Harbor District Development Permit Application Package

Wadulh Lagoon Tidal Wetland Enhancement Project

Humboldt County Resource Conservation District

June 24, 2024

→ **The Power of Commitment**

Humboldt Bay Harbor, Recreation and Conservation District Development Permit

Prepared for:

Humboldt County Resource Conservation District

5630 South Broadway

Eureka, CA 95503

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In collaboration with:

U.S. Fish and Wildlife Service

Humboldt Bay National Wildlife Refuge Complex

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June 24, 2024

Rob Holmlund
Humboldt Bay Harbor, Recreation and Conservation District
601 Startare Drive
Eureka, CA 95501

Wadulh Lagoon Tidal Wetland Enhancement Project – Application Package Submittal for the Humboldt Bay Harbor, Recreation and Conservation District Development Permit

Dear Mr. Holmlund,

Attached please find the application package for Humboldt Resource Conservation District's Wadulh Lagoon Tidal Wetland Enhancement Project (Project). The application package includes the completed development permit form, additional general information, adjoining property owners, names and addresses, permits and other public approvals, Project Description and figures, 30% Design Plans (attached separately), Statewide Restoration General Order General Protection Measures, Wetlands Habitat and Restoration Plan, and the processed CEQA Statutory Exemption for Restoration Projects Concurrence documentation.

The Project is concurrently submitting applications for coverage to the U.S. Army Corps of Engineers, Northcoast Regional Water Quality Control Board, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration Restoration Center, and the Coastal Commission.

If you have questions or require any additional information, please contact me via email at kerry.mcnamee@ghd.com.

Regards

Kerry McNamee
Environmental Planner

707-267-2207
kerry.mcnamee@ghd.com

Contents

Attachments

HUMBOLDT BAY HARBOR, RECREATION AND CONSERVATION DISTRICT

P.O. BOX 1030
Eureka, California 95502
phone (707) 443-0801
fax (707) 443-0800

PERMIT APPLICATION

Date Filed_____

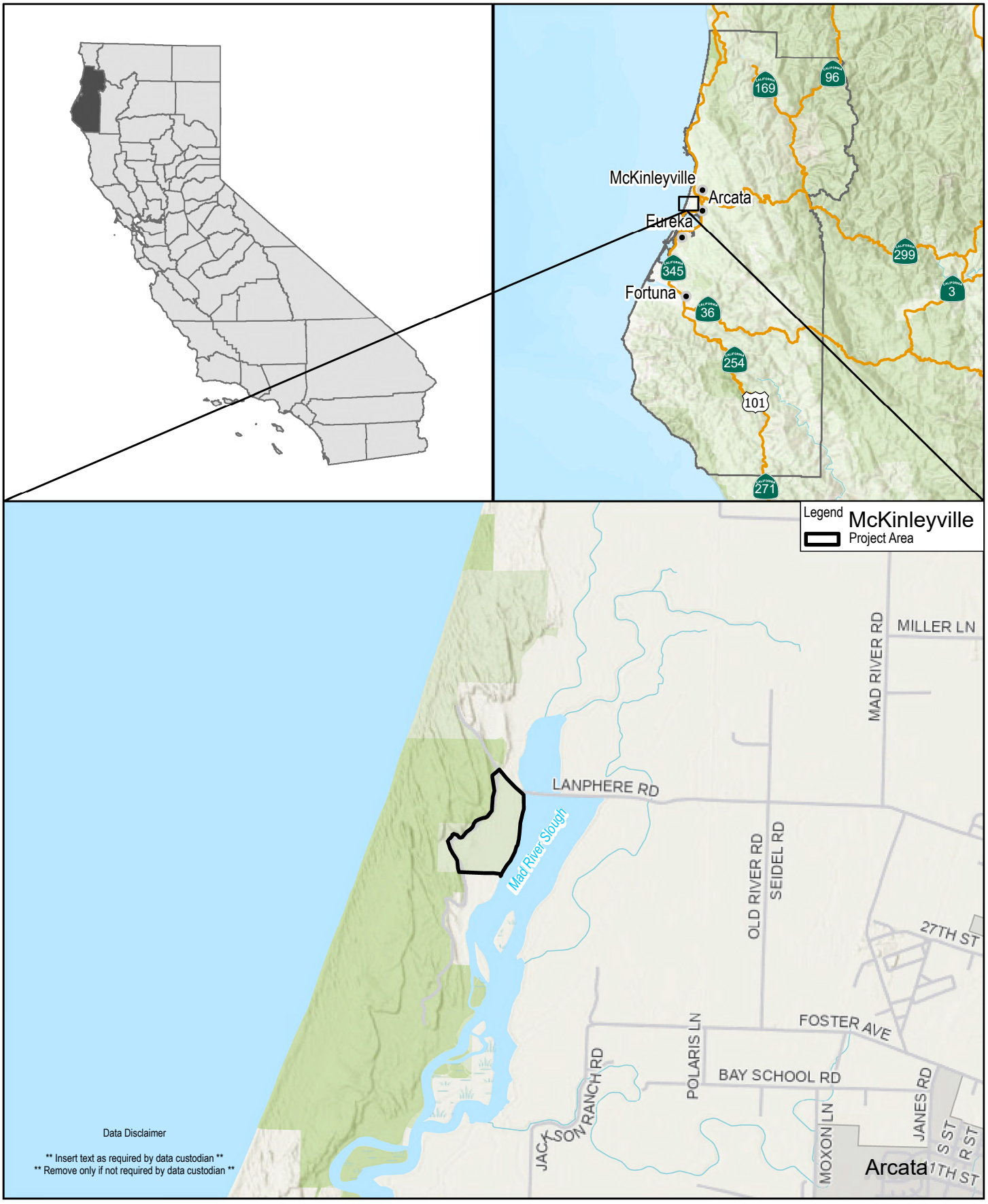
General Information	For District Use
1.) Name, Address, phone # and email of Developer, Project Sponsor and Legal Owner See Attachment 1	A. Application No._____ Application Type: Franchise ☐ Permit ☐ Lease ☐
2.) Address of Project and Assessor's block, lot and Parcel Number Lanphere Road and Refuge Access Road, Arcata CA 95521 APN 506-291-014	B. Date Received by Harbor District
	C. Date Accepted for filing by Commission
3.) Contact person Name, Address, phone # Kerry McNamee, GHD P.O. Box 1010 Eureka CA 95501 707-267-2207	D. Date of Public Notice
	E. Date of Environmental Compliance
	F. Date of Public Notice
4.) Attach list of names and addresses of all adjoining property owners See Attachment 2	G. Date of Public Hearings
5.) List and describe any other related Project Permits & Other Public Approvals required, including those required by City, Regional, State & Federal Agencies. See Attachment 3	H. Date of Commission Action Approval: _____ Conditional _____ Disapproval _____
	I. Expiration Date
6.) Existing City/County Zoning Agriculture Exclusive - A, B, F and T	Describe in detail the proposed project:
7.) Proposed Site Use (Project Title) Wadulh Lagoon Tidal Wetland Enhancement Project	

Describe proposed project

The Wadulh Lagoon Tidal Wetland Enhancement Project (Project; Wadulh pronounced “wah-dush”) includes a 54.2-acre Project Area within a 78-acre parcel (APN 506-291-014-000) along the upper western portion of the Mad River Slough on Humboldt Bay, approximately 1.25 miles west of the City of Arcata, in Humboldt County, California (Figure 1 Location Map). The Project Area is located on the Wadulh Unit of the Humboldt Bay National Wildlife Refuge (NWR). The parcel is owned by the U.S. Fish and Wildlife Service (USFWS). The parcel consisted of tidal wetlands and mudflat prior to its conversion to agricultural land in the 1930’s. Currently the parcel is an abandoned, subsided pasture that is bound on the east side by a failing levee along Mad River Slough, on the west side by dunes and dune forest, on the north by Lanphere Road, and on the south by a vegetated cross levee.

The Project will restore a diked former agricultural pasture to a combination of estuarine and palustrine wetland habitats, including salt marsh, brackish marsh, mudflat, and subtidal/intertidal eelgrass habitat, while protecting existing forested wetlands to the west. The Project’s limits of disturbance (i.e. earthwork) is planned across 28.9 acres, and the completed Project will restore and protect a total of 52 acres of tidal lagoons, intertidal salt and brackish marsh, and freshwater emergent wetlands. The Project will have numerous long-term benefits for climate resiliency, coastal wetlands and associated native species, and sensitive species recovery and result in a mosaic of wetland types as well as a net increase in wetlands.

See Attachment 4 Project Description for additional Project detail, including Table 1.5-1 which includes acreages of created habitat following Project implementation



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N

GHD

Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Vicinity Map

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

FIGURE 1

PRE-PROJECT EELGRASS CHECKLIST

Please complete the Eelgrass Pre-project Checklist below. Note that the checklist questions relate to the Area of Potential Effect (APE) associated with your project, which incorporates a surrounding buffer inclusive of the limits of potential construction and/or maintenance-related activities that could affect eelgrass habitat. Provide a copy of the completed questionnaire along with your permit application and a map depicting the proposed project location, potential eelgrass depth range-10 to +4 feet, and benchmark eelgrass distribution in the vicinity of the proposed project. Maps should be of an appropriate scale to clearly depict the preliminary/proposed APE boundary in relation to both existing and potential eelgrass resources as provided in the Humboldt Bay Eelgrass Comprehensive Management Plan and associated webpage (humboldtbay.org/eelgrass-management-plan). Here you'll find information and links including eelgrass information for permit applicants, a baseline eelgrass distribution map, and the Humboldt Bay Eelgrass Comprehensive Management Plan. Contact the Harbor District office with questions (443-0801).

For New Projects:

		YES	NO
a)	Is the project located within 100 feet of previously mapped (known) eelgrass habitat?		x
b)	Will any construction or new operational traffic occur within the vicinity of existing eelgrass?		x
c)	Is any portion of the project located in an area with depths ranging from -10 to +4 feet?	x	
d)	Does the project result in new cover, shading or other form of light reduction of open water areas ranging in depth from -10 to +4 feet?		x
e)	Is the project anticipated to affect wind or tidal circulation patterns within the bay?		x
f)	Could the project affect ambient water temperature or clarity or result in new effluent (including stormwater) discharge point?		x
g)	Does the project result in any placement of fill, including shoreline armor?	x	
h)	Is the project anticipated to lead to an increase in boat traffic that could affect nearby eelgrass habitat through grounding, prop scarring, wake, or shading impacts?		x

For Maintenance/Repair Projects and Construction Activities:

		YES	NO
i)	Is project construction likely to increase turbidity? To what extent and for what duration?		x
j)	Will construction require the use of a barge or other vessel that may temporarily impact the bay floor (e.g. spud poles, anchoring, prop scarring, etc.) within known eelgrass habitat or within depths ranging from -10 to +4 feet?		x
k)	Will construction require the use of turbidity curtains in proximity to eelgrass habitat?		x
l)	Will project construction result in temporary shading from moored/anchored working vessel(s)?		x

If you responded yes to any of the questions above, your project may have the potential to affect eelgrass habitat and you'll need to conduct a preliminary eelgrass survey. Please refer to the District's Eelgrass Management Plan webpage for further guidance and a list of local agency contacts should you have additional questions.

See Attachment 4 for additional information related to potential eelgrass impacts.

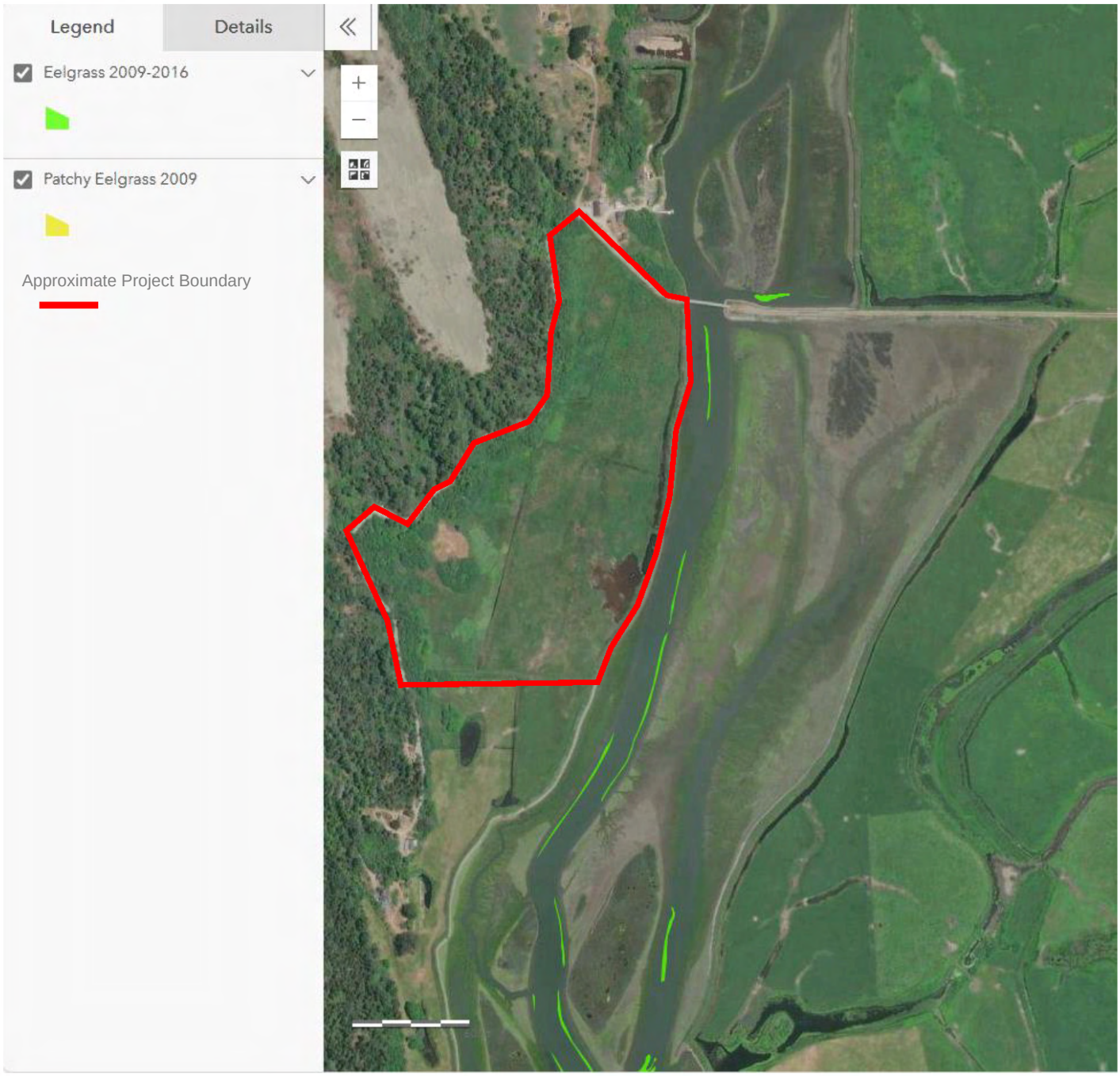

Figure 2: Baseline Eelgrass Distribution Map (HBRCD 2024). Refer to 30% Design Plans Sheet 5 (Attachment 4) for site elevations.

