasive species annually. In year 5 if tidal wetlands not establishing the following management actions may be deemed necessary: 1) active planting or re-seeding, 2) raise and fill marsh plains, 3) adjust tidegate operations
	Vegetation in SMA or channels hinders sediment management capability or hydraulic conveyance in channels	Remove vegetation. Assess channel geometry for adequate slope, cross-sectional area for maintaining channel conditions. Adjust channel width/depth, meander, slope accordingly to achieve bankfull channel in dynamic equilibrium. Selected sediment removal from channel to achieve conditions indicated above.
	Target invasive non-native species do not meet success criteria as defined in HMMP	Weed management/and or invasive species control Continued/increased frequency of monitoring until infestation is under control.
	Weedy vegetation dominates the restoration area and threatens to spread to adjacent landowner properties	
	Increases in salinity not consistent with planned seasonal shifts	Inspect system to determine source of problem (i.e., tidal channels are filling, or sediment management areas have reduced freshwater flows), and repair/modify

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Observation Issue/Area	Trigger	Potential Management Action
		Discontinue monitoring after 5 years if salinity objectives are attained Continue monitoring beyond 5 years until management triggers are no longer exceeded for at least 5 years.
Fisheries Habitat	Tidewater goby habitat not supporting tidewater goby	Continue monitoring If gobies are not present, attempt to determine what is preventing them from using habitat and modify design if feasible.
	Juvenile salmonid habitat not used by juvenile salmonids	If no salmonids are present at likely habitats tidal freshwater ecotone, TWC confers with Regulatory Agencies to determine what is preventing them from using habitat and modify design as feasible. Sediment management if lack of connectivity is restricting species use. Add habitat modifications (e.g., revegetation, channel shading, in-stream habitat features) Discontinue monitoring after 10 years if habitat objectives are met
	DO < 7.0 mg/L	Additional monitoring to establish temporal and spatial extent of low DO zone(s); compare to available pre-project DO data Determine source of problem (e.g., poor circulation, sedimentation, excess decaying organic matter), and repair/modify (i.e., dredge channel, clean out sediment basin management area) Discontinue monitoring after 5 consecutive years in which DO objectives are met; Monitoring duration will be dependent on flows and DO levels and could take longer than 5 years.
	Water temperatures in excess of 22-23°C	Additional monitoring to establish temporal and spatial extent of high temperature zone(s) Determine source of problem (e.g., poor

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Observation Issue/Area	Trigger	Potential Management Action
		circulation, sedimentation) and repair or modify conditions. Remove channel blockage Discontinue monitoring after 5 years if thresholds not exceeded
	Dying aquatic organisms	Evaluate for low DO, sudden change in salinity or temperature, or other disturbances to habitat. Regrade terminal ponds and salt panne areas for better tidal exchange. Change tidegate management, increase tidal exchange as can be safely allowed without flooding or backwatering adjacent properties.
	Stagnant waters and/or salt pannes	
Dune Reconfiguration Area	Dune fencing completely buried	Evaluate dune height. If greater height needed, install new fencing.
	New overwash destroys fencing/dune reconfiguration	Remove debris (ie dune fencing). Evaluate goals and need. If dune rebuilding is still needed, rebuild dune before overwash area becomes attractive Snowy Plover habitat. Install dune fencing as needed. Replant dunemat plants for sand trapping and habitat benefit. Reconstruct dune using mechanical means
	Dune mat plants fail to establish.	Evaluate soil and water conditions. Consider replanting at optimal time of year.

5.7 Attainment of Various Permit Requirements

Short-term monitoring under the HMMP and long-term monitoring under the AMP has been designed to ensure that the project complies with the various permits and biological documents required for this project. A list of these permits is included here. This is not an exhaustive list and additional permits/biological documentation may be required as the permitting process progresses:

- Humboldt County Conditional Use and Grading Permits
- RWQCB Section 401 Water Quality Certification

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- CDFG 1600 Lake and Streambed Alteration Agreement
- State Lands Commission Lease
- California Coastal Commission Coastal Development Permit
- NMFS, USFWS Section 7 Formal Consultation
- USACE Section 404

Additional permit requirements beyond the scope of this AMP may be requested by a specific agency and will need to be folded into the adaptive management process as appropriate.

5.8 Develop Action Plan

Every year, at the same time of year, an annual action plan will be developed to identify any necessary adaptive management activities. The annual plan allows TWC to assess severity of need, optimal timing, and whether or not activities can or should be folded into routine operations or maintenance actions.

The Annual Action Plan will be structured according to the following format:

1. Cover Page:
2. Table of Contents
3. Site Map with locations of workplan project locations denoted
4. Workplan

For each workplan project, describe:

a. The triggers and evaluation process

b. Workplan activities or BMPs to remediate issues. See Management Actions in Section 5.10.

Monitoring data and follow up documentation of actions taken to satisfy the Annual Action Plan will be stored in a data management system with the plan.

Annual Action Plans and follow up documentation will be preserved and included in annual reports to the resource agencies. They will also be presented at the five and ten year interim reviews.

5.9 Emergency Management

Unique circumstances may arise that require emergency adaptive management actions. The threshold for determining if these actions should occur includes these questions:

- Does the delay threaten human life or safety?
- Does the delay threaten property or risk other imminent liabilities?
- Would the delay trigger endangered species or other environmental enforcement actions?

These shall be implemented on an as-needed basis using the best judgement of the EREP management team.

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Documentation of any emergency management activities shall take place upon completion of the adaptive management action. An Emergency Management Brief (EMB) shall describe the crisis situation, circumstances justifying emergency action, adaptive management solution, and provide follow up documentation. EMBs will be included in the Annual Report.

5.10 Implementation of Management Actions

Management triggers may be corrected by a range of management actions, indicated in compliance with project permits. Table 5-5 contain Potential Management Actions (PMAs) that should be followed when management actions are conducted. These PMAs also correlate with Mitigation Measures detailed in the Project Environmental Impact Report and identified Best Management Practices.

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Table 5-5: Potential Management Actions and Impact Avoidance Measures

WETLANDS								
	POTENTIAL MANAGEMENT ACTIONS[1]	LOCATION	WORK WINDOW[2]	WORK DURATION	ANTICIPATED FREQUENCY[4]	DESCRIPTION OF EQUIPMENT / METHODS	DESCRIPTION OF QUANTITIES[3] / MATERIAL	IMPACT AVOIDANCE MEASURE[5] AND BEST MANAGEMENT PRACTICES[6]
1	Implement site specific erosion control BMPs such as soil bioengineering and vegetative revetments[7]	Project-wide	June 1 – October 15	0-120 days	Frequent	Heavy equipment and hand crews	0-10 Acres of Erosion Control BMPs using vegetation, soil bioengineering	FEIR MMRP BMP: a, b, k
2	Remove obstructions if deemed necessary to maintain habitat and hydrologic function	Project-wide	June 1 – October 15	0-60 days	Frequent	Heavy equipment and hand crews	0-50 obstructions including debris jams, trees, sediment plugs (0-10,000 CY)	FEIR MMRP BMP: c, d, k
3	Install or modify instream structures such as Large Woody Debris (LWD) to re-direct flow and sediment conveyance to floodplains and SMAs	Project-wide	June 1 – October 15	0-60 days	Moderate	Heavy equipment and hand crews	Install 0-15 Instream Structures[7] Modify or adjust existing instream structures	FEIR MMRP BMP: b, e, k
4	Sediment excavation to improve channel function	In channel, Project-wide	June 1 – October 15	0-120 days	Moderate	Heavy equipment for excavation	0-25,000 CY of Sediment and 2,000 LF of sediment Removal	FEIR MMRP BMP: d, f, k
5	Additional berm breaches and/or levee lowering	Project-wide	June 1 – October 15	0-60 days	Infrequent	Heavy equipment for grading and excavation	0-5,000 CY of Excavation	FEIR MMRP BMP: k
6	Conduct pre- or post-storm maintenance to remove excess sediment	In channel, Project-wide	June 1 – Nov. 30	0-120 days	Moderate	Heavy equipment and hand crews	0-25,000 CY of Sediment	FEIR MMRP BMP: f, g, k
7	Repair failed or damaged road-stream crossings[7]	Within 100 feet of road-stream crossings	June 1 – October 15	0-60 days	Infrequent	Heavy equipment and hand crews	0-5 Crossings 0-1,000 CY Excavation/Grading/Crossing 0-500 CY Rock Fill/Crossing	FEIR MMRP BMP: f, g, k
8	Excavate plugged culverts and conduct maintenance on tide gates Replace or enlarge culverts and tides gates as needed[7]	Within 100 feet of existing culverts	June 1 – October 15	0-30 days	Moderate	Heavy equipment and hand crews	0-5 Crossings 0-1,000 CY Excavation/Grading/Crossing 0-500 CY Rock Fill/Crossing	FEIR MMRP BMP: d, f, g, k
9	Excavated and/or till sediment management area and distributary channels and deposit excavated sediment at designated reuse areas including application/placement of excavated sediment on agricultural lands	Sediment Management Areas	June 1 – October 15	0-120 days	Frequent	Heavy equipment for sediment removal and transport to reuse areas	0-5,000 CY of Sediment	FEIR MMRP BMP: d, h, k

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	1. POTENTIAL MANAGEMENT ACTIONS[1]	LOCATION	WORK WINDOW[2]	WORK DURATION	ANTICIPATED FREQUENCY[4]	DESCRIPTION OF EQUIPMENT / METHODS	DESCRIPTION OF QUANTITIES[3] / MATERIAL	IMPACT AVOIDANCE MEASURE[5] AND BEST MANAGEMENT PRACTICES[6]
10	Trim or remove vegetation and/or invasive vegetation as necessary to maintain stream function per project design plans[7]	Outside of planted areas. (i.e. SMA)	Year-round, with the exception of the bird breeding and nesting season between 1 March and 1 July.	0-120 days	Frequent	Herbicides, hand pruning tools and possibly chainsaws and brush cutter/mowing or other light equipment	Limited annually to 5 ac or less within SMAs, active bench areas, and active channel areas only. Only trees and shrubs less than 5 years old and no larger than 4" dbh	FEIR MMRP BMP: c, I, k, m
		For maintenance access and maintenance of channel vegetation/ bioengineering	Year-round	0-120 days	Frequent		0-5 Acres Trees no larger than 6" dbh	
		Removal of non-native species Project-Wide	Year-round	0-120 days	Frequent		0-100 Acres	
11	Excavation of tidal channels and/or re-fill or plugged drainage ditches to improve hydrologic connectivity[7]	Project-wide	June 1-October 15	0-90 days	Infrequent	Heavy equipment and hand crews	0-5,000 LF of tidal channels/ditches 0-10,000 LF of berm outboard ditch	FEIR MMRP BMP: d, g, k
12	Repair eroded sections and employ erosion control measures (protecting bare soil, stabilizing banks, armoring, geotechnical bank protection, dissipating concentrated flows)[7]	Project-wide	June 1-October 15	0-120 days	Moderate	Heavy equipment and hand crews	0-1,000 CY of Rock Fill 0-10,000 CY of Grading/Excavation	FEIR MMRP BMP: k, l
13	Raise height of berms without expanding footprint and/or filling wetlands	Existing berm locations only	June 1-October 15	0-120 days	Infrequent	Heavy equipment for grading	0-9,000 LF of Berm	FEIR MMRP BMP: k, l
14	Maintain or repair (as-built) access ramps, access roads and road atop berms	Existing berm locations and other access road ramps	June 1-October 15	0-60 days	Moderate	Heavy equipment for grading and repairs	0-1,000 CY of Road Base 0-1,000 CY of Grading	FEIR MMRP BMP: d, k, l
15	Provide additional revegetation with native plants	Project-wide	Year-round	0-60 days	Moderate	Hand tools and possibly small augering devices/light equipment	0-1,000 plants	FEIR MMRP BMP: k
16	Apply/place excavated sediment on Agricultural Lands	Agricultural Lands	April 1-Nov. 30	0-120 days	Moderate	Heavy/farm equipment	0-100,000 CY of Sediment	BMP: d
17	Install Exclusion Fence	Project-wide	Year-round	0-120 days	Moderate	Heavy equipment and hand crews	0-7,500 LF	FEIR MMRP BMP: b, j, k

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	1. POTENTIAL MANAGEMENT ACTIONS[1]	LOCATION	WORK WINDOW[2]	WORK DURATION	ANTICIPATED FREQUENCY[4]	DESCRIPTION OF EQUIPMENT / METHODS	DESCRIPTION OF QUANTITIES[3] / MATERIAL	IMPACT AVOIDANCE MEASURE[5] AND BEST MANAGEMENT PRACTICES[6]
18	Flash Grazing	Limited to active planting areas and areas of naturally recruiting plants	Spring	Limited time periods as needed for weed control	Frequent	Temporary livestock exclusion fence using temporary electrical fencing Sheep/goats	Will depend on the species, extent and density of weed cover in active planting and natural recruitment areas.	FEIR MMRP BMP: n
20	Raise/Re-configure dunes	Over-wash areas	Year round with exception of active nesting season	0-30 days	Moderate	Heavy equipment and hand crews	0-10 Acres	FEIR MMRP BMP: m, n
21	Install Sand Fencing	Over-wash areas	Year round with exception of active nesting season	0-30 days	Moderate	Heavy equipment and hand crews	0-10 Acres	FEIR MMRP BMP: m, n

[1] Potential Management Actions considered to be "Development" under the Coastal Act and included in the Project's CDP. Potential Actions considered to not be "Development" under the Coastal Act include and not limited to: Fence, Repair, Fence Replacement, Soil Sampling and all Monitoring Methods identified in the AMP.

