



Cannibal Island Restoration Project

Operations and Maintenance Plan

California Trout

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→ The Power of Commitment



Operations and Maintenance Plan Cannibal Island Restoration Project

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1. Introduction

This Operations and Maintenance Plan (Plan) has been developed for the Cannibal Island Restoration Project (Project). The core Project objective is to restore and expand natural estuarine functions and processes that promote recovery of habitat for native fish, invertebrates, wildlife, and plant species compatible with surrounding working agricultural lands. This will be carried out via strategic lowering of dikes along the northern portion of the Project Area, restoring existing slough channel connectivity and historical geometry. Additionally, the Project will improve native flora and fauna via the focused removal of invasive vegetation (particularly dense-flowered cordgrass [*Spartina densiflora*]), provide public access via a 2,000-foot trail and parking lot, and benefit agricultural lands via the installation of an approximately 6,000-foot setback levee and elevating the existing Cannibal Island Road which will protect approximately 54 acres of existing agricultural lands along the eastern extents of the Project Area, and over 50 acres beyond the southern extent, from tidal inundation. Flood gates (culverts equipped with flood gates) are proposed in conjunction with the setback levee to manage flood drainage from the eastern agricultural lands.

To maintain the Project, post construction operations and maintenance actions are anticipated to include dense-flowered cordgrass control efforts, levee and dike management, flood gate maintenance, and trail and parking lot maintenance. These efforts are anticipated to occur following Project construction and continue for the minimum life of the Project, which is typically 20-25 years, to meet long-term Project goals. Portions of the Project are within the Natural Resources Conservation Services (NRCS) Agricultural Conservation Easement Program - Wetland Reserve Easement (ACEP-WRE) program (hereafter referred to as “WRE program”). Maintenance activities may also be required by the ACEP-WRE program beyond the scope of the Project. This Plan does not propose operations and maintenance actions of agricultural lands located outside of the WRE area because those areas are the responsibility of individual landowners. This Plan does include maintenance actions of the setback levee installed as a Project component to protect agricultural lands.

The Plan is limited in scope to the specific aspects discussed. While every attempt is made to be comprehensive in scope, every possible condition or need cannot be foreseen. Monitoring and maintenance actions described in this Plan are covered in the regulatory permits obtained for the Project. However, new, expanded, or unforeseen impacts to regulated habitats, waters, or wetlands may require modifications to permits or new permits in the future. The operations and maintenance activities defined in this Plan are intended to commence upon completion of Project construction.

1.1 Project Location

The Project Area is located three miles west of the town of Loleta, California in the Eel River estuary, within the Cannibal Island USGS 7.5-minute quadrangle (**Appendix A, Figure 1**). The 794-acre Project Area is at the western-most extent of the Eel River delta and estuary approximately one mile inland and northeast of the Eel River mouth. Cannibal Island is located in the northern portion of the Eel River estuary and is bounded by Sevenmile Slough on the north and east, North Bay Slough on the west and Mosley Slough on the southwest (**Appendix A, Figure 2**).

The northern and western portion of the Project Area (approximately 462 acres) is owned by California Department of Fish & Wildlife (CDFW) and managed as part of the of the Eel River Wildlife Area (ERWA) Cannibal Island Unit (Assessor Parcel Numbers 310-043-001, 310-033-004, 310-021-003, and 310-021-004). The remaining 332 acres are privately owned by Hansen (APNs 310-043-003 and 310-051-001) and Pedrazzini (APNs 310-043-004, -005, and -006). Approximately 220 acres of the private property are held in the WRE program by the NRCS (**Appendix A, Figure 3**).

1.2 Project Description

The proposed Project will enhance (widen and deepen) existing tidal slough channels within the limits of Project disturbance to historical geometry (**Appendix A, Figure 4**). Construction activities will include the removal of outdated water control and conveyance structures, excavation of slough channels to accelerate the formation of high-quality aquatic habitat for listed fish species, and placement of excavated fill in appropriate locations to mimic natural marsh topography (natural levees and hummocks or tidal marsh ridges) and enhance wetland vegetation diversity through removal of invasive dense-flowered cordgrass. Excavated soils from the channels would be placed in low hummocks approximately 2-feet high adjacent to the channels. These hummocks are anticipated to retain wetland parameters as they will not exceed marsh plain elevation and would not constitute conversion to uplands. Much of the existing dike network within the Project Area would be reconfigured or removed. A new setback levee will be constructed to protect agricultural land from tidal inundation as full amplitude is restored, including one newly constructed set-back levee in the eastern portion of the Project Area, and elevating the grade of Cannibal Island Road in the southern portion of the Project Area. Sediment excavated during construction would be beneficially reused within the Project Area and would not be hauled off-site.

1.3 Project and Regulatory Background

This is a restoration Project that is exempt from the requirements of CEQA pursuant to the Statutory Exemption for Restoration Projects (SERP) (Public Resources Code § 21080.56). No National Environmental Policy Act (NEPA) compliance is required because there is no federal nexus with the Project outside of the Clean Water Act and Endangered Species Act where each jurisdictional agency carries out NEPA for their respective actions.

The Project Area includes wetlands within the jurisdiction of the U.S. Army Corps of Engineers (USACE), the North Coast Regional Water Quality Control Board (NCRWQCB), and the California Coastal Commission (CCC), endangered or threatened species habitat within the jurisdiction of the National Marine Fisheries Service (NMFS; also known as the National Oceanic & Atmospheric Administration Restoration Center [NOAA RC]), and the U.S. Fish and Wildlife Service (USFWS), and contains lands regulated by the Humboldt County Planning and Building Department. Required permits and approvals are listed in **Table 1-1**.

Table 1-1 Permits Required for the Project

Permit	Agency
Clean Water Act (CWA) Section 404 — Nationwide Permit (NWP) 27	USACE
Endangered Species Act (ESA) Section 7 — Salmonids	NMFS (also known as NOAA RC) Programmatic Biological Opinion (PBO)
ESA Section 7—Tidewater Goby	USFWS PBO
CWA Section 401—Statewide Restoration General Order (SRGO)	NCRWQCB
Individual Coastal Development Permit (CDP)	CCC
Conditional Use Permit	Humboldt County Planning and Building Department
Lake and Streambed Alteration Agreement (LSAA) and California Endangered Species Act (CESA) Compliance	CDFW
Encroachment Permit	Humboldt County Public Works
Lease	State Lands Commission

1.4 Responsible Parties

The CDFW is responsible for monitoring Project components that occur on their property, and Project-related infrastructure that may span parcel boundaries, such as the setback levee, flood gates, and potentially the fence along the setback levee. CDFW will implement or oversee implementation of the maintenance actions described in this Plan. Private landowners may communicate with CDFW regarding potential maintenance needs they observe, however it is not their responsibility to carry out monitoring or maintenance activities of Project components. Based on needs and available resources, each landowner may choose to collaborate with various partners to assist with the monitoring and maintenance .

The WRE program that exists within the Project Area allows for periodic maintenance activities to be planned and implemented under a Compatible Use Authorization (CUA) between the NRCS and landowners. All monitoring and maintenance activities described in this Plan that is within the WRE program area will be completed in accordance with the NRCS CUA process. The eastern boundary of the WRE program across all parcels aligns with the approximate location of the setback levee, therefore the lands to remain under the WRE program will predominantly convert to tidal marsh (see **Appendix A, Figure 3**).

NRCS has a unique monitoring responsibility on the Project Area lands protected by its perpetual conservation easements. All WRE program easements are required by policy to be monitored annually in accordance with the Common Provisions Manual (440-CPM-527-P). Prior to the end of each federal fiscal year, monitoring information collected must be entered into NRCS' easement business tool, and a copy of the completed Annual Monitoring Worksheet (form NRCS-CPA-1251) must be retained for the duration of the easement enrollment according to federal records management requirements. NRCS monitors the easements it administers to ensure the following: that the integrity of the easements is being maintained, the goals and objectives for which the easements were purchased are being met, to identify management or maintenance actions needed, and to maintain a relationship with the landowner and, where applicable, other conservation partners. Monitoring ensures the terms and conditions of the easement deeds are being met and program objectives are being achieved in accordance with statutory and regulatory authorities and requirements. Additionally, the annual reporting allows the easement condition status to be determined in the easement business tool and reported as appropriate in the agency's annual accountability reporting.

2. Overview of Project Components and Long-Term Management Needs

This Plan was developed to support post-construction ongoing management and maintenance activities that may be necessary to support the long-term functions of the Project and operational needs to protect land. NRCS monitoring is primarily focused on easement compliance and will include a review of restoration objectives, management plans, vegetation, and hydrology. Monitoring is primarily focused on whether the Project component is safely and effectively carrying out its intent as designed, or whether repair or replacement is necessary. Maintenance activities will be prioritized and implemented based on both NRCS monitoring outcomes and the monitoring described herein which would generally include observations of physical character to determine whether the Project component is functioning as designed. 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 under existing conditions and far less than the impacts associated with Project construction as described in Project permitting documentation. Maintenance actions would be implemented in accordance with avoidance measures (listed in **Appendix B**), and best management practices (listed in **Appendix C**).

2.1 Description of Project Components to be Maintained

This section summarizes the functions and potential maintenance needs for the Project components. Following construction, long-term maintenance will be required to ensure that the Project functions as intended. Maintenance needs will be primarily limited to management of dense-flowered cordgrass, the setback levee, gated culverts, trail, parking lot and fencing. Cannibal Island Road will continue to be routinely maintained by the County. See **Appendix A, Figure 4** for locations of Project components described below.

2.1.1 Dense-flowered Cordgrass Management

Vegetation management would include the as-needed removal of invasive vegetation. Through the Regional Eradication Program, which operates in various locations throughout the Eel River estuary, dense-flowered cordgrass is currently being treated using a variety of methods including top-mowing, grinding, tilling, excavation, flaming and application of herbicide. Proposed treatment methods are generally consistent with those outlined in the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey 2013). Per the Project's PBO issued by NOAA RC, only U.S. Environmental Protection Agency aquatically approved herbicide may be utilized within 25 feet of a wetland or waterway (see PBO Measure VHDR-6 – General Herbicide Use). Dense-flowered cordgrass control is a planned component of the Project and will occur throughout the documented infested areas during construction, which are located along the western extent of the Project Area. It is possible that focused control techniques of dense-flowered cordgrass would occur in the documented infestation areas prior to construction to prevent the spread of this highly invasive species during construction.

Following construction, qualitative monitoring is recommended at least annually to document and treat dense-flowered cordgrass infestations early with the goal of managing dense-flowered cordgrass before it gets out of control and functionally displaces native vegetation communities. Long-term follow up treatment and maintenance of dense-flowered cordgrass is anticipated. The methods utilized to control dense-flowered cordgrass (listed above) include a series of treatments implemented over time based on seasonality, weather, tides, labor availability, and other factors. The proposed treatment methods are consistent with those outlined in PBO Measures VHDR-6 – General Herbicide Use, VHDR-7 – Herbicide Application Planning, VHDR-8 – Herbicide Application Reporting, and Measure 5.5.1 – NOAA Herbicide Use Protection Measures (see **Appendix B** for the full list of PBO and SRGO avoidance measures). Vegetation management will occur on an as-needed basis and pending available funding.

2.1.2 Setback Levee

An approximate 6,000-foot-long setback levee will be located on the eastern side of the proposed marsh system (located centrally) to protect agricultural lands from tidal inundation. The top of the setback levee would contain a gravel surface to provide site access for vehicles and/or equipment. The setback levee is designed to operate without extensive maintenance.

Monitoring will be qualitative and will include visual inspections performed annually and after major storm and high tide events. Monitoring will look for evidence of obvious flooding and erosion or erosion resulting from wind generated waves. Maintenance of the setback levee will be triggered by observations of the physical character of the levee and dike during monitoring events. If necessary, the setback levee will be mowed annually to discourage growth of woody and invasive vegetation. Repair from erosion or burrowing animals would occur on an as-needed basis. Grading and/or re-graveling portions of the setback levee will occur as necessary .

2.1.3 Flood Gates

The Project proposes six new culverts through the proposed setback levee and Cannibal Island Road, all equipped with flood gates. Up to two flood gates will be installed under the setback levee, and up to four installed under the elevated portion of Cannibal Island Road. The culverts would vary in size and be equipped with side and/or top hinge gates. The gates would prevent tidal and flood inundation landward and would open when the inboard water levels (located east of the gate) are higher relative to outboard (located west of the gate) which would typically occur daily during and following rainfall events, enabling drainage from adjacent agricultural land to the east.

The new flood gates and associated drainage ditches (located on the outboard, west side, of the setback levee) will be monitored annually and following extreme storms to ensure proper functioning. The culvert and ditch elevations will be compared to the elevations on the Record Drawings. If needed, debris and sediment would be removed from culverts and/or ditches consistent with the CUA process to maintain the design function. Sediment removed would be reused throughout the Project Area as part of ongoing agricultural operations or placed in subsided tidal lagoons to increase the pace of salt marsh accretion. Sediment reuse on wetland areas would only occur if wetland function would be unimpacted and the purpose of the reuse is to promote habitat restoration and/or sea level rise resiliency for habitat diversity purposes.

2.1.4 Tidal Wetlands (Channels and Tidal Ridges)

The Project area west of the setback levee will include enhancement of former tidal channels. The re-established channels and connection to the Eel River estuary will increase the tidal prism within the Project Area. The increased tidal prism would increase sediment transport throughout the system and provide habitat variability and increased complexity, promoting sediment accretion in subsided areas through a network of inter-tidal mudflats and habitat ridges. The mudflats would passively evolve into inter-tidal salt marshes with sediment accretion from the Eel River over time. The tidal wetland system of channels, ridges and mudflats have been designed in equilibrium with the restored tidal prism.

2.1.5 Trail

The Project proposes approximately 2,000 feet of publicly accessible trail located atop an existing dike on the west side of the Project Area. The trail will be graded, surfaced with gravel and will be wide enough to serve as an accessway for vehicles and other equipment. The trail will be located adjacent to Mosley Slough, and drainage in this location will remain unchanged. Monitoring of the trail would occur annually or after extreme storms and include visual observation. Anticipated routine maintenance includes vegetation trimming, removal or mowing. Grading and/or re-graveling portions of the trail would occur as necessary .

2.1.6 Parking Lot

A parking lot is proposed under the Project to provide parking for trail users. The parking lot will be gravelled and therefore will manage stormwater onsite due to its permeability. Monitoring of the parking lot will occur annually or after extreme storm events to observe areas of potential damage, instability or unsafe conditions. Grading and/or re-graveling portions of the parking lot would occur as necessary .

2.1.7 Fencing

Fencing on the eastern side of the setback levee and along both sides of the County Road adjacent to the elevated portions of Cannibal Island Road would occur under the Project. Monitoring of the fencing will occur annually or after extreme storm events to observe areas of potential damage, instability, or unsafe conditions. Repairs of the fencing will occur following extreme storm events, if damage occurs and as funding allows, or once approximately every 10-15 years.

3. Monitoring

In general, the tidal marsh restoration portion of the Project is expected to be self-maintaining and dynamic over the long term, and marsh plain habitat is expected to be restored. The result of restoration is a net increase of full tidal subtidal channels and sloughs, intertidal channel and mudflats, and coastal salt marsh and brackish marsh. The Project will enhance native plant communities and promote expansion of rare plant habitat through the treatment and control of non-native dense-flowered cordgrass.