Pre-Project Eelgrass Checklist Additional Information

a. The Project is located approximately 150 feet from mapped occurrences of eelgrass at its closest point, and ranges up to approximately 450 feet from other mapped occurrences.

c. A component of the Project is to create eelgrass habitat, which is anticipated to passively revegetate from natural recruitment of existing eelgrass from within the Mad River Slough. Excavation is proposed to a minimum depth of approximately -1.0 feet NAVD88 within the lagoon channels, predominantly located in the interior of the parcel (see Attachment 5 – Project 30% Designs).

g. The Project results in placement of fill within the interior of the parcel to create salt marsh ridges, marsh areas, to fill a remnant anthropomorphic ditch, and to construct levees at the northern and southern parcel boundaries to protect neighboring property owners from tidal inundation (see Attachment 4 – Project Description). This fill will be sourced from the excavated tidal lagoon channels, and from the lowering of the failing Mad River Slough levee. The existing tidegate will be breached at the end of construction to enable tidal influence within the property. No shoreline armoring is proposed, rather shoreline levee removal will occur.

Application Questions

Answer all questions completely. If the question does not apply to your project, so indicate by marking N.A. If you have questions, please contact the Harbor District Office.

Project Description

8. Site Size

The Project Area includes a 54.2-acre portion within a 78-acre parcel (APN 506-291-014-000). The Project's limits of disturbance (i.e. earthwork) is planned across 28.9 acres.

9. Square Footage

Specific habitat areas include (see Attachment 4 – Project Description and Figure 4 for more detailed information on the areas and locations of project components):

- 16.5 acres of subtidal habitat
- 9.6 acres of salt marsh
- 13.0 acres of mudflat
- 11.5 acres of forested wetland
- 0.7 acres of dunes
- 2.9 acres of uplands

10. Number of floors of construction

n/a

11. Amount of off-street parking provided

No new parking will be provided, and no existing parking nearby will be removed.

12. Attach plans

See Attachment 5 for the 30% design plans.

13. Proposed scheduling

The Project is planned for implementation in summer 2025, specifically to occur on or after August 15, 2025 to avoid interference with the nesting bird season. The Project will be constructed in either one or two seasons and is anticipated to be either entirely completed by October 15, 2025, or would include completion of all internal earthwork by October 15, 2025 with the Mad River Slough levee lowering and tide gate removal and hydrologic interconnectivity (breaching) to occur by October 15, 2026.

14.Associated projects

The project is a part of the Humboldt Bay National Wildlife Refuge. All refuge units and associated projects are managed by the Refuge's Comprehensive Conservation Plan.

The Project includes placement of gravel on 0.27 acres of Refuge Access Road, which is not tidally influenced and outside of Harbor District jurisdiction.

15.Anticipated incremental development

Incremental development is not anticipated in the Project. The construction of the Project will be complete in one to two construction seasons.

16.If residential, include the number of units, schedule of unit sizes, range of sale prices or rents, and type of household size expected.

n/a

17.If commercial, indicate the type, whether neighborhood, city or regionally oriented, square footage of sales area, and loading facilities

n/a

18.If industrial, indicate type, estimated employment per shift, and loading facilities.

n/a

19.If institutional, indicate the major function, estimated employment per shift, estimated occupancy, loading facilities, and community benefits to be derived from the project.

n/a

20.If the project involves a variance, conditional use or recognizing application, state this and indicate clearly why the application is required.

n/a

Are the following items applicable to the project or its effects? Answer yes or no. Discuss all items answered yes.

21.Change in existing features of any bays, tidelands, beaches, lakes or hills, or substantial alteration of ground contours.

The Project Area is located on historically modified tidelands. It was mapped in 1870 as part of a U.S. Coast and Geodetic Survey of Humboldt Bay. The 1870 map indicates that a large portion of the low pasture area was intertidal mud flat or sub-tidal prior to diking and draining which occurred in the mid 1930's with the construction of the Mad River Slough levee and tide gate.

This Project proposes to modify the current ground contours slightly through the creation of the new tidal lagoon channel and placement of excavated materials in locations and elevations to support

establishment of salt marsh habitat. The tidal lagoon channels will be graded to range from approximately -1.5 to 2.0 feet NVD88. Marsh elevations will range up to 8.0 feet. Placement of fill will result in the creation of new upland conditions at the northern cross levee site (the existing southern cross levee will be enhanced).

The removal of the existing tide gate (including associated culvert) in the Mad River Slough levee will provide full tidal connectivity between Mad River Slough and the excavated tidal lagoon channel network. Approximately 1,650 linear feet of the Mad River Slough Levee will be lowered from approximately 9 to 13 feet to approximately 7 feet in elevation (NAVD88).

22.Change in scenic views or vistas from existing residential areas or public lands or roads.

The northern cross levee is expected to limit sight views beyond it northwards from a portion of Lanphere Road. All other Project components are at or below ground elevation and will not block or significantly alter views of Humboldt Bay from residential areas, public lands, or roads.

23.Change in pattern, scale or character of general area of project.

No. The Project will maintain the natural visual character of the area. The work proposed will look similar to the existing conditions of levees, grassy and herbaceous groundcover, and tidally influenced marsh.

24.Significant amounts of solid waste or litter.

No. The Project will generate limited solid waste during construction, which will be disposed of at a proper disposal location.

25.Change in dust, ash, smoke, fumes or odors in vicinity.

No change in ash or smoke will occur in the vicinity as a result of the Project. Minor odors from the use of equipment during construction activities will be intermittent and temporary and will dissipate rapidly from the source with an increase in distance. Temporary increase in fugitive dust may occur during construction and earth moving activities. The Project's State Water Resources Control Boards Final Statewide Restoration General Order (SRGO) General Protection Measures (GPM) include GPM-12 to reduce potential impacts from fugitive dust (Attachment 6).

> 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.

26.Change in ocean, bay, lake, stream or ground water quality or quantity, or alteration of existing drainage patterns.

Implementation of the Project will alter existing drainage patterns within the Project site through the excavation of tidal channels, grading to appropriate salt marsh habitat elevations, and removal of the tide gate. By breaching the tide gate location, the site will experience the full tidal regime. At higher tides, flood tide flows will overtop the lowered levees, the salt marsh ridges, and fringing salt marsh. Ebb flows will circulate through the network of channels within the lagoons providing more opportunity for salt marsh vegetation to trap sediment which may allow marshes to keep pace with sea level rise for a longer time. The increased hydrologic connectivity between the Project Area and Mad River Slough will provide nursery and significant off-channel habitat for federally and state-listed fish species. Creation of aquatic habitat will also promote further establishment of eelgrass beds.

The Project's SRGO General Protection Measures include measures and protocols to reduce potential negative water quality changes associated with temporary construction impacts (Attachment 6).

27. Substantial change in existing noise or vibration levels in the vicinity.

A. During Construction

Construction of the Project will result in a temporary noise increase associated with the use of construction equipment for the Project.

B. During Project Utilization

Operational activities associated with the Project include monitoring and maintenance (i.e. invasive species management). Noise at the Project Area during these activities would not measurably exceed the existing background noise levels because only infrequent vehicular access and temporary maintenance activity would be required.

28. Site on filled land or on slope of 10% or more.

Most of the site is flat, ranging between 2 feet and 8 feet in elevation (NAVD88). The existing southern, and Mad River Slough levees have slopes at or greater than 10%. Construction along these levees will occur to create gentle slopes to integrate them into the marsh plain elevation and to raise the elevations of portions of the levee to contain tidal waters and minimize the potential for flooding on adjacent properties.

29. Use of disposal or potentially hazardous materials, such as toxic substances, flammable or explosives.

Construction of the Project will include the transport and use of common hazardous materials inherent to the construction process, including petroleum products such as fuel and lubricants for construction equipment and vehicles, concrete curing compounds, and solvents for construction of Project improvements. These materials are commonly used during construction, are not acutely hazardous, and will be used in relatively small quantities. The following protocols and measures will be implemented to reduce potential impacts to aquatic environments and water quality:

- 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.

- 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.
- All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location with secondary containment to prevent spills from traveling to surface water.
- Construction equipment shall not be stored in inundation areas or 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.
- 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).

The Project's SRGO General Protection Measures include additional measures and protocols reduce potential impacts related to potential hazards, materials storage and disposal (Attachment 6).

30.Substantial change in demand for municipal services (police, fire, water, sewage, etc.)

No. Implementation of the Project will not induce population growth and will not result in the need to increase staffing, create new hazardous conditions, or result in a modification to the road system that would restrict access for emergency services.

31.Substantially increase fossil fuel consumption (electricity, oil, natural gas, etc.).

No. Construction and maintenance operations will require temporarily or limited amounts of fossil fuels, primarily gas, diesel, and motor oil.

32.Relationship to larger project or series of projects

The Refuge's Comprehensive Conservation Plan (CCP) provides the goals, objectives, and strategies to guide management of all of the Humboldt Bay National Wildlife Refuge units. The Wadulh Project is in the CCP and implementation and management of the parcel will follow the objectives and strategies of the CCP.

Environmental Setting

33. Describe the project site as it exists before the project including information on topography, soil stability, plants and animals, and any cultural, historical, or scenic aspects. Describe any existing structures on the site and the use of the structures. Attach photographs of the site. Snapshots or polaroid photos will be accepted.

Currently the parcel is an abandoned, subsided pasture (Photo 1 and 2) that is bound on the east side by a failing levee along the Mad River Slough (Photo 3), on the west side by dunes and dune forest (Photo 2), on the north by Lanphere Road (Photo 5), and on the south by a cross levee (Photo 1). Little infrastructure remains onsite from former agricultural use, including fence posts or other fence material.

The toe of the levee along Mad River Slough is at approximately 4 feet NAVD88, and the crest of the levee ranges from 9 to 13 feet NAVD88; Lanphere Road to the north ranges between 8 and 15 feet and the crest elevation of the cross levee to the south is approximately 10 feet. The projected 100-year flood elevation is 11.1 feet.

Wetland vegetation varies across the Project Area, as some portions are relatively undisturbed and some have experienced high disturbance from an altered hydrologic regime and land management practices (see Section 2.3 of the WHRP for a full description of plant species included as Attachment 7). Formerly grazed portions of the parcel are occupied by a matrix of common non-native grasses. In areas that extend towards the ditch at the base of the existing levee (west side) dominant vegetation includes brackish salt-tolerant species due to the salt water infiltration through the failing tide-gate that has been occurring, and due to the tidal overflow during high tides. Other native and nonnative herbaceous species persist throughout the site. Forested wetlands exist at the western border of the Project Area and are comprised of mixtures of coastal dune willow, wax myrtle, and other species. Upland communities are comprised of beach pine forest that intergrades with forested wetlands in the west of the Project Area; ruderal which is dominated by non-native grasses observed in the formerly grazed wetlands; and discrete areas of Scotch broom and California/Himalayan blackberry brambles.

Based on the location, the site is likely utilized by deer, racoons, foxes, river otters, and other mammals. The former pastureland, brush, and forested areas provide foraging and nesting habitat for various avian species. California Endangered Species Act (CESA) listed species that may occur within the Project Area include:

- Bald Eagle (fly-over only)
- Coho Salmon, SONCC ESU
- Longin Smelt
- Steelhead, Northern CA DPS summer-run
- White-tailed Kite (fly-over only)

Federal ESA listed species nearby may include Tidewater Goby (USFWS); Coho Salmon, Chinook Salmon, Steelhead, Eulachon, Longfin Smelt and Green Sturgeon (NOAA RC). Tidewater Goby is assumed to be present within the Project Area.

Cultural resource inventorying was conducted during the CEQA SERP process and there are no eligible historic resources within the Project Area. The Wiyot Tribe has significant cultural connection to the Project Area. The Wiyot Tribe will be an active participant in concept, design, and final interpretive signage around the restoration site and will use the site to educate its members and provide eco-cultural interpretation.

Project Area Photos

Photo 1: Southern cross levee in its current condition, looking east toward Mad River Slough levee. The cross levee was constructed circa 2019 when the Mad River Slough levee breached and the adjacent property flooded to the south (picture right). The Project Area still receives intermittent brackish water intrusion from the impaired Mad River Slough levee.

Photo 2: Ponding water in the interior of the Project Area near the southern cross levee, looking northwest toward the Lanphere Dune Unit in the far background, and the forested wetlands in front of them. This area is invaded by non-native facultative pasture grasses.

Photo 3: Outboard edge (east) of Mad River Slough levee, where the breach has occurred (the “saddle” seen in the background), and location of the failing tide gate (out of frame).

Photo 4: Looking north up Mad River Slough at the tide gate “bubbling” as ponding water from the west of the levee drains.

Photo 5: At the northern-most extent of Mad River Slough levee, looking northwest at Lanphere Road and the site of the proposed levee that will be adjacent to Lanphere Road.

34. Describe the surrounding properties, including information on plants and animals and any cultural, historical, or scenic aspects. Indicate the type of land use (residential, commercial, etc.) intensity of land use (one-family, apartment houses, shops, department stores, etc.) and the scale of development (height, frontage, set-back, rear yard, etc.) Attach photographs of the vicinity. Snapshots or polaroid photos will be accepted.

The Project is located adjacent to the Lanphere Dunes Unit of Humboldt Bay National Wildlife Refuge. Forested wetlands and dune forest can be seen to the west of the Project Area (background of Photo 2). Mad River Slough is to the east of the Project Area (Photos 3 4, and 7). Properties to the north (background of Photo 5) and south (Photo 8) formerly had agricultural uses. The property to the north currently has a couple residential houses and is utilized for oyster production support uses (e.g. oyster storage and equipment). Actual oyster production is further north. The property to the south currently has a couple residential houses. USFWS has been in communication with landowners to the north and south of the Project Area to gain their input on Project design.

Nearby roads are rural asphalt or gravel roads, sometimes bordered by agricultural fences. Refuge Access Road borders the west side of the Project Area. A small gravel parking lot is located off the road and can only be used with a USFWS permit or during guided tours.

Surrounding Area Photos

Photo 6: Refuge Access Road on the west boundary of the Project Area. The road is bordered on either side by forested wetlands (photo left) and forested wetlands grading to dune forest (photo right).

Photo 7: At the eastern-most extent of the southern cross levee, looking north at the Mad River Slough Levee. The levee is variable in height along its length due to scour, which has compromised its longevity and has allowed for salt water to seep into the Project Area.

Photo 8: The property to the south of the Project Area maintains similar conditions adjacent to the cross levee. A residence is located on the property.

---------- Questions 35; 36 and 39 MUST BE ANSWERED! ----------

35.How will the proposed use or activity promote the public health, safety, comfort, and convenience?