[2] Work window to be expanded if necessary for "Emergency" conditions. Out of channel grading, excavation, and other earth-moving activities may be extended from June 1 – October 15 to include and period of April 15 – Nov. 30 if predicted rainfall is less than 40% for Ferndale area, and work shall cease upon precipitation. In-channel grading, excavation, and other earth-moving activities shall be limited to June 1 – Nov. 30 only, and if predicted rainfall is less than 40% for Ferndale area, and work shall cease upon precipitation. More restrictive timeframe may be required by CDF&W, USFWS, or NOAA-Fisheries.

[3] Quantities given and a maximum, not-to-exceed value for any given year. Quantities beyond what is specified here would require additional regulatory review/approval.

[4] Anticipated Frequency categories include: Frequent (every 1-2 years), Moderate (every 2-5 years), Infrequent (every 5-15 years), and Rare (15+ years, or not at all)

[5] See FEIR MMRP

[6] BMP Notes

a - Utilize onsite native soil to the extent practical

b – Design techniques and standards shall be similar to those in project plans

c – Chip debris and utilize for onsite mulch to the extent practical

d - Dispose in uplands outside of Coastal Zone or designated sediment reuse areas on agricultural uplands in accordance to the Sediment Reuse Plan Template

e – Under the direction of a qualified biologist

f – Avoid removal of mature (>10 year) riparian vegetation

g – Avoid permanent placement of fill in wetlands

h – Removal of vegetation will be limited to excavation areas within SMAs and necessary to achieve design capacity

i - Per local invasive removal plans (e.g. Spartina Eradication Plan)

j – Shall not block public access

k – Conduct pre-construction surveys performed by a qualified biologist

l - Upon completion of ground disturbance activities and prior to the onset of the rainy season, all bare soil areas shall be seeded in compliance with the seed mix specified in the HMMP.

m- Survey results must indicate that no nesting habitat for any bird species is present in the area

n – Pre-construction rare plant surveys shall be conducted in suitable rare plant habitat

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5.10.1 Annual Report

The Annual Report will be structured according to the following format:

1. Cover Page:
2. Table of Contents
3. Site Map with locations of workplan project locations denoted
4. Yearly Review
    a. Provide data from monitoring activities
    b. Provide progress data/photos from prior year's workplan projects
    c. Emergency Management Briefs, describing:
        i. The triggers and evaluation process
        ii. Emergency justification (why it was an emergency)
        iii. Emergency activities
5. Workplan

For each workplan project, describe:

    a. The triggers and evaluation process
    b. Workplan activities to remediate issues

6. Documentation of Project Implementation

5.10.2 Data Management

Field notes, photos, datasheets and numerical or statistical data shall be stored in raw data format for 10 years after current monitoring year or until the completion of the project or for such terms as may be required by permits or funders. All electronically stored data shall be kept for at least 10 years after completion of the project.

5.10.3 Five and Ten Year Reviews

Adaptive Management will be reviewed with the parties to the drainage easement on an annual basis and with the resource agencies at five and ten year intervals. The purpose of these meetings will be to review the previous annual reports, discuss adaptive management techniques employed and success, and to determine if modifications to the adaptive management protocol are needed. It is not the intent to create a new process but rather to refine triggers and solutions, potentially resulting in updated Guiding Management tables.

At Year 10, the Adaptive Management Plan permit will be up for renewal.

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Appendices

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Figure 9 Proposed Conceptual Mitigation Plan

Figure 10 Snowy Plover Habitat Areas

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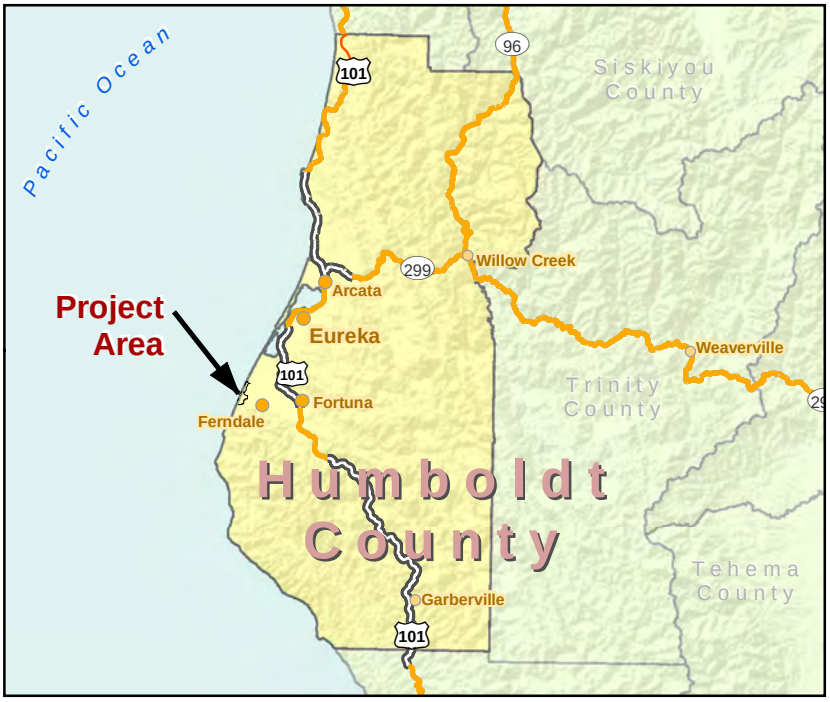

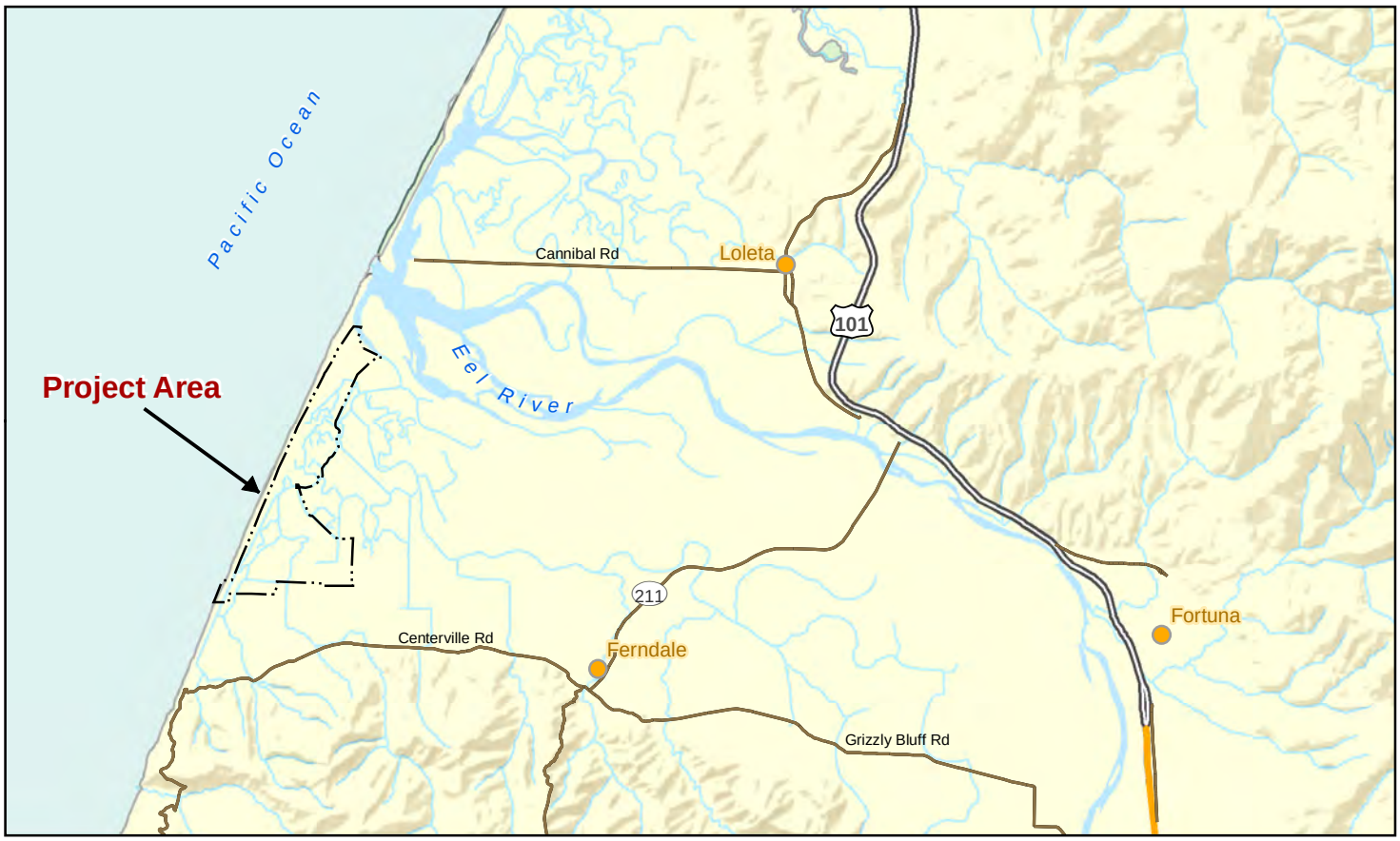

Eel River Estuary Preserve (EREP)
Humboldt County
Counties
Freeway
Highway
Roadway
Waterways

Paper Size 8.5" x 11" (ANSI A)
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Miles
Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Eel River Estuary and Centerville Slough Enhancement Project
HMMP

Job Number	8410882.05
Revision	A
Date	11 Oct 2016

Project Location

Figure 1

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Data source: USA Base Maps; USA Census; Humboldt County transportation data, 2008. Created by:jclark2

Existing Components

- EREP Project Area
- Property Boundaries
- Bridge
- Buildings
- Local Roads
- Waterways
- Culvert
- Tidegate
- Well
- Access Roads
- Dike/Berm

Paper Size 8.5" x 11" (ANSI A)

0 500 1,000 1,500 2,000 Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US

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Eel River Estuary and Centerville Slough Enhancement Project HMMP