Given the current Project partnerships and nature of maintenance activities this Plan has defined three types of post-construction monitoring including 1) NRCS Performance Monitoring in Easement Areas, 2) Non-regulatory Performance Monitoring, and 3) Maintenance Monitoring. Non-regulatory performance monitoring will occur throughout the restored portions of the Project Area and will be used to track Project evolution and efficacy beyond the scope of regulatory monitoring. Maintenance monitoring will occur throughout the entire Project Area to ensure the long-term operation of the Project is successful, consistent with the overall goals of the Project. Post-construction regulatory monitoring, which includes the monitoring that is required under Project permits primarily associated with documentation of wetland re-establishment, is not included in this Plan. Regulatory monitoring (required under Project permits) is described in the Wetlands & Habitat Restoration Plan. Each of the three types of monitoring are further described below.

3.1 NRCS Performance Monitoring in Easement Areas

Performance monitoring will be conducted annually by NRCS for areas under the WRE program in accordance with existing statute, regulation, and policy. Data will be collected using the Annual Monitoring Worksheet (form NRCS-CPA-1251) (link to information below). Performance monitoring is intended to observe, document and track the outcomes of the Project site restoration and its long-term stewardship. Monitoring results will contribute to informing Project performance and efficacy. Performance monitoring activities will include onsite monitoring and review of conservation planning documents. The Annual Monitoring Worksheet can be found here: https://www.nrcs.usda.gov/sites/default/files/2022-10/NRCS-CPA-1251%20Annual%20Monitoring%20Worksheet%20%2810-18%29_Revised_12-18_for_WV.pdf

3.2 Non-Regulatory Performance Monitoring

Voluntary monitoring (that is not required by regulatory agencies) may take place to observe, document and track the outcomes of the Project beyond what is required in regulatory permits (which is discussed in the Wetlands & Habitat Restoration Plan). It is expected that the Project would be monitored for up to five years following construction, or as funding is available. Non-regulatory monitoring may include the following:

- Topography – Topographical surveys would be conducted at the five- and ten-year marks, or as funding is available. The topographical surveys would monitor the geomorphic evolution of the restoration components within the Project site. At a minimum, topographic changes would be monitored at established (monumented) channel cross-sections and longitudinal (thalweg) profile surveys. Topographic surveys would be conducted with a Total Station or GPS system. Photo-points would be established at each monumented cross-section at a minimum.
- Surface Water Hydrology – As funding is available, surface water level loggers would be installed within the downstream portion of channels that do not completely dry out during low tide, and discharge estimates would be determined.
- Fish Monitoring – The purpose of fish monitoring will be to characterize the fish assemblage and document species presence and distribution throughout the restored Project Area. Monitoring fish use of the restoration area is expected to occur for five years after the tidal restoration project is complete, with annual reports provided in each year in which monitoring occurs. Monitoring may occur on a

monthly basis to determine seasonal trends in habitat use and occupancy, but may be limited to quarterly monitoring (spring, summer, fall, winter) based on funding and staff constraints. Monitoring techniques will rely on seining (beach and/or pole) and trapping (fyke, channel net, minnow traps). As funding and equipment become available, other methods including eDNA/water samples and passive integrated transponder (PIT) and/or acoustic tags may be utilized to determine presence and occupancy of select species. Sampling will occur at 5-15 sites throughout the Project Area and locations will be stratified by habitat type to characterize fish assemblages in a variety of habitats (i.e., channels of varying size, intertidal mud pans, deep water habitats etc.). Fish monitoring will be conducted in compliance with all avoidance and minimization measures required within the NOAA and USFWS PBOs and all other pertinent permits.

- Water Quality – Water quality measurements would be taken concurrently at each fish monitoring location for a duration of up to five years or as funding is available. Data measurement may include temperature, salinity and dissolved oxygen sampling. A series of water quality data loggers may be deployed following Project implementation that would record pH, conductivity, and temperature. The locations of the water quality data loggers would be determined following Project implementation.
- Photographic Monitoring – Photo monitoring points will be established at key locations that can be revisited over the course of the restoration project to document conditions before and after construction. Photo monitoring points will be selected to provide coverage of the project extent and representation of the major project elements. The GPS coordinates and bearing for each photo point will be recorded. Photos will be taken annually for five years beginning just prior to construction.
- If monitoring occurs, a monitoring report would be developed annually when data is collected and would include monitoring data from the pertinent categories mentioned above. It would be made available to funders, regulatory agencies and/or other entities as requested. Year one would begin following construction of the Project. Due to the Project potentially being constructed over two seasons, the temporal label of “Year one”, “Year two”, may be staggered throughout the Project Area.

3.3 Maintenance Monitoring

Maintenance monitoring will assess the above-described Project components and will be used to inform the timing and extent of maintenance actions. Maintenance monitoring will be completed by CDFW throughout the Project Area. In addition, the NRCS will monitor easement areas as part of its annual monitoring and site inspection. Neighboring landowners are anticipated to take an active role in maintenance monitoring of their properties adjacent to the restored Project Area as part of their ongoing land stewardship and to protect their interest in the integrity and success of the Project. Maintenance monitoring is intended to support decision making and justification to conduct maintenance actions. The monitoring and maintenance activities defined in this Plan would commence upon completion of Project construction and would be monitored for the minimum Project life and consistent with typical CDFW Wildlife Area maintenance. Areas within the WRE program would be monitored as required by the WRE program. Described below are the proposed maintenance monitoring methods and frequencies with corresponding maintenance triggers and actions.

4. Maintenance Monitoring, Triggers and Actions

This section defines the maintenance monitoring (type and frequency), triggers, and corresponding actions that support achievement of the Project goals. The maintenance monitoring is focused primarily on visual observations to assess and document physically observable trends. Some observations may result in the need to increase monitoring frequency, while others may result in the need to take action. This will be determined

through the evaluation of visual triggers. Maintenance 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 trajectory and where maintenance actions are necessary to ensure that the Project goals are achieved.

Once a maintenance trigger is activated, there are a range of possible maintenance options. For example, 1) it may be determined that no maintenance action is indicated or that additional (or modified) monitoring may be required to make a decision on whether or not maintenance action is required, or 2) monitoring results indicate that a maintenance action is required. Once maintenance needs are identified, potential actions identified in Table 4-1 will be implemented as funding is available. Parameters required for potential maintenance actions are included in **Appendix C (Table C-1)** and include location, work window, work duration, anticipated frequency, equipment and methods to be used, quantities and materials, and impact avoidance measures. Impact avoidance measures are consistent with the accepted best management practices under the Project's SERP documentation and anticipated regulatory requirements under the Project's permits.

Potential maintenance actions listed in Table 4-1 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 maintenance actions. Actual actions may deviate from this list given unforeseen monitoring results and/or site performance and would be implemented under required permits (as applicable). Additionally, the details on the timing and degree of each of these actions are equally dependent upon the monitoring results. For significant maintenance actions that may have implications for adjacent landowners, such landowners will be consulted. In addition, where appropriate, regulatory agencies and NRCS may be consulted to ensure compliance with existing permits and WREs.

Table 4-1 Summary of Potential Maintenance Actions Resulting from Maintenance Monitoring

Project Component	Monitoring Method & Frequency	Maintenance Trigger	Potential Maintenance Actions ¹ (Subject to NRCS Wetland Reserve Easement)
Dense-flowered Cordgrass Management	Visual inspection annually (at a minimum) of vegetation composition relative to past year and trends. Visual inspection to occur at specific locations to be determined by landowners and/or NRCS.	Invasive vegetation dominates observed area, and the actual or potential spread threatens critical native habitat.	Weed management/and or invasive species control via US EPA aquatically approved herbicide (within 25 feet of a wetland or waterway), in accordance with PBO Measure VHDR-6 – General Herbicide Use, and top-mowing or grinding techniques. Increased frequency of monitoring until infestation is under control.
Setback Levee	Visual inspection annually and following extreme events to observe evidence of obvious flooding, erosion, settling or cracking of the setback levee, to ensure that these potential actions are not compromising the stability of the levee, designed intent of the levee to protect adjacent agricultural land, or use of the levee as an accessway.	Evidence of erosion, cracking, slumping, or animal borrowing holes. Woody vegetation establishment.	Repair eroded sections and employ erosion control measures (protecting bare soil, stabilizing banks, dissipating concentrated flows). Raise or lower height of setback levee. Maintain or repair road surface atop levee. Remove woody and/or weedy vegetation via mowing or hand tools.
Gated Culverts	Visual inspection annually and following extreme events to observe evidence of obvious changes compromising flood gates or drainage channel function from design intent or as-built conditions.	Gate flap is not operating correctly (i.e., not fully closing, lodged open). Culverts and drainage channels are partially obstructed, fully plugged, damaged or are not conveying flow as designed.	Replace or repair damaged flood gates. Remove debris from obstructed flood gates. Excavate plugged culverts, or replace or enlarge culverts as needed. Implement site specific erosion control BMPs to protect culvert functions while minimizing channel and wetland habitat benefits such as revegetating bare or eroding areas near culverts.
Tidal Wetlands (Channels and Habitat Ridges)	Visual inspection annually and following extreme events, supplemented as needed with topo/bathy survey cross-sections and longitudinal profiles to observe change in channel geometry, marsh plain elevation, tidal ridge geometry and vegetation cover.	Channel geometry has been reduced or enlarged compared to as-built conditions. Erosion of tidal ridge. Increase or decrease in tidal circulation relative to design conditions. Vegetation composition varies from analogous estuarine habitats,	Follow up assessment of rates/causes of erosion or sedimentation, evaluation of effects relating to structure and function of tidal wetland. Remove sediment / debris jams. Apply erosion control fabrics, coconut fiber rolls, or other BMPs to redirect or reduce the energy of flows over erosion area. Regrade tidal channels, ridges and mudflats to improve tidal wetland function.

Project Component	Monitoring Method & Frequency	Maintenance Trigger	Potential Maintenance Actions ¹ (Subject to NRCS Wetland Reserve Easement)
Trail	Visual inspection annually and following extreme events to observe evidence of obvious flooding, erosion, settling or cracking of the trail surface to ensure that these potential actions are not compromising the trail stability, design or safety for use as a public accessway.	Evidence of trail erosion, cracking, slumping, or animal borrowing holes. Woody vegetation establishment. Gravel missing from overwash events and presence of bare soil.	Repair eroded sections and employ erosion control measures (protection of bare soil, bank stabilization, dissipation of concentrated flows). Remove woody and/or weedy vegetation via mowing or hand tools. Maintain or repair trail surface atop via placement of gravel or other finishing product.
Parking Lot	Visual inspection annually and following extreme events to observe evidence of obvious flooding, cracking or loss of gravel from the parking lot to determine whether these potential actions are compromising function and safety of the parking lot.	Evidence of parking lot flooding, cracking, or substantial loss of gravel/finishing agent. Establishment of woody or herbaceous vegetation. Pooling of water.	Repair areas of parking lot where cracking or settlement has occurred. Replace gravel. Removal of woody or herbaceous vegetation. Grading of parking lot to remove depressions which cause water to pool.
Fencing	Visual inspection annually and following extreme events to observe evidence of downed fence lines or posts, vegetation caught on fence lines, burrowing or other obvious pathway under fences which could compromise the fence integrity.	Evidence of a downed fence line or post, vegetation hung on fence line. Evidence of potential fence post failure (such as animal burrow adjacent to the fence post).	Repair or replace fence line or post. Removal of vegetation hung on fence line. Filling in of burrow or hole that could lead to fence post failure.

¹ – See Table C-1 in Appendix C for specific maintenance actions and corresponding impact avoidance measures

4.1 Emergency Repairs

Unique circumstances may arise that require emergency maintenance actions. The threshold for determining if these actions should occur include 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?
- Emergency actions are also those actions that meet the CEQA definition of emergency:

Section 21060.3. EMERGENCY

“Emergency” means a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. “Emergency” includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage.

CEQA Emergency Project Exemptions (Section 15269)

The following emergency projects are exempt from the requirements of CEQA.

- Projects to maintain, repair, restore, demolish, or replace property or facilities damaged or destroyed as a result of a disaster in a disaster-stricken area in which a state of emergency has been proclaimed by the Governor pursuant to the California Emergency Services Act, commencing with Section 8550 of the Government Code. This includes projects that will remove, destroy, or significantly alter an historical resource when that resource represents an imminent threat to the public of bodily harm or of damage to adjacent property or when the project has received a determination by the State Office of Historic Preservation pursuant to Section 5028(b) of Public Resources Code*
- Emergency repairs to publicly or privately owned service facilities necessary to maintain service essential to the public health, safety or welfare. Emergency repairs include those that require a reasonable amount of planning to address an anticipated emergency.*
- Specific actions necessary to prevent or mitigate an emergency. This does not include long-term projects undertaken for the purpose of preventing or mitigating a situation that has a low probability of occurrence in the short-term but this exclusion does not apply (i) if the anticipated period of time to conduct an environmental review of such a long-term project would create a risk to public health, safety or welfare, or (ii) if activities (such as fire or catastrophic risk mitigation or modifications to improve facility integrity) are proposed for existing facilities in response to an emergency at a similar existing facility.*
- Projects undertaken, carried out, or approved by a public agency to maintain, repair, or restore an existing highway damaged by fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide, provided that the project is within the existing right of way of that highway and is initiated within one year of the damage occurring. This exemption does not apply to highways designated as official state scenic highways, nor any project undertaken, carried out, or approved by a public agency to expand or widen a highway damaged by fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide.*
- Seismic work on highways and bridges pursuant to Section 180.2 of the Streets and Highways Code, Section 180 et Seq.*

If an emergency occurs within a wetland or tidal slough channel, this would be considered under the jurisdiction of the U.S. Army Corps of Engineers (USACE), which defines an emergency separately from CEQA and states:

An emergency situation is present where there is a clear, sudden, unexpected, and imminent threat to life or property demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property or

essential public services (i.e., a situation that could potentially result in an unacceptable hazard to life or a significant loss of property if corrective action requiring a permit is not undertaken immediately).

Emergency actions / repairs shall be implemented on an as-needed basis using the best judgement of the property owners. If repair of maintenance activities are needed in response to an emergency or to avoid an emergency, regulatory agencies should be contacted as soon possible for emergency permit authorization steps.

5. Reporting and Documentation

Reporting and documentation for each of the three types of post-construction monitoring is summarized below.

5.1.1 NRCS WRE Performance

For areas under easement, outcomes from performance monitoring will be documented by NRCS in accordance with the Annual Monitoring Worksheet (form NRCS-CPA-1251). Reporting associated with performance monitoring will be shared with property owners and any other party identified in the specific funding agreement, if any.

5.1.2 Non-regulatory Performance

Non-regulatory performance monitoring will be conducted on a voluntary basis for up to five years following construction, or as funding is available. If monitoring occurs, a monitoring report would be developed annually when data is collected and would include monitoring data from the pertinent categories mentioned above. It would be made available to funders, regulatory agencies and/or other entities as requested.

Regulatory monitoring, i.e. monitoring that is required by permits, will be conducted in accordance with Project permits and is anticipated to be required annually for five years.