The creation of off-channel habitat in the Project Area will provide critical salmonid rearing and refugia habitat that will contribute to the recovery of the area's commercial and recreational fisheries. Multiple tidal and riverine restoration projects have demonstrated the utilization of created or enhanced habitats through post-construction fish surveys to measure project effectiveness. Additionally, the Wiyot Tribe will use the site to educate its tribal members and provide eco-cultural interpretation. The proposed cross levee to the north, and enhanced cross levee to the south, will contain tidal waters within the Project Area and therefore provide protection to adjacent landowners and land uses from tidal inundation.

36.How is the requested grant, permit, franchise, lease, right, or privilege required by the public convenience and necessity?

The Project will have numerous long-term benefits for climate resiliency, coastal wetlands and associated native species, sea level rise, and sensitive species recovery. See Attachment 4 Project Description for more information.

37.Financial statement:

A. Estimated cost of the project.

The total estimated cost of the Project is $1,622,000.

B. How will the project be financed.

The Project is funded through a National Coastal Wetlands Conservation Grant and the U.S. Fish and Wildlife Service.

38.Describe fully directions necessary to arrive at project site.

Take Lanphere Road west from Arcata, across Lanphere Road Bridge. The Project Area can be access through a gate to the left at the Refuge boundary. Permission from USFWS is required for site access. The access road behind the gate will arrive at a gravel parking lot. Another gate to the southern cross levee is located approximately 0.15 miles south of the parking lot.

39.Will the Applicant agree that as a condition of the permit being issued to Applicant, to indemnify and hold harmless the Humboldt Bay, Harbor Recreation and Conservation District from any and all claims, demands, or liabilities for attorneys' fees obtained from or against demands for attorney's fees, costs of suit, and costs of administrative records made against District by any and all third parties as a result of third party environmental actions against District arising out of the subject matter of this application and permit, including, but not limited to, attorney's fees, costs of suit, and costs of administrative records obtained by or awarded to third parties pursuant to the California Code of Civil Procedure Section 1021.5 or any other applicable local, state, or federal laws, whether such attorneys' fees, costs of suit, and costs of administrative records are direct or indirect, or incurred in the compromise, attempted compromise, trial, appeal, or arbitration of claims for attorneys' fees and costs of administrative records in connection with the subject matter of this application and permit?

Yes.

NOTE

The District hereby advises the Applicant that, under California Public Resources Code Section 21089, the District when a lead agency under the Environmental Quality Act of 1970, as amended, pertaining to an Environmental Impact Report (EIR) or a Negative Declaration may charge and collect from the Applicant a reasonable fee in order to recover the estimated costs incurred by the District in preparing an Environmental Impact Report (EIR) or Negative Declaration for the project and the procedures necessary to comply with the provisions of the public resources code on the Applicants project. In the event your project contains an analysis of issues pertaining to the Environmental Quality Act of 1970, as amended, for which District staff is not competent to independently review, or District requires the same in preparation of an Environmental Impact Report (EIR) or Negative Declaration for the project, the District may retain a reviewing consultant to evaluate the content of the Administrative-Draft EIR and Final EIR or Negative Declaration with respect to these issues. The cost of such reviewing consultant services shall be borne by the Applicant.

CERTIFICATION: I hereby certify that he statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Dated: 24 June 2024 _____ _____

For Humboldt County Resource Conservation District

Attachments

Attachment 1

Additional General Information

General Information

1. Name Address, phone # and email of Developer, Project Sponsor and Legal Owner

Project Sponsor (Applicant):
Humboldt County Resource Conservation District
Doreen Hansen
5630 South Broadway
Eureka, CA 95503
(707) 498-1072
doreen@hcrcd.org

Legal Owner:
U.S. Fish and Wildlife Service
Cashell Villa
1020 Ranch Road
Loleta, CA 95551
(707) 773-5406
Cashell_villa@fws.gov

Developer:
The entity implementing the project (the contractor) is to be determined following the bidding period. The U.S. Fish and Wildlife Service will be managing the bidding and construction management.

Attachment 2

Adjoining Property Owners

Adjoining Property Owners, Names and Addresses

NAME	APN	MAILING ADDRESS
RALPH C J & CAROL P TR	506-281-007-000	7000 LANPHERE RD ARCATA CA 95521
UNITED STATES OF AMERICA	506-291-008-000	N/A
SEA HORSE RANCH LLC CO	506-291-013-000	240 OLE HANSEN RD EUREKA CA 95503
HUNT CAROLYN A TR	506-261-001-000	495 HUNTS DR MCKINLEYVILLE CA 95521
UNITED STATES OF AMERICA	506-281-001-000	2233 WATT AVE STE 375 SACRAMENTO CA 95825-0509
UNITED STATES OF AMERICA	506-291-009-000	2800 COTTAGE WAY W-1832 SACRAMENTO CA 95825-0509

Attachment 3

Permits and Other Public Approvals

Permits & Approvals

CEQA Statutory Exemption for Restoration Projects (SERP)	CONCURRENCE NO. 21080.56-2023-045-R1 Approved January 17, 2024
California Department of Fish & Wildlife California Endangered Species Act (CESA) Restoration Management Permit	Application submitted - pending
Coastal Act Federal Consistency Negative Determination	Application submitted - pending
North Coast Regional Water Quality Control Board (Regional Board) Clean Water Act (CWA) Section 401 Water Quality Certification Statewide Restoration General Order (SRGO)	Application submitted - pending
U.S. Army Corps of Engineering (USACE) CWA Section 404 Permit, Nationwide Permit 27	Application submitted - pending
NEPA Compliance (NOAA Restoration Center's Programmatic Environmental Impact Statement for Coastal Habitat Restoration)	Number F22AP00894 Complete May 23, 2024
NOAA Fisheries Endangered Species Act (ESA) Programmatic Biological Opinion (PBO)	Application submitted - pending
USFWS – ESA Statewide Restoration PBO	Application submitted - pending

Attachment 4

Project Description

1. Project Description

1.1 Project Location and Setting

The Wadulh Lagoon Tidal Wetland Enhancement Project (Project; Wadulh pronounced “wah-dush”) includes a 54.2-acre Project Area within a 78-acre parcel (APN 506-291-014-000) along the upper western portion of the Mad River Slough on Humboldt Bay, approximately 1.25 miles west of the City of Arcata, in Humboldt County, California (**Appendix A, Figure 1 [Vicinity Map]**). The Project Area is located on the Wadulh Unit of the Humboldt Bay National Wildlife Refuge (NWR). The parcel is owned by the U.S. Fish and Wildlife Service (USFWS). The parcel consisted of tidal wetlands and mudflat prior to its conversion to agricultural land in the 1930’s. Currently the parcel is an abandoned, subsided pasture that is bound on the east side by a failing levee along the Mad River Slough, on the west side by dunes and dune forest, on the north by Lanphere Road, and on the south by a cross levee (**Appendix A, Figure 2 [Project Area w Existing Conditions]**). The toe of the levee along Mad River Slough is at approximately 4 feet NAVD88, and the crest of the levee ranges from 9 to 13 feet NAVD88; Lanphere Road to the north ranges between 8 and 15 feet and the crest elevation of the cross levee to the south is approximately 10 feet. The projected 100-year flood elevation is 11.1 feet (all elevations in this document are referenced to the NAVD88 datum).

Historical conditions have been gleaned through a U.S. Coast and Geodetic Survey of Humboldt Bay from 1870 (USFWS 2023a). Overlay of the Project boundary on the map indicates that a large portion of the pasture area was once intertidal mudflat or sub-tidal prior to levee construction and drainage of the parcel. The map indicates a margin of salt marsh vegetation bordered the mudflat and buffered the forested wetlands.

The Project will restore a diked former agricultural pasture to a combination of estuarine and palustrine wetland habitats, including salt marsh, brackish marsh, mudflat, and subtidal/intertidal eelgrass habitat, while protecting existing forested wetlands to the west which receive drainage from the adjacent dune slope. The Project’s limits of disturbance (i.e. earthwork) is planned across 28.9 acres, and the completed Project will restore and protect a total of 52 acres of tidal lagoons, intertidal salt and brackish marsh, and freshwater emergent wetlands to restore the natural shoreline with a transition from slough to salt marsh to freshwater forested wetlands generally from east to west. The Project Area is zoned Agriculture Exclusive (AE) with minimum lot size of 60 acres, and combining zones A, B, F and T (archaeological resource area, beach and dune areas, flood hazard area, and transitional agricultural lands, respectively). The Project Area is entirely within the California Coastal Zone and is in both the Appeal and State Coastal Zone jurisdiction, therefore defaults to being under the jurisdiction of the California Coastal Commission (state) under the Coastal Act (however, because the Project Area is under federal ownership, compliance with the Coastal Act will occur at the federal consistency determination level). The Project will restore natural tidally driven ecological processes and salt marsh habitat within the AE zoned area, which is a conditionally allowable use according to Humboldt County land use code. Similarly, because the Project is under federal ownership, a Conditional Use Permit from Humboldt County is not required (see Section 1.6 for a list of all regulatory requirements).

1.1.1 Existing Conditions

Climate

The Project Area is within the Eureka Plain Humboldt County Planning Watershed Area (Humboldt Bay sub-watershed [HUC-12]), and directly adjacent to the Mad River Slough. Mad River Slough is a low elevation and low gradient, tidal slough that is just over a half mile east of the Pacific Ocean, and drains adjacent agricultural low-lands to Humboldt Bay to the south. Humboldt Bay is characterized by cool, foggy summers and cool, rainy winters. Due to its proximity to the Pacific Ocean, the weather throughout the year in the Project Area is considered mild, with a relatively narrow temperature range. The intense maritime effect of the Pacific Ocean causes uniquely cool summers. Most rainfall occurs from October to April. Fog and overcast conditions are common, especially during the evening and early morning hours.

Mad River Slough Levee

The Basis of Design Report (USFWS 2023a) prepared for the Project provides an overview of the levee condition when assessed in 2015. In the nine years since the assessment of the levee, erosion and overtopping has continued to occur further eroding low and vulnerable spots within the levee. According to the Basis of Design Report:

> AECOM evaluated the condition and stability of the Mad River Slough Levee (AECOM 2015a). They determined that the levee has undergone long-term progressive erosion on the east (slough) side. Erosion caused block failures, slumping, and over steepening of the levee face, and significant loss of the original levee cross section. AECOM judged that there had been sufficient loss of the levee to create a “relatively high extant risk of breaching or overtopping in the near future” (AECOM, 2015a). AECOM surveys also found low points in the levee crest at 10.5 feet NAVD 19881 elevation, which would allow overtopping during a 25-year return period extreme tide event.
>
> The poor condition of the levee was further demonstrated when the tidegate within the Project Area collapsed and breached the Mad River Slough Levee in 2019. Caltrans responded quickly and installed a replacement tidegate and culvert, and restored the levee. The private landowner to the south also responded by constructing the South Cross Levee on the southern edge of the Project Area. The South Cross Levee lies primarily on what is now Refuge property, but a portion of the eastern end of the South Cross Levee is located on the private land to the south.

Agricultural Productivity

The Project Area was previously owned by Caltrans who purchased the site for use as a wetland mitigation bank. The site has not been grazed or used for agricultural productivity since approximately 2015 and agriculture infrastructure (i.e. fencing) has not been maintained and is in disrepair. Portions of the drainage ditches are blocked and the site drains poorly. The Mad River Slough levee is in poor condition and contains several low points where overtopping occurs during peak spring tides. The site contains subsided marsh-land and former bay-lands. It seasonally floods with rainwater in low spots that are disconnected from the drainage network. There is leakage of saltwater through the tidegate and from levee overtopping from Mad River Slough that have resulted in the conversion of pasture grasses to more salt tolerant species which are not suitable fodder for agricultural purposes.

As described above, the Mad River Slough levee is failing and would need to be rebuilt to provide adequate isolation from tidal influence to allow for use as a grazing pasture. In addition to substantial levee repair, excavation of drainage ditches, installation of fencing and other infrastructure, and tidegate improvements

within the Project Area would be necessary in order for agricultural productivity to effectively return as a sustainable land use at the site.

Restoration of the parcel to agricultural production is not consistent with NRW management goals. The NWR's primary management goal for the Project Area is to conserve, manage, restore, and enhance estuarine and palustrine wetland habitats representative of the Humboldt Bay area to benefit their associated native fish, wildlife, plants, and special status species. The NWR determined in an alternatives analysis that restoring the Project Area to grazing pasture would result in brackish scrub wetland with minimal habitat value for avian and aquatic species, and that Sea Level Rise would eventually raise groundwater levels and cause die-off vegetation in low areas converting the Project Area to mudflat. Additionally, restoring the site to agricultural grazing pasture is not an economically viable option for the NWR. The cost to restore the levee and agricultural infrastructure are estimated to exceed $400,000, which far exceeds potential income from grazing fees.

Aquatic Resources

Although the parcel was diked along its boundary with the Mad River Slough and converted to agricultural purposes, the majority of the parcel contains aquatic resources (i.e. wetlands or flowing waters). Aquatic resources within the parcel were mapped in 2018 and show the dominance of palustrine emergent, estuarine, and Other Waters of the U.S. (i.e. a ditch) throughout the Project Area (ICF 2018a), see **Appendix A, Figure 3 (Existing Wetland Conditions)**. During the wet season, precipitation largely remains onsite via saturated soils and can result in surface-level ponding. Water within the ditch is conveyed offsite via the tidegate however typically pools up during high tide and precipitation events. During the dry season groundwater levels drop (however the groundwater table remains relatively high, i.e. typically within one foot of the surface), and water levels within the Project Area are driven by daily tidal cycles. At low tide, mudflat is visible at the toe of the levee. No Project work is proposed within the Mad River Slough channel thalweg, rather Project work would occur along (and at the base of) the Mad River Slough levee and at the tidegate. The Mad River Slough will influence the Project Area greatly following the removal of the leaky tidegate.

Approximately 90 percent of salt marsh has been lost around Humboldt Bay since 1900, largely through diking and draining, and more than 75 percent of Humboldt Bay's shoreline has been armored or otherwise altered (Laird et al. 2013). This loss of salt marsh and shoreline has resulted in significant loss of ecosystem services essential to the environment, flora, and fauna around Humboldt Bay. Vital salt marsh ecosystem services include production of wildlife food and habitat, water quality improvement, recreation, buffering against sea level rise (SLR) impacts, and carbon sequestration. The Project will restore historical wetland types, increase adaptation to SLR, and provide protection as part of the Humboldt Bay NWR in perpetuity. The Project will also assist the recovery of five federally listed endangered fish species (Southern Oregon Northern California Coho Salmon [*Oncorhynchus kisutch*], California Coastal Chinook Salmon [*Oncorhynchus tshawytscha*], Northern California Steelhead [*Oncorhynchus mykiss*], Tidewater Goby [*Eucyclogobius newberryi*], and proposed listed Longfin Smelt [*Spirinchus thaleichthys*]), as well as special status bird and plant species. Tidal restoration is expected to promote recovery and maintenance of tidal marsh habitats that support a range of native fish, invertebrates, wildlife, and plant species, while also enabling marsh elevations to keep pace with SLR. The Project will support State Executive Order N-82-20 of restoring and conserving 30 percent of coastal waters by 2030.