Job Number 8410882.05
Revision A
Date 11 Oct 2016

Project Area and Existing Conditions

Figure 2

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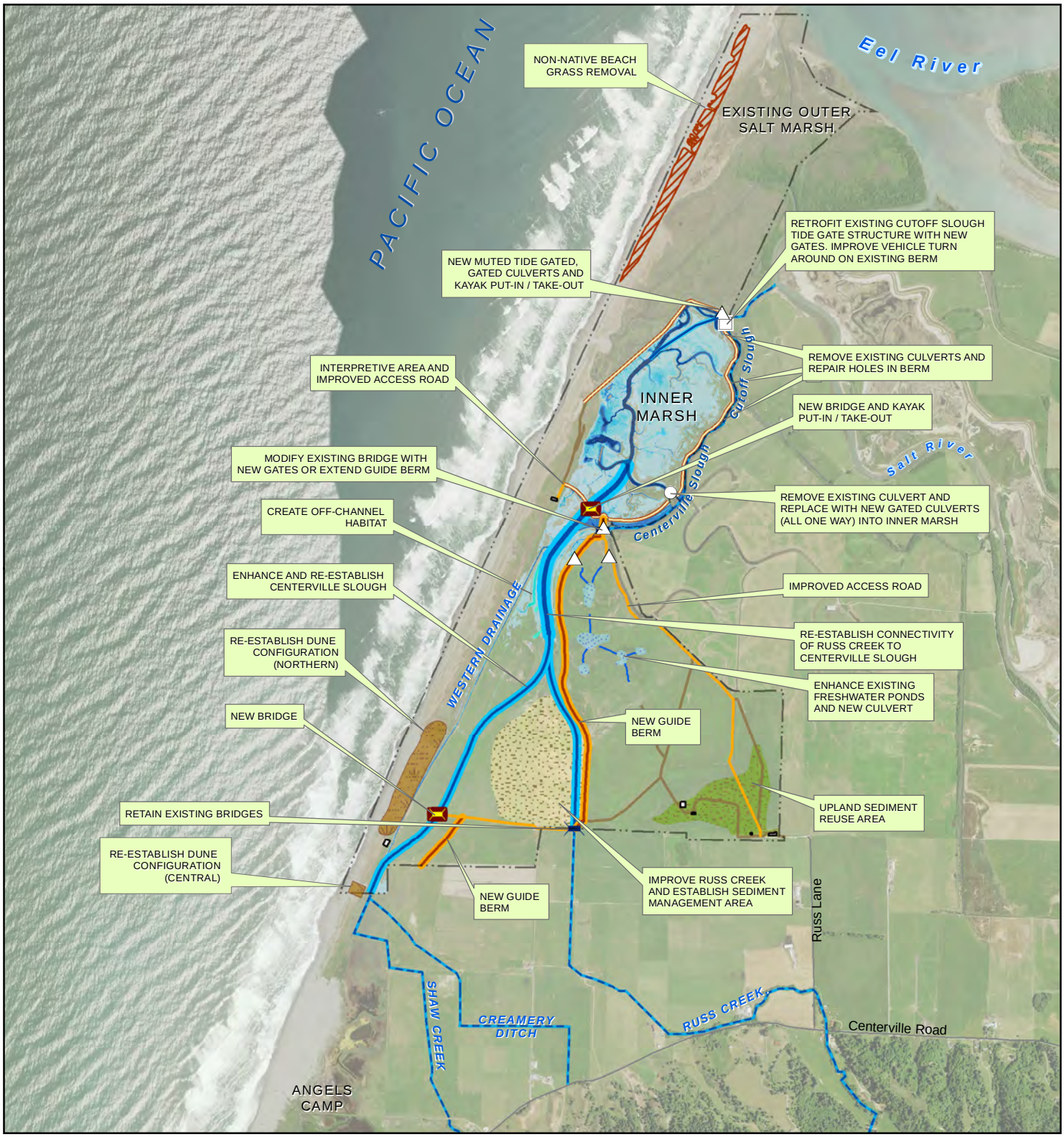
Data source: Google Earth Aerial, 2014; County of Humboldt: administrative boundaries. Created by:jclark2



Existing Features

- Eel River Estuary Preserve
- Buildings
- Existing Drainage
- Existing Access Route

Proposed Project Components

- New Culvert/Tidegate
- Replace Existing Culverts
- Retrofit Existing Tidegate
- Proposed Bridge
- Improved Access Road
- Berm with Improved Access Road
- Proposed Berm / Guide Berm
- Channel Re-establishment
- Freshwater Pond Conveyance
- Non-Native Beach Grass Removal
- Enhanced Freshwater Complex
- Brackish Off-Channel Habitat
- Primary Sediment Management Area
- Upland for Sediment Reuse (36.9 ac)
- Re-establish Dune Configuration

Seasonal Muted Tide Levels (Reference: NOAA Lidar)

- <2.5'
- <3.0'
- <3.5'
- <4.0'
- <5.0'

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Paper Size 8.5" x 11" (ANSI A)

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Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
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Eel River Estuary and Centerville Slough Enhancement Project
HMMP

EREP Proposed Project Components

Job Number	8410882.05
Revision	A
Date	21 Oct 2016

Figure 3

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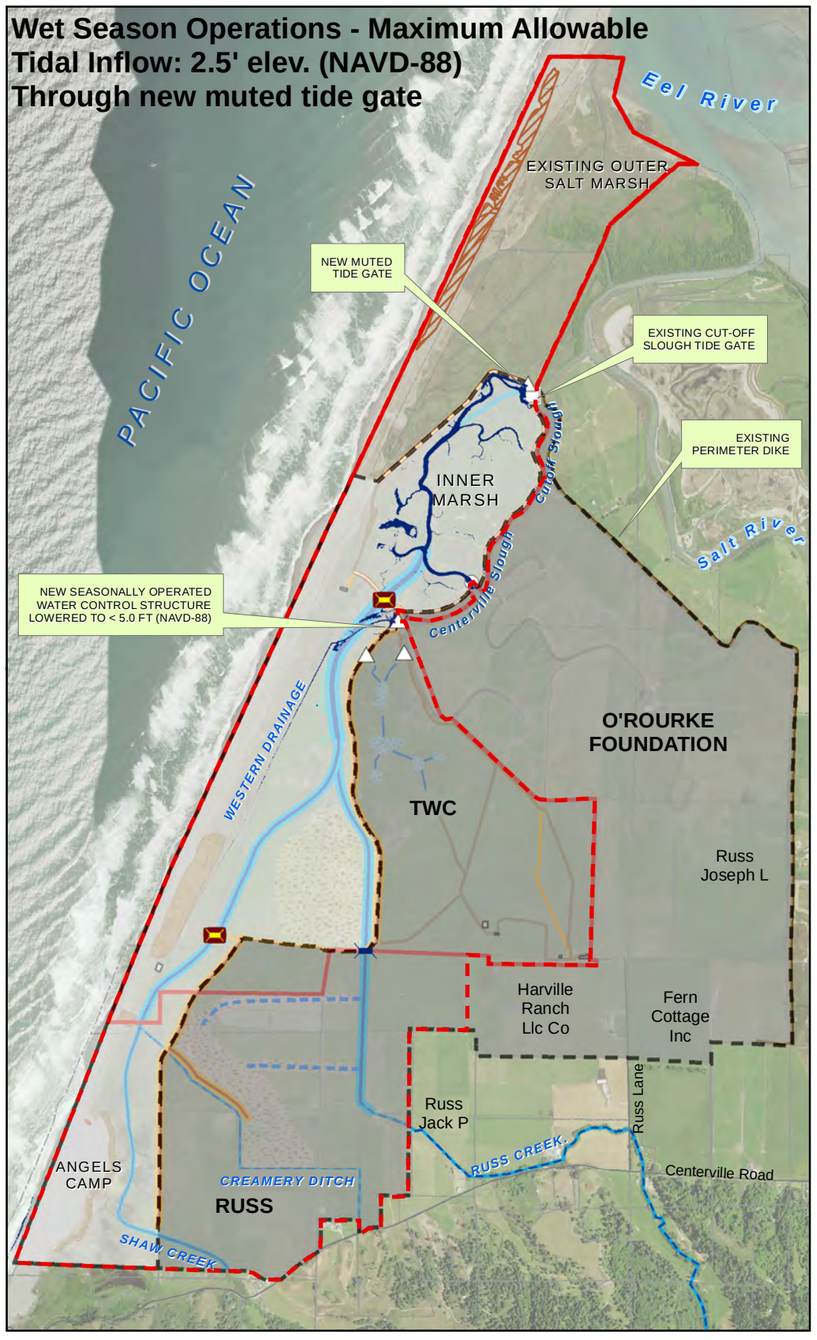

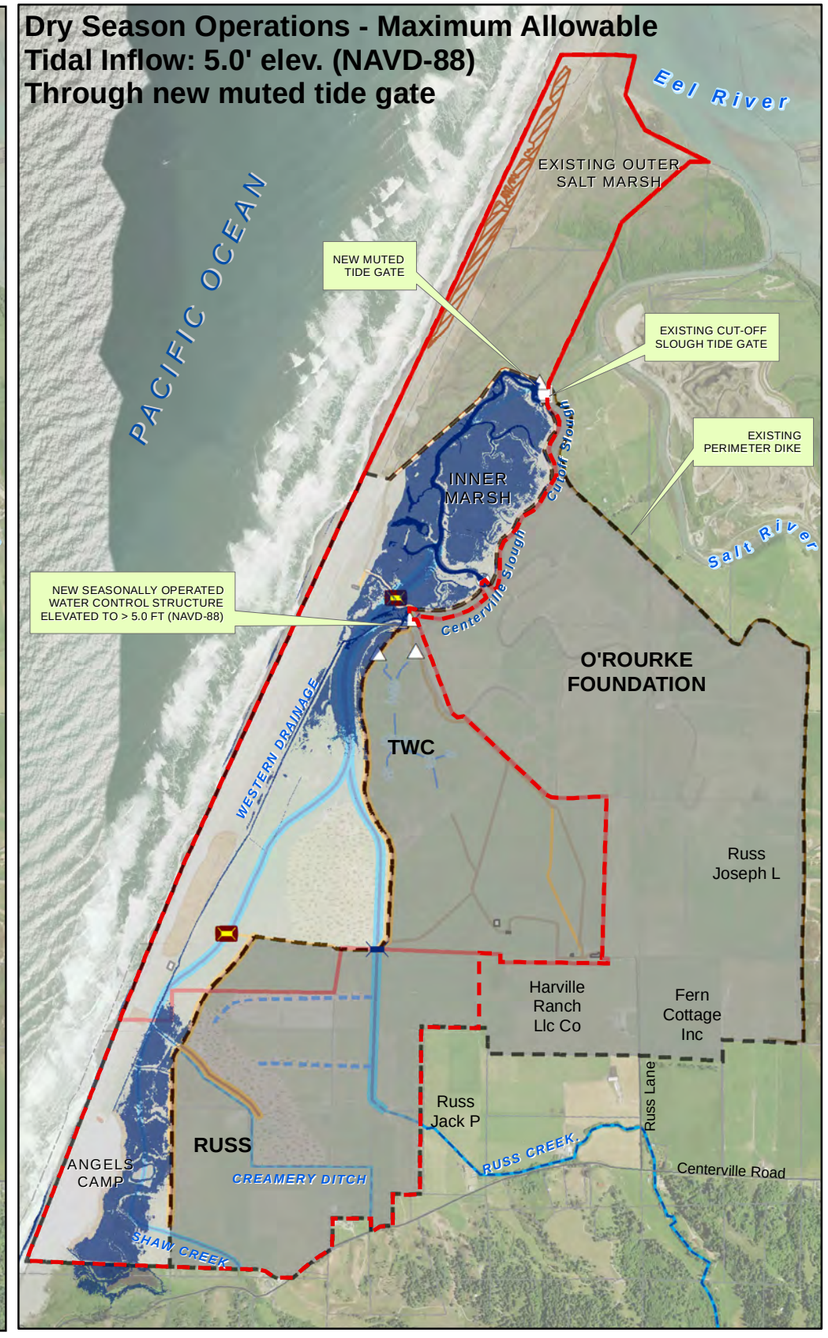

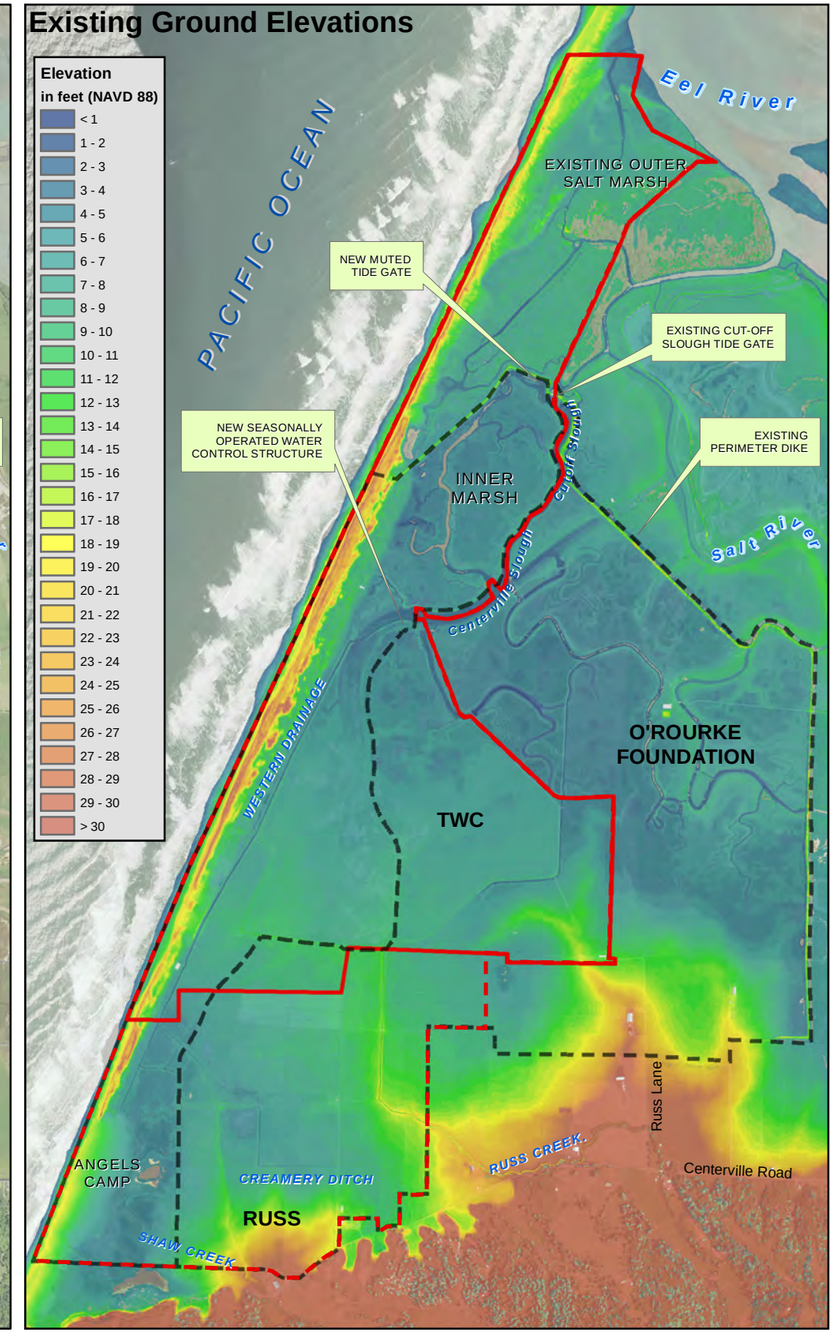

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Existing Features

- EREP Project Area
- CEQA Project Area
- WLMP Area (Eastern)
- WLMP Area (Western)
- Buildings
- Existing Drainage
- Existing Access Route
- Existing Dike
- Existing Bridge
- LocalRoads
- Approx. Parcel Boundaries