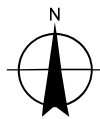
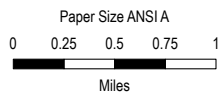
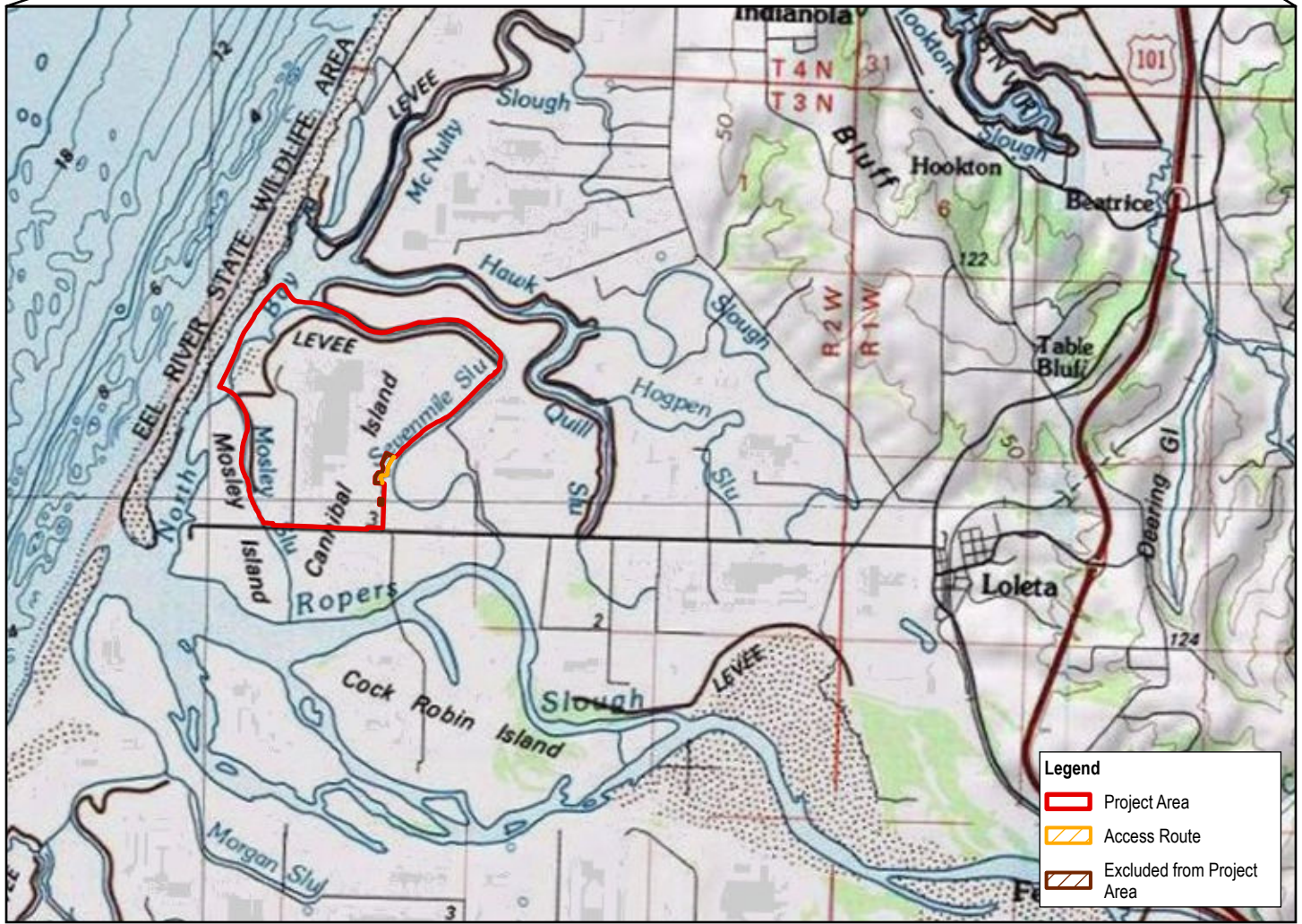
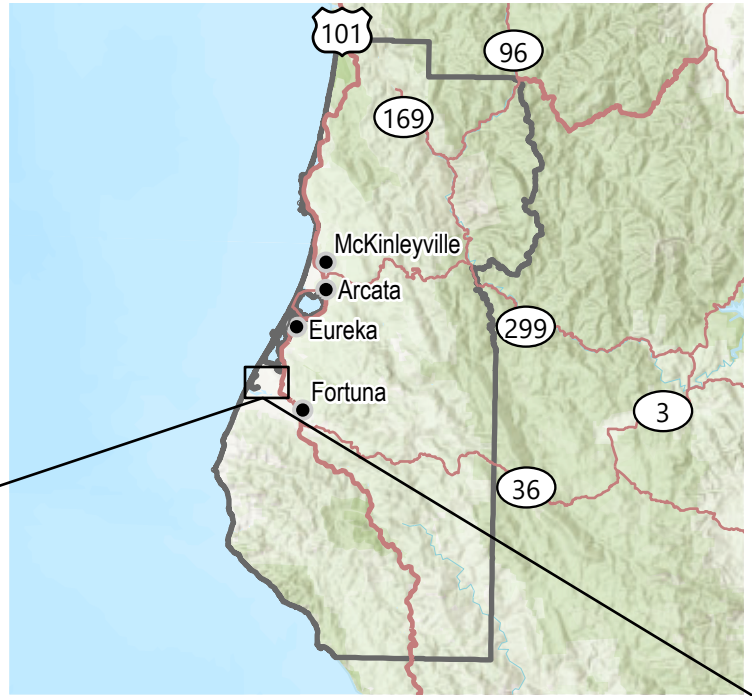
5.1.3 Maintenance

CDFW will carry out maintenance activities that are typical of and consistent with CDFW Wildlife Area maintenance plans. Significant maintenance actions, i.e., maintenance activities that differ from typical CDFW Wildlife Area maintenance activities, would be annually documented by CDFW. If significant maintenance activities are performed, documentation will include pre- and post-maintenance photographs with captions, identification of maintenance action location(s), and a description of the maintenance action taken, referencing potential maintenance actions included in **Appendix C, Table C-1**. Reporting will include documentation of conformity with criteria in **Appendix C, Table C-1**, including work window, work duration, description of equipment and methods, materials used, and avoidance measures implemented. Documentation of significant maintenance activities will be retained by CDFW for record keeping and shared with jurisdictional agencies to the extent required under Project permits.

Appendices

Appendix A

Figures



CalTrout
Cannibal Island Restoration Project

Project No. 11206383
Revision No. -
Date 21 Nov 2022

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

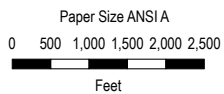
Vicinity Map

FIGURE 1



Legend

- Project Area
- Access Route
- Excluded from Project Area



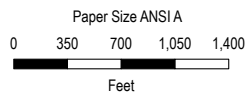
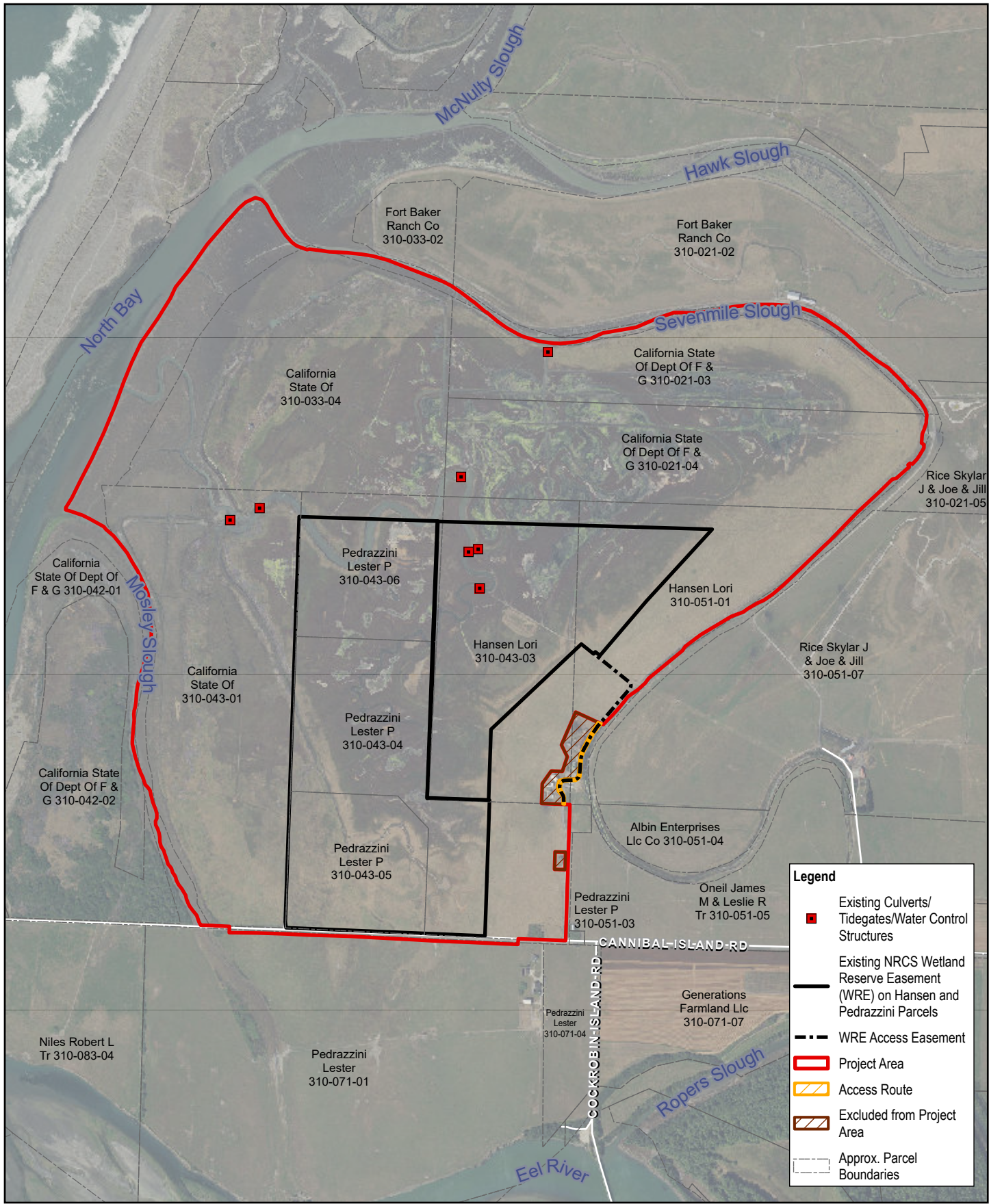
**CalTrout
Cannibal Island Restoration Project**

Project No. 11206383
Revision No. -
Date Nov 2022

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

Project Area

FIGURE 2



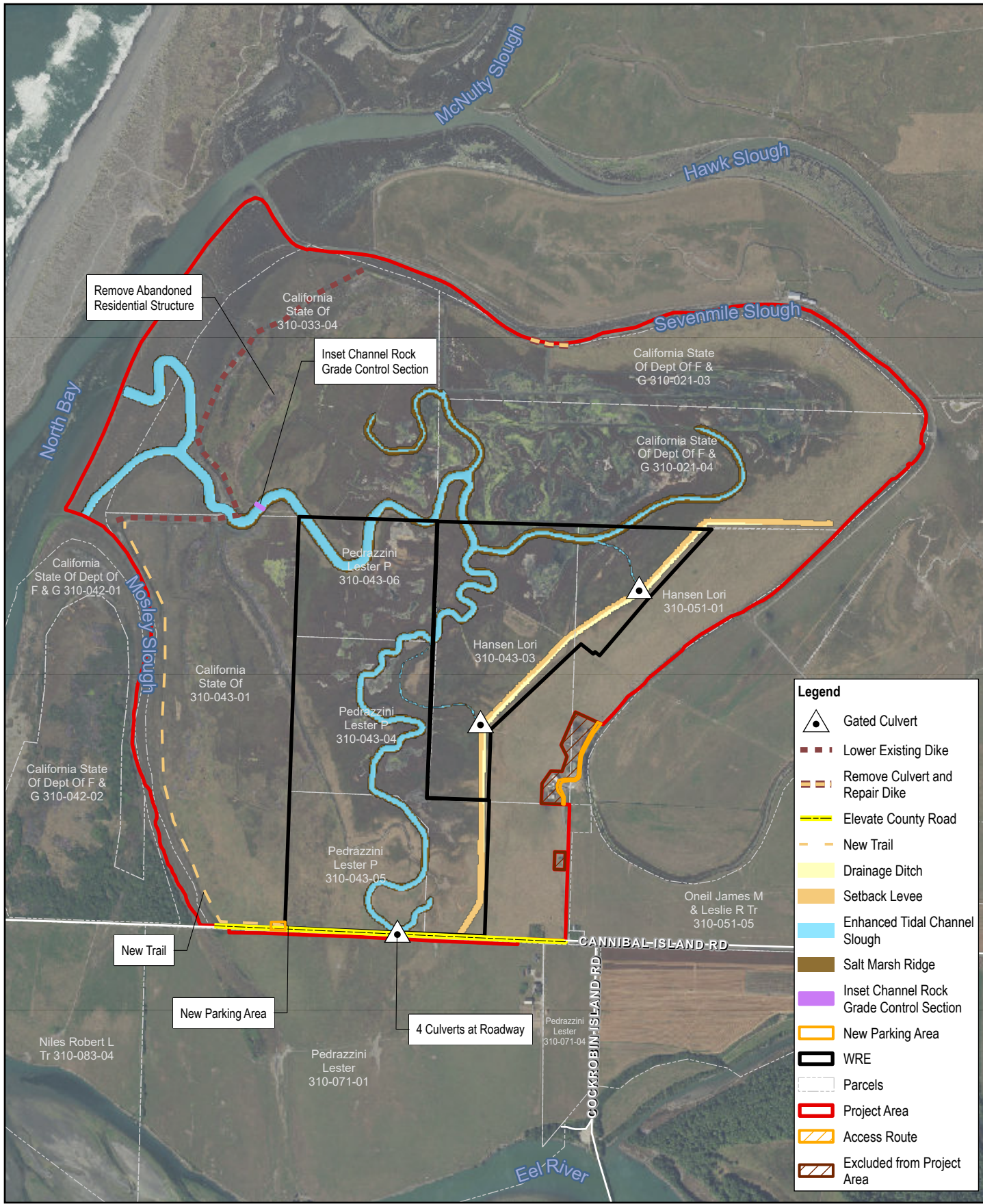
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CalTrout
 Cannibal Island Restoration Project

Project No. 11206383
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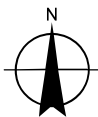
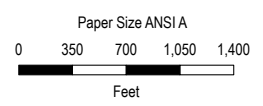
Ownership Boundaries

FIGURE 3



Legend

- Gated Culvert
- Lower Existing Dike
- Remove Culvert and Repair Dike
- Elevate County Road
- New Trail
- Drainage Ditch
- Setback Levee
- Enhanced Tidal Channel Slough
- Salt Marsh Ridge
- Inset Channel Rock Grade Control Section
- New Parking Area
- WRE
- Parcels
- Project Area
- Access Route
- Excluded from Project Area



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

CalTrout
Cannibal Island Restoration Project

Project No. 11206383
Revision No. -
Date Aug 2023

Project Area and Components

FIGURE 4

Appendix B

**Programmatic Biological Opinion (PBO)
and State Restoration General Order
(SRGO) Avoidance and Minimization
Measures**



Avoidance and Minimization Measures for Coverage by USFWS and NMFS PBO

Avoidance and Minimization Measures for Coverage by USFWS and NMFS PBO

California Trout

4 October 2023



Avoidance and Minimization Measures

Cannibal Island Restoration Project

Prepared for:



California Trout

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Prepared by:



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Eureka, CA 95501, United States

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1. Introduction

The Cannibal Island Restoration Project (hereafter “Project”) will be implemented under Endangered Species Act (ESA) Section 7 coverage Programmatic Biological Opinions (PBOs) for listed fish species. This memorandum includes minimization measures required within the PBOs administered by 1) the National Oceanic and Atmospheric Administration Restoration Center (NOAA RC) and U.S. Army USACE of Engineers (USACE) for covered salmonids and green sturgeon (NMFS 2022), and 2) the United States Fish and Wildlife Service (USFWS) for Tidewater Goby (USFWS 2022).