Critical Habitat

There are 2.0 acres within the Project Area that are mapped as critical habitat for endangered Tidewater Goby consisting of borrow ditches and a seasonally flooded wetland. The critical habitat is of poor quality.

Connectivity for Tidewater Goby between Mad River Slough and the Project Area is impaired. Outward passage from the Project Area is through a 24-inch diameter culvert with a top-hinged flap gate. Flow velocities outward through the culvert when the flap-gate is open preclude inward passage from the slough to the borrow ditches. Passage into the existing Project Area could occur during infrequent high tides that briefly overtop the Mad River Slough levee. The seasonally flooded wetland dries out early in the summer, potentially during breeding season. There were several sampling efforts for Tidewater Goby within Mad River Slough since 2000, but no Tidewater Goby have been located in Mad River Slough since 1993 (Shea, Personal Communication).

Proposed Project Actions will result in partial filling of the borrow ditches and excavation of a portion of the seasonally flooded wetland. The Proposed Project Actions will result in 15.2 acres of suitable habitat for Tidewater Goby. The habitat will consist of permanently flooded pools with minimum depths ranging between 0 and 3.8 feet. The pools will be disconnected from Mad River Slough at low tides but will be flooded by twice-daily high tides. The tides will recirculate about 50% of the pool volume maintaining good water quality. Inflow from freshwater springs on the western side of the Project Area will create brackish conditions suitable for Tidewater Goby. Flow velocities within the pools will be negligible creating suitable conditions for Tidewater Goby which are poor swimmers. USFWS designed and implemented similar features at the McDaniel Slough, Salmon Creek, and Cattail Creek (Humboldt Bay National Wildlife Refuge), and Elk River restoration projects. The Martin Slough and Riverside Ranch (Salt River) restoration projects possess similar habitat features. Fish monitoring conducted by NOAA, USFWS, Cal Poly Humboldt, and fishery consultants established that pool areas with these features create suitable aquatic habitat and low-tide refugia for marine species. Sampling demonstrated that the pools were rapidly colonized by marine species in saline and brackish areas including the endangered Tidewater Goby.

Other Special-status Fish Species

The Project Area is located within Humboldt Bay in which NOAA-jurisdictional special status species, Coho Salmon, Chinook Salmon and Steelhead, Eulachon and Longfin Smelt. No sampling for any fish species (including Tidewater Goby) has occurred within the inboard ditches in the Project Area. The aquatic conditions within the inboard ditch and remnant agricultural ditch network do not provide suitable habitat for salmonids, Eulachon or Longfin Smelt due to the limited access between Mad River Slough and the aquatic habitat within the Project site, and stagnant conditions. Therefore, it is unlikely that salmonids, Eulachon or Longfin Smelt would be relocated during dewatering and fish relocation, however handling and relocation of these species cannot be ruled out because presence is possible.

1.2 Project Background and Completed Studies

The Project site has been the subject of environmental studies undertaken by Caltrans starting in 2015. The Humboldt County Resource Conservation District (HCRCD) acts as lead agency for the Project, and the USFWS as the partnering federal agency who is developing preliminary concept plans for the restoration and tidal enhancement of Wadulh Lagoon. The concept plan is informed by the previous extensive studies conducted for Caltrans and their consultants (AECOM, Inc. and ICF, Inc.), and investigations by USFWS staff.

The following studies and reports have been completed to date:

- Wetland and Waters of the U.S. Delineation Report (ICF 2018a)
- Biological Assessment (ICF 2018b)
- Biological Opinion (USFWS 2018)

- Section 106 of the National Historic Preservation Act and State Historic Preservation Act (USFWS 2023 [sensitive information and not included in references])
- Basis of Design Report (USFWS 2023a), which includes data from:
    - Restoration Project Concept Design Report (AECOM 2015a)
    - Sediment Availability and Transport Analysis; Site Evolution (AECOM 2015b)
    - Topographic, Vegetation Survey and Hydrologic Monitoring Report (AECOM 2015c)
- 30% Conceptual Design Plans (USFWS 2023b)

The USFWS is completing an updated Endangered Species Act consultation for Project implementation through their Programmatic Biological Opinion (PBO). The Project has been approved for use of the California Environmental Quality Act (CEQA) Statutory Exemption for Restoration Projects (SERP) through the California Department of Fish and Wildlife (CDFW). USFWS will provide management and long-lasting stewardship of the site as it is a component of the Lanphere Dunes Unit of the Humboldt Bay NWR.

The Project's namesake—Wadulh— (pronounced "wah-dush") is the word for dunes in the Wiyot language, and the name Wadulh Lagoon was selected in recognition of the Wiyot Tribe's significant cultural connection to the Project Area. The USFWS has engaged with the Wiyot Tribe and other tribes in the region (i.e., Table Bluff, Bear River Band of the Rohnerville Rancheria, and Blue Lake Rancheria, since 2021. In early 2023, the USFWS held an in-person meeting with tribal representatives to provide updates and receive input on designs, funding, upcoming cultural surveys, and restoration elements. The Wiyot Tribe will be an active participant in concept, design, and final interpretive signage around the Project site and will use the site to educate its members and provide eco-cultural interpretation.

1.3 Project Goals, Objectives and Schedule

The primary goals and objectives of the Project include the following:

1.3.1 Goals

Habitat goals:

– Restore full tidal hydrology;
– Improve forested and aquatic habitat for fish and wildlife species;
– Minimize conversion to mudflat;
– Create suitable hydrologic conditions to support eelgrass;
– Promote long-term sustainability of fringing salt marsh; and,
– Increase SLR resiliency.

Infrastructure goals:

– Prevent tidal flooding from Project onto adjacent properties; and,
– Prevent nuisance flooding of the Refuge Access Road.

1.3.2 Objectives

Objectives in support of the habitat goals include:

– Lowering existing levees to salt marsh elevations in one or more places;
– Excavating low-lying areas of pasture to create a channel network at elevations that will support eelgrass (*Zostera marina*);
– Excavating a tidal channel network to restore tidal flows to the site;
– Using excavated fill in strategic areas to create suitable conditions for establishment of salt and brackish marsh. The freshwater that drains from the adjacent dune system will support the creation of fringing brackish marsh; and,
– Placing fill strategically to create conditions to trap tidally transported suspended sediment and promote salt marsh expansion.

Objectives in support of infrastructure goals include:

– Placing fill against an existing levee that protects the property owner to the south, and along Lanphere Road to the north to a height of 11.5 feet NAVD88 to contain tidal waters within the Project Area and minimize the potential for flooding to adjacent properties; and,
– Placing road fill gravel on Refuge Access Road to increase elevation to approximately 10.5 feet to reduce likelihood of nuisance flooding;

1.3.3 Schedule

The Project is planned for implementation in summer 2025, specifically to occur on or after August 15, 2025 to avoid interference with the nesting bird season. The Project will be constructed in either one or two seasons and is anticipated to be either entirely completed by October 15, 2025, or would include completion of all internal earthwork by October 15, 2025 with the Mad River Slough levee lowering and tidegate removal and hydrologic interconnectivity to occur between August 15, 2026 and October 15, 2026.

1.4 Project Components

The Project's limits of disturbance (i.e. earthwork) is planned across 28.9 acres and includes the placement of fill to form salt marsh ridges, excavation of tidal lagoons, lowering of approximately 1,650 feet of Mad River Slough levee, removal of the existing tide gate, and excavation where the existing tidegate is located to provide full tidal connectivity between Mad River Slough and the excavated tidal lagoon channel network. Movement of equipment may occur outside of the 28.9-acre limits of disturbance. The completed Project will restore and protect a total of 52 acres of intertidal salt and brackish marsh, and freshwater emergent wetlands, and will restore the natural shoreline with a transition from slough to salt marsh to freshwater forested wetlands.

The components of the Project include (**Appendix A, Figure 4 [Project Area w Components]**):

– Lowering of approximately 1,650 linear feet of the Mad River Slough Levee;
– Excavating and grading of approximately 9.35 acres to a suitable elevation for creation of a tidal lagoon channel network which will support eelgrass establishment and provide low-tide refugia for multiple fish species, including Coho Salmon, Tidewater Goby, and Longfin Smelt due to the perched pools that will hold water during low tide. The tidal lagoon channels will be graded to range from approximately -1.5 to 2.0 feet;
– Placement of approximately 27,000 cubic yards of native fill to raise low-lying areas to elevations that will support salt marsh (all fill will be generated on site by excavating tidal channels and eelgrass habitat and levee lowering and removal). Specifically fill will be placed and graded to create the salt

marsh ridges (which will be interconnected with the tidal lagoon channel network and offer habitat variability) and within the marsh fill areas both at elevations ranging from 5.5 to 8.0 feet. The existing ditch will be filled to match adjacent contours. Placement of fill will not result in the creation of upland conditions;

– Placement of fill at the northern and southern parcel boundaries to create cross levees that will contain tidal waters and minimize the potential for flooding on adjacent properties. Each cross levee will be built to approximately 11.5 feet. Currently, only a cross levee exists along the southern parcel boundary which will be augmented to create the cross levee under this Project. The cross levees will contain a 3 to 1 slope from approximately 11.5 feet to 8.5 feet and then will contain 10 to 1 slopes from 8.5 feet and below to integrate into the marsh plain elevation;
– Placement of gravel along Refuge Access Road to increase the elevation to approximately 10.5 feet including fill slopes of 1 to 1 and replacement of up to three culverts depending on their condition;
– Removal of the existing tidegate and breaching of the levee. Breaching will not occur until other Project elements are completed (after its use as a barrier to isolate the work area from incoming tide); and,
– Replacement of one culvert located aligned with the proposed ditch fill at the southern cross levee, and installation of one culvert to be located perpendicular to the proposed northern property boundary cross levee.

An additional component of the Project is invasive species management, which will occur indirectly due to the reintroduction of tidal waters into the site resulting in the mortality of existing invasive species. Currently the Project Area is dominated by non-native pasture grasses including creeping bent-grass (*Agrostis stolonifera*), sweet vernal grass (*Anthoxanthum odoratum*), tall fescue (*Festuca arundinacea*), perennial rye grass (*Festuca perennis*), velvet grass (*Holcus lanatus*), Kentucky blue grass (*Poa pratensis*), meadow false rye grass (*Schedonorus pratensis = Festuca arundinacea*), and rough blue grass (*Poa trivialis*). Patches of spreading rush (*Juncus patens*) persist in the grazed wetland pastures due to their unpalatability. Reintroduction of tidal waters is anticipated to result in mortality of the pasture grasses. At the close of construction, areas at or higher than 7.5 feet elevation will be seeded with native seed mix, and all areas lower in elevation will passively revegetate with salt tolerant species such as pickleweed (*Salicornia pacifica*), saltgrass (*Distichlis spicata*), spreading rush and other *juncus* spp. varieties, slough sedge (*Carex obnupta*), and pacific silverweed (*Argentinia pacifica*). Invasive dense-flowered cordgrass (*Spartina densiflora,* hereafter referred to as Spartina) was observed in relatively low numbers (approximately 15 occurrences) on the outboard side of the Mad River Slough levee. During levee removal, patches of Spartina will be buried onsite as much as is feasible, however due to the prolific seed bank of Spartina at the regional level, some presence of Spartina is anticipated to occur onsite. The USFWS will treat Spartina at the Project site in accordance with its Comprehensive Conservation Plan (CCP) which is utilized to manage all of the Humboldt Bay Wildlife Refuge units, which includes a combination of manual, mechanical and chemical control approaches (USFWS 2009). The Wadulh site is in the process of being added to the USFWS's CCP (Villa personal communication 2024), and will be in the CCP prior to construction.

1.4.1 Project Implementation

The Project will be constructed starting August 15, 2025, pending agency approvals (see Section 1.6 for list of approvals). The Project will be constructed in either one or two seasons and is anticipated to be either entirely completed by October 15, 2025, or would be predominantly completed by October 15, 2025 with the levee lowering and tidegate removal to occur between August 15, 2026 and October 15, 2026.

USFWS anticipates that there will be three Project Phases. The first phase of the Project will involve excavation of tidal lagoons and construction of the cross levees. USFWS proposes to remove the top six inches of excavated areas (including vegetation) from the tidal lagoon excavation areas and place the combined soil and vegetation in marsh fill areas. Excavation of dry soil material from the upper 2.5 feet will initially be reserved for use in constructing cross levees and road fills. The remainder of the excavated materials will be used to construct marsh fills, salt marsh ridges, and ditch fills. A plug will be left in place that separates the tidal lagoons from the existing flooded areas where the tide gate is located. Surface and groundwater management before and during construction is discussed in Section 1.4.2.

The second phase of the Project will involve levee lowering. USFWS anticipates that the Contractor will initiate the lowering from the north and south ends of the Project Area. The soil material excavated from the levee lowering will be placed in the borrow ditches adjacent to the inboard side of the levee. This will also create an access corridor for the contractor's equipment. Should high tides overtop the lowered levees prior to Project completion, water will be captured and held within the excavated tidal lagoons.

The third phase of the Project will involve breaching the Mad River Slough Levee. The breach will be excavated at a period of low tide. The breach will remove the existing tide gate and associated culvert. The extent of the breach excavation will be limited to the reach of Contractor's ability to operate from the lowered levees.

Prior to this work occurring, aquatic resources within the site (i.e., the existing ditch) will be de-fished and dewatered, and an earthen barrier will be constructed to isolate the site from tidal waters which is further discussed in Section 1.4.2 below. Project work will begin in mid-August and water within the site is anticipated to have receded, however a maximum dewatering area of approximately 2,500 linear feet may occur.

Primary access to the Project Area during construction and operation will occur via Refuge Access Road and Lanphere Road. Construction equipment and materials will be transported to the work areas via these ingress and egress locations and will not be stored in inundated areas or in sloughs. Construction staging and stockpile areas will occur at an existing parking area maintained by the Refuge. All areas higher than 7.5 feet in elevation that were disturbed by equipment, staging and stockpiling will be de-compacted and seeded as needed prior to Project completion. The anticipated equipment necessary for Project implementation includes excavators, scrapers, dozers, loaders, dump trucks, water trucks, and pumps.

1.4.2 Surface Water and Groundwater Management

During excavation, management of surface water and groundwater seepage will be required through the construction period. Surface water management will be required to reduce nuisance water within the active work area, and to prevent aquatic and non-aquatic organisms from entering the active work area. Earthen material will be placed against the existing tidegate to act as a barrier to prevent water and aquatic organisms from entering the work area, and to isolate the work area that will be dewatered. All earthwork will be completed by the selected contractor.

The barrier will be comprised of native material or washed gravel, and will be installed during low tide, when the least amount of water is within the work area. Once the earthen barrier is securely installed and the work area is isolated, the isolated area would be seined (or similar) by a Qualified Biologist to relocate special status fish and other 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 species, surface water would be pumped or routed via gravity flow out of the active work area to an adjacent area to settle. The majority of the site is wetlands, and therefore the outflow will be pumped or conveyed to an area of uplands as much

as is feasible, however may be discharged into disconnected wetlands. A silt bag or similar may be put over the outflow piping to capture sediment, as required by on-the-ground conditions and Project permits. Dewatered surface water will not be discharged into a receiving waterway, i.e., the Mad River Slough.