ERECSEP Proposed Project Components

- Replace Existing Culverts
- New Culvert/Tidegate
- Retrofit Existing Tidegate
- Proposed Bridge
- Improved Access Road
- Berm with Improved Access Road
- Proposed Berm / Guide Berm
- Channel Re-establishment
- Channel Realignment
- Floodplain Overflow Swale
- Freshwater Pond Conveyance
- Non-Native Beach Grass Removal
- Enhanced Freshwater Complex
- Brackish Off-Channel Habitat
- Primary Sediment Management Area
- Secondary Sediment Management Area
- Re-establish Dune Configuration
- Cut

Muted Tide Levels
(Reference: NOAA LiDAR, NAVD88)

- < 2.5'
- < 5.0'
- above

Eel River Estuary Preserve

Job Number	8410882
Revision	A
Date	21 Oct 2016

Water Level Management

Figure 4

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Data source: Humboldt County Parcels 2016. NOAA lIDAR. GHD Project Components, 2016. NAIP orthoimagery, 2014. Created by:jclark2

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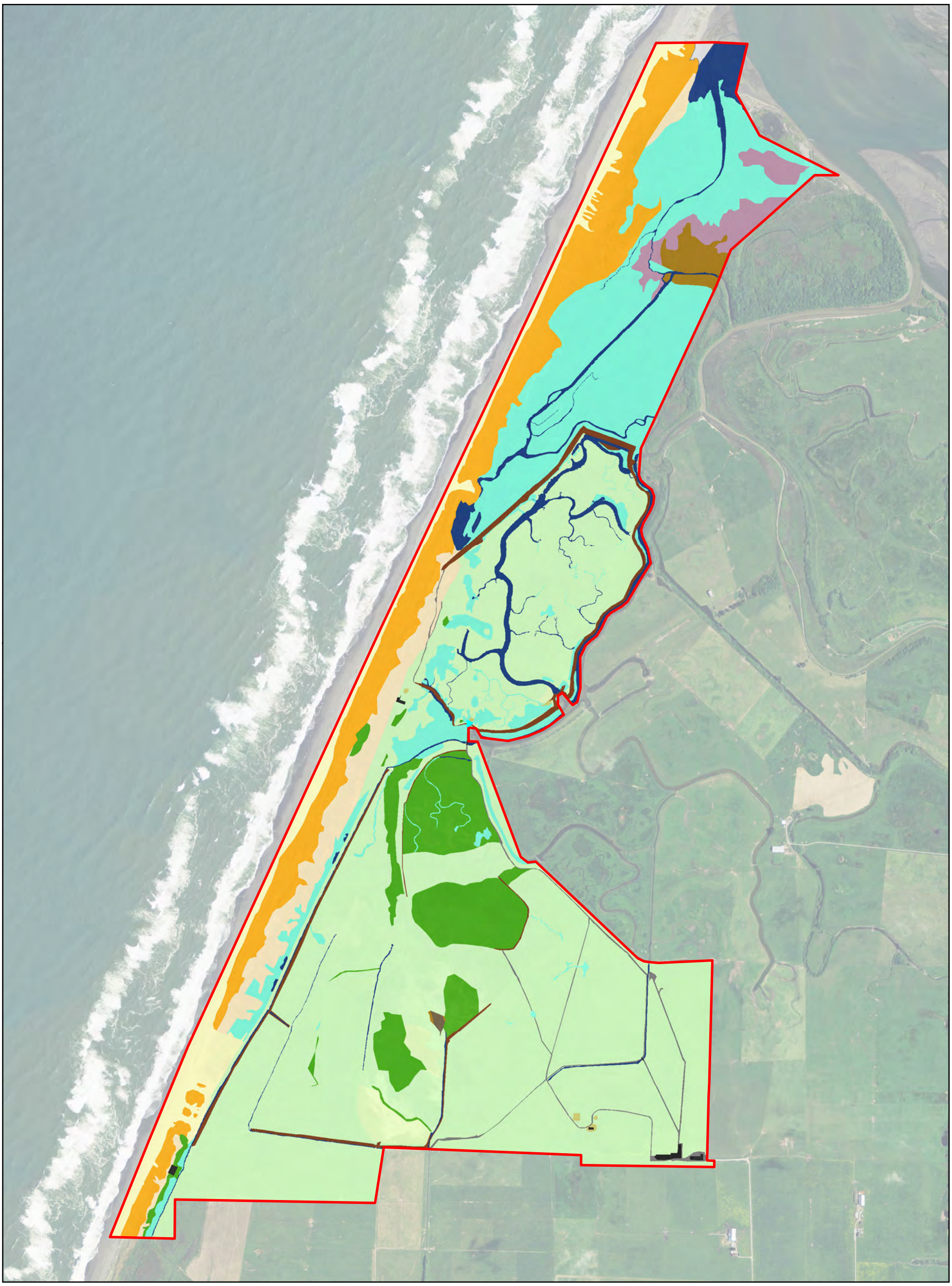

Project Boundary

Agricultural
- Freshwater Emergent Herbaceous
- Pasture and/or Agricultural Wetland
- Forested Agricultural

Non-Agricultural
- Ammophila
- Aquatic
- Bare Ground
- Beach
- Developments
- Dominant Invasive
- Dune Mat
- Forested Riparian
- Levee/Berm
- Roads
- Tidal Wetland (Saltmarsh/Brackish Herbaceous/Mudflat)
- Scrub Shrub
- Unmapped

Paper Size 11" x 17" (ANSI B)

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Eel River Estuary and Centerville Slough Enhancement Project
HMMP

Job Number	8410882.05
Revision	A
Date	11 Oct 2016

Existing Habitat Summary

Figure 5

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Data source: Wetland Mapping, GHD, 2013, and Mad River Biologists, 2011; Parcel Lines, Humboldt County, v41, 2010; Aerial Imagery, 4 band 0.5ft resolution, NOAA, 2010. Created by:jclark2

Project Boundary

Agricultural
- Freshwater Emergent Herbaceous
- Pasture and/or Agricultural Wetland
- Forested Agricultural Grassland

Non-Agricultural
- Ammophila
- Aquatic
- Bare Ground
- Beach
- Developments
- Dominant Invasive
- Dune Mat
- Forested Riparian
- Levee/Berm
- Roads
- Saltmarsh and Brackish Herbaceous
- Scrub Shrub
- Unmapped

Paper Size 11" x 17" (ANSI B)

0 1,000 2,000

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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HMMP

Job Number	8410882.05
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Date	21 Oct 2016

Proposed Habitat Summary

Figure 6

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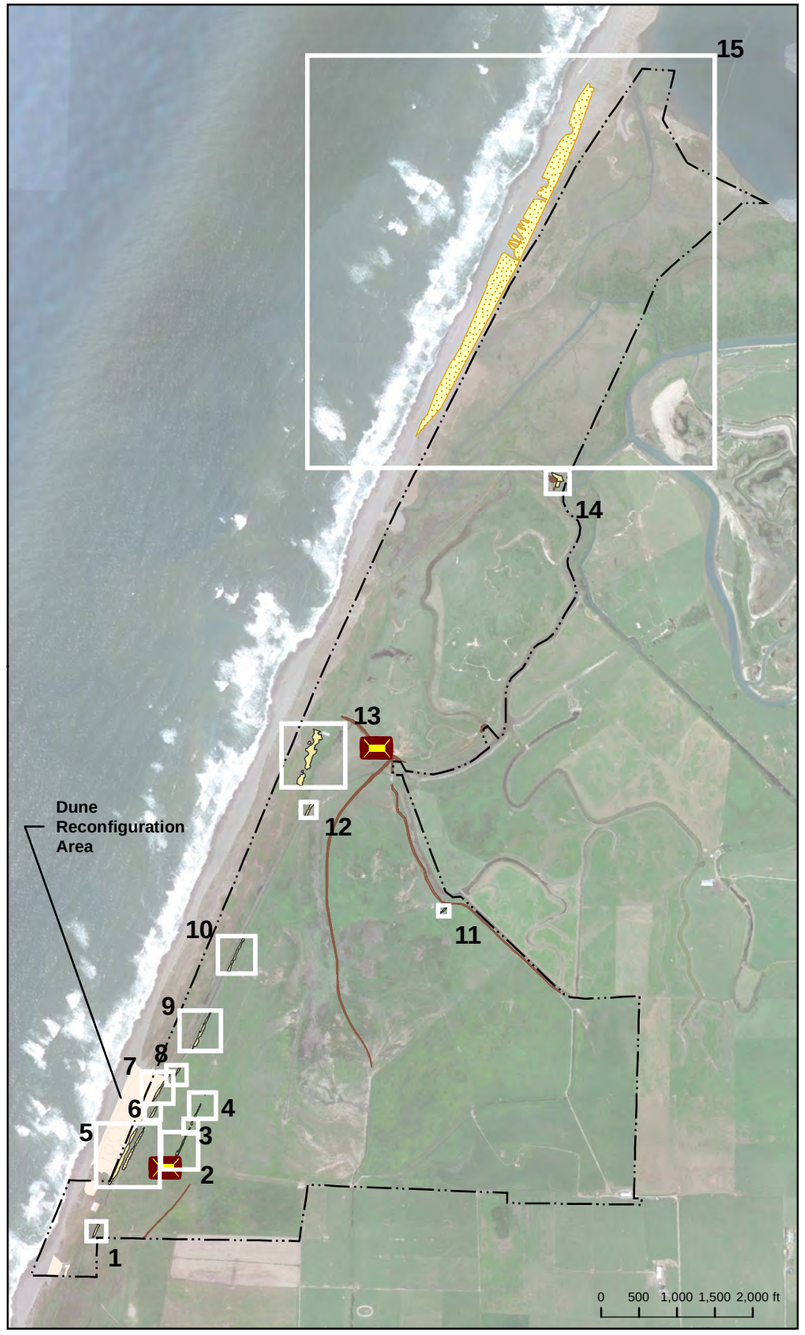