2. Reporting

The applicant (California Trout) is responsible for conducting all applicable Project monitoring and reporting requirements prior to, during, and after Project construction (e.g., revegetation monitoring, species rescue, and relocation reporting). Separate reporting procedures are required by the NOAA RC and USACE for covered salmonids, and the USFWS for Tidewater Goby.

2.1.1 NOAA Reporting

By April 1 of the year following completion of construction of a Project, the applicant will submit a completion report (RC Arcata Office Programmatic Biological Opinion Post-Project Monitoring Form) to the NOAA RC and the USACE that includes Project as-built plans, and photo documentation of pre-Project conditions and post-construction conditions (taken immediately after Project construction). For Projects including fish relocation, the report will also include all fisheries data collected by a qualified fisheries biologist, including the number of listed salmonids killed or injured during the proposed action, the number and age class of listed salmonids captured and removed, and any effects of the proposed action on listed salmonids not previously considered.

2.1.2 USFWS Reporting

The applicant must submit to the applicable USFWS Field Office and Lead Action Agency their Project specific Post-Construction Report Form (Appendix B in USFWS PBO; USFWS 2022). Applicants will provide the information requested in the Post-Construction Report Form to the respective USFWS Field Office (and copy the Action Agency) by December 1. If there is ongoing revegetation or species monitoring beyond the report due date, a report will be provided annually on December 1 until success criteria have been met or monitoring has ceased. Per General Protection Measure (GPM): Vegetation/Habitat Disturbance and Revegetation (VHDR-5), Revegetation Monitoring and Reporting, the standard for revegetation success (within the Action Area) is 60 percent (%) absolute cover compared to pre-Project conditions at the Project site or at least 60% cover compared to an intact, local reference site. If an appropriate reference site or pre-Project conditions cannot be identified, success criteria will be developed for review and approval on a Project-by-Project basis, based on the specific habitat impacted and known recovery times for that habitat and geography.

The Project is expected to be self-maintaining post-construction, and proposes not to conduct vegetation monitoring as a condition of permit agreements. The Project will conduct pre- and post-construction photo monitoring.

2.2 Incidental Take

2.2.1 USFWS Incidental Take Protocols

The applicant will use the Endangered Species Act (ESA) Section 7(a)(2) Review Form (Appendix A in the USFWS PBO; USFWS 2022) to document metrics needed to calculate estimated incidental take so the USFWS Field Office can identify the incidental take expected from the Project and enter that estimate into a USFWS maintained internal tracking tool. The applicant will report all injury or mortality of listed species to the USFWS Field Office within 48 hours.

The Post-Construction Report Form will be used to document actual incidental take from the Project. No more than 10% of all Tidewater Goby individuals captured and relocated may be injured or killed per Project.

Upon locating a dead, injured, or sick endangered or threatened species specimen, this must be reported to the USFWS Resident Agent in Charge (Sacramento 916-569-8444 or Los Angeles 310-328-1516), and prompt notification must be made to the nearest USFWS Field Office. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. The

USFWS is to be notified in writing within 48 hours of the accidental death of, or injury to, a threatened or endangered species, or of the finding of any dead or injured specimen during implementation of the proposed action. Notification must include the date, time, and location (including GPS location information in UTM, NAD 83) of the incident or discovery, as well as any pertinent information on circumstances surrounding the incident or discovery. Care should be taken in handling sick or injured specimens to ensure effective treatment and care, or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials, the finder has the responsibility to carry out instructions provided by USFWS Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

2.2.2 NOAA Incidental Take Protocols

To be exempt from the prohibitions of the ESA, the Federal action agency must ensure that any applicant complies with the following terms and conditions:

1. Minimize the amount or extent of incidental take of listed salmonids resulting from field activities in support of the Program.
2. NOAA RC shall contact NMFS within 48 hours if injuries or mortality at any restoration Project or monitoring site on any given day exceed three percent of the number of captured fish for any listed species. Fish capture and/or relocation will cease at the Project site until NMFS is contacted. NMFS will review the activities resulting in take and determine if modified methods or additional protective measures are required before fish handling at the site may resume.

3. Project Summary

The Cannibal Island Restoration Project (Project) is approximately 795.2 acres of agricultural bottoms and tidal saltmarsh in the Eel River Delta, 3 miles west of the town of Loleta, Humboldt County, CA. The Project Area is at the western-most extent of the Eel River delta and estuary approximately one mile inland and northeast of the Eel River mouth. The Project is within the Cannibal Island U.S. Geological Survey (USGS) 7.5-minute quadrangle, bounded by Cannibal Island Road to the south, the North Bay of the Eel River Delta and Mosley Slough to the west, and Sevenmile Slough to the north and northeast.

The northern and western portion of the Project Area (approximately 462 acres) is owned by CDFW and managed as part of the of the Eel River Wildlife Area (ERWA) Cannibal Island Unit (APNs 310-043-001, 310-033-004, and 310-021-003, 310-021-004). The remaining 332 acres are privately owned by Hansen (APNs 310-043-003 and 310-051-001) and Pedrazzini (APNs 310-043-004, -005, -006). Approximately 220 acres of the private property are held in Wetland Conservation Easements by the Natural Resources Conservation Service (NRCS) Wetlands Reserve Easement Program (WRP).

The Project will restore a landscape of mostly diked agricultural land to a mosaic of pasture and natural habitats, including estuarine and tidal slough channels, brackish ponds, freshwater ponds, and agricultural pastures. Restoration of the natural tidal inundation range and hydraulics as well as fluvial and tidal sediment deposition to

restore wetland functions is critical to achieve Project objectives. Increased tidal exchange and connectivity between historical tidal wetland areas and North Bay will support broader native plant, fish, wildlife, and benthic infauna diversity within estuarine and freshwater marsh habitats, and in wetland-ecotones. Improvement of tidal channel networks will accommodate physical processes such as sediment transport and marsh plain sediment accretion. The Project will enhance and reconnect full tidal exchange to approximately 500 acres of former tidal marsh habitat and construct inter-tidal lagoons with tidal marsh features.

Construction activities will include the removal of outdated water control structures, excavation of slough channels to accelerate the formation of high-quality aquatic habitat for listed fish species, and placement of excavated fill in appropriate locations to mimic natural marsh topography (natural levees and hummocks or tidal marsh ridges) and enhance wetland vegetation diversity through removal of invasive dense-flowered cordgrass. Excavated soils from the channels would be placed in low hummocks approximately 2-feet high adjacent to the channels. These hummocks are anticipated to retain wetland parameters as they will not exceed marsh plain elevation and would not constitute conversion to uplands. Placement of ¼ ton rock will occur along a section of channel to provide inset channel grade control to manage the tidal prism. This grade control is anticipated to be beneficial to manage tidal prism until the site elevations increase to be representative of a system with full tidal amplitude, which is expected to occur over 10-20 years. The rock would be placed over a 20-foot-long section where a former road crossing is located and failing culvert is proposed for removal. This area is a suitable location for the inset channel grade control because it likely already contains compacted sediment (from previous infrastructure), and will be disturbed via the road crossing and culvert removal anyway. Much of the existing dike network within the Project Area would be reconfigured or removed. A new setback levee will be constructed to protect agricultural land from tidal inundation as full amplitude is restored, including one newly constructed set-back levee in the eastern portion of the Project Area, and raising of Cannibal Island Road in the southern portion of the Project Area. Sediment excavated during construction would be beneficially reused within the Project Area and would not be hauled off-site. The Project would result in enhanced tidal channels and salt marsh, and full tidal range restoration is expected to promote recovery and maintenance of tidal marsh habitats that support a variety of native fish, invertebrates, wildlife, and plant species.

See Project Description in application attachments for a detailed description of Project activities and accompanying figures.

4. Summary of Construction Activities for Project

The following are general details of the proposed Project's construction, operation, and maintenance activities.

Construction Timing:

Project construction will be phased into one to two construction seasons based on available funding, site conditions, and sequencing for earthwork with construction water management and County Road construction. Under the PBOs, the general construction season will be from June 15 to November 1. Restoration, construction, fish relocation, and dewatering activities within any wetted and/or flowing creek channel shall only occur within this period. Extensions to this work season can be granted if: 1. There is less than a 50% chance of 1.5 inches of rain predicted over any 24-hour period during the granted time extension, and 2. The RC determines, and National Marine Fisheries Service (NMFS) confirms, that an extension will not result in effects that go beyond those analysed during the ESA consultation on the Program, either in type or magnitude. Construction will be limited to daylight hours absent prior approval from NMFS RC and USFWS.

Construction Materials:

Multiple sediment reuse areas coupled with the extent of Project excavation are anticipated to necessitate multiple staging areas within the Project footprint.

Equipment Types anticipated for Project construction include:

- Excavators (Conventional and/or Amphibious)
- Scrapers
- Dozers

Loaders
Dump Trucks
Small Tractors
Compactors
Graders
Water Trucks
Pumps

Site Access & Staging:

A temporary construction entrance shall be placed at the intersection of the Cannibal Island County Road and Senestraro Lane. Cannibal Island Road is a two-lane paved County road. Senestraro Lane is a single lane dirt road extending north from Cannibal Island Road and located on CDFW property. Plans include a public access parking lot near this intersection which will be used for construction staging. The CDFW access road (Senestraro Lane) will be the primary entrance and exit for construction activities within the site. Another temporary construction entrance will be placed at the intersection of Cannibal Island Road and the Hansen/Pedrazzini private driveway to provide a route along the eastern boundary of the Hansen residence and follow the perimeter dike to and past Sevenmile Slough as needed to access the eastern and northern portion of the site. Construction equipment and materials will be transported to the work areas via these ingress and egress locations.

Construction Activities:

The proposed Project will enhance (widen and deepen) existing tidal slough channels within the limits of Project disturbance. In addition to the slough channel work, various culverts will be removed within the Project boundaries. During excavation, management of surface water will be required through the construction period. Surface water management will be required to reduce nuisance water within the active work area. Inflow management will also reduce the moisture content in excavated soils and prevent aquatic and non-aquatic organisms from entering the construction area. Cofferdams will be used to isolate instream work areas that will be dewatered.

Constructed Facilities (Natural and Artificial Infrastructure) and Operations and Maintenance to those Facilities:

Ongoing management and maintenance activities may be necessary to assure the long-term hydraulic and ecological functions of the Project. The following maintenance actions are anticipated after the Project is constructed:

- Setback Levee
 - Observations of physical character (annually and following extreme storms)
 - Mowing to discourage growth of woody vegetation and invasives species (annually)
 - Repair from erosion or burrowing animal damage (as needed)
- Grading and/or resurfacing portions of the access roads (as needed)
- Cleaning debris and sediment from channels, drainage ditches and tide gates (as needed annually and following extreme storms)
- Removing invasive vegetation and re-planting native species (as needed)

5. Avoidance and Minimization Measures

General avoidance and minimization measures from the USFWS PBO (USFWS 2022) and NOAA PBO (NMFS 2022) are presented first, followed by measures focused on water quality and general measures for all covered species. Additionally, vegetation and habitat avoidance and minimization measures are detailed.

There is overlap between the language and intent of the general measures included in both PBOs, and all measures detailed below will be implemented and satisfy requirements for coverage by both the USFWS and NOAA PBOs.

Measures listed in the USFWS PBO are distinguished in this document by “USFWS” listed before the measure (e.g., “USFWS GPM-1”), and measures from the NOAA PBO are distinguished similarly by “NOAA” listed before the measure.

A separate Dewatering and Fish Relocation Plan (GHD 2023, included as separate attachment in application package) has been developed to detail protection measures implemented for the Project in relation to dewatering activities and species-specific handling and relocation protection measures.

5.1 General Measures

A number of conservation measures have been incorporated into the proposed action. The purpose of conservation measures is to incorporate design refinements and best practices into the proposed action to avoid and/or minimize potential effects. The rationale behind including these commitments is that the Program’s Project applicant(s) will undertake and implement the applicable and necessary measures below as part of any proposed Project. Although these best practices are required for restoration Projects authorized under the Program, specific measures may be altered, added, or removed on an individual Project basis with the approval of the NOAA RC and USACE, in coordination with NMFS West Coast Region, or with approval by the USFWS Field Office (as applicable). The following GPM are consistent across both NMFS PBO (NMFS 2022) and USFWS PBO (USFWS 2022).

USFWS GPM-1: Receipt and Copies of All Permits and Authorizations

Work will not begin until all necessary permits and authorizations have been issued (e.g., USACE, USFWS, NMFS, State and/or Regional Boards, or California Department of Fish and Wildlife [CDFW]). The applicant will ensure that a readily available copy of the applicable agency permits and authorizations (e.g., USFWS PBO, NMFS PBO, or Section 404 permit) is maintained by the construction foreperson/manager on the Project site for the duration of Project activities.

Notification to NOAA RC

Work shall not begin until: (a) the USACE and/or NOAA RC has notified the applicant that NMFS has not objected to incorporating the Project into the Program (i.e., the requirements of the ESA have been satisfied), and (b) all other necessary permits and authorizations are finalized.

USFWS GPM-2 & GPM-3: Construction Work Windows & Construction Hours

Construction work windows may be required, depending on whether the Project involves in-water construction and/or whether Covered Species have the potential to occur in the Project area. Covered Species work windows are provided in Section 2.1.5.3, *Guild- and Species-Specific Protection Measures*.

Construction activities will generally be limited to daylight hours, to the extent practicable. If nighttime construction is necessary, including in tidally influenced waters where tides may limit daylight access and work schedules, all Project lighting (e.g., staging areas, equipment storage sites, roadway, and construction footprint) will be selectively placed and directed onto the roadway or construction site and away from sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. If the work area is near surface waters, the lighting will be shielded so that it does not shine directly into the water.

USFWS GPM-6: Work Area and Speed Limits

Construction work and materials staging will be restricted to the smallest area practicable in designated work areas, routes, staging areas, temporary interior roads, or the limits of existing roadways.

Prior to initiating construction or grading activities, brightly colored fencing or flagging or other practical means will be erected to demarcate the limits of the Project activities, including the boundaries of designated staging areas; ingress and egress corridors; stockpile areas for spoils disposal, soil, and materials; and equipment exclusion zones. Flagging or fencing will be maintained in good repair for the duration of Project activities.

Posted speed limits on public roadways will be adhered to and speeds will be limited to 20 miles per hour (mph) in the Project area on unpaved surfaces and unpaved roads (to reduce dust and soil erosion), or in areas where Covered Species have the potential to occur. Speeds greater than 20 mph may be permitted in the Project area where Covered Species are not expected to occur (e.g., in areas where Covered Species have been excluded) and there is no risk of

generating excessive dust (e.g., surfaces are paved, saturated, or have been treated with other measures to prevent dust).

USFWS GPM-8: Prevent Spread of Invasive Species

The spread or introduction of nonnative, invasive plant and animal species will be avoided. When practicable, nonnative invasive plants in the Project areas will be removed and properly disposed of in a manner that will not promote their spread. Equipment will be cleaned of any sediment or vegetation at designated wash stations before entering or leaving the Project area, to avoid spreading pathogens or nonnative invasive species. Activities that create new habitat for nonnative invasive species will be avoided. Isolated infestations of nonnative invasive species identified in the Project area will be treated with weed management methods at an appropriate time, to prevent further formation of seed and destroy viable plant parts and seed. Wash sites must be in confined areas that limit runoff to any surrounding habitat, and on a flat grade. Upland areas will use rice straw or invasive species-free local slash/mulch for erosion control; the remainder of the Project area will use certified, weed-free erosion control materials. Mulch must be certified weed-free. Construction supervisors and managers will be educated on weed identification and the importance of controlling and preventing the spread of invasive weeds.