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 anticipated to be feasible to pump water entirely to areas of uplands for infiltration. Groundwater within the work area will be pumped to an area to settle which will include potential use of the excavated tidal lagoon channels (which will be disconnected from Mad River Slough at this time). Discharge of turbid water directly to receiving waters (i.e., Mad River Slough) will not occur. The earthen barrier will be removed during low tide prior to an incoming tide so that loose sediment is deposited on the marsh plain, as opposed to entrained into receiving waters.

1.4.3 Site Stabilization and Revegetation

Following construction, the contractor will demobilize and remove equipment, supplies, and construction materials. The disturbed areas above the salt marsh plain (above 7.5 feet) will be restored to pre-construction conditions or stabilized with a combination of native grass seed (broadcast or hydroseed), and mulch. If required, revegetation will include replanting and any potential compliance monitoring in support of mitigation required by resource agencies for impacts to regulated habitats, such as wetlands or Environmentally Sensitive Habitat Areas.

1.4.4 Management and Maintenance

Ongoing management may be necessary, such as:

- Cross levees at northern and southern property boundaries
    - Mowing to discourage growth of woody vegetation and invasives species (as needed)
    - Repair from erosion or burrowing animal damage (as needed)
- Invasive species control will continue over the course of long-term management of the site in accordance with the USFWS CCP.
- General observational Project oversite will occur multiple times a year to guide any required adaptive management.

The above maintenance activities will be prioritized and implemented based on management priorities. Specific monitoring activities would generally include qualitative observations of physical character of the site and plant communities to determine whether Project objectives have been met and are proposed in the Wetlands and Habitat Restoration Plan. The frequency and details of monitoring are described in the Plan and will ultimately be determined during Project permitting and will be subject to available funding. The impacts associated with the maintenance activities will be infrequent and short-term. In addition, they are anticipated to be no greater than the traditional maintenance historically performed on these lands under existing conditions.

1.5 Project Impacts to Wetlands and Other Waters of the U.S.

Existing wetlands and other waters of the U.S. within the Project Area is shown in **Appendix A, Figure 3**. Implementation of the Project will result in limited permanent impacts to wetlands and predominantly

temporary impacts to wetlands. Permanent impacts are considered to occur when a wetland is filled to an elevation that results in upland conditions (above 8.0 ft at this Project site). Temporary impacts are considered to occur when wetlands are filled or modified but not to an elevation to result in upland conditions; the wetland remains a wetland although may convert wetland types. The majority of impacts resulting from this Project are temporary impacts to wetlands resulting in a conversion of wetland types.

Permanent impacts to jurisdictional wetlands (i.e. placement of fill above 8.0 feet NAVD88) will occur in discrete locations at the southern cross-levee to fortify the existing levee and in discrete locations along Lanphere Road to the north to create levee conditions to contain tidal waters and prevent flooding to adjacent properties. Additionally, minor impacts to wetlands on the outskirts of Refuge Access Road may occur when low-lying portions of the road are raised to similarly fortify the stability of the road for access (**Appendix A, Figure 5 [Project Components & Existing Wetlands]**). Permanent impacts to wetlands in the Project Area total approximately 0.71 acres and are entirely from construction of the two cross levees and Refuge Access Road raising.

Temporary impacts to jurisdictional wetlands include grading and/or placement of soil at or below 8.0 feet NAVD88 to raise low-lying areas to elevations that will support salt marsh, and to fill the existing ditch to match adjacent contours. Additionally, existing wetlands will be excavated to suitable elevations to create tidal lagoon channels that will support eelgrass establishment and provide low-tide refugia for fish species (**Appendix A, Figure 5**). Fill below 8.0 feet NAVD88 is considered a temporary impact to wetlands, as the wetlands will remain at elevations to sustain them as wetlands. The wetland types will shift over time as full tidal influence is reintroduced to the Project Area (e.g., palustrine emergent wetlands shifting to estuarine wetlands, mudflat, and open water). Temporary impacts to wetlands in the Project Area total approximately 25.60 acres, which includes approximately 23.57 acres of existing wetlands that will convert to a different wetland type, and 2.03 acres of existing wetlands that will remain the same type of wetland. **See Table 1.5-1** for an overview of wetland impacts, to note bolded text represents permanent wetland impacts (0.71 acres), italicized text represents temporary impacts to wetlands that will be converted from one wetland type to another (23.57 acres), and underlined text represents created wetlands (1.05 acres). Temporary impacts to wetlands that will not be converted are not accounted for in the table, and include the placement of erosion control materials, all of which occur below the High Tide Line (HTL) mark. All erosion control materials will be organic, i.e., no plastic or non-compostable materials will be utilized, and areas above 7.5 feet NAVD88 will be reseeded with a native seed mix appropriate for the ecology of the site.

Table 1.5-1. Post-construction wetland type conversions

Project Component	Existing Habitat within Limit of Ground Disturbance	Area of Existing Habitat within Limits of Ground Disturbance (acres)	Proposed Habitat Post-Construction	Total Area Created Post-construction (acres)[1]
- Levee Creation or Enhancement: Lanphere Road Ecolevee & Cross Levee Enhancement - Raise Refuge Access Road	**Estuarine Communities**	**0.05**	Uplands (Roads / Cross Levee)	2.9
	Palustrine Emergent Wetlands	**0.60**		
	Palustrine Forest Wetland	**0.06**		

Project Component	Existing Habitat within Limit of Ground Disturbance	Area of Existing Habitat within Limits of Ground Disturbance (acres)	Proposed Habitat Post-Construction	Total Area Created Post-construction (acres)[1]
	Other Waters of the U.S.	**0.002**		
- Mad River Slough Levee Breach - Wadulh Lagoon Channels - "Other": Areas that lie between Project Component boundaries	*Estuarine Communities*	*2.84*	Subtidal / Permanently Flooded[2]	16.5
	Palustrine Emergent Wetlands	*13.73*		
	<u>Upland Communities</u>	<u>0.11</u>		
- Mad River Slough Levee Lowering - Marsh Fill Areas - Ditch Fill - Salt Marsh Ridges - Sills	*Palustrine Emergent Wetlands*	*5.28*	Salt Marsh / Mudflat	9.6 / 13.0
	Other Waters of the US	*1.18*		
	Palustrine Forest Wetland	*0.55*		
	<u>Upland Communities</u>	<u>0.94</u>		
Outside Limit of Ground Disturbance	--	--	Forested Wetlands	11.5
	--	--	Dunes	0.7

1. The Project Area totals 54.2 acres. Post-construction habitat includes areas outside the limit of disturbance which will be influenced by the post-construction tidal regime. These totals include upland areas that will remain uplands, and wetland types that will not be converted to different wetland types post-construction.
2. Subtidal areas with depths greater than 0.65 feet NVD88 meet conditions to support eelgrass (10.8 acres).

Impact calculation summary:

- Permanent impacts (wetlands to uplands; bold): 0.71 acres
- Temporary impacts (wetlands to wetlands; italics): 25.60 acres
    - Temporary impact (conversion between types of wetlands): 23.57 acres
    - Temporary impact (no conversion between wetland types): 2.03 acres (not shown in wetland conversion table above)
- Wetland creation (uplands to wetlands; underlined): 1.05 acres
- Uplands that will remain uplands: 1.50 acres

1.6 Required Permits and Approvals

USFWS staff have prepared 30% concept plans and is in the process of completing 65% design plans. Prior to Project implementation, 100% construction plans will be developed to bid the Project.

The Project will require the following permits/approvals:

- CEQA – Statutory Exemption for Restoration Projects (SERP), pursuant to Public Resources Code Section 21080.56 (completed)
- Humboldt Bay Harbor, Conservation and Recreation District – Harbor Development Permit
- California Coastal Commission – Coastal Act Federal Consistency – Negative Determination
- California Department of Fish & Wildlife – California Endangered Species Act (CESA) – Restoration Management Permit
- North Coast Regional Water Quality Control Board – Clean Water Act (CWA) Section 401 Water Quality Certification through Statewide Restoration General Order (SRGO)
- California State Historic Preservation Office and National Historic Preservation Act (NHPA) Section 106
- U.S. Army Corps of Engineers – CWA Section 404 Permit, Nationwide Permit 27
- NOAA Fisheries – Endangered Species Act (ESA) Programmatic Biological Opinion (PBO)
- USFWS – ESA Statewide Restoration PBO (underway)
- NEPA Compliance (underway by USFWS via NOAA Restoration Center's Programmatic Environmental Impact Statement for Coastal Habitat Restoration)

The RCD or USFWS will be the applicant for each permit. It is anticipated that the USFWS will be the applicant for federal permits and on the Federal Consistency Determination with the CA Coastal Commission and SRGO, and the RCD will be the applicant on all other permit applications.

1.7 Project Benefits

The Project will have numerous long-term benefits for climate resiliency, coastal wetlands and associated native species, and sensitive species recovery.

1.7.1 Coastal Resiliency

The Project will build resilience for coastal communities and endangered species regarding future SLR by utilizing a nature-based approach. When the Project is completed, there will be several mechanisms that will capture suspended sediment within the Project Area. Tidal currents in the tidal lagoons will have low velocity and the water will be sufficiently deep to produce conditions that promote settling of sediment carried by tidal flooding. At higher tides, flood tide flows will overtop the lowered levees, the salt marsh ridges, and fringing salt marsh. Salt marsh vegetation is effective at trapping suspended sediment when overtopping occurs. Ebb flows will circulate through the network of channels within the lagoons providing more opportunity to trap sediment. Project design elements are intended to trap suspended sediment brought in by tides which may allow marshes to keep pace with SLR for a longer time. To allow for ecological development, barriers to upslope migration of salt marsh will be removed. Thus, the Project is designed around process-based restoration where individual features will likely evolve due to the dynamic nature of a tidal setting. The Project is expected to persist and provide value for at least 50 years given SLR.

1.7.2 Coastal Wetland Restoration

The Project will result in long-term net benefits for coastal wetlands and associated dependent species, including restoration and protection of 52 acres of intertidal salt marsh, brackish marsh, and freshwater emergent wetlands (**Appendix A, Figure 6 [Post-construction Habitat Based on 30% Design]**). It will restore diked and drained salt marsh and intertidal areas, reestablish a natural transition from uplands to shoreline and the slough, and provide nursery and significant off-channel habitat for federally and state-listed fish species and habitat for shorebirds and raptors. Creation of aquatic habitat will also promote further establishment of eelgrass beds in Mad River Slough, which are known to support among the highest diversity and abundance of shorebirds in the western hemisphere as well as significant rearing and refugia habitat for fish and invertebrate species.

1.7.3 Support Increased Biodiversity

The Project is located adjacent to the Lanphere Dunes Unit of Humboldt Bay NWR, which is the only place on Humboldt Bay where the transition from slough to salt marsh to freshwater wetlands to upland (dunes) is preserved. The Project is an opportunity to expand upon this adjacent unique habitat, and restore a natural shoreline with a transition from slough to salt marsh to freshwater scrub shrub wetlands (located within the western/interior portion of the site). This freshwater wetland area, which is dominated by woody species, has been monitored for bird use for the past 30 years by the Humboldt Bay Bird Observatory and is used by a variety of neotropical migrants and other songbirds.

The Project will restore salt marsh, which has significantly declined within Humboldt Bay compared to historical conditions. This loss of salt marsh habitat within Humboldt Bay is an important factor contributing to the decline of numerous plant and wildlife species, including Lyngbye's sedge (*Carex lyngbyei*), Bald Eagle (*Haliaeetus leucocephalus*), American Peregrine Falcon (*Falco peregrinus anatum*), American Kestrel (*F. sparverius*), Merlin (*F. columbarius*), Sharp-shinned Hawk (*Accipiter striatus*), Cooper's Hawk (*Accipiter cooperii*), Osprey (*Pandion haliaetus*), White-tailed Kite (*Elanus leucurus*), Red-tailed Hawk (*Buteo jamaicensis*), Northern Harrier (*Circus hudsonius*), and Northern Red-legged Frog (*Rana aurora*). The Project will play an important role in the recovery of these wildlife species by providing suitable habitat that is limited throughout Humboldt Bay as compared to historical conditions.

1.7.4 Sensitive Species Recovery

Diking and draining of salt marshes has contributed to the substantial population declines of local salmonid species, including Coho Salmon, Chinook Salmon, and Steelhead Trout, as well as Tidewater Goby and Longfin Smelt. Restoration of tidal channels, eelgrass beds, and salt marsh will restore and provide critical fish refugia and nursery habitat that result in long-term net benefit to these sensitive species. Juvenile salmonids utilize the estuary, especially areas with eelgrass, as nursery areas for extended periods before entering the ocean. Estuaries provide food sources and habitat where juvenile fishes obtain the size needed to increase their chances of survival at sea. Similarly, studies of other northern California estuaries and lagoons show that Steelhead Trout and Coastal Cutthroat Trout (*O. clarkii clarkii*) use these habitats year-round. Created habitat will also benefit Tidewater Goby which prefer salt marshes that border freshwater wetlands for both spawning and rearing.

1.7.5 Interagency Collaboration

The collaborative Project includes the California State Coastal Conservancy, Humboldt County Resource Conservation District (CEQA lead), USFWS, Wiyot Tribe, and Caltrans. The team met with neighbors during the preliminary development of the plan and plans to meet again during the public outreach portion of the process to address any questions or concerns about the plans. The Wiyot Tribe will be an active participant in concept, design, and final interpretive signage around the Project site and will use the site to educate its members and provide eco-cultural interpretation.

1.7.6 Consistency with Regional and State Plans

The Project is within the approved boundary of Humboldt Bay NWR and would be consistent with the Humboldt Bay NWRC Comprehensive Conservation Plan. The Project is adjacent to the Lanphere Dunes Unit, which has been designated a National Natural Landmark. The Project will increase the acreage of preserved land on the Lanphere Dunes Unit, including both estuarine and palustrine wetlands. Dike removal and restoration of living shorelines is consistent with adaptation policies in the Humboldt Bay Sea Level Adaptation Planning Project. In addition, this Project is supported by an array of other management plans in Northern California and Humboldt Bay. It will also serve as a demonstration area and catalyze future conservation efforts of similar sites on the west coast. The Project is consistent with the Humboldt Bay Harbor, Recreation, and Conservation District's Humboldt Bay Management Plan. Eelgrass restoration is consistent with the Humboldt Bay Eelgrass Comprehensive Management Plan.