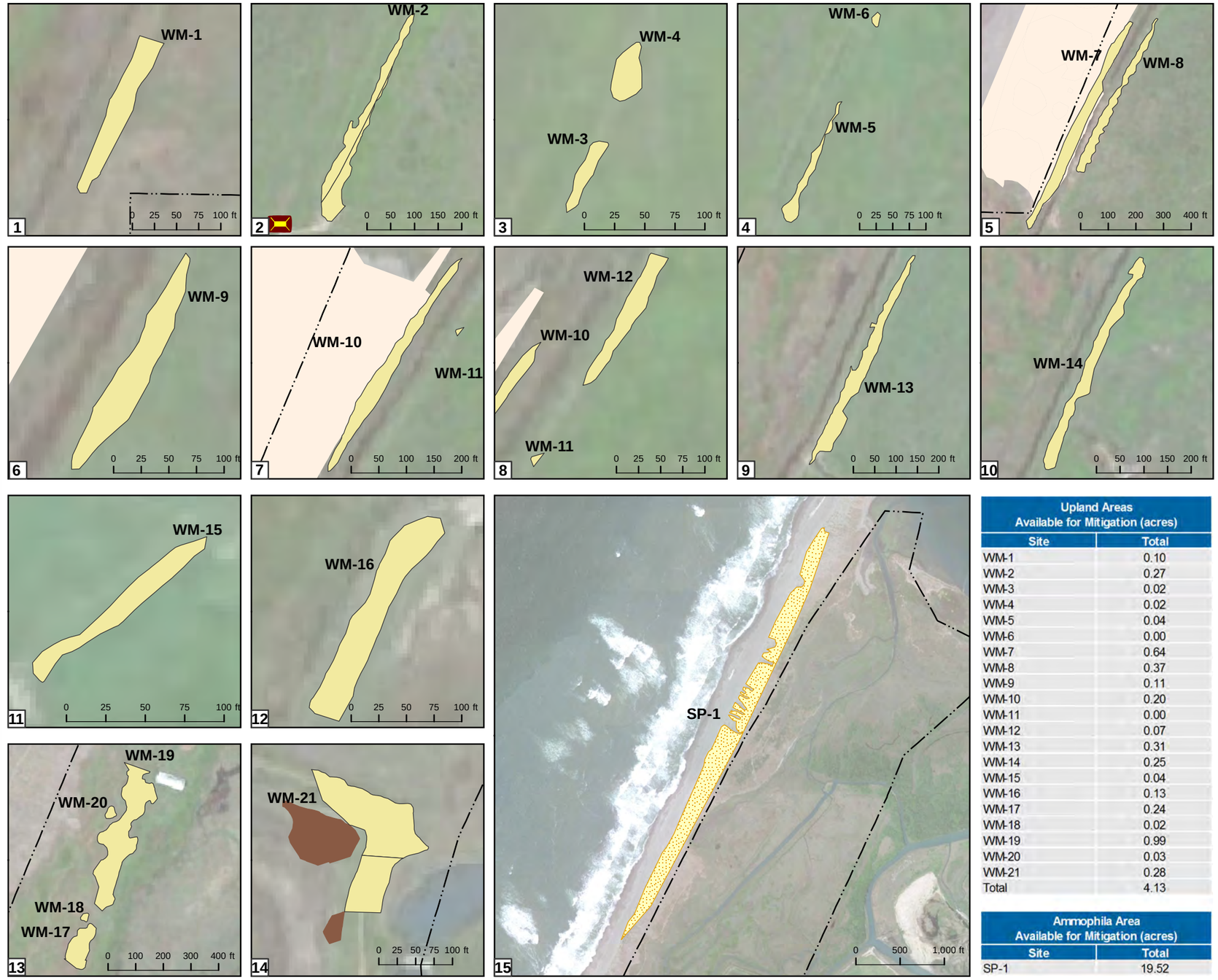

Upland Areas Available for Mitigation (acres)	
Site	Total
WM-1	0.10
WM-2	0.27
WM-3	0.02
WM-4	0.02
WM-5	0.04
WM-6	0.00
WM-7	0.64
WM-8	0.37
WM-9	0.11
WM-10	0.20
WM-11	0.00
WM-12	0.07
WM-13	0.31
WM-14	0.25
WM-15	0.04
WM-16	0.13
WM-17	0.24
WM-18	0.02
WM-19	0.99
WM-20	0.03
WM-21	0.28
Total	4.13

Ammophila Area Available for Mitigation (acres)	
Site	Total
SP-1	19.52

Paper Size 11" x 17" (ANSI B)

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

EREP Property Boundary (Reference: Humboldt County Parcel Data)

Areas of Fill

Wetland Fill (Freshwater Wetlands)

Proposed Bridge

Mitigation Sites

Uplands

Ammophila area available for mitigation

Eel River Estuary and Centerville Slough Enhancement Project HMMP

Job Number 8410882.05
Revision A
Date 21 Oct 2016

Wetland Fill and Mitigation Sites

Figure 7

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Data source: Google Earth Aerial, 2014; County of Humboldt: administrative boundaries. Created by:jclark2

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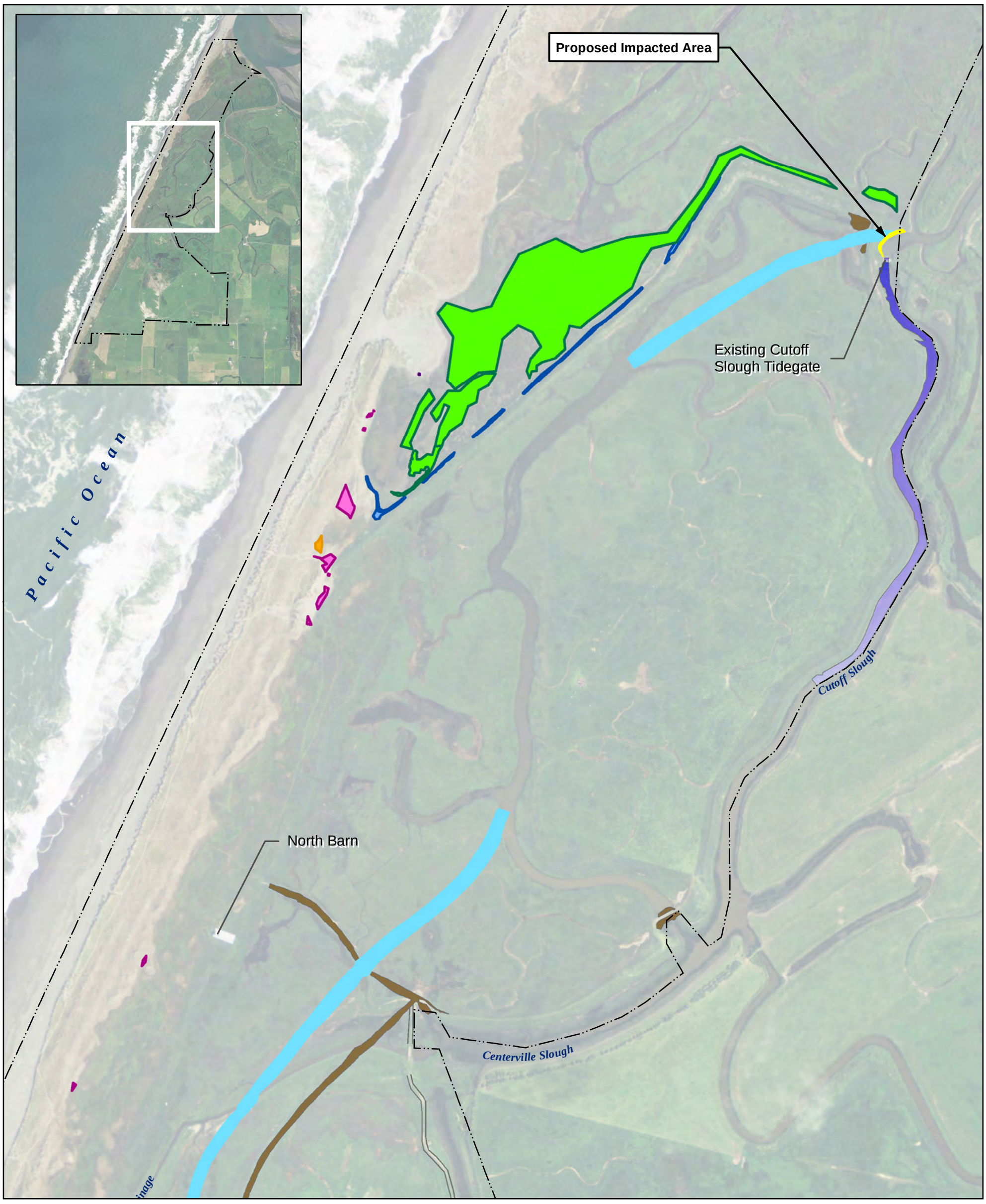

Existing Special Status Species

- Project
- Humboldt Bay's Owl-Clover (CRPR List 1B.2) — 0.41 acres
- Beach Layia (FE, SE, CRPR List 1B.1) — 0.28 acres
- Dark Eyed Gilia (CRPR List 1B.2) — 0.04 acres
- Sand Spurrey (CRPR List 2B.1) — 0.001 acres
- Eel Grass Percent Cover (Dark = 15% Light = 0 - 5%) — *2.07 acres*
- Lyngbye's sedge (CRPR List 2B.2) — 10.05 acres

Proposed Impacted Areas

- Lyngbye's sedge *0.05 acres*

Areas of Ground Disturbance

- Fill
- Cut

Paper Size 11" x 17" (ANSI B)

0 100 200 300 400 500

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Eel River Estuary and Centerville Slough Enhancement Project
HMMP

Job Number	8410882.05
Revision	A
Date	11 Oct 2016

Special Status Species Avoidance

Figure 8

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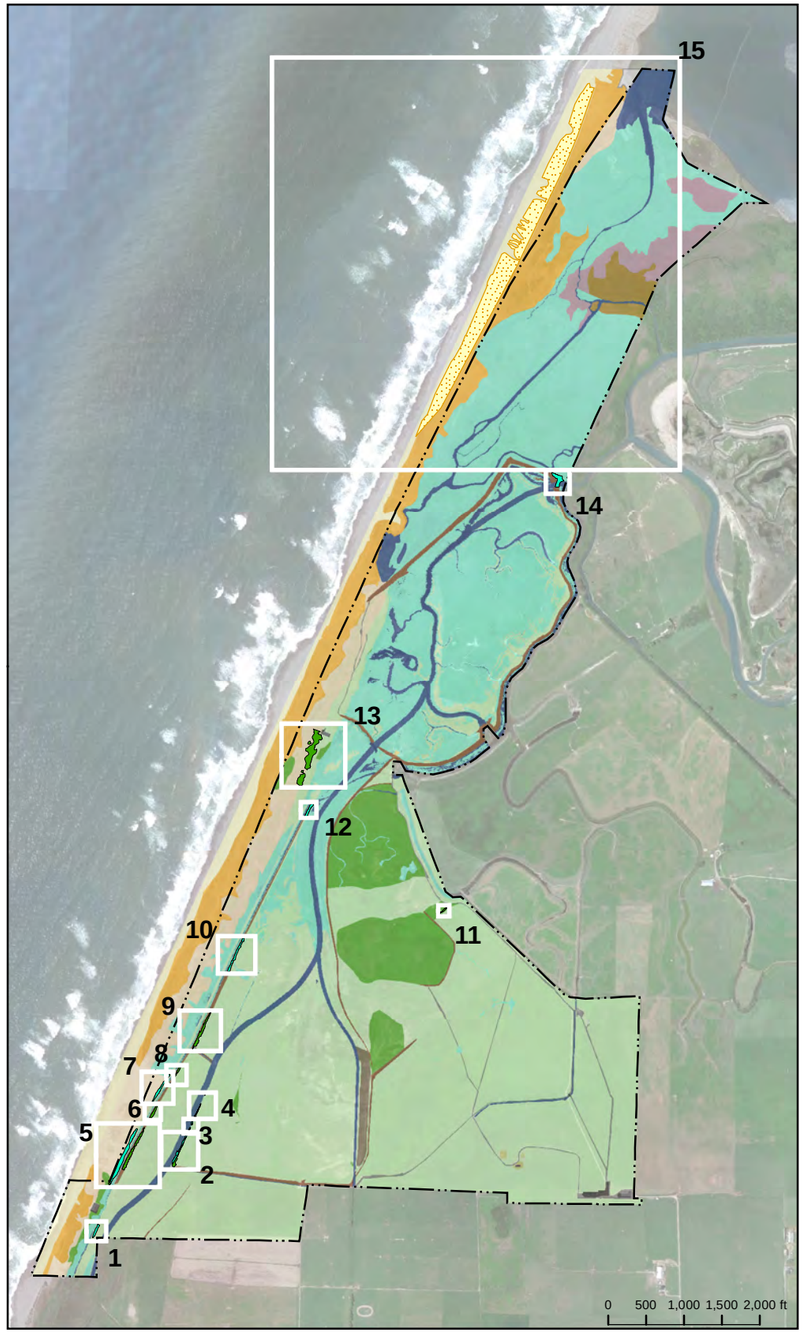
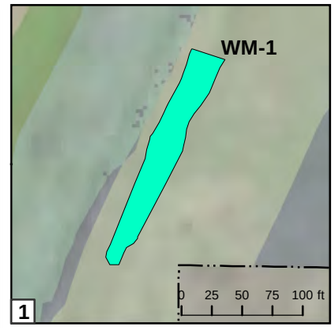
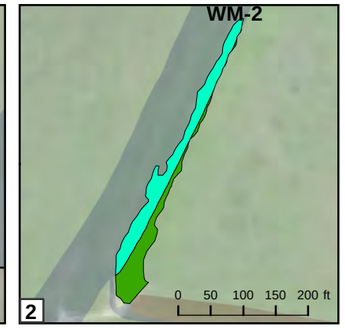
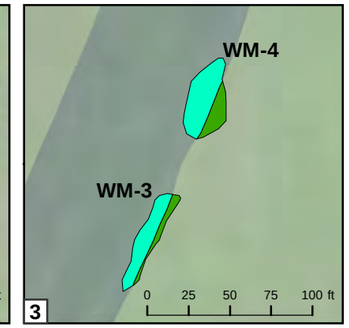
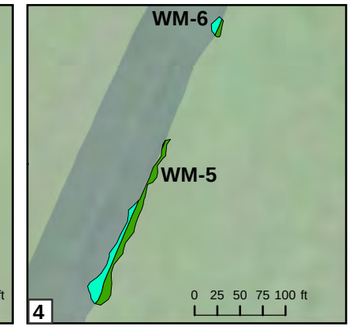
Data source: Habitat Mapping, GHD, 2013, J.B. Lovelace & Associates, 2011, and Humboldt Bay Harbor District Preliminary Spartina Mapping, 2013; Parcel Lines, Humboldt County, v41, 2010; Aerial Imagery, 4 band 0.5ft resolution, NOAA, 2010. Created by:jclark2