Guidelines within the Aquatic Invasive Species Disinfection/Decontamination Protocols (CDFW 2016) include:

- If decontamination is not done on site, transport contaminated equipment in sealed plastic bags and keep separate from clean gear.
- Gear may be dedicated for a specific field site but should be left on site and be cleaned when moved off site.
- Sets of field gear may be rotated in and out of field per cleaning cycle.
- When practical, begin work upstream and work downstream. This avoids transporting aquatic invasive species to non-infested upstream areas.

Disinfectant methods include:

- Place used gear in a freezer, thawing, immersing gear in saltwater solution for 10 minutes, rinsing, and hanging to dry.
- Submerge gear within a quat solution for at least 10 minutes and rinse.

USFWS GPM-9: Practices to Prevent Pathogen Contamination

The applicant will review and implement restoration design considerations and best management practices (BMPs) to help prevent pathogen contamination, as published by the “Working Group for Phytophthoras in Native Habitats” (www.calphytos.org), when there is a risk of introduction and spread of plant pathogens in site plantings. The applicant will review and implement decontamination protocols to prevent the spread of pathogens among amphibians or other aquatic animals when working in aquatic habitats that may support native amphibians. Gear and equipment that may contact water will be cleaned and decontaminated to prevent the spread of chytrid fungus.

USFWS GPM-10: Equipment Maintenance and Materials Storage

Vehicle traffic will be confined to existing roads and the proposed access route(s). All machinery must be in good working condition, showing no signs of fuel or oil leaks. Oil, grease, or other fluids will be washed off at designated wash stations prior to entering the construction site. Inspection and evaluation for the potential for fluid leakage will be performed daily during construction. All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location (e.g., barges) with secondary containment to prevent spills from traveling to surface water or drains. The applicant will establish staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in coordination with resource agencies. Staging areas will have a stabilized entrance and exit and will be at least 100 feet from waterbodies, unless site-specific circumstances do not provide such a setback; in such cases, the maximum setback possible will be used. Fluids will be stored in appropriate containers with covers and will be properly recycled or disposed of off-site. Machinery stored on site will have pans or absorbent mats placed underneath potential leak areas.

Construction equipment such as portable equipment, vehicles, and supplies, including chemicals, shall be stored at designated construction staging areas or on barges, exclusive of any riparian or wetland areas. Any equipment that may leak shall be stored over impermeable surfaces, if available, and drip pans (or any other type of impermeable

containment measure) will be placed under parked machinery and checked and replaced, when necessary, to prevent drips and leaks from entering the environment.

USFWS WQHM-2: Storm Water Pollution Prevention Plan, & WQHM-3: Erosion Control

The contractor/applicant to the Program shall inspect, maintain, and repair all erosion control materials and devices prior to and after any storm event, at 24-hour intervals during extended storm events, and a minimum of every two weeks until all erosion control measures are no longer needed.

Immediately after Project completion and before the close of the seasonal work window, all exposed soil shall be stabilized with erosion control measures such as mulch, seeding, and/or placement of erosion control blankets. Where straw, mulch, or slash is used on bare mineral soil, the minimum coverage shall be 95 percent with two-inch minimum depth.

All Projects that are required to obtain coverage under the National Pollutant Discharge Elimination system (NPDES) General Order for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Order) will prepare and implement a site-specific storm water pollution prevention plan (SWPPP), as required by the Construction General Order.

For Projects that do not require coverage under an NPDES permit, the Project Proponent will include appropriate BMPs, and a rain even action plan if seasonal rain during the construction period might occur, to reduce the potential release of water quality pollutants to receiving waters. BMPs may include the following measures:

- Install erosion control measures, such as straw bales, silt fences, fiber rolls, or equally effective measures, at riparian areas adjacent to stream channels, drainage canals, and wetlands, as needed. Erosion control measures will be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to erosion control measures will be made as needed to protect water quality.
- Erosion control products that include synthetic or plastic monofilament or cross-joints in the netting that are bound/stitched (e.g., straw wattles, fiber rolls, or erosion control blankets) and could trap snakes, amphibians, and other wildlife will not be used.

USFWS GPM-11: Material Disposal

All refuse, debris, unused materials, and supplies that cannot reasonably be secured will be removed daily from the Project work area and deposited at an appropriate disposal or storage site. All construction debris will be removed from the work area immediately on Project completion.

USFWS GPM-12: Fugitive Dust Reduction

To reduce dust, construction vehicles will be speed-restricted to 20 mph when traveling on nonpaved surfaces. Stockpiled materials susceptible to wind-blown dispersal will be covered with plastic sheeting or other suitable material to prevent movement of the material. During construction, water (e.g., trucks, and portable pumps with hoses) or other approved methods will be used to control fugitive dust. Dust suppression activities must not result in a discharge to waterbodies.

USFWS GPM-13: Trash Removed Daily

During Project activities all trash, especially food-related refuse that may attract potential predators or scavengers, will be properly contained in sealed containers, removed from the work site, and disposed of daily.

USFWS GPM-14: Project Cleanup after Completion

Work pads, temporary falsework, and other construction items will be removed from the 100-year floodplain by the end of the construction window. Removal of materials must not result in discharge to waterbodies.

USFWS GPM-15: Revegetate Disturbed Areas

All temporarily disturbed areas will be decompacted and seeded/planted with an assemblage of native riparian, wetland, and/or upland plant species suitable for the area. The applicant will develop a revegetation plan. Plants for revegetation will come primarily from active seeding and planting, or from natural recruitment where applicable. Plants imported to the restoration areas will come from local stock. Only native plants (genera) will be used for restoration

efforts. Certified weed-free native mixes and mulch will be used for any restoration planting or seeding. Revegetation activities in and adjacent to waterbodies and other aquatic habitat suitable for Covered Species will commence after construction activities at a site are complete.

5.2 In-Water and Water Quality Measures

USFWS WQHM-1: Staging Areas and Stockpiling of Materials and Equipment

Staging, storage, and stockpile areas must be outside of habitat suitable for Covered Species unless necessary for Project implementation and approved by the Action Agency and the USFWS Field Office. Where feasible, staging will occur on access roads or other previously disturbed upland areas, such as developed areas, paved areas, parking lots, areas with bare ground or gravel, and areas clear of vegetation, to avoid sensitive habitats and limit disturbance to surrounding habitats. Similarly, all maintenance equipment and materials (e.g., road rock and Project spoil) will be restricted to the existing service roads, paved roads, or other determined designated staging areas. See GPM-10, Equipment Maintenance and Materials Storage, for more details regarding protection measures for materials storage. Staging areas will be established for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants. Staging areas will have a stabilized entrance and exit and will be at least 100 feet from bodies of water, unless site-specific circumstances do not provide such a setback; in such cases, the maximum setback possible will be used. See also IWW-2, In-Water Vehicle Selection and Work Access; and IWW-4, In-Water Staging Areas, and Use of Barges. If an off-road staging area is chosen and if Covered Species are potentially present, the Qualified Biologist will survey the selected site to verify that no sensitive resources would be disturbed by staging activities.

Stockpiling of materials, portable equipment, vehicles, and supplies (e.g., chemicals), will be restricted to the designated construction staging areas. If rain is predicted in the forecast during the dry season, and stockpiled soils will remain exposed and unworked for more than 7 days, then erosion and sediment control measures must be used. If there is a high-wind scenario, then soil will be covered at all times. During the wet season, no stockpiled soils will remain exposed, unless properly installed and maintained erosion controls are in place on and around the stockpile. Temporary stockpiling of material onsite will be minimized. Stockpiled material will be placed in upland areas far enough away from Covered Species habitat that these materials cannot discharge to waters of the United States. Additional species-specific erosion control measures may also be necessary because of the potential for listed species at the Project site. More detail is provided in Section 2.1.5.3, Guild and Species-Specific Protection Measures.

NOAA Materials In or Near Water

All materials placed in or over streams, rivers or other waters shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings, or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances toxic (e.g., copper, other metals, or pesticides, petroleum-based products, etc.) to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

NOAA Water Filtration

Water containing mud or silt from construction activities shall be treated by filtration or retention in a settling pond to avoid draining sediment-laden water back to the stream channel. Alternatively, an infiltration area may be created and used within the regular Project footprint or in upland areas if the soil composition of the area adequately supports infiltration back into the system.

USFWS WQHM-4: Hazardous Materials Management and Spill Response

As part of the Stormwater Pollution Prevention Plan (SWPPP) or Project Specific Water Pollution Control Plan, the applicant will prepare and implement a hazardous materials management and spill response plan. The applicant will ensure that any hazardous materials are stored at the staging area(s) with an impermeable membrane between the ground and hazardous material, and that the staging area is designed to prevent the discharge of pollutants to groundwater and runoff water. The applicant will use and store hazardous materials, such as vehicle fuels and lubricants, in designated staging areas away from stream channels and wetlands, unless otherwise approved in the ESA Section 7(a)(2) Review Form, according to local, state, and federal regulations. The applicant will notify

regulatory agencies within 24 hours of any leaks or spills and will properly contain and dispose of any unused or leftover hazardous products off site.

USFWS IWW-1: Appropriate In-Water Materials

Selection and use of gravels, cobble, boulders, and instream woody materials in streams, and other materials (e.g., oyster shells, other substrates) for reef/bed restoration will be performed to avoid and/or minimize adverse impacts to aquatic Covered Species and their habitats. On-site gravels will be screened and sorted; Gravels imported from a commercial source will be clean-washed and of appropriate size. As necessary to protect Covered Species, placement will be overseen by a Qualified Biologist; implementation timing will be determined based on the least amount of overlap (or impact on) all sensitive biological resources that may be affected, and the timing of their use of the receiving area. Imported gravel from outside the Project watershed will not be from a source known to contain historical hydraulic gold mine tailings, dredger tailings, or mercury mine waste or tailings. Materials that may foul or degrade spawning gravels (e.g., sand or soil eroding from sandbag or earthen dams) will be managed to avoid release and exposure in salmonid streams. Oyster shells or other substrates for reef/bed restoration will be cured and inspected to be free of pathogens and/or nonnative species.

USFWS IWW-2: In-Water Vehicle Selection and Work Access

If work requires that equipment enter wetlands or below the banks of a Water of the US, equipment with low ground pressure will be used to minimize soil compaction. Low-ground-pressure heavy equipment mats will be used, if needed, to lessen soil compaction. Hydraulic fluids in mechanical equipment working in the waters of the United States or any other aquatic habitat suitable for Covered Species will not contain organophosphate esters. The amount of time this equipment is stationed, working, or traveling in the waters of the United States or other aquatic habitat suitable for Covered Species will be minimized. All equipment will be removed from the aquatic feature within the Action Area during nonwork hours or returned to the staging area.

USFWS IWW-3: In-Water Placement of Materials, Structures, and Operation of Equipment

Material used for bank stabilization or in-water restoration will minimize discharge sediment or other forms of waste to waters of the United States or other aquatic habitat suitable for Covered Species. Construction will occur from the top of the stream bank, on a ground protection mat underlain with filter fabric, or a barge. All materials placed in streams, rivers, or other waters will be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings, or other materials used for in-channel structures will not contain coatings or treatments, or consist of substances toxic to aquatic organisms (e.g., zinc, arsenic, creosote, copper, other metals, pesticides, or petroleum-based products) that may leach into the surrounding environment in amounts harmful to aquatic organisms. Except for the following conditions, equipment must not be operated in standing or flowing waters without site-specific approval from the USFWS Field Office:

- All construction activities must be effectively isolated from water flows, to minimize the potential for runoff. This may be accomplished by working in the dry season or dewatering the work area in the wet season.
- When work in standing or flowing water is required, structures for isolating the in-water work area and/or diverting the water flow must not be removed until all disturbed areas are cleaned and stabilized. The diverted water flow must not be contaminated by construction activities.
- All open-flow temporary diversion channels must be lined with filter fabric or other appropriate liner material to prevent erosion. Structures used to isolate the in-water work area and/or divert the water flow (e.g., cofferdam or geotextile silt curtain) must not be removed until all disturbed areas are stabilized.

5.3 All Species Measures

USFWS ASP-2: Preconstruction Surveys for Tidewater Goby

A Qualified Biologist will conduct visual preconstruction surveys and implement additional protection measures within 5 days prior to beginning work to protect the species and habitat from avoidable construction-related disturbance. The intent of the survey is to assess current species habitat and species use locations in the Project area immediately prior

to construction. The preconstruction survey is not intended to be a presence/absence or protocol-level survey; the potential for species presence would have already been evaluated prior to Project approval. Pre-construction surveys may be phased across a construction site if construction in different areas will occur at different times; only areas where disturbance is imminent need to be surveyed. If construction activities at a given location cease for more than 5 consecutive days, and there is potential for Covered Species to reoccupy habitat at that site, the Qualified Biologist will resurvey the Project area prior to resuming construction and implement applicable protection measures.

USFWS GPM-4: Environmental Awareness Training

For Projects occurring where Covered Species are likely to be present, prior to engaging existing or new personnel in construction activities, new construction personnel will participate in environmental awareness training conducted by a Qualified Biologist. Construction personnel will be informed regarding the identification, potential presence, habitat requirements, legal protections, avoidance and minimization measures, and applicable protection measures for Covered Species with the potential to occur in or immediately adjacent to the Project site. Construction personnel will be informed of the procedures to follow should a Covered Species be encountered during construction activities. For Projects where the Qualified Biologist is not regularly on the Project site, training may be provided in an online/virtual meeting. For Projects that may continue over an extended duration and require excessive training events, a training video developed under the supervision of the Qualified Biologist may be used to train new personnel, as long as a Qualified Biologist is available by phone to answer questions about the training or to answer questions that may arise during construction.

USFWS GPM-5: Environmental Monitoring

Where appropriate and based on Project-specific requirements, a Qualified Biologist(s) will perform site clearance at the beginning of each day and will monitor construction activities throughout the day in, or immediately adjacent to, sensitive resources and/or Covered Species habitat (including critical habitat as applicable), as necessary. The Qualified Biologist will confirm that all applicable protection measures are implemented during Project construction. The Qualified Biologist will have the authority to stop any work if they determine that any permit requirement is not fully implemented or if it is necessary to protect Covered Species. The Qualified Biologist will prepare and maintain a biological monitoring log of construction site conditions and observations, which will be kept on file.

USFWS ASP-3: Species Capture, Handling, and Translocation

Tidewater Goby capture, handling, and translocation will only be conducted by a USFWS-Approved Biologist(s). The applicant will prepare a Covered Species translocation plan to be reviewed and approved by the USFWS Field Office as part of the ESA Section 7(a)(2) Review Form. The plan will include capture and translocation methods, translocation site, and post translocation monitoring, if applicable.

USFWS Self-Imposed Annual Take Limits

No more than 10% of all Tidewater Goby individuals captured and relocated may be injured or killed per Project.

NOAA Salmonid Relocation

For salmonid relocations, the qualified biologist shall submit qualifications to the NOAA RC for approval prior to fish relocation activities.

5.4 Dewatering Activities and Fish Relocation Protection Measures

All dewatering, General Fish Protection Measures, and fish relocation measures from both the NOAA and USFWS PBOs are included in a separate document (Dewatering and Relocation Plan; GHD 2023). This document includes information on dewatering measures, cofferdam construction, limits on area of disturbance for stream dewatering, fish relocation measures, and biologist qualifications.

In addition to the General Fish Protection Measures, several GPMs, as applicable, are important to protect these species per USFWS and NOAA PBO guidance. These GPMs are outlined in this document and the Dewatering and

Relocation Plan, and include: GPM 2, Construction Work Windows; GPM 4, Environmental Awareness Training; GPM 5, Environmental Monitoring; ASP 1, Qualifications of the Qualified Biologist and USFWS-Approved Biologist; ASP 2, Preconstruction Surveys; ASP-3, Species Capture, Handling, and Translocation; WQHM 3, Erosion Control Plans; WQHM 4, Hazardous Materials Management and Spill Response Plan; IWW 1 through IWW 13 (In-Water Work, as applicable to the Project); VHDR 6 and VHDR 7 (for herbicide use); and VHDR 8 (for herbicide reporting).