1.8 References

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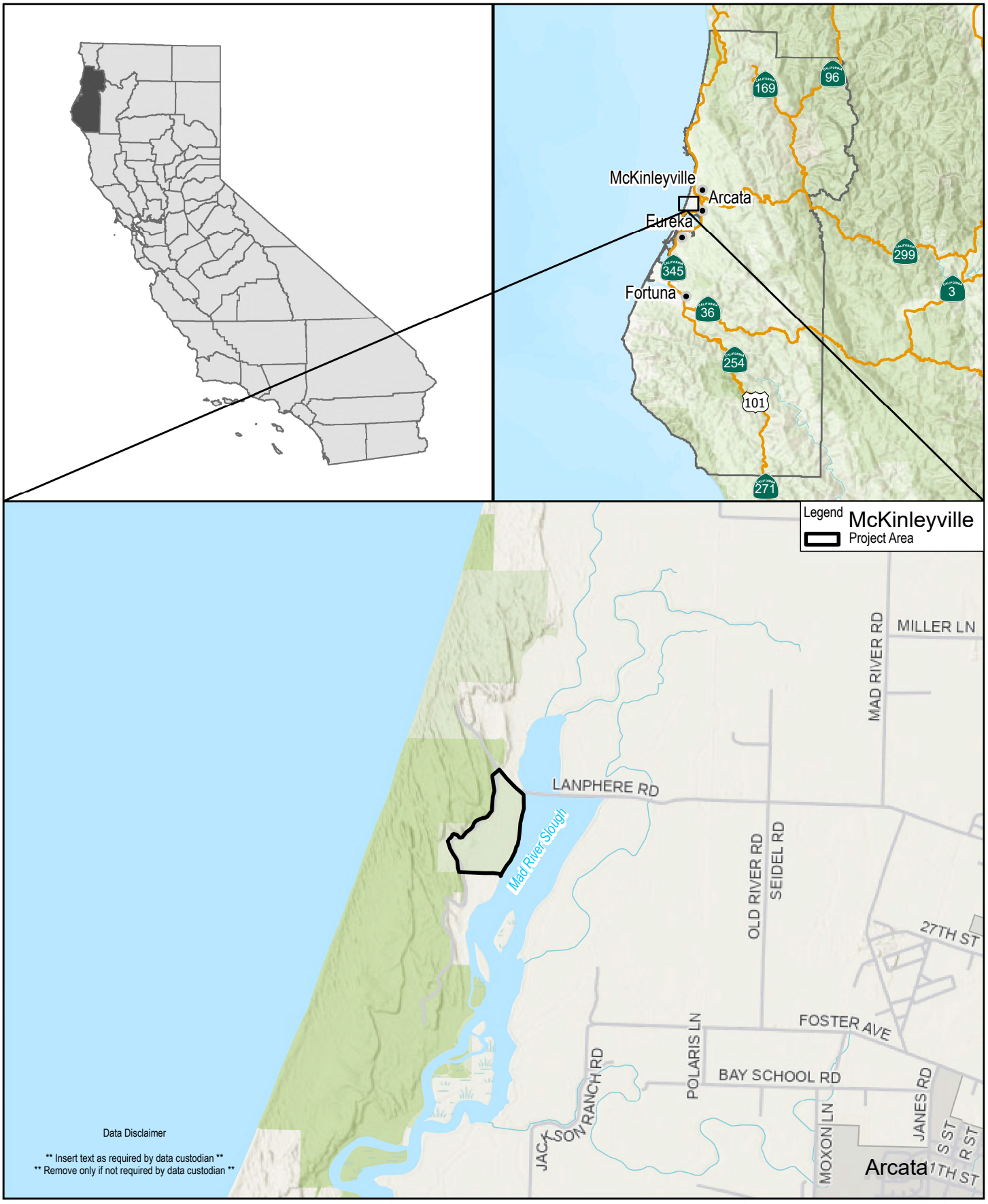
Villa, C. Personal Communication. 2024. USFWS Wildlife Refuge Manager – Wadulh site.



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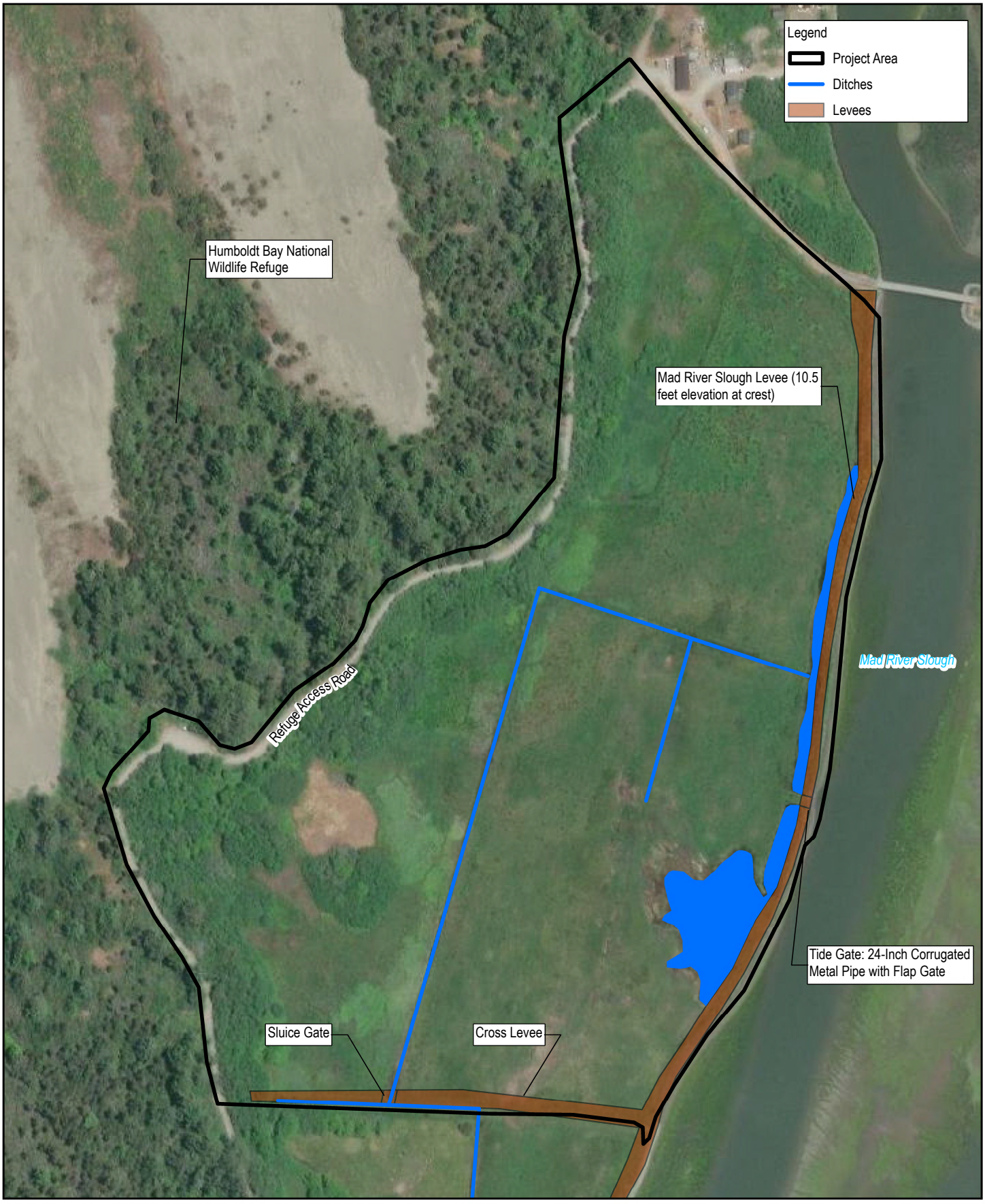
Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

Vicinity Map

FIGURE 1



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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project Area with Existing Conditions

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

FIGURE 2

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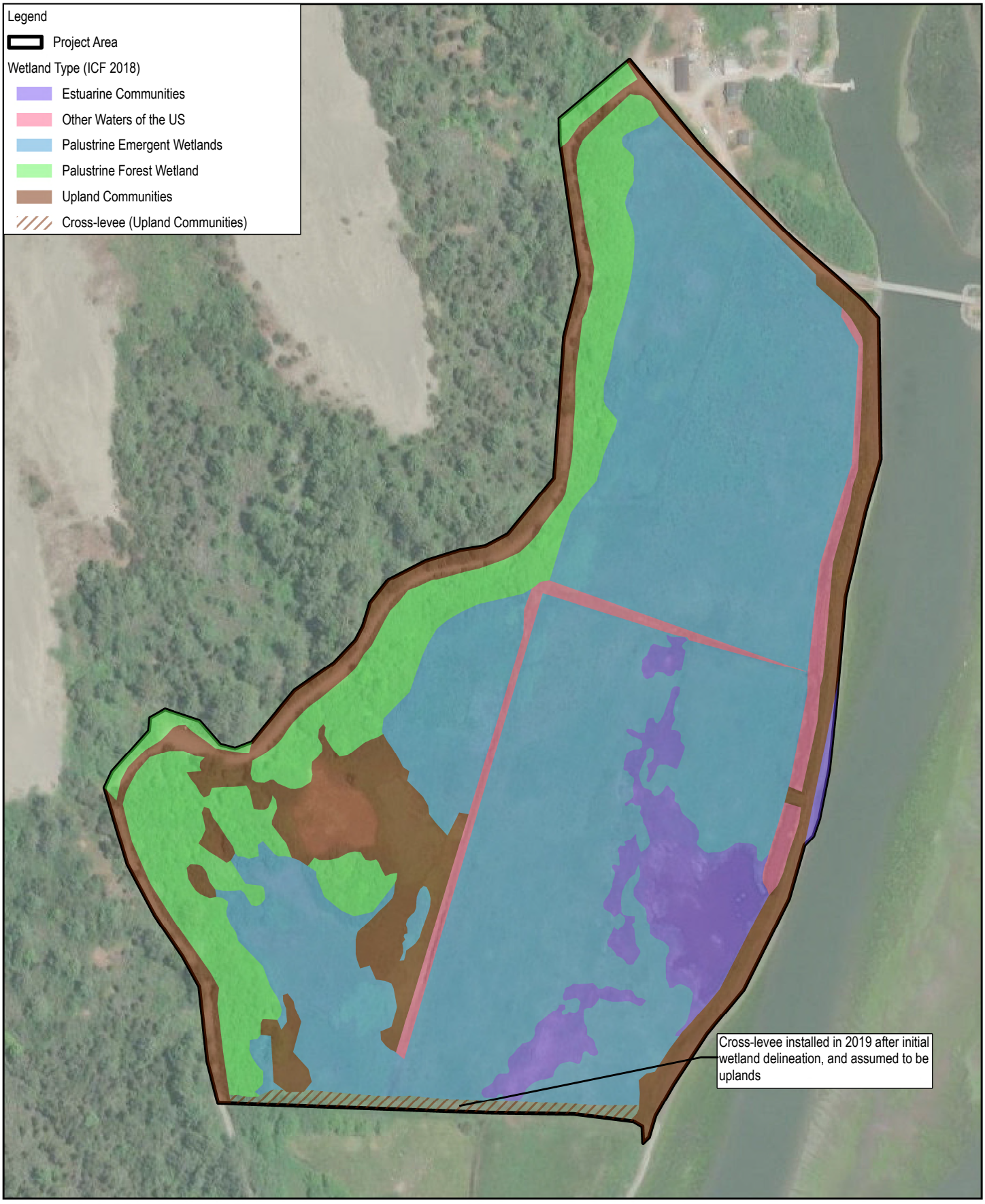

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

Existing Wetlands

FIGURE 3

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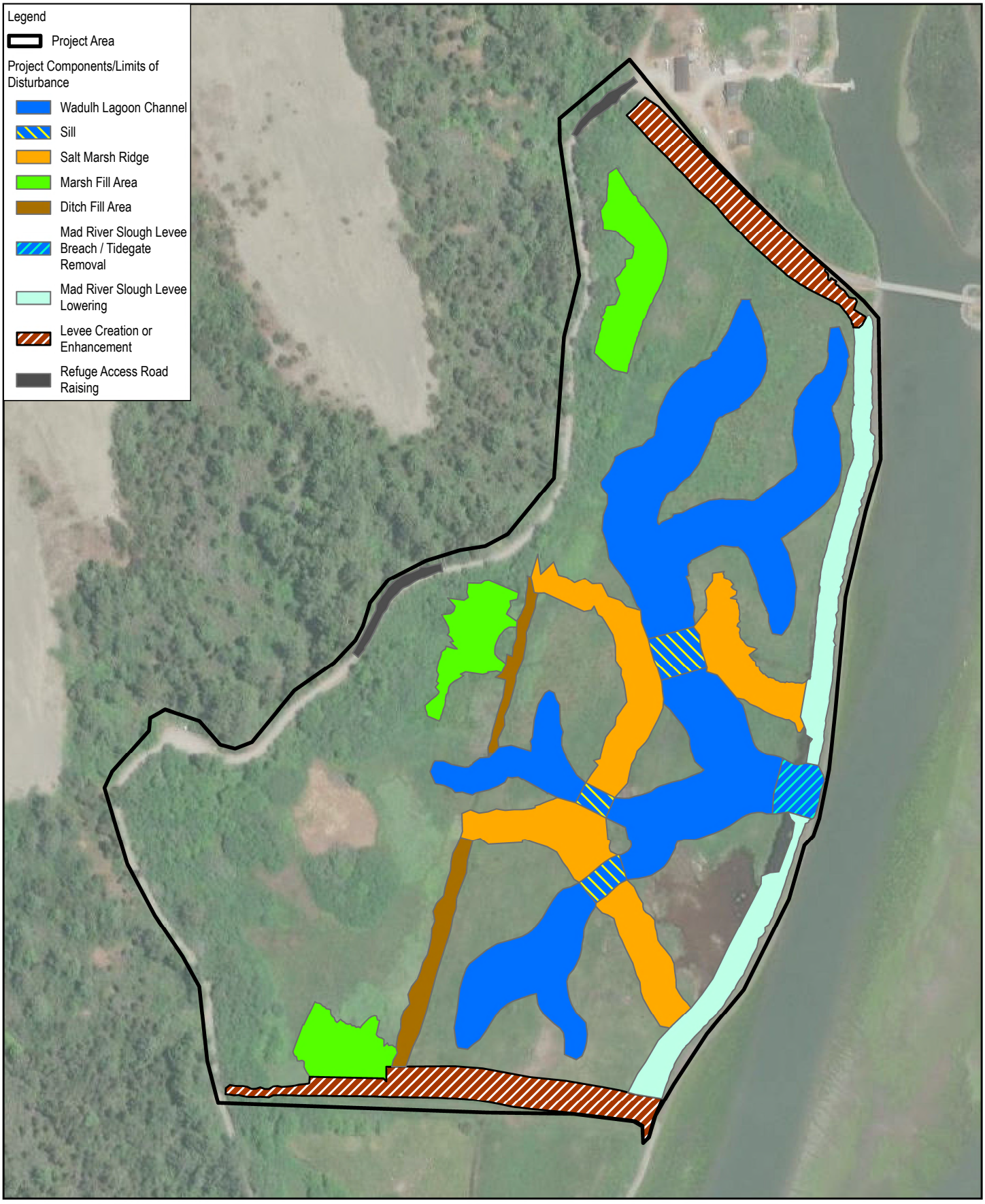