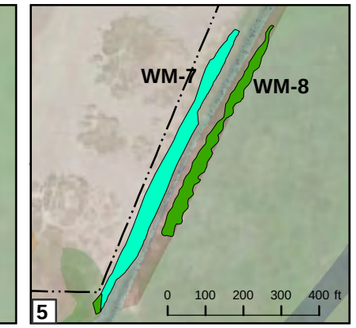


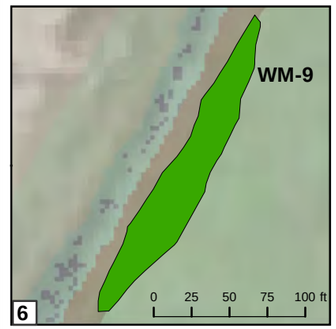


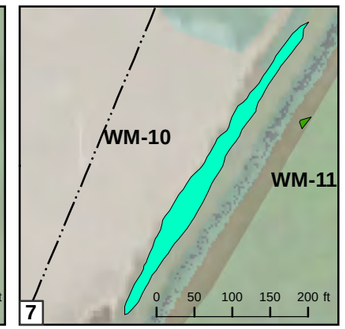


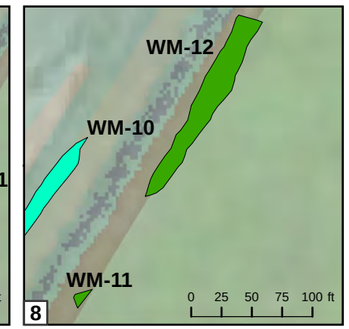


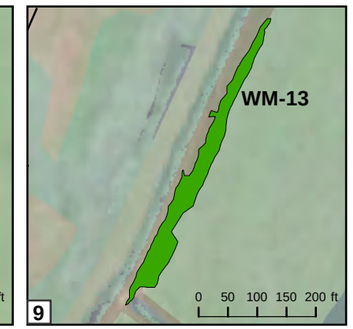


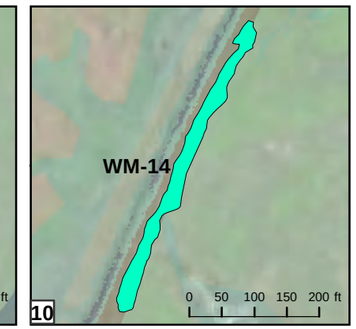


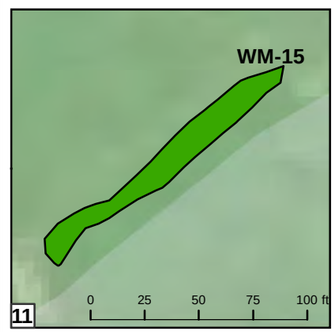


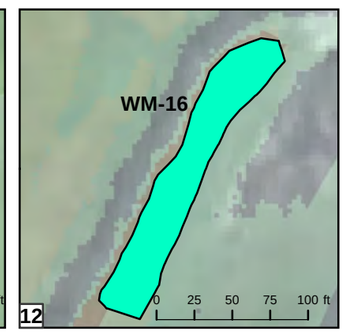


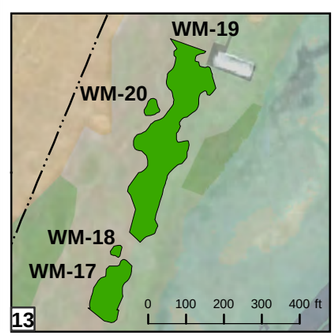


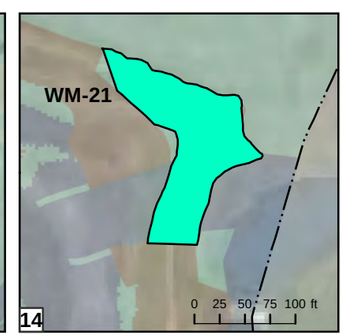


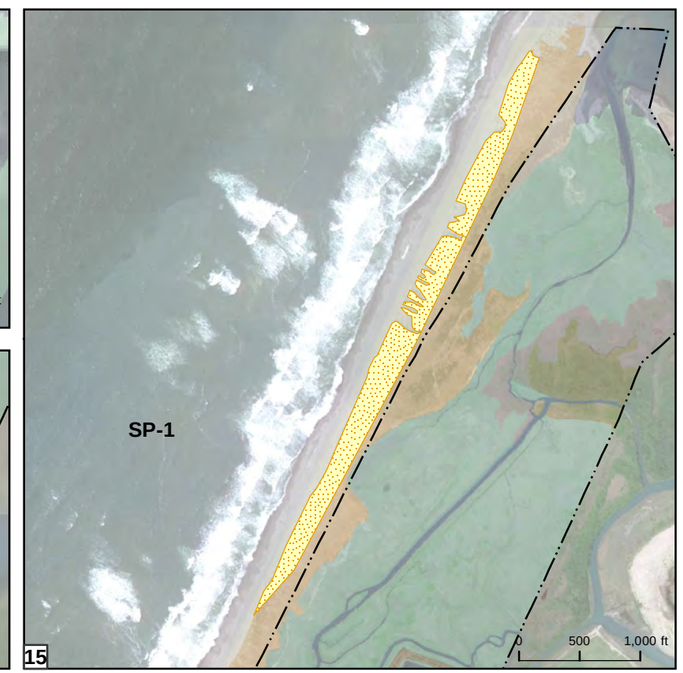












Upland Areas Converted to New Wetland Type (acres)

Site	Freshwater	Tidal	Total
WM-1		0.10	0.10
WM-2	0.11	0.17	0.27
WM-3	0.00	0.01	0.02
WM-4	0.01	0.02	0.02
WM-5	0.03	0.02	0.04
WM-6	0.00	0.00	0.00
WM-7	0.02	0.62	0.64
WM-8	0.37		0.37
WM-9	0.11		0.11
WM-10		0.20	0.20
WM-11	0.00		0.00
WM-12	0.07		0.07
WM-13	0.31		0.31
WM-14		0.25	0.25
WM-15	0.04		0.04
WM-16		0.13	0.13
WM-17	0.24		0.24
WM-18	0.02		0.02
WM-19	0.99		0.99
WM-20	0.03		0.03
WM-21		0.28	0.28
Total	2.33	1.80	4.13

Ammophila Area Converted to New Habitat Type (acres)

Site	Beach	Total
SP-1	19.52	19.52

Paper Size 11" x 17" (ANSI B)

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

EREP Property Boundary (Reference: Humboldt County Parcel Data)

Mitigation Areas
- Freshwater
- Tidal
- Ammophila area available for conversion

Proposed EREP Project Habitats

Agricultural
- Freshwater Emergent Herbaceous
- Pasture and/or Agricultural Wetland
- Forested Agricultural Wetland

Non-Agricultural
- Ammophila
- Aquatic
- Bare Ground
- Beach
- Developments
- Dominant Invasive
- Dune Mat
- Forested Riparian
- Levee/Berm
- Roads
- Tidal Wetland (Saltmarsh/Brackish Herbaceous/Mudflat)
- Scrub Shrub
- Unmapped

GHD

Eel River Estuary and Centerville Slough Enhancement Project
HMMP

Job Number 8410882.05
Revision A
Date 21 Oct 2016

Proposed Conceptual Mitigation Plan

Figure 9

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718 Third Street Eureka CA 95501 USA T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

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Data source: Google Earth Aerial, 2014; County of Humboldt: administrative boundaries. Created by:jclark2

EREP Project Area
Snowy Plover Observation Locations
Snowy Plover Impact Site
Snowy Plover Mitigation Site

Paper Size ANSI B

0 250 500 1,000 1,500 2,000 2,500 Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Eel River Estuary and Centerville Slough Enhancement Project HMMP

Job Number 8410882.05
Revision A
Date 21 Oct 2016

Snowy Plover Habitat Areas, Impact Site and Mitigation Site

Figure 10

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Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by:jclark2

Attachment C – Public Access Plan

Eel River Estuary Preserve

Public Access Plan

DRAFT

September 17th , 2013

Eel River Estuary Preserve Public Access Plan

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Acknowledgements:

The Wildlands Conservancy would like to thank all of the neighbors, facilitators, ranchers, adjacent landowners, Assemblyman Wes Chesebro, the Ferndale Chamber of Commerce, Tom and Patti Connick, Karen Pingitore, the Ferndale Storefront and Business Community, State Senator Noreen Evans, teachers, and elected officials for all of their input, time, participation, and collaboration to develop this plan.

1. Introduction

Description and History of the Eel River Estuary Preserve

The Eel River Estuary Preserve (EREP), formerly Connick Ranch, located in Humboldt County, California, is owned and managed by The Wildlands Conservancy (TWC), a 501(c)(3) non-profit public benefit corporation with a dual mission "To preserve the beauty and biodiversity of the earth and to provide programs so that children may know the wonder and joy of nature." This coastal preserve encompasses roughly 1,200 acres, including verdant, prime agricultural pastures, 300 acres of salt marsh habitat with tidal inundation, waterfowl habitat, Russ Creek riparian, and 3.8 miles of beach and dunes stretching from the south spit of the Eel River mouth, south to a point approximately one mile north of Centerville Beach County Park (See Figure 1). Flowing out of the Wildcat Mountains to the south, Russ Creek enters the preserve and flows north across the property, eventually joining Cutoff Slough, which flows to the Pacific Ocean via the Salt and Eel Rivers. Rare species documented on EREP include tidewater goby (Eucyclobobius newberryi), Snowy Plover (Charadrius alexandrinus)bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), beach layia (Layia carnosa), dark-eyed gilia (Gilia millefoliata), Lyngby's sedge (Carex lyngbyei) and Humboldt Bay owl's clover (Castilleja ambigua ssp. humboldtiensis).

EREP offers the unusual opportunity to maintain and enhance historic agricultural operations, preserve the tradition of the 2nd oldest water fowling hunt club in the estuary, and restore terrestrial and cold-water fish habitat in what the California Department of Fish and Wildlife (then Fish & Game) referred to in their 1974 report as "first priority" restoration land. Our current grazing lessees, Miranda Dairies, were the first dairy farmers to implement organic methods and become certified in Humboldt County. The Mirandas continue their profitable operations on the EREP, with restoration objectives and their organic practices working in harmony. Because TWC manages a large part of the EREP for agricultural grasslands that encompass freshwater ponds, the EREP reduces depredation on adjacent properties, and provides wintering habitat to as many as 15,000 Aleutian geese (Branta hutchinsii leucopareeia) and 200-300 tundra swans (Cygnus columbianus), as well as many species of other waterfowl. Also, EREP provides habitat for a diversity of birds, fish, and mammals, such as Steelhead (Salmo gairdnerii), Harbor seals (Phoca vitulina), Brown pelicans (Pelecanus occidentalis), and the California sea lions (Zalophus californianus). In addition to the agricultural, restoration and public access objectives, TWC also manages a historic waterfowl hunting club. The Eel River Gun Club is the 2nd oldest gun club in the estuary and TWC recognizes water fowling as part of the traditional use of the preserve. TWC has initiated significant habitat enhancement and agricultural improvements in conjunction with multiple partners and adjacent property owners.