5.5 Vegetation/Habitat Disturbance Protection Measures

The following protection measures apply to all Projects where vegetation/habitat disturbance occurs:

USFWS GPM-7: Environmentally Sensitive Areas and/or Wildlife Exclusion.

Where appropriate, fencing, flagging, or biological monitoring will be used to minimize disturbance to environmentally sensitive areas and Covered Species habitat. If the Project site is suitable for fencing, prior to the start of construction, environmentally sensitive area fencing (ESAF) and/or Wildlife Exclusion Fencing (WEF) will be installed between the active work area(s) and any suitable terrestrial habitat where Covered Species could enter the site. When fencing is not practicable due to Project size, topography, soils, or other factors, monitoring by a Qualified Biologist during construction activities can be used to minimize impacts (see GPM-5, Environmental Monitoring).

- The Qualified Biologist will determine the location of the ESAF and/or WEF prior to the start of construction.
- WEF specifications (e.g., height, installation requirement, or materials) will be determined based on the species the fencing is intended to exclude. ESAF does not require such specifications and may include flagging or monitoring (see GPM-5, Environmental Monitoring).
- The ESAF and/or WEF will remain in place throughout the duration of the construction activities and will be inspected and maintained regularly by the Qualified Biologist until completion of the Project. Repairs to the ESAF and/or WEF will be made within 24 hours of discovery. The fencing will be removed only when all construction equipment is removed from the site, the area is cleared of debris and trash, and the area is returned to natural conditions.

USFWS VHDR-1: Avoidance of Vegetation Disturbance

The applicant will minimize the amount of soil, terrestrial vegetation, emergent vegetation, and submerged vegetation (e.g., eelgrass and kelp in marine areas, or submerged aquatic vegetation in freshwater areas) disturbed during Project construction and completion by using methods creating the least disturbance to vegetation. Disturbed areas will be revegetated with plant species appropriate to the site. Existing native vegetation will be retained as practicable, emphasizing the retention of shade-producing and bank-stabilizing trees and brush with greater than 6-inch-diameter branches or trunks. Disturbance to existing grades and native vegetation, the number of access routes, the size of staging areas, and the total area disturbed by the Project will be limited to the extent of all temporary and permanent impacts, as defined by the final Project design. All roads, staging areas, and other facilities will be placed to avoid and limit disturbance to aquatic habitat suitable for Covered Species (e.g., streambank or stream channel, and riparian habitat). Existing ingress or egress points will be used and/or work will be performed either from the top of the banks, from barges on the waterside of the stream or levee bank, or from dry gravel beds. Existing native vegetation will be retained as practicable, emphasizing the retention of shade-producing and bank-stabilizing trees and brush with greater than 6-inch-diameter branches or trunks. Vegetation disturbance and soil compaction will be minimized by using low-ground-pressure equipment that has a greater reach than or exerts less pressure per square inch on the ground than other equipment.

USFWS VHDR-2: Native and Invasive Vegetation Removal Materials and Methods

- All invasive plant species (e.g., those rated as invasive by the Cal-IPC, or local problem species) will be removed from the Project site as practicable, using locally and routinely accepted management practices. Invasive plant material will be destroyed using approved protocols and disposed of at an appropriate upland disposal or compost area. Invasive plant materials stockpiled at sites known to experience flash flooding outside the flood season will be removed within 15 days of the initial creation of the stockpile, to contain the potential spread of

invasive plant material. Stockpiling of invasive plant materials is prohibited during the flood season (typically November to April).

- When practicable, nonnative plants will be removed when flowers or seeds are not present. If flowers or seeds are present and have the potential for seed to be widely dispersed during removal (e.g., Spanish broom [*Spartium junceum*] and eupatory [*Ageratina adenophora*]), the flowering head will be removed and placed in a container for disposal prior to removal.
- Whenever practicable, nontarget vegetation will be protected in order to minimize the creation of exposed ground and potential for re-colonization of nonnative plants. A botanist will be consulted prior to any restoration implementation and during preparation of restoration plans.
- Where appropriate, barriers will be installed to limit illegal off-highway vehicle activity following removal of nonnative vegetation along roadways. Examples of barriers are large rocks, soil berms, and cut vegetation.
- To the extent practicable, crews in known or assumed occupied habitat for Covered Species will minimize multiple stream crossings for nonnative plant removal from both streambanks simultaneously (e.g., during a work period, an individual will conduct activities along one streambank for the entire stretch before initiating activities on the opposing bank). Stream crossings will use existing features such as bridges and boulders to avoid boots in the water, as much as feasible. Habitat will be assumed occupied when suitable habitat is present within the current range of the species and their absence has not been determined by a negative finding using protocol level surveys.

USFWS VHDR-3: Revegetation Materials and Methods (See also GPM-15: Revegetate Disturbed Areas)

On completion of work, site contours will be returned to preconstruction conditions or designed to provide increased biological and hydrological functions. Where disturbed, topsoil will be conserved for reuse during restoration, to the extent practicable. Native plant species comprising a diverse community structure (plantings of both woody and herbaceous species if both are present). Revegetation through natural recruitment is also allowed (e.g., in tidal and managed wetlands and working landscapes where disturbed areas typically revegetate more quickly through natural recruitment than through seeding).

Any area barren of vegetation as a result of Project implementation will be restored to a natural state by mulching, seeding, planting, or other means, with native trees, shrubs, willow stakes, erosion control native grass seed mixes, or herbaceous plant species, following completion of Project construction. Restoration planning for these areas should include steps to prevent colonization by nonnative species, including recolonization by any nonnative plant species that occupied the site prior to Project implementation. Irrigation may also be required to ensure survival of containerized shrubs or trees or other vegetation, depending on rainfall. If irrigation is used, all irrigation materials will be removed once no longer needed. Soils that have been compacted by heavy equipment will be decompacted by shallow or deep ripping, if necessary to allow for revegetation at Project completion as heavy equipment exits the construction area.

USFWS VHDR4: Revegetation Erosion Control Materials and Methods

If erosion control fabrics are used in revegetated areas, they will be slit in appropriate locations to allow for plant root growth. Only non-monofilament, wildlife-safe fabrics will be used. All exclusion netting/caging placed around plantings will be removed after 2 years or sooner.

USFWS VHDR-5: Revegetation Monitoring and Reporting

If removal of vegetation is required within Project access or staging areas, the disturbed areas shall be replanted with native species, and the area will be maintained and monitored for a period of two years after replanting is complete to ensure the revegetation effort is successful. The standard for success is 60% survival of plantings or 80% ground cover for broadcast planting of seed, after a period of two years.

No reporting of vegetation monitoring is proposed by the Project.

USFWS VHDR-6: General Herbicide Use (modified from original text, see below)

To maximize the efficacy of invasive plant control, herbicide treatment of dense-flowered cordgrass will be implemented as part of an Integrated Pest Management (IPM) strategy including mowing, grinding, tilling, excavation and flaming (see Project Description). When appropriate within the context of the IPM strategy, the herbicide imazapyr will be applied primarily using backpack sprayers, but may also include spray equipment mounted on ATVs, boats, amphibious tracked vehicles, or aerial drones. The target treatment area is located within an extensive tidal wetland and slough complex. Aerial drones will be used where they offer greater application access and/or reduced environmental impacts to the marsh habitat. Specific herbicide applications and methodologies will be prescribed by a certified Pest Control Advisor based on field conditions and will be applied by or under the supervision of a Licensed Applicator in accordance with the manufacturers label and all pertinent state and local permits. Prescriptions will aim to apply the lowest legal effective application rate and will target the minimum area necessary for effective control. Imazapyr is an aquatic herbicide approved by the U.S. EPA and the State of California for use in sensitive estuarine environments (H.T. Harvey & Associates and GHD, 2013), which breaks down rapidly in water and when applied according to the label is not toxic to aquatic animals. Therefore, consistent with the Programmatic EIR for the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey & Associates and GHD, 2013) we propose not to use application buffers for Waters of the U.S., but rather, applications will occur at a low or receding tide, which increases efficacy by maximizing drying times and reduces total amount of herbicide needed.

The licensed Applicator will follow recommendations for all California restrictions, including wind speed, rainfall, temperature inversion, and ground moisture for each herbicide used. In addition, herbicides will not be applied when rain is forecast to occur within 24 hours, or during a rain event or other adverse weather conditions (e.g., snow, fog).

Herbicide adjuvants are limited to water or nontoxic or practically nontoxic vegetable oils and agriculturally registered, food grade colorants (e.g., Dynamark U.V. [red or blue], Aquamark blue, or Hi-Light blue) to be used to detect drift or other unintended exposure to waterways.

Any herbicides will be transported to and from the worksite in tightly sealed waterproof carrying containers. The licensed Applicator will carry a spill cleanup kit. Should a spill occur, people will be kept away from affected areas until clean-up is complete. Herbicides will be mixed more than 150 feet, as practicable, from any water of the state to minimize the risk of an accidental discharge. Impervious material will be placed beneath mixing areas in such a manner as to contain any spills associated with mixing/refilling.

USFWS VHDR-7: Herbicide Application Planning

Written chemical application, monitoring, and reporting prescriptions will be provided to each Project Proponent from a certified Pest Control Advisor (PCA) (CEPA 2011). The PCA will ensure that legal, appropriate, and effective chemicals are used, with appropriate methodologies. Field scouting must be done before application; the licensed Applicator (CEPA 2011) must be on site to lead all applications and will adhere to the PCA prescription and standard protection measures for application. Prior to field scouting or application, the PCA should receive Environmental Awareness Training (see GPM-4, Environmental Awareness Training) for the Project so that they are aware of Covered Species and habitats present at the Project site. The PCA monitoring prescription should address timing necessary to evaluate and report target species efficacy as well as any nontarget plant and animal effects. As applicable, Best Management Practices for Wildland Stewardship: Protecting Wildlife When Using Herbicides for Invasive Plant Management (Cal-IPC 2015 or the most recent version) will be followed. If the guidance cannot be followed as applicable, then a Project specific IPM Plan will also be submitted with the ESA Section 7(a)(2) Review Form.

USFWS VHDR-8: Herbicide Application Reporting

The licensed applicator will keep a record of all plants/areas treated; amounts and types of herbicides used; and dates of application as well as other monitoring elements prescribed by the PCA in VHDR-7; pesticide application reports must be completed within 24 hours of application and submitted to the applicable agencies for review. Wind and other weather data will be monitored and reported for all application reports.

Below is a description of the known toxicity of herbicides proposed for use under this programmatic. If other herbicides are proposed for use by a Project Proponent, a complete effects analysis must be submitted along with the ESA Section 7(a)(2) Review Form to allow USFWS to determine if application of the herbicide(s) can be covered under the PBO.

5.5.1 NOAA Herbicide Use Protection Measures

The following protection measures apply to all Projects where herbicide application is anticipated as a Project activity.

- Whenever feasible, reduce vegetation biomass by mowing, cutting, or grubbing it before applying herbicide to reduce the amount of herbicide needed.
- Chemical control of invasive plants and animals will only be used when other methods are determined to be ineffective or infeasible. Herbicide use will be evaluated on a Project-by-Project basis with consideration of (and preference given toward) integrated pest management (IPM) strategies wherever possible. See University of California statewide IPM Program for guidance documents (<http://ipm.ucanr.edu/index.html>). Chemical use is restricted in accordance with approved application methods and BMPs designed to prevent exposure to non-target areas and organisms. Any chemical considered for control of invasive species must adhere to all regulations, be approved for use in California, its application must adhere to all regulations per the California Environmental Protection Agency, and it must be applied by a licensed applicator under all necessary state and local permits. Use herbicides only in a context where all treatments are considered, and various methods are used individually or in concert to maximize the benefits while reducing undesirable effects and applying the lowest legal effective application rate, unless site-specific analysis determines a lower rate is needed to reduce non-target impacts. Treat only the minimum area necessary for effective control. Soil-activated herbicides can be applied as long as directions on the label are followed. NOAA RC will recommend Project proponents seek the advice of a PCA if they are unfamiliar with the best chemical choices and combinations for their Project, even if they are only planning to use the choices put forward in this biological assessment. If the Project proponent is experienced with the use of certain chemicals and chemical mixtures, this extra step may not be necessary.
- To limit the opportunity for surface water contamination with herbicide use, all Projects will have a minimum buffer for ground-based broadcast application of 100 feet, and the minimum buffer with a backpack sprayer is 15 feet (aerial application is not included in the proposed action).
- The licensed Applicator will follow recommendations for all California restrictions, including wind speed, rainfall, temperature inversion, and ground moisture for each herbicide used. In addition, herbicides will not be applied when rain is forecast to occur within 24 hours, or during a rain event or other adverse weather conditions (e.g., snow, fog).
- Herbicide adjuvants are limited to water or nontoxic or practically nontoxic vegetable oils and agriculturally registered, food grade colorants (e.g. Dynamark U.V. (red or blue), Aquamark blue or Hi-Light blue) to be used to detect drift or other unintended exposure to waterways.
- Any herbicides will be transported to and from the worksite in tightly sealed waterproof carrying containers. The licensed Applicator will carry a spill cleanup kit. Should a spill occur, people will be kept away from affected areas until clean-up is complete. Herbicides will be mixed more than 150 feet, as practicable, from any water of the state to minimize the risk of an accidental discharge. Impervious material will be placed beneath mixing areas in such a manner as to contain any spills associated with mixing/refilling.
- The licensed pesticide applicator will keep a record of all plants/areas treated, amounts and types of herbicide used, and dates of application, and pesticide application reports must be completed within 24 hours of application and submitted to applicable agencies for review. Wind and other weather data will be monitored and reported for all pesticide application reports.

6. Literature Cited

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Cannibal Island Restoration Project

Avoidance and Minimization Measures for Certification Under the Statewide Restoration General Order (SRGO)

California Trout

27 September 2023



Avoidance and Minimization Measures

Cannibal Island Restoration Project

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1. Introduction

Statewide Restoration General Order (SRGO) Notice of Intent (NOI) Application Requirements

The following documentation supports the Projects Waste Discharge Requirements and Clean Water Act (CWA) Section 401 Certification through the State Water Resources Control Boards Final Statewide Restoration General Order (SRGO, hereafter “Order”) (WQ 2022-0048-DWQ). Information contained herein supports enrollment in the Order through submittal of a Notice of Intent (NOI), and addresses the following to fulfill pre-application requirements outlined in the Order Attachment B, Notice of Intent Form (SWRCB 2022):

In addition to relevant information discussed at the pre-application consultation, the NOI must include:

-Project design steps taken to first avoid, and then minimize, impacts to waters of the state.

See **Section 4**, Avoidance and Minimization Measures

-Applicable General Protection Measures (GPMs listed in the Final Order, Attachment A—Description and Eligibility) to be implemented for the project.

See **Section 5**, General Protection Measures

-Mitigation Measures (per CEQA considerations) to be implemented for the project.

The project is exempt from CEQA consideration through the California Department of Fish and Wildlife (CDFW) Statutory Exemption for Restoration Projects (SERP) (Public Resources Code § 21080.56).

-Proof of the Sacred Lands Search and proof of tribal notification (and opportunity to comment) regarding the proposed project.