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project No. **12632975**
Revision No. **-**
Date **4/25/2024**

Project Components

FIGURE 4

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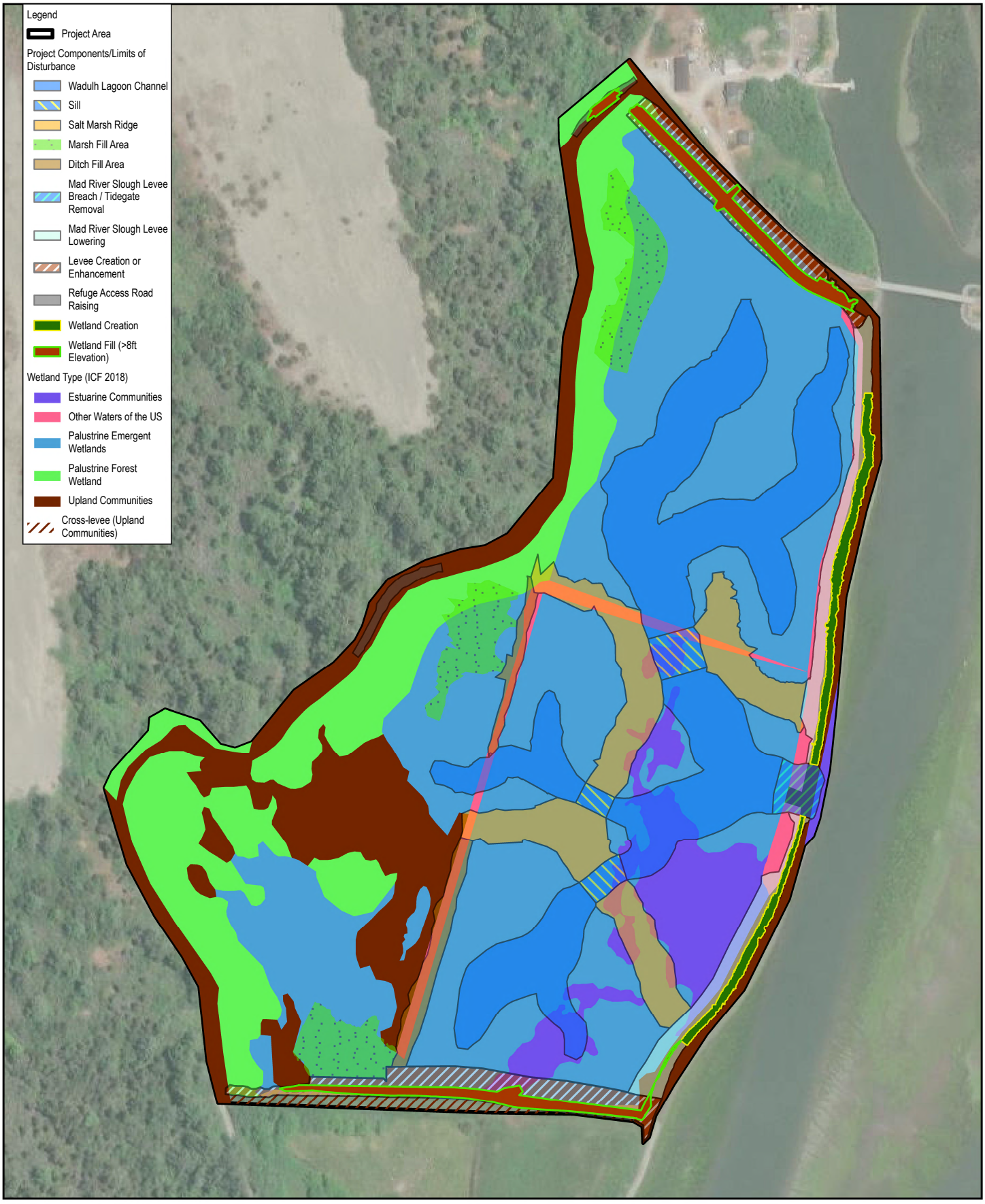

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project Components & Existing Wetlands

Project No. **12632975**
Revision No. **-**
Date **4/25/2024**

FIGURE 5

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0.1	MLW
3.2	MTL
6.3	MHW
7.1	MHHW
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10.2	10-YEAR
10.5	25-YEAR
10.8	50-YEAR
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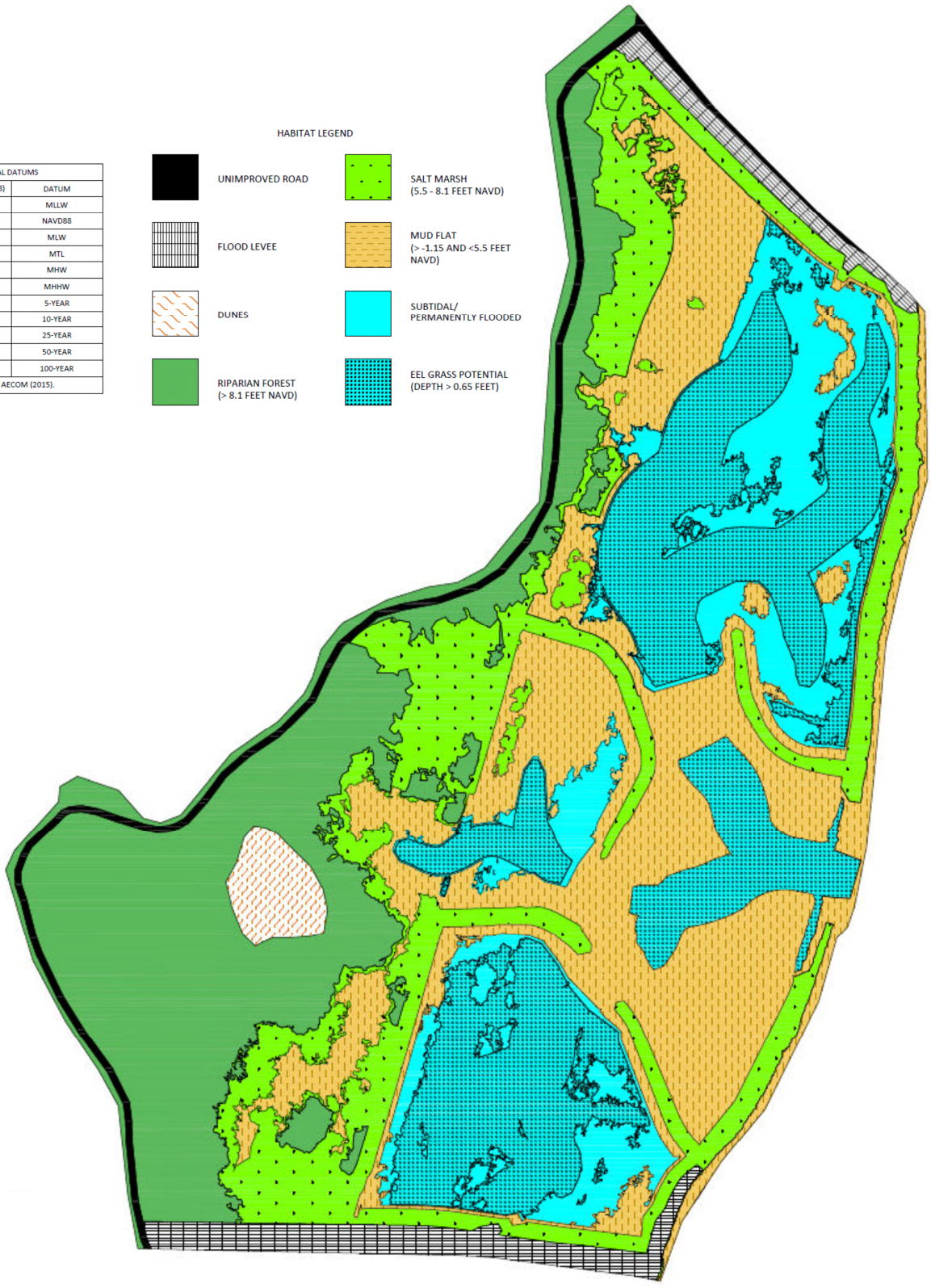

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Proposed Post-construction Habitat Based on 30% Design

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

FIGURE 6

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Attachment 5

30% Designs (attached separately)

Attachment 6

SRGO General Protection Measures

Wadulh Lagoon Tidal Wetland Enhancement Project

SRGO General Protection Measures

U.S. Fish & Wildlife Service and Humboldt County Resource Conservation District

19 June 2024

SRGO General Protection Measures

Prepared for:

U.S. Fish and Wildlife Service

Humboldt Bay National Wildlife Refuge Complex

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1. Introduction

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

The following documentation supports the Wadulh Lagoon Tidal Wetland Enhancement Project (Project) 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 NOI application for details.

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

See **Section 4**, 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). See **Attachment 7** of the Joint 401/404 Application Package for the approved SERP application.

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

See **Section 5**, Cultural Resources Investigation.

Please see **Attachment 3** of the Joint 401/404 Application Package for the detailed Project Description. The Project will have numerous long-term benefits for climate resiliency, coastal wetlands and associated native species, and sensitive species recovery.

2. Summary of Construction Activities

The Project will be constructed starting August 15, 2025, pending agency approvals. The Project will be constructed in either one or two seasons and is anticipated to be either entirely completed by October 15, 2025, or would be predominantly completed by October 15, 2025 with the levee lowering and tidegate removal to occur between August 15, 2026 and October 15, 2026.

USFWS anticipates that there will be three Project Phases. The first phase of the Project will involve excavation of tidal lagoons and construction of the cross levees. USFWS proposes to remove the top six inches of excavated areas (including vegetation) from the tidal lagoon excavation areas and place the combined soil and vegetation in marsh fill areas. Excavation of dry soil material from the upper 2.5 feet will

initially be reserved for use in constructing cross levees and road fills. The remainder of the excavated materials will be used to construct marsh fills, salt marsh ridges, and ditch fills. A plug will be left in place that separates the tidal lagoons from the existing flooded areas where the tide gate is located. Surface and groundwater management before and during construction is discussed in Section 2.1.

The second phase of the Project will involve levee lowering. USFWS anticipates that the Contractor will initiate the lowering from the north and south ends of the Project Area. The soil material excavated from the levee lowering will be placed in the borrow ditches adjacent to the inboard side of the levee. This will also create an access corridor for the contractor's equipment. Should high tides overtop the lowered levees prior to Project completion, water will be captured and held within the excavated tidal lagoons.

The third phase of the Project will involve breaching the Mad River Slough Levee. The breach will be excavated at a period of low tide. The breach will remove the existing tide gate and culvert. The extent of the breach excavation will be limited to the reach of Contractor's ability to operate from the lowered levees.

Prior to this work occurring, aquatic resources within the site (i.e., the existing ditch) will be de-fished and dewatered, and an earthen barrier will be constructed to isolate the site from tidal waters which is further discussed in Section 2.1 below.

Primary access to the Project Area during construction and operation will occur via Refuge Access Road and Lanphere Road. Construction equipment and materials will be transported to the work areas via these ingress and egress locations and will not be stored in inundated areas or in sloughs. Construction staging and stockpile areas will occur at an existing parking area maintained by the Refuge. All areas higher than 7.5 feet in elevation that were disturbed by equipment, staging and stockpiling will be de-compacted and seeded as needed prior to Project completion. The anticipated equipment necessary for Project implementation includes excavators, scrapers, dozers, loaders, dump trucks, water trucks, and pumps.

2.1 Surface Water and Groundwater Management

During excavation, management of surface water and groundwater seepage will be required through the construction period. Surface water management will be required to reduce nuisance water within the active work area, and to prevent aquatic and non-aquatic organisms from entering the active work area. Earthen material will be placed against the existing tidegate to act as a barrier to prevent water and aquatic organisms from entering the work area, and to isolate the work area that will be dewatered. All earthwork will be completed by the selected contractor.

The barrier will be comprised of native material or washed gravel, and will be installed during low tide, when the least amount of water is within the work area. Once the earthen barrier is securely installed and the work area is isolated, the isolated area would be seined (or similar) by a Qualified Biologist to relocate special status fish and other 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 species, surface water would be pumped or routed via gravity flow out of the active work area to an adjacent area to settle. The majority of the site is wetlands, and therefore the outflow will be pumped or conveyed to an area of uplands as much as is feasible, however may be discharged into disconnected wetlands. A silt bag or similar may be put over the outflow piping to capture sediment, as required by on-the-ground conditions and Project permits. Dewatered surface water will not be discharged into a receiving waterway, i.e., the Mad River Slough.

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 anticipated to be feasible to pump water entirely to areas of uplands for infiltration. Groundwater within the work area

will be pumped to an area to settle which will include potential use of the excavated tidal lagoon channels (which will be disconnected from Mad River Slough at this time). Discharge of turbid water directly to receiving waters (i.e., Mad River Slough) will not occur. The earthen barrier will be removed during low tide prior to an incoming tide so that loose sediment is deposited on the marsh plain, as opposed to entrained into receiving waters.

3. 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 GPMs applicable to the Project per SRGO Attachment A criteria. **General protection measures that are proposed for modification by the Project are highlighted in grey, and the modification proposed is italicized.**

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 not attached to the SRGO application package, but include extensive avoidance and minimization measures for protection of water quality and can be provided upon request.

4. 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 aquatics 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. 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 Species. 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 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.)

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 Containment and Removal. 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 above 7.5 feet NAVD 88 will be de-compacted and seeded with plant species suitable for the area. 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.*
The Project proposes to allow passive revegetation at elevations below 7.5 feet NAVD88; therefore, the Project will not develop a revegetation plan.

Note to RWQCB reviewer: GPM-15 has been updated to include seeding of areas above 7.5 feet, versus 8.0 feet as stated in the original measure, to reflect Project design plans.

Water Quality and Hazardous Materials Staging and Stockpiling of Materials

WQHM-1: Staging Areas and Stockpiling of Materials and Equipment. Staging, storage, and stockpile areas must be outside of waters of the state. To the extent 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 aquatic 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 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 in coordination with resource agencies. Staging areas will have a stabilized entrance and exit and will be located 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. If an off-road site is chosen and if special-status species are potentially present, the Biological Monitor will survey the selected site to verify that no aquatic 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 (to be defined by the approving Water Board as appropriate for an individual project site), then soils will be covered at all times. During the wet season, no stockpiled soils will remain exposed, unless properly installed and maintained erosion and sediment 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 aquatic habitats that these materials cannot discharge to a water of the state.

Erosion and Sedimentation Control Measures
WQHM-2: Storm Water Pollution Prevention Plan. All projects covered by the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction

General Permit) will prepare and implement the required, site-specific, storm water pollution prevention plan (SWPPP).