The Eel River estuary is the fourth largest estuary in California and is one of the most significant on the California coast, as it consists of nearly 50 miles of estuary and delta. Water from the Eel River, the 3rd largest river system in California, travels through the estuary and empties into the Pacific Ocean near Ferndale, Ca. The Eel and Salt River deltas/estuary historically supported a diverse array of ecologically valuable estuary dependent fish and wildlife species once abundant along the North Coast, including Coho and Chinook salmon, Steelhead,

Cutthroat trout, neotropical migratory birds, waterfowl, shorebirds, and numerous plant and amphibian species. Historically, ships could access a port located in Scotia many miles inland, now there is no ship access through the estuary. After years of disturbance and increased erosion from flooding, logging, and agricultural use, sedimentation in the estuary has decreased its size significantly. Listed as a federal and state Scenic and Wild River, the health of the Eel River is crucial for environmental, recreational, and aesthetic reasons. TWC intends to join with efforts of the Salt River Restoration effort underway in Humboldt County and to coordinate their restoration efforts with the Humboldt Co. RCD and the State Coastal Conservancy (SCC) to the benefit of Ferndale and to improve the drainage of all prime agricultural lands of the mighty Eel River watershed.

TWC's intention is to continue agricultural operations at their present level, seek resource enhancement opportunities and to provide public access and capital improvements for the purpose of passive outdoor recreational opportunities, including: picnicking, hiking, wildlife viewing, nature study, academic research, equestrian use, photography, outdoor education, bicycling and boating. With the EREP, TWC is pleased to offer the public a rare opportunity of high quality coastal access from which to witness firsthand the ecological enhancements underway in the Eel River Delta, as well as to see how these activities can coexist with and be mutually beneficial for agriculture in the coastal zone.

Figure 1: Vicinity Map

Acquisition

EREP was purchased by TWC by 2008 & 2009. A majority of the preserve is comprised of the historic Connick Ranch, approximately 1100 acres purchased from Tom & Patty Connick with the express intention of creating public access on the property as part of their family legacy. The Connick Ranch property, 1,100 acres, was originally owned by Harris Connick and Edythe Russ Connick in the early 1900s. As with many other Eel Delta properties, the Connick Ranch was historic tidal marsh reclaimed for agricultural use in the late 19th century. Originally a private working dairy ranch, this property contains estuarine wetlands, freshwater and brackish marshes, and fertile grazing pasture.

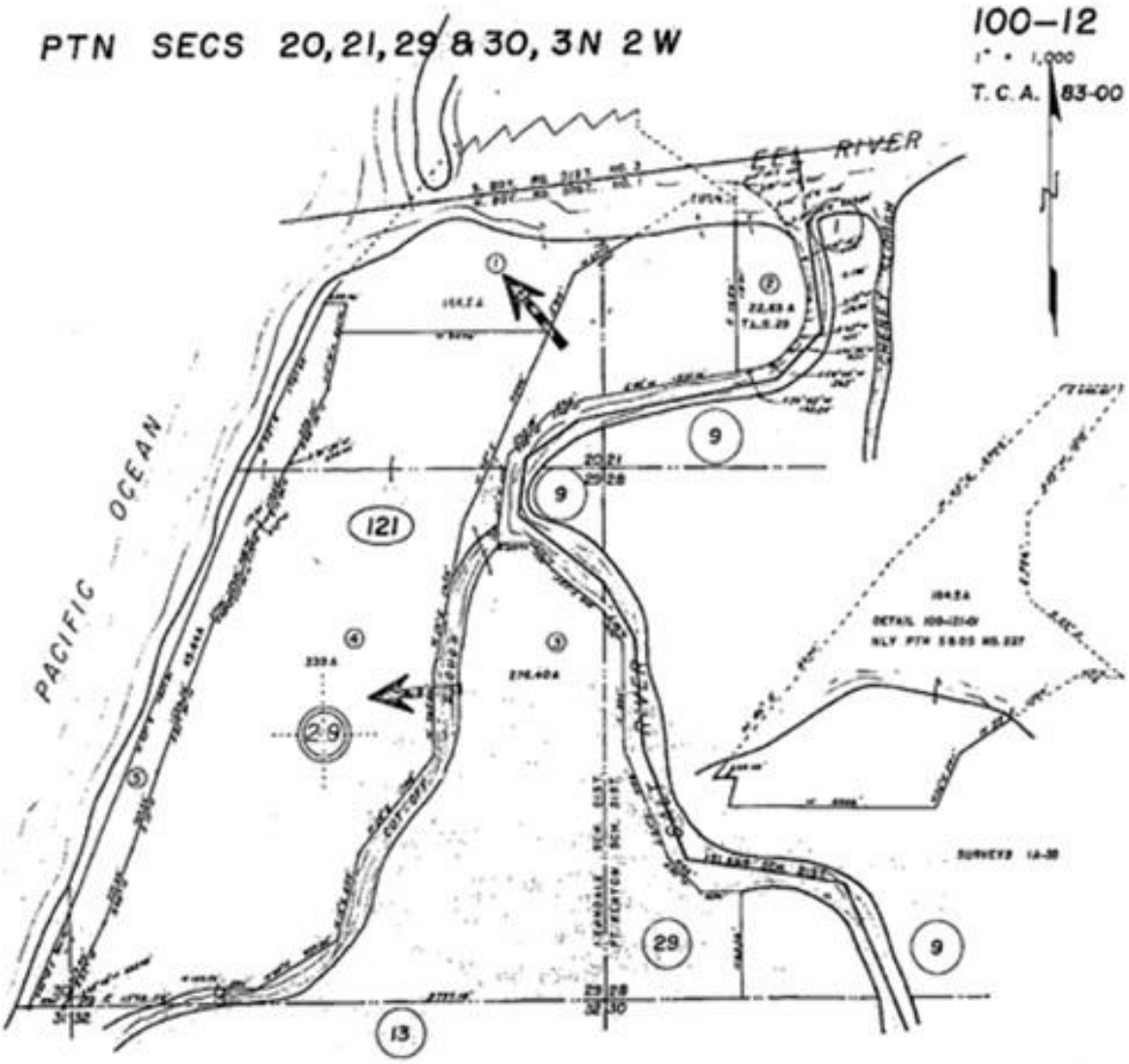
In addition to Connick Ranch, TWC assembled the highly fragmented parcels that are comprised of undivided ownerships in what was labeled as "the Palco property". The Palco property is located on fractional sections 20, 29, 30, and 31 in Township 3 north, Range 2 west, of the Humboldt meridian. These sections are the same as described in Book 2 of Patents Page 334 as recorded July 27, 1875 and as shown on the official government survey dated 1855 and 1890 (See Figure 2). It consists of 82 acres (3.8 miles) of dune property, which the lumber company used historically as an area to collect timber that had drifted downriver and out through the estuary.

The Palco property portion of EREP is comprised of coastal beach grass habitat that is dominated by European beach grass (Ammophila arenaria), an exotic and invasive plant that was introduced to stabilize the dunes, which over time has replaced all of the native dune grass on this property. The dunes provide habitat for the federally threatened Snowy Plover, whose existence is threatened due to disturbance, predation, and habitat loss.

With previous purchases of undivided interests in the Palco Property made in 2007 (from the Swaner Family Limited Partnership and in 2006 from the Good Samaritan Hospital Foundation, who granted TWC portions of the property, and by way of court release from Palco & Maxxam Company bankruptcy proceedings in Texas) TWC was able to acquire 25% of the property. With that interest, TWC petitioned the court for a partition sale to acquire the remainder of the undivided interest in the 82 acres of beach dunes. With this acquisition, the EREP was consolidated in order to be managed in perpetuity by TWC.

Following the acquisition, TWC took several steps to maintain the historic use of the property. First, TWC enrolled the property in a Williamson Act contract. Second, TWC began restoring several of the structures on the property, including an historic barn. Third, TWC took steps to ensure that the land remained in agricultural production, has maintained agricultural leases on the property since 2008, and intends to continue to do so. Last, TWC initiated its policy of renewing the duck club lease for the foreseeable future. TWC intends to direct the public access activities planned for the property and described in this document.

Figure 2: Historical Sections Map circa 1890



2. Definitions of Public Access

Invited versus uninvited

"Public access" in this document is defined as unguided, uninvited guests who visit EREP during normal operating hours, who adhere to TWC's rules and regulations governing public access and whose actions and mobility will be limited to the defined public access route. Public access includes participating in recreational opportunities provided on EREP, such as: hiking, mountain biking, horseback riding, boating, picnicking, wildlife viewing, and photography. Public access, for purposes of this document, does not include ongoing agricultural activities performed by TWC or its lessees, TWC's guided education groups, academic research, invited guests, and others whose actions and mobility are unlimited on EREP.

Invited guests to EREP include: members of the existing duck club, agricultural operators, academic researchers, TWC contractors, public agency staff, school groups, scout groups, church groups, and a variety of guests who may be invited by preserve staff to visit EREP or to work with TWC on various projects such as enhancement efforts. Invited guests will not be limited in their mobility on EREP; however, a member of the EREP staff will either join the group or will have given prior approval before the guest(s) enter the property. Every reasonable effort will be made by preserve staff to avoid disrupting or causing conflict with the agricultural operations of neighboring properties. Efforts to reduce conflict will reduce the impact of invited guests on adjacent properties by educating guests on preserve rules and regulations. Invited guests may visit before, during, and after normal operating hours, with approval from EREP staff.

Day use

Day use on EREP is defined as 8 hour periods from dawn to dusk (example: 8am-5pm, 9am-6pm) and is seasonally variable. In its first year of public access, EREP will be open five days a week for 8 hours a day. After its first year of opening to the public, dependent upon staffing and other constraints, EREP may be open daily for 8 to 9 hours of public access.

Overnight use

At EREP, camping will be available to invited groups. Camping locations will be chosen so as to have no impact to neighboring and adjacent properties, and campfires will be seasonally restricted. Areas under consideration for camping include the North Barn, the Barn Headquarters, and the pasture north of the Barn Headquarters.

Rules and Regulations

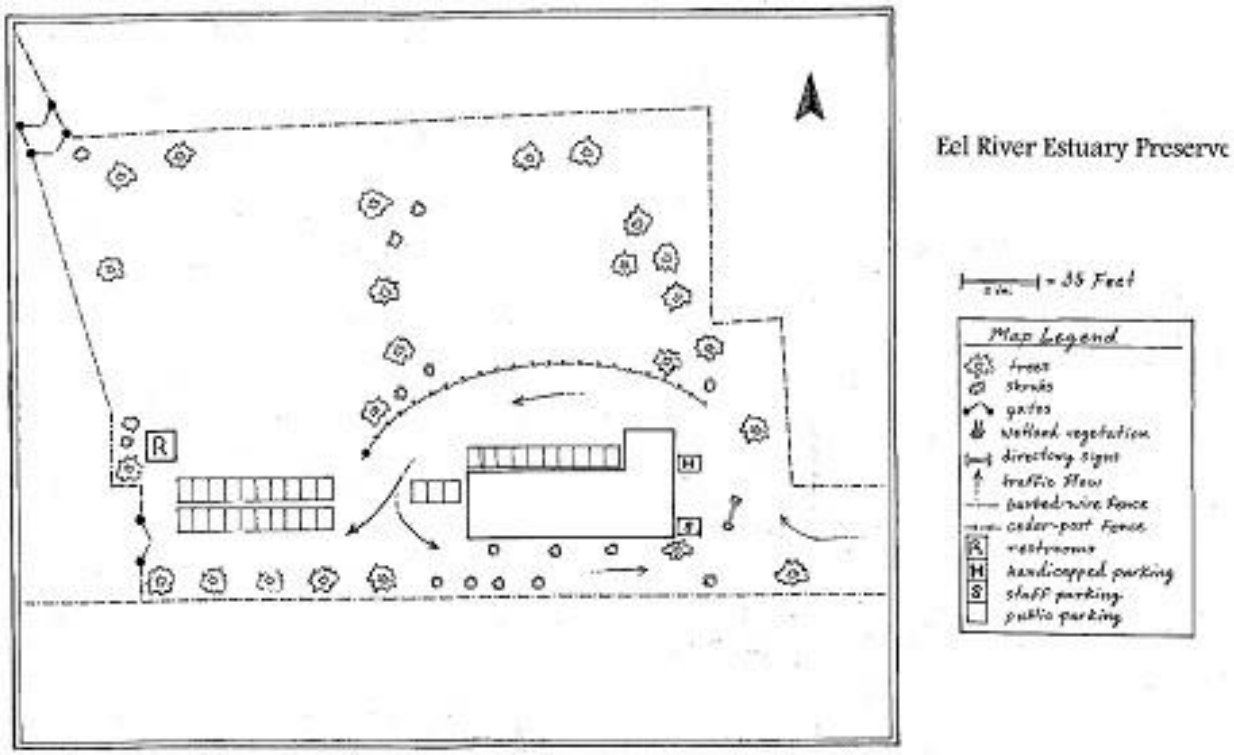
TWC's standard rules and regulations will continue to be enforced by TWC staff Rangers who will be patrolling EREP to aide, direct, educate, and protect the public, while maintaining protection and security of the property and its natural resources. Staff Rangers will be on duty during normal operating hours to enforce the following rules and regulations that steer the public towards the "leave no trace" approach:

1. Do not trespass outside of the Preserve boundaries
2. Take only photographs and leave only footprints
3. Dogs must be on a leash
4. Do not disturb wildlife or stock animals
5. No littering: Pack out your trash
6. No use of unauthorized motor vehicles
7. No hunting, no shooting
8. Pick up after your pets
9. Stay on marked trails
10. No smoking
11. No alcohol
12. No fires
13. No barbequing

Parking Access

Approximately 36 parking spots will be available for public use at the Barn Headquarters, including two handicap and staff parking spots (See Figure 3). The parking sites will be located on the north and west sides of the barn, with handicap parking designated on the east side of the barn.