See **Section 6**, Cultural Resources Investigation

2. Project Summary

The Cannibal Island Restoration Project (Project) is approximately 794 acres of agricultural bottoms and tidal saltmarsh in the Eel River Delta, three miles west of the town of Loleta, Humboldt County, CA. The Project Area is at the western-most extent of the Eel River delta and estuary approximately one mile inland and northeast of the Eel River mouth. The Project is within the Cannibal Island U.S. Geological Survey (USGS) 7.5-minute quadrangle, bounded by Cannibal Island Road to the south, the North Bay of the Eel River Delta and Mosley Slough to the west, and Sevenmile Slough to the north and northeast.

The northern and western portion of the Project Area (approximately 462 acres) is owned by California Department of Fish & Wildlife (CDFW) and managed as part of the of the Eel River Wildlife Area (ERWA) Cannibal Island Unit (APN 310-043-001, 310-033-004, and 310-021-003, 310-021-004). The remaining 332 acres are privately owned by Hansen (APN 310-043-003 and 310-051-001) and Pedrazzini (APN 310-043-004,-005, -006). Approximately 220 acres of the private property are held in Wetland Conservation Easements by the Natural Resources Conservation Service (NRCS) Wetlands Reserve Easement Program (WRP).

The Project will restore a landscape of mostly diked agricultural land to a mosaic of pasture and natural habitats, including estuarine and tidal slough channels, brackish ponds, freshwater ponds, and agricultural pastures. Restoration of the natural tidal inundation range and hydraulics as well as fluvial and tidal sediment deposition to restore wetland functions is critical to achieve Project objectives. Increased tidal exchange and connectivity between historical tidal wetland areas and North Bay will support broader native plant, fish, wildlife, and benthic infauna diversity within estuarine and freshwater marsh habitats, and in wetland-ecotones.

Improvement of tidal channel networks will accommodate physical processes such as sediment transport and marsh plain sediment accretion. The Project will enhance and reconnect full tidal exchange to approximately 500 acres of former tidal marsh habitat and construct inter-tidal lagoons with tidal marsh features.

The Project will enhance (widen and deepen) existing tidal slough channels within the limits of Project disturbance. Construction activities will include the removal of outdated water control structures, excavation of slough channels to accelerate the formation of high-quality aquatic habitat for listed fish species, and placement of excavated fill in appropriate locations to mimic natural marsh topography (natural levees and hummocks or tidal marsh ridges) and enhance wetland vegetation diversity through removal of invasive dense-flowered cordgrass. Excavated soils from the channels would be placed in low hummocks approximately 2-feet high adjacent to the channels. These hummocks are anticipated to retain wetland parameters as they will not exceed marsh plain elevation and would not constitute conversion to uplands. Placement of ¼ ton rock will occur along a section of channel to provide inset channel grade control to manage the tidal prism. This grade control is anticipated to be beneficial to manage tidal prism until the site elevations increase to be representative of a system with full tidal amplitude, which is expected to occur over 10-20 years. The rock would be placed over a 20-foot-long section where a former road crossing is located and failing culvert is proposed for removal. This area is a suitable location for the inset channel grade control because it likely already contains compacted sediment (from previous infrastructure), and will be disturbed via the road crossing and culvert removal anyway. Much of the existing dike network within the Project Area would be reconfigured or removed. A new setback levee will be constructed to protect agricultural land from tidal inundation as full amplitude is restored, including one newly constructed set-back levee in the eastern portion of the Project Area, and raising of Cannibal Island Road in the southern portion of the Project Area. Sediment excavated during construction would be beneficially reused within the Project Area and would not be hauled off-site.

See **Attachment 5 of the SRGO application package** for the Project Description and details of project activities and accompanying figures.

3. Summary of Construction Activities for Project

The following are general details of the proposed Project's construction, operation, and maintenance activities.

Construction Timing:

Project construction will be phased into one to two construction seasons based on available funding, site conditions, and sequencing for earthwork and County Road construction. Each season will span approximately June through the end of October, as feasible with dry weather and allowable permitting windows.

Construction Materials:

Multiple sediment reuse areas coupled with the extent of Project excavation are anticipated to necessitate multiple staging areas within the Project footprint.

Equipment Types anticipated for Project construction include:

- Excavators (Conventional and/or Amphibious)
- Scrapers
- Dozers
- Loaders
- Dump Trucks
- Small Tractors
- Compactors
- Graders

Water Trucks
Pumps

Site Access & Staging:

A temporary construction entrance shall be placed at the intersection of the Cannibal Island County Road and Senestraro Lane. Cannibal Island Road is a two-lane paved County road. Senestraro Lane is a single lane dirt road extending north from Cannibal Island Road and located on CDFW property. Plans include a public access parking lot near this intersection which will be used for construction staging. The CDFW access road (Senestraro Lane) will be the primary entrance and exit for construction activities within the site. Another temporary construction entrance will be placed at the intersection of Cannibal Island Road and the Hansen/Pedrazzini private driveway to provide a route along the eastern boundary of the Hansen residence and follow the perimeter dike to and past Sevenmile Slough as needed to access the eastern and northern portion of the site. Construction equipment and materials will be transported to the work areas via these ingress and egress locations.

See **Attachment 11 of the SRGO application package** for the Project 65% Design Plans

Construction Activities:

See **Attachment 5 of the SRGO application package** for details of Project construction activities, and **Attachment 5, Appendix A, Figure 2-8**, for the location of proposed Project activities.

Constructed Facilities (Natural and Artificial Infrastructure) and Operations and Maintenance to those Facilities:

Ongoing management and maintenance activities may be necessary to ensure the long-term hydraulic and ecological functions of the Project.

Maintenance actions are anticipated after the Project is constructed, and are described in the Project Operations and Maintenance Plan (**Attachment 9 of the SRGO application package**).

- Setback Levee
 - Observations of physical character (annually and following extreme storms)
 - Mowing to discourage growth of woody vegetation and invasives species (annually)
 - Repair from erosion or burrowing animal damage (as needed)
- Grading and/or resurfacing portions of the access roads (as needed)
- Cleaning debris and sediment from channels, drainage ditches and floodgates (as needed)
- Removing invasive vegetation and re-seeding with native seed mixes, as necessary

Surface Water and Groundwater Management

During excavation, management of surface water will be required through the construction period. Surface water management will be required to reduce nuisance water within the active work area. Inflow management will also reduce the moisture content in excavated soils and prevent aquatic and non-aquatic organisms from entering the construction area. Cofferdams will be used to isolate instream work areas that will be dewatered.

The cofferdam(s) will be either an aqua dam, or will be comprised of native material or washed gravel encased with an impermeable geotextile or visqueen liner in combination with ecology blocks and/or temporary sheet piles pushed into the subsurface. Cofferdam(s) will be installed during low tide, when the least amount of water is within the work area(s). Once the cofferdam is securely installed and the work area is isolated, the isolated area would be seined (or similar) to relocate special status fish and other special status aquatic species to nearby suitable habitat; common species will be relocated to suitable habitat as is feasible. Once the area is free of special status fish species, surface water would be pumped or routed via gravity flow out of the active

work area to an adjacent area to settle. Due to the expansive marsh plain, pumping surface water to an area of uplands to infiltrate is not feasible.

After initial surface dewatering, groundwater dewatering is expected to be necessary within work area(s) due to the low elevation of the marsh plain and high water table. Groundwater dewatering will involve pumping water out of the work area to a nearby area to infiltrate. As mentioned above, it is not feasible to pump water to areas of uplands for infiltration. Discharge of turbid water directly to receiving waters (i.e. Mosley Slough, Sevenmile Slough, or North Bay) will not occur. The cofferdam(s) will be removed on an incoming tide so that loose sediment is deposited on the marsh plain, as opposed to entrained into receiving waters.

Excavation of the tidal channel network to connect with North Bay will occur using excavators and dump trucks.

Equipment will use the remnant dikes to access the channel excavation area. A temporary road will be used to allow equipment access over the salt marsh, where an excavator will offload sediment to dump trucks for disposal throughout the Project Area. Portions of the channel may need to be excavated with an amphibious excavator. Silt curtains may be installed to limit the delivery of turbid water outside the immediate work area, if feasible.

4. Avoidance and Minimization Measures

The Project is receiving permits/approvals from various agencies for sensitive fish species documented or potentially present in the Project Area. Included in this document are General Protection Measures (GPM) applicable to the Project per SRGO Attachment A criteria. Additional avoidance and minimization measures for the Project include minimization measures required within the Programmatic Biological Opinions (PBO) administered by 1) the National Oceanic and Atmospheric Administration Restoration Center (NOAA RC) and U.S. Army USACE of Engineers (USACE) for covered salmonids (NMFS 2022), and 2) the United States Fish and Wildlife Service (USFWS) for Tidewater Goby (USFWS 2022). These documents are attached to the SRGO application package, and include extensive avoidance and minimization measures for protection of water quality.

A summary of avoidance and minimization measures is described below. The Contractor shall be responsible for the installation of piping, pumps, fish screens, erosion control measures, cofferdams, and the proposed culverts in collaboration with and under the direction of a qualified biologist and engineer.

Erosion Control Measures and Best Management Practices

The Contractor will employ Best Management Practices (BMPs) during construction including the following BMPs from the current California Stormwater BMP Handbook for Construction (CASQA 2022):

- EC-1: Scheduling
- EC-2: Preservation of Existing Vegetation
- NS-2: Dewatering Operations
- NS-9: Vehicle Equipment and Fueling
- NS-10: Vehicle & Equipment Maintenance
- WM-2: Material Use
- WM-4: Spill Prevention and Control

Additionally, the Contractor(s) will be responsible for minimizing erosion and preventing the transport of sediment to sensitive areas utilizing the following approaches:

- Installation of temporary fiber rolls, as needed.
- Silt fence surrounding newly constructed public access parking (proposed construction staging area).

- Seed mix applied to all disturbed areas above elevation 7.5 ft (revegetation design is included in the Project's design plans).
 - A variety of seed mixes will be applied to edges and slopes of newly constructed setback levee, Cannibal Island Road, the newly constructed parking lot, recreation trail, and temporarily disturbed access and staging areas, based on elevation.

Additional Erosion Control Measures include:

- Sufficient erosion control supplies will be always maintained on site, available for prompt use in areas susceptible to erosion during rain events;
- Disturbance of existing vegetation will be minimized to only that which is necessary to complete the work;
- The Contractor(s) will make adequate preparations, including training and providing equipment, to contain oil and/or other hazardous materials spills;
- Dewatering operations will be conducted where needed from the work location and stored or disposed of appropriately;
- Vehicle and equipment maintenance should be performed off-site whenever practical;
- Contractor(s) shall ensure that the site is prepared with BMPs prior to the onset of any storm;
- All erosion and sediment control measures shall be maintained in accordance with their respective BMP fact sheet until disturbed areas are stabilized;

This plan may not cover all the situations that arise during construction due to unanticipated field conditions.

Variations may be made to the plan in the field subject to the approval of or at the direction of the Project Manager.

Water Quality Control Measures

Avoidance and minimization measures to protect water quality include the following:

- Construction equipment shall not be stored in inundation areas or in sloughs.
- The Contractor(s) will ensure that any liquid fuel pumps used on-site (for dewatering, etc.) shall be placed on absorbent pads and containment implements. The Contractor(s) shall have spill containment materials located at the site, with operators trained in spill control procedures. All staging shall be within the limits of disturbance, and the Contractor(s) shall not unnecessarily disturb aquatic habitat and wetlands. At the close of construction, the Contractor(s) shall restore staging areas and temporary haul roads to pre-project conditions (de-compacted and naturalized as needed).
- Following implementation of a diversion system and isolation of the project reach, standing water remaining within the Project reach will be pumped to a sufficient level to allow a qualified biologist to relocate aquatic organisms. Given the Project area is primarily wetlands, following completion of relocation activities, the remaining water will be pumped to surrounding wetlands and allowed to infiltrate or into temporary holding/filter tanks and allowed to settle. Following dewatering and relocation, equipment will then be permitted within the channel.
- During excavation, management of surface water will be required through the construction period. Surface water management will be required to reduce nuisance water within the active work area. Inflow management will also reduce the moisture content in excavated soils and prevent aquatic and non-aquatic organisms from entering the construction area. Cofferdams will be used to isolate instream work areas that will be dewatered, and stream flow bypassed downstream.
- Following construction, the contractor will demobilize and remove equipment, supplies, and construction materials. The disturbed areas above the salt marsh plain will be restored to pre-

construction conditions or stabilized with a combination of native herb and grass seed (broadcast or hydroseed), straw mulch, or other plantings/revegetation.

5. General Protection Measures

All applicable GPMs that may be incorporated into the proposed Project are listed below, sourced from Attachment A of the Order (SWRCB 2022). There have been no GPMs specific to the proposed Project that cannot be implemented (there are some GPMs that do not apply to the proposed Project).

Sourced from Appendix A of the Order– General Protection Measures

General Protection Measures

GPM-1: Receipt and Copies of All Permits and Authorizations

Work will not begin until all necessary permits and authorizations have been received (e.g., USACE, USFWS, NMFS, State and Regional Boards, CDFW). The project proponent will ensure that a readily available copy of the applicable agency permits and authorizations (e.g., USFWS Biological Opinion, NMFS Biological Opinion, Section 404 permit, etc.) is maintained by the construction foreman/manager on the project site for the duration of project activities.

GPM-2: Construction Work Windows

Construction work windows may be required in order to avoid impacts to aquatic resources and associated beneficial uses during the wet season. Project proponents must also follow the applicable Regional Board's construction work windows, unless otherwise approved.

GPM-3: Construction Hours

Construction activities will generally be limited to daylight hours, to the extent feasible. If nighttime construction is necessary, including in tidally influenced waters where tides may limit daylight access and work schedules, all project lighting (e.g., staging areas, equipment storage sites, roadway, and construction footprint) will be selectively placed and directed onto the roadway or construction site and away from aquatic habitats. Light glare shields will be used to reduce the extent of illumination into aquatic habitats. If the work area is near surface waters, the lighting will be shielded so that it does not shine directly into the water.

GPM-4: Environmental Awareness Training

For projects occurring in aquatic resources (e.g., wetlands, riparian areas, etc.), prior to engaging existing or new personnel in construction activities, new construction personnel will participate in environmental awareness training conducted by an agency-approved biologist or resource specialist. 9 Construction personnel will be informed regarding the identification, potential presence, legal protections, avoidance and minimization measures, and applicable general protection measures for all aquatic resources with the potential to occur within or immediately adjacent to the project site. Construction personnel will be informed of the procedures to follow should aquatic resources be disturbed during construction activities. For projects where the agency-approved biologist or resource specialist is not regularly on the project site, training may be provided via online/web-based meeting with an interactive portion (e.g., web-based or in-person discussion) to be included during remote training sessions. For projects that may continue over an extended duration and require excessive training events, a training video developed under the supervision of the FWS-approved biologist or resource specialist may be used to train new personnel, as long as an FWS-approved biologist or resource specialist is available via phone to answer questions about the training or that may arise during construction.

GPM-5: Environmental Monitoring

As required in the NOA, a resource specialist will ensure that all applicable protective measures are implemented during project construction. The resource specialist will have authority to stop any work if they

determine that any permit requirement is not fully implemented. The resource specialist will prepare and maintain a monitoring log of construction site conditions and observations, which will be kept on file.