WQHM-3: Erosion and Sediment Control Measures. For projects that do not require coverage under a NPDES permit per GPM WQHM-2, the project proponent will develop and implement erosion and sediment control measures (or plan), which will include appropriate BMPs to reduce the potential release of water quality pollutants to receiving waters. BMPs may include the following measures:

– Employ tackifiers, soil binders, or mulch as appropriate for erosion control.
– Install sediment control measures, such as straw bales, silt fences, fiber rolls, or equally effective measures, at repair areas adjacent to stream channels, drainage canals, and wetlands, as needed. Sediment control measures will be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to sediment control measures will be made as needed to protect water quality.
– No sediment control products will be used that include synthetic or plastic monofilament or cross-joints in the netting that are bound/stitched (such as straw wattles, fiber rolls, or erosion control blankets), and which could trap snakes, amphibians, and other wildlife. Other Water Quality Measures

WQHM-4: Hazardous Materials Management and Spill Response Plan. As part of the SWPPP or Erosion Control Plan (WQHM-2 and WQHM-3), project proponent will prepare and implement a hazardous materials management and spill response plan. Project proponent 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. Project proponent will stop work, follow the spill response plan, and arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills. (See WQHM-6. Accidental Discharge of Hazardous Materials for accidental discharges of a reportable quantity of a hazardous material, sewage, or an unknown material.) Project proponent will notify regulatory agencies within 24 hours of any leaks or spills. Project proponent will properly contain and dispose of any unused or leftover hazardous products off-site. Project proponent will use and store hazardous materials, such as vehicle fuels and lubricants, in designated staging areas located away from stream channels and wetlands, according to local, state, and federal regulations, as applicable. Also see GPM-10: Equipment Maintenance and Materials Storage for more detail on spill prevention.

WQHM-5: In-Water Concrete Use. Not applicable.

WQHM-6. Accidental Discharge of Hazardous Materials. Following an accidental discharge of a reportable quantity of a hazardous material, sewage, or an unknown material, the following applies (Wat. Code, § 13271):
As soon as (A) discharger has knowledge of the discharge or noncompliance, (B) notification is possible, and (C) notification can be provided without substantially impeding cleanup or other emergency measures then:

• First call – 911 (to notify local response agency)
• Then call – Office of Emergency Services (OES) State Warning Center at: (800) 852-7550 or (916) 845-8911
• Lastly, follow the required OES procedures as set forth in: http://www.caloes.ca.gov/FireRescueSite/Documents/CalOESSpill_Booklet_Feb2014_FINAL_BW_Acc.pdf

Following notification to OES, the discharger will notify the State or Regional Board (and other agencies requiring notification in their respective permits), as soon as practicable (ideally within 24 hours). Notification may be via telephone, e-mail, delivered written notice, or other verifiable means.

General In-Water Measures

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 resources, special-status aquatic 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 aquatic species, placement will be overseen by an agency-approved Monitor; implementation timing will be determined based on the least amount of overlap, or impact on, all aquatic natural 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 historic hydraulic gold mine tailings, dredger tailings, or mercury mine waste or tailings. Materials that may foul or degrade spawning gravels, such as sand or soil eroding from sand bag 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 non-native species.

IWW-2: In-Water Vehicle Selection and Work Access. If work requires that equipment enter wetlands or below the bank of a waters of the state, equipment with low ground-pressure (typically less than 13 to 20 pounds per square inch (psi)) should be selected where feasible to minimize soil compaction. Low ground pressure heavy equipment mats should be used if needed to lessen soil compaction. Hydraulic fluids in mechanical equipment working in the waters of the state, will not contain organophosphate esters. Vegetable based hydraulic fluids are preferred, where feasible. The amount of time this equipment is stationed, working, or traveling in the waters of the state will be minimized. All equipment will be removed from the aquatic feature during non-work hours where appropriate or returned to the agency-approved staging area in the aquatic feature.

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 state. Where feasible, construction will occur from the top of the stream bank, or 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 State or Regional Board staff:

– 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., coffer dam or geotextile silt curtain) must not be removed until all disturbed areas are stabilized.

IWW-4: In-Water Staging Areas and Use of Barges. Where appropriate and practical, barges will be used to stage equipment and construct the project, while reducing noise, traffic disturbances and effects to terrestrial vegetation. When barge use is not practical, construction equipment and project materials may be staged in designated agency-approved staging areas. Existing staging sites, maintenance toe roads, and

crown roads will be used to the maximum extent possible for project staging and access to avoid affecting previously undisturbed areas. For projects that involve in-water work for which boats and/or temporary floating work platforms are necessary, buoys will be installed so that moored vessels will not beach on the shoreline and anchor lines will not drag. Moored vessels and buoys will not be within 25 feet of vegetated shallow waters.

Note to RWQCB reviewer: the Project doesn't require floating work platforms or the use of barges. Existing staging sites, and roadways will be utilized for staging.

Dewatering Activities and Aquatic Species Relocation

IWW-5: Cofferdam Construction. Cofferdams may be installed both upstream and downstream, and along portions of the cross section of a channel or other waterway if necessary to isolate the extent of the work areas. When feasible, construction of cofferdams will begin in the upstream area and continue in a downstream direction, allowing water to drain and allowing fish and aquatic wildlife species to leave (under their own volition), from the area being isolated by the cofferdam, prior to closure. The flow will then be diverted only when construction of the upstream dam is completed and the work area has been naturally drained of flow, at this point, the downstream dam, if necessary, would be completed and then flow would be diverted around the work area. Cofferdams and stream diversion systems will remain in place and fully functional throughout the construction period. In order to minimize adverse effects to aquatic species, stream diversions will be limited to the shortest duration necessary to complete in-water work. In-water cofferdams will only be built from materials such as sandbags, plastic, clean gravel (possibly wrapped in impermeable material), rubber bladders, vinyl, steel, or earthen fill, in a manner that minimizes siltation and/or turbidity. Sandbags may only be used to build cofferdams upstream of spawning gravels when filled with clean gravel (or other material acceptable to the approving Water Board). Where possible, cofferdams should be pushed into place. If pile driving (sheet piles) is required, vibratory hammers should be used and impact hammer should be avoided. If necessary, the footing of the cofferdam will be keyed into the channel bed at an appropriate depth to capture the majority of subsurface flow needed to dewater the streambed. When cofferdams with bypass pipes are installed, debris racks will be placed at the bypass pipe inlet in a manner that minimizes the potential for fish impingement and/or entrapment. As needed and where feasible, bypass pipes will be monitored for accumulation of debris. All accumulated debris will be removed. When appropriate, cofferdams will be removed so surface elevations of water impounded above the cofferdam will not be reduced at a rate greater than one inch per hour. Cofferdams in tidal waters should be removed during the lowest possible tide and in slack water to the extent feasible to minimize disturbance and turbidity. This will minimize the probability of fish and other aquatic species stranding as the area upstream becomes dewatered. All dewatering/diversion facilities will be installed such that natural flow is maintained upstream and downstream of project areas. An area may need to be dewatered for long enough to allow special-status species to leave on their own before final clearance surveys and construction can begin.

Note to RWQCB reviewer: an earthen cofferdam will be built at the existing tidegate to isolate the construction area (see Section 2.1 of this document for a description of dewatering).

IWW-6: Dewatering/Diversion. The area to be dewatered will encompass the minimum area necessary to perform construction activities. *The project proponent will dewater the site according to methods outlined in Section 2.1, and appropriate types of BMPs for the installation, operation, maintenance, and removal of structures will comply with USFWS and NOAA PBO Avoidance and Minimization Measures for dewatering and fish relocation.*

IWW-7: Fish and Aquatic Species Exclusion While Installing Diversion Structures. Fish and other aquatic species will be excluded from occupying the area to be dewatered by blocking the stream channel above and below the area to be dewatered with fine-meshed block nets or screens while coffer dams and other diversion structures are being installed. Block net mesh will be sized to ensure aquatic species

upstream or downstream do not enter the areas proposed for dewatering. Mesh will be no greater than 1/8-inch diameter. The bottom of the net must be completely secured to the channel bed. Block nets or screens must be checked at least twice daily at the beginning and end of the workday and cleaned of debris to permit free flow of water. Block nets or screens will be placed and maintained throughout the dewatering period at the upper and lower extent of the areas where aquatic species will be removed. Net placement is temporary and will be removed once dewatering has been accomplished or construction work is complete for the day.

IWW-8: Removal of Diversion and Barriers to Flow. Upon completion of construction activities, any diversions or barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate and consideration of turbidity levels. Alteration of creek beds will be minimized to the maximum extent possible; any imported material that is not part of the project design will be removed from stream beds upon completion of the project.

IWW-9: In-Water Pile Driving Plan for Sound Exposure. Not applicable.

IWW-10: In-Water Pile Driving Methods. Not applicable.

IWW-11: Sediment Containment during In-Water Pile Driving. Not applicable.

IWW-12: Pile-driving Monitoring. Not applicable.

Dredging Operations and Dredge Materials Reuse
IWW-13: Dredging Operations and Dredging Materials Reuse Plan. Not applicable.

Revegetation, and Herbicide Use Vegetation/Habitat Disturbance and Revegetation
VHDR-1: Avoidance of Vegetation Disturbance. The project proponent will minimize, to the greatest extent feasible, the amount of soil, terrestrial vegetation, emergent native vegetation, and submerged vegetation (e.g., eelgrass and kelp in marine areas, or submerged aquatic vegetation in brackish and freshwater areas) disturbed during project construction and completion and using methods creating the least disturbance to vegetation. 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 waters of the state and other aquatic habitats (e.g., streambank or stream channel, riparian habitat) as much as possible. When possible, existing ingress or egress points will be used and/or work will be performed from the top of the creek banks or from barges on the waterside of the stream or levee bank, or 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. Where possible, vegetation disturbance and soil compaction will be minimized by using low ground-pressure (typically less than 13 to 20 pounds psi) equipment that exerts less pressure per square inch on the ground than other equipment. To minimize impacts to vegetation, select equipment with a greater reach.

VHDR-2: Native and Invasive Vegetation Removal Materials and Methods. *Invasive plant species on-site will be either (1) removed during excavation, and the spoils will be buried in areas that will be inundated with salt water, thereby creating unsuitable conditions for the plants to revive, or (2) tidal inundation with salt water will create incompatible conditions for the invasive species to persist. The Project Area will be monitored for target invasive species post-construction according to the USFWS Comprehensive Conservation Plan (CCP) (USFWS 2009). See **Attachment 6** (WHRP) of the Joint 401/404 Application Package, **Section 4.4** for further details of invasive species management.*

VHDR-3: Revegetation Materials and Methods. Upon completion of work, site contours will be returned to preconstruction conditions or to contours specified in a Water Board-approved project design that provides enhanced biological and hydrological functions. Where disturbed, topsoil will be conserved (and watered at an appropriate frequency) for reuse during restoration to the extent practicable. *Per GPM-15: Revegetate Disturbed Area, the Project proposes to allow revegetation of the tidal wetland through natural recruitment.* Soils that have been compacted by heavy equipment will be decompacted, as necessary, to allow for revegetation at project completion as heavy equipment exits the construction area.

VHDR-4: Revegetation Erosion Control Materials and Methods. If erosion control fabrics are used in revegetated areas, they will be slit in appropriate locations as necessary to allow for plant root growth. Only non-monofilament, wildlife-safe fabrics will be used. All plastic exclusion netting placed around plantings will be removed after 2 years or sooner if practicable.

VHDR-5: Revegetation Monitoring and Reporting. See **Attachment 6** (WHRP) *of the Joint 401/404 Application Package, **Section 4** for further details of Project monitoring and reporting. Modifications to VHDR-5 have been proposed.*

Herbicide Use

VHDR-6: General Herbicide Use. Not applicable.

VHDR-7: Herbicide Application Planning. Not applicable.

VHDR-8 Herbicide Application Reporting. Not applicable.

5. Cultural Resource Investigations

Tribal consultation was completed in 2023 via an archaeology study between the USFWS and the Wiyot Tribe and SHPO compliance was also completed. The archaeology report included a sacred lands search for which proof will be shared with NCRWQCB and USACE separately.

6. Citations

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

USFWS. 2009. Comprehensive Conservation Plan and Final Environmental Assessment. Humboldt Bay National Wildlife Refuge Complex. September.

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.

Attachment 7

Wetlands and Habitat Restoration Plan

Wetlands & Habitat Restoration Plan (WHRP)

Wadulh Lagoon Tidal Wetland Enhancement Project

Humboldt County Resource Conservation District

June 19, 2024

Wetlands & Habitat Restoration Plan

Prepared for:

U.S. Fish and Wildlife Service

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1. Introduction

This Wetland & Habitat Restoration Plan (WHRP) has been prepared for the Wadulh Lagoon Tidal Wetland Enhancement Project ("Project") for the U.S. Army Corps of Engineers (USACE), the North Coast Regional Water Quality Control Board (NCRWQCB), and the California Coastal Commission (CCC). This WHRP summarizes the findings from various environmental studies that document existing wetland and habitat conditions within the Project Area, and discloses the anticipated permanent and temporary impacts within the Project Area to Army Corps jurisdictional three-parameter wetlands and Other Waters of the U.S. and state from implementation of the Project. The WRHP documents that the Project will not result in a loss of wetlands or other regulated waters. Included in the WHRP are descriptions of Project components, anticipated post-construction conditions, and proposed monitoring.

The Project complies with the California Environmental Quality Act (CEQA) through the California Department of Fish and Wildlife (CDFW) Statutory Exemption for Restoration Projects (SERP) (Public Resources Code § 21080.56). Due to the nature and extent of the habitat restoration, the Project team is seeking approval for environmental compliance through various permitting pathways recently developed in an effort to streamline implementation of restoration projects. The Project's permitting pathways are summarized in **Table 1.4-1**.

1.1 Project Location

The Project Area includes a 54.2-acre portion within a 78-acre parcel (APN 506-291-014-000) along the upper western portion of the Mad River Slough on Humboldt Bay, approximately 1.25 miles west of the City of Arcata, in Humboldt County, California (**Appendix A, Figure 1**). The Project Area is located on the Lanphere Dunes Unit of the Humboldt Bay National Wildlife Refuge (NWR). The parcel is owned by the U.S. Fish and Wildlife Service (USFWS). The parcel was formerly a tidal wetland prior to its conversion to agricultural land in the 1930's. Currently the parcel is an abandoned, subsided pasture formerly used for grazing that is bound on the east side by a failing levee along the Mad River Slough, on the west side by dunes and dune forest, on the north by Lanphere Road, and on the south by a cross levee (**Appendix A, Figure 2**).

1.2 Project Purpose & Need

The Project will restore a diked former agricultural pasture to a combination of estuarine and palustrine wetland habitats, including salt marsh, brackish marsh, mudflat, and subtidal/intertidal eelgrass habitat, while protecting existing forested wetlands to the west which receive drainage from the adjacent dune slope. The Project's limits of disturbance is planned across 28.9 acres, and the completed Project will restore and protect a total of 52 acres of tidal lagoons, intertidal salt and brackish marsh, and freshwater emergent wetlands to restore the natural shoreline with a transition from slough to salt marsh to freshwater forested wetlands generally from east to west. The Project will have numerous long-term benefits for climate resiliency, coastal wetlands and associated native species, and sensitive species recovery.

Existing conditions in the Project Area consist of abandoned cattle grazing pasture