Figure 3: Barn Headquarters Parking



Postings/Signage to Preserve

In order to direct visitors to EREP, and subject to county approval, a sign announcing EREP will be posted at the corner of Centerville Road and Russ Lane. This sign will not only direct visitors down Russ Lane, but it will also post days and hours of operation and whether or not EREP is open or closed. Posting “open” or “closed” on the sign will reduce the amount of traffic down Russ Lane when EREP is closed, thus reducing the amount of vehicles, some with horse trailers, that will have to turn around.

Fencing and Gates (easement issue needs to be resolved to confirm these details)

As discussed in the attached "Issue Resolution Proposal," a great deal of fencing, signage and gating will be added to EREP to not only protect EREP and its resources, but also to protect the adjoining properties and their resources (see Figure 4).

Beginning at the entrance to EREP, a large metal gate, most likely made of 4"x 4" square tubing, will be hung at the TWC property boundary. A turn around area will be built so that cars and trucks with trailers will be able to turn around.

The existing gate at the entrance to EREP will remain for agricultural purposes. Adjacent landowners needing to move stock from one pasture through the Russ Lane easement corridor, at the gated portions on private property of the Russ Lane corridor, to pastures located across Russ Lane, will have priority access. When plans to receive or gather and ship stock are known by adjacent landowners, they will inform TWC staff reasonably in advance of the stock movement operations. Traffic will be stopped by the adjustment of the gates, as necessary, along the Russ Lane easement corridor, in order to accommodate said stock movement. During normal working hours, this gate will remain open, unless agricultural operations require traffic be held while stock is moved safely.

Next, a fenced corridor will run the length of the first part of the public access trail, until the trail reaches the first steel bridge and continues onto the levee.

A locked gate and a wing fence will be considered at the entrance to EREP from the dunes (See Figure 5). If a gate is installed, a fence will extend at least 75' on both sides of the gate, and the gate will be open during normal business hours and locked after hours to prevent trespass.

To prevent trespass onto O'Rourke Foundation (ORF) and to reduce liability on all parties, a gate and wing fence will be installed at the Cutoff Slough tidegates. The gate will be setback from the tidegates approximately 10', and the three to five strand barb wire fence will go down the sides of the levee to prevent access to the gates.

All remaining gates will remain in place, with the addition of locks to prevent trespass after hours.

Figure 4: Improvements Map

Figure 5: Dune Gate Details

Note: A 16' to 20' gate with 75' or greater three-strand barbwire fencing will be considered at the entrance of EREP at the dunes to protect from trespass.

4. Enforcement

Dune Access

A high degree of trespass along the dunes exists today, and pre-dates TWC's acquisition of the property in 2008. TWC observes that the visitors utilize the dunes in many locations extending from Centerville Beach to the mouth of the Eel. The entry point for these visitors is invariably Centerville Beach, which TWC has no control over. Nevertheless, TWC Rangers make contact with approximately 25 OHV users per month, and observe 1 to 2 campers, and over a dozen campfires per month. TWC discourages these visitors from unauthorized entry and trespass to the dunes on its property. Through these public contacts, TWC has reduced the erosion and trespass on the dunes on its property significantly.

To find a solution to this challenge, TWC will request a meeting between the landowners, the facilitators, the Humboldt County Department of Parks and Recreation, and the First District Supervisor in order to explore ways that the various entities (including the County) could work together to manage and improve the use of Centerville Beach for the benefit of all.

If found desirable by the Centerville Beach working group, TWC will consider installing a locked wing gate near the entrance of EREP from the dunes to prevent illegal trespass onto the

EREP from the dunes, and TWC staff Rangers will continue patrolling the EREP dunes and posting "Private Property - No Vehicles" signs along the EREP boundary at the dunes. TWC will encourage adjacent property owners to install similar signage and fencing along their property boundaries. Staff Rangers have and will continue to restore closed OHV trails on its property, while weekly patrols will identify, document, and close any new trails or breaches in the dunes.

4. Issue Resolution Proposal

1. Issue-The term **"public access"** is undefined

Problem Statement- Left undefined, public access means different things to different people, causing conflict and misunderstanding in discussions. Since it is both the fundamental mission of TWC, and the key area of concern for surrounding landowners, it must be defined in an overall access plan for the Preserve.

Proposed Solution- Hereafter, and in a proposed new public access plan for EREP, public access shall be defined as unguided, uninvited guests who come visit EREP during defined operating hours in compliance with TWC's Preserve Guidelines, and whose actions and mobility will be limited to "public access routes" clearly established in this public access plan. Public access does not include guided educational groups, research groups, lessees, contractors, or other invited guests, whose actions and mobility are unlimited on EREP.

2. Issue- Dogs pose a risk to adjacent livestock operations

Problem Statement- Use of dogs has been part of the historical agricultural operations and hunting activities on the property. However, unleashed or untrained dogs may threaten livestock. Some adjacent landowners seek to minimize potential disturbance to existing agricultural operations and have proposed a sheep wire (welded wire) fence along the boundary of the ORF and EREP to prevent such dogs from getting onto adjacent properties.

Proposed Solution- Due to ecological concerns as well as its own grazing operations, TWC and its staff Rangers share a preference to minimize free-dog roaming on EREP. However, a sheep fence or vegetative boundary of the length proposed will require cost and maintenance that is prohibitive to installation. TWC's experience with grazing operations on other preserves suggests an alternative model for exercising control over dogs that has proven successful thus far. TWC will enforce its strict leash law, a practice common at all of its sites. Owners of dogs found off-leash will be immediately asked to leave the Preserve.

3. Issue- Parking proposed south of Barn Headquarters is unacceptable

Problem Statement- Proposed parking on the south side of the barn is located on Russ property and blocks/inhibits agricultural activities.

Proposed Solution- Concur. Parking will only be sited west of, and north of the barn, on TWC property.

4. Issue- A posted trail at EREP through the dunes onto the beach may attract unwanted visitors and increase trespass in the area.

Problem Statement- Once a trail is marked, the perception of "open" and "public access" in the community may invite trespass onto EREP from ATVs, trucks, campers at all hours of the day, all days of the week. This will create increased trespass that will lead to increases in existing levels of illegal camping, fires, trespass onto adjacent landowners, and liability issues.

Proposed Solution - As earlier outlined, a high degree of trespass along the dunes exists today, and pre-dates TWC's acquisition of the property in 2008. TWC proposes a three-fold solution to this challenge. First, and in addition to its existing levels of patrol and enforcement of appropriate dune use, TWC will consider installing a locked wing gate near the entrance to EREP from the dunes to prevent illegal trespass onto EREP from the dunes. Second, TWC will request a meeting between the landowners, the facilitators, County Parks and the First District Supervisor in order to explore ways that the various entities (including the County) could work together to improve use of Centerville Beach for the benefit of all. Lastly, EREP staff Rangers will continue patrolling the EREP dunes and continue posting "Private Property - No Vehicles" signs along the EREP boundary. Staff Rangers will maintain and restore closed OHV trails, while weekly patrols will identify any new trails or breaches in the dunes.

5. Issue- Trespass, liability at the tide gates

Problem Statement- People, children especially, will be drawn to the tide gates as an area to explore, trespass onto neighboring properties (ORF), and destroy property thus opening TWC and neighboring landowners to liability.

Proposed Solution- Per the request, and in order to address this concern, TWC will agree to install a locked gate with a wing fence that is setback 10' in front of the tide gates.

6. Issue- EREP and ORF border

Problem Statement- ORF alleges that proximity to the slough between ORF and and EREP will increase disturbance to ORF operations and increase risk of liability.

Proposed Solution- ORF proposes that TWC should install a fence (welded wire, barbed wire) along the public access boundary of the northern levee along the slough to prevent public access into the slough, as well as reducing liability for TWC and ORF. They also propose that this setback be at least 150' in width from the water's edge.

However, installing fencing in wetland areas significantly reduces bird habitat by increasing the frequency and duration of perching predators, which reduces nesting, feeding, and foraging opportunities for birds in the slough area. Also, installation and maintenance of wetland fencing

will increase management issues, while reducing aesthetic appeal for visitors. Therefore, TWC proposes to install signage every 500' setback at least 20' from the slough indicating the dangers of and restricting access to the slough. TWC encourages ORF to establish a similar setback of no less than 30-feet from the edge of the slough. This combined and cooperative effort will achieve multiple benefits. First, it will increase the buffer between livestock and visitors to the EREP. Second, it will help improve water quality in the slough by maintaining a buffer between cattle and open waterways. Third, it will increase ecological productivity of the slough. Last, it will provide an opportunity for future riparian revegetation that will very likely serve as a visual barrier between the properties and help offset ecological impacts associated with the proposed enhancement project.

7. Issue- Public access along Russ Creek **may disrupt Jay Russ's adjacent agricultural** operations

Problem Statement- There is no barrier, physical or visual, between EREP and Jay Russ, and public access along Russ Creek may have negative impacts on agricultural activities on Jay Russ's property.

Proposed Solution- There will be no "public access" as defined at Russ Creek. However, the corridor to the Russ Creek bridge and beyond is crucial to agricultural operations on EREP, and is open to outdoor education and research as guided by TWC Rangers.

8. Issue – Aleutian Cackling Geese (ACG)

Problem Statement – Public access at the EREP may shift predation from EREP property to ORF, diminishing pasture quality at the ORF. It was suggested that during the ACG residency in Humboldt County, TWC should implement a policy of no visitation to EREP on off-hunting days so as to draw geese to short grass habitat on EREP.

Proposed Solution- Due to agricultural operations at EREP, ACG are heavily drawn to the EREP, thereby increasing predation at EREP and decreasing predation on surrounding lands. Although it is not TWC's responsibility to mange ACG populations for the benefit of ORF, TWC intends to continue managing a significant part of EREP for ACG, thereby benefitting ORG's agricultural operations directly. TWC proposes that ORF staff and EREP staff both participate in the ACG Coordination Meetings serving Del Norte and Humboldt counties in order to try and develop a joint management strategy that: 1) identifies preferred ACG areas; 2) coordinates hazing towards those areas, and; 3) does so in association with other lower Eel pasture managers, and in a manner that is consistent with the newly developing enhancement plan for the EREP.

9. Issue – Visitation Hours

Proposal- Prohibit visitation other than from dawn to dusk.

Problem Statement- Some landowners have suggested that visitation should only occur from dawn to dusk.

Proposed Solution- Generally this comports with TWC's access plan, but it potentially conflicts with occasional overnight stays by school/scouting/church groups, docent-led moonlight tours, and so forth. TWC anticipates that the demand for overnight visitation will be low, but for the first calendar year of plan implementation TWC will limit such visits to invited guests only.

10. Issue - Boat Use

Problem Statement- Boat use will increase risk of injury and potential for trespass onto ORF. This, in turn, will increase exposure to liability for ORG.

Proposed Solution – Non-motorized boat use at the EREP is considered fundamental to TWC's access vision for the property. However, TWC is sensitive to the risks inherent in water-related activities. Subject to the laws of the State of California with regard to tidally influenced waters and Waters of the State, as are regulated by statute, TWC will entertain the concept of relocating its proposed put-in site from inboard of the Occidental Floodgate (Cutoff Slough Tidegate) to the outboard site where boats have historically landed via the Eel River Estuary. TWC will incorporate signed guidance at the put-in about water safety, appropriate and inappropriate destinations and uses, and local history of the agricultural zone.