GPM-6: Work Area and Speed Limits

Construction work and materials staging will be restricted to designated work areas, routes, staging areas, temporary interior roads, or the limits of existing roadways. Prior to initiating construction or grading activities, brightly colored fencing or flagging or other practical means will be erected to demarcate the limits of the project activities, including the boundaries of designated staging areas; ingress and egress corridors; stockpile areas for spoils disposal, soil, and materials; and equipment exclusion zones. Flagging or fencing will be maintained in good repair for the duration of project activities. Vehicles will obey posted speed limits on public roadways and will limit speeds to 20 miles per hour (mph) within the project area on unpaved surfaces and unpaved roads (to reduce dust and soil erosion) or in areas where special status species have the potential to occur. Speeds greater than 20 mph may be permitted in the project area where special-status species are not expected to occur (e.g., within areas from which special-status species have been excluded) and where there is no risk of generating excessive dust (e.g., surfaces are paved, saturated, or have been treated with other measures to prevent dust).

GPM-7: Environmentally Sensitive Areas

Monitoring, flagging, or fencing will be used, where appropriate, to minimize disturbance to environmentally sensitive areas (e.g., waters and wetlands). If fencing is used:

- Fencing used must be approved by CDFW and/or USFWS for compatibility with species under their jurisdiction, as applicable, that may occur on site.
- The agency-approved biologist or resource specialist will determine the location of fencing prior to the start of construction (e.g., between active work area(s) and sensitive resources).
- Fencing will remain in place throughout the duration of the construction activities and will be inspected and maintained regularly by the agency approved biologist or resource specialist until completion of the project.
- Repairs to the fencing will be made within 24 hours of discovering any failure.
- Fencing will be removed when all construction equipment is removed from the site, the area is cleared of debris and trash, and the area is returned to natural conditions.

GPM-8: Prevent Spread of Invasive Exotic Plants

The spread or introduction of invasive exotic plant species by arriving vehicles, equipment, imported gravel, and other materials, will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas will be removed and properly disposed of in a manner that will not promote their spread.

Equipment will be cleaned of any sediment or vegetation at designated wash stations before entering or leaving the project area to avoid spreading pathogens or exotic/invasive species. Isolated infestations of noxious weeds identified in the project area will be treated with approved eradication methods at an appropriate time to prevent further formation of seed and destroy viable plant parts and seed. Wash sites must be in confined areas that limit run-off to any surrounding habitat and on a flat grade. Upland areas will use rice straw or invasive species-free local slash/mulch for erosion control, while the remainder of the project area will use certified, weed-free erosion control materials. Mulch must be certified weed free. The project proponent will follow the guidelines in the CDFW's California Aquatic Invasive Species Management Plan (CDFW 2008) and Aquatic Invasive Species Disinfection/Decontamination Protocols (CDFW 2016), where relevant. Construction supervisors and managers will be educated on weed identification and the importance of controlling and preventing the spread of noxious weeds. The project proponent will follow any applicable local guidance to prevent the spread of invasive animal species. Construction supervisors and managers will be responsible for the implementation of appropriate protocols (e.g., disinfection of equipment and footwear) to prevent the spread of invasive animals.

GPM-9: Practices to Prevent Pathogen Contamination

The project proponent will review and implement restoration design considerations and best management practices as published by the Working Group for Phytophthoras in Native Habitats (www.calphytos.org), when there is a risk of introduction and spread of plant pathogens in site plantings. ([http://www.suddenoakdeath.org/welcome-to-calphytos-org-phytophthoras-in-native-habitats/resources/#restoration.](http://www.suddenoakdeath.org/welcome-to-calphytos-org-phytophthoras-in-native-habitats/resources/#restoration))

GPM-10: Equipment Maintenance and Materials Storage

Vehicle traffic will be confined to existing roads and the proposed access route(s). All machinery must be in good working condition, showing no signs of fuel or oil leaks. Oil, grease, or other fluids will be washed off at designated wash stations prior to equipment entering the construction site. Inspection and evaluation for the potential for fluid leakage will be performed daily during construction. Where possible, and where it would not result in greater impact to aquatic resources, no equipment refueling, or fuel storage will take place within 100 feet of a body of water. All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location (e.g., barges) with secondary containment to prevent spills from traveling to surface water or drains. Project proponents will establish staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in coordination with resource agencies. Staging areas will have a stabilized entrance and exit and will be located in upland areas to the extent possible and at least 100 feet from bodies of water unless site-specific circumstances do not provide such a setback or would result in further damage to sensitive resources, in which case the maximum setback possible will be used. Fluids will be stored in appropriate containers with covers and properly recycled or disposed of offsite. Machinery stored on site will have pans or absorbent mats placed underneath potential leak areas as a precautionary measure to further reduce the potential for impact from an unintended or previously undetectable leak.

GPM-11: Material Disposal

All refuse, debris, unused materials, and supplies that cannot reasonably be secured will be removed daily from the project work area and deposited at an appropriate disposal or storage site. All construction debris will be removed from the project work area immediately upon project completion. The Water Quality and Hazardous Materials measures (below) will be implemented as applicable to ensure proper handling and disposal of hazardous materials.

GPM-12: Fugitive Dust Reduction

To reduce dust, construction vehicles will be speed restricted as described in GPM-6, Work Area and Speed Limits when traveling on non-paved surfaces. Stockpiled materials susceptible to wind-blown dispersal will be covered with plastic sheeting or other suitable material to prevent movement of the material. During construction, water (e.g., trucks and portable pumps with hoses) or other approved methods will be used to control fugitive dust, as necessary. Dust suppression activities must not result in a discharge to waters of the state unless such discharges are approved by the State or Regional Board.

GPM-13: Trash Removed Daily

During project activities all trash will be properly contained within sealed containers and removed from the work site and disposed of as necessary to maintain a trash-free work area (e.g., trash containers will not be used beyond capacity and fully close/seal).

GPM-14: Project Cleanup after Completion

Work pads, temporary falsework, and other construction items will be removed from the 100-year floodplain by the end of the construction window. Removal of materials must not result in discharge to waterbodies.

GPM-15: Revegetate Disturbed Areas

All temporarily disturbed areas will be de-compacted and seeded/planted with an assemblage of native riparian, wetland, and/or upland plant species suitable for the area. The project proponent will develop a revegetation plan, including (as applicable) a schedule; plans for grading of disturbed areas to pre-project contours; planting palette with plant species native to the project area; invasive species management; performance standards;

success criteria; and maintenance requirements (e.g., watering, weeding, and replanting). Plants for revegetation will come primarily from active seeding and planting; natural recruitment may also be proposed if site conditions allow for natural recruitment to reestablish vegetation and avoid potential negative risks associated with erosion and impacts to water quality. Plants imported to the restoration areas will come from local stock, and to the extent possible, local nurseries. Only native plants (genera) will be used for restoration efforts. Certified weed-free native mixes and mulch will be used for restoration planting or seeding. Revegetation activities within and adjacent to Waters of the State will commence as soon as is practicable after construction activities at a site are complete.

6. Cultural Resources Investigation

A cultural resources study was conducted in 2020 for a majority of the Project area, with an addendum of the Project in 2022 to investigate a small area added to the Project south of the Cannibal Island Road (GHD 2020). The investigations included written correspondence regarding the investigation sent to the Native American Heritage Commission (NAHC) along with a request to search the Sacred Lands Inventory File. Proof of this correspondence is provided in **Attachment 10 of the SRGO application package**, Cannibal Island Restoration Project Cultural Resources Investigation Report and Addendum—these documents do not contain confidential information and are therefore attached, and no California Register of Historical Resources eligible historic resources or cultural resources were identified. Requirements for inadvertent discovery protocols will be incorporated into construction documents prior to bidding and ground disturbance. Inadvertent discovery protocols will include tribal notification.

7. Citations

California Stormwater Quality Association (CASQA). 2022. Construction BMP Handbook. Subscription. <https://www.casqa.org/resources/bmp-handbooks>

National Marine Fisheries Service (NMFS). 2022. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response. NOAA Restoration Center and U.S. Army Corps of Engineers. National Marine Fisheries Service, West Coast Region, USA.

State Water Resource Control Board (SWRCB). 2022. Clean Water Act Section 401 – Certification and Wetlands Program, Statewide Restoration General Order. https://www.waterboards.ca.gov/water_issues/programs/cwa401/generalordersunderdev.html

U.S. Fish and Wildlife Service (USFWS). 2022. Programmatic Biological Opinion and Conference Opinion – California Statewide Programmatic Restoration Effort. U.S. Fish and Wildlife Service, Pacific Southwest Regional Office, Sacramento, California, USA.

Appendix C

Potential Management Actions, Impact Avoidance and Minimization Measures, and Best Management Practices

Table C-1 Potential Maintenance Actions and Best Management Practices to Reduce or Avoid Impacts

POTENTIAL MAINTENANCE ACTIONS ¹	LOCATION	WORK WINDOW ²	WORK DURATION	ANTICIPATED FREQUENCY ³	DESCRIPTION OF EQUIPMENT / METHODS	DESCRIPTION OF QUANTITIES ⁴ / MATERIAL PER YEAR	IMPACT AVOIDANCE & MINIMIZATION MEASURES ⁵ AND BEST MANAGEMENT PRACTICES ⁶
1 Implement site specific erosion control BMPs such as soil bioengineering and vegetative revetments	Project-wide	June 15 – November 1	0-120 days	Moderate	Heavy equipment and hand crews	0-10 acres of erosion control BMPs using vegetation, soil bioengineering	Measures: - GPM-15: Revegetate Disturbed Areas BMPs: a, b, g, h, k, l a. Utilize onsite native soil to the extent practical b. Design techniques and standards shall be similar to those in project plans g. Avoid permanent placement of fill in wetlands h. Removal of vegetation will be limited to excavation areas 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 above 7.5 ft elevation shall be seeded in compliance with native seed mix.
2 Repair eroded sections of levee or dike and employ erosion control measures (protecting bare soil, stabilizing banks, armoring, geotechnical bank protection, dissipating concentrated flows)	Project-wide	June 15- November 1	0-120 days	Moderate	Heavy equipment and hand crews	0-1,000 cy of rock fill 0-10,000 cy of grading/excavation	BMPs: a, b, g, h, k, l a. Utilize onsite native soil to the extent practical b. Design techniques and standards shall be similar to those in project plans g. Avoid permanent placement of fill in wetlands h. Removal of vegetation will be limited to excavation areas 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 above 7.5 ft. elevation shall be seeded in compliance with native seed mix.
3 Remove channel obstructions if deemed necessary to maintain habitat and hydrologic function	Project-wide	June 15 – November 1	0-60 days	Frequent	Heavy equipment and hand crews	0-50 obstructions including debris jams, driftwood, sediment plugs (0-10,000 cy)	Measures: - IWW-1: Appropriate In-water Materials - IWW-2: In-water Vehicle Selection and Work Access - IWW-3: In-water Placement of Materials, Structures, and Operation of Equipment BMPs: c, d, k c. Chip debris and utilize for onsite mulch to the extent practical d. Dispose in uplands k. Conduct pre-construction surveys performed by a qualified biologist
4 Additional dike lowering or breaches	Northern Project boundary	June 15 – November 1	0-60 days	Infrequent	Heavy equipment for grading and excavation	0-5,000 cy of Excavation	BMPs: k k. Conduct pre-construction surveys performed by a qualified biologist
5 Excavate plugged culverts or associated drainage channels, and conduct maintenance on gated culverts Replace or enlarge culverts and gates as needed	Within 100 feet of existing culverts	June 15 – November 1	0-30 days	Moderate	Heavy equipment and hand crews	0-10 culverts 0-1,000 cy excavation/grading/crossing 0-500 cy rock fill/crossing	Measures: - IWW-1: Appropriate In-water Materials - IWW-2: In-water Vehicle Selection and Work Access - IWW-3: In-water Placement of Materials, Structures, and Operation of Equipment

POTENTIAL MAINTENANCE ACTIONS ¹	LOCATION	WORK WINDOW ²	WORK DURATION	ANTICIPATED FREQUENCY ³	DESCRIPTION OF EQUIPMENT / METHODS	DESCRIPTION OF QUANTITIES ⁴ / MATERIAL PER YEAR	IMPACT AVOIDANCE & MINIMIZATION MEASURES ⁵ AND BEST MANAGEMENT PRACTICES ⁶
							BMPs: d, f, g, k d. Dispose in uplands f. Avoid removal of mature (>10 year) riparian vegetation g. Avoid permanent placement of fill in wetlands k. Conduct pre-construction surveys performed by a qualified biologist
6	Raise height of dike or levee (including trail) without expanding footprint and/or filling wetlands	Existing dike, and levee locations only	June 15 - November 1	0-120 days	Infrequent	Heavy equipment for grading	0-9,000 lf of dike or levee BMPs: k, l g. Avoid permanent placement of fill in wetlands 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 above 7.5 ft. elevation shall be seeded in compliance with native seed mix.
7	Maintain or repair (as-built) access roads and road atop dike and levee	Existing dike and levee locations and other access road ramps	June 15 - November 1	0-60 days	Moderate	Heavy equipment for grading and repairs	0-1,000 cy of road base 0-1,000 cy of grading Measures: - WQHM-3: Erosion Control (and WQHM-2: Stormwater Pollution Prevention Plan) BMPs: d, k, l d. Dispose in uplands 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 above 7.5 ft. elevation shall be seeded in compliance with native seed mix.
8	Provide additional revegetation with native plants	Project-wide	Year-round	0-60 days	Moderate	Hand tools and possibly small augering devices/light equipment	0-5,000 plants Measures - GPM-15: Revegetate Disturbed Areas - VHDR-3: Revegetation Materials and Methods - VHDR-4: Revegetation Erosion Control Materials and Methods BMP: k k. Conduct pre-construction surveys performed by a qualified biologist
9	Apply/place excavated sediment on Agricultural Lands	Agricultural lands east of the setback levee	April 1 - Nov. 30	0-120 days	Moderate	Heavy/farm equipment	0-100,000 cy of sediment BMP: d d. Dispose in uplands
10	Mow, trim, thin or remove vegetation and/or invasive vegetation as necessary to maintain function per Project design plans	Atop dike and setback levee to retain access	Year-round, with the exception of the bird breeding and nesting season between March 15 and August 15.	0-120 days	Frequent	Herbicides, hand pruning tools and possibly chainsaws and brush cutter/mowing or other light equipment. Flash grazing may be utilized in conformance with the WRE program easement conditions.	0-10 acres Trees no larger than 6" dbh Measure: - VHDR-2: Native and Invasive Vegetation Removal Materials and Methods - VHDR-6: General Herbicide Use - VHDR-7: Herbicide Application Planning - VHDR-8: Herbicide Application Reporting - Measure 5.5.1: NOAA Herbicide Use Protection Measures
		Removal of non-native species Project-Wide, i.e. dense-flowered cordgrass	Year-round exception of the bird breeding and nesting	0-120 days	Frequent		0-500 acres BMPs: c, k, l, m, n c. Chip debris and utilize for onsite mulch to the extent practical

POTENTIAL MAINTENANCE ACTIONS ¹	LOCATION	WORK WINDOW ²	WORK DURATION	ANTICIPATED FREQUENCY ³	DESCRIPTION OF EQUIPMENT / METHODS	DESCRIPTION OF QUANTITIES ⁴ / MATERIAL PER YEAR	IMPACT AVOIDANCE & MINIMIZATION MEASURES ⁵ AND BEST MANAGEMENT PRACTICES ⁶
		season between March 15 and August 15.					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 above 7.5 ft. elevation shall be seeded in compliance with native seed mix. 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

¹ Potential Maintenance Actions subject to NRCS WRE program easement.

² Work window subject the agency requirements and expanded if necessary for "Emergency" conditions.

³ 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)

⁴ 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

⁵ Impact Avoidance & Minimization Measures sourced from the Programmatic Biological Opinion (PBO) and State Restoration General Order (SRGO) used for the Project (see **Appendix B**)

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

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

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 above 7.5 ft elevation shall be seeded with either the agricultural or one-parameter wetland native seed mix as described in the Wetlands and Habitat Restoration Plan.

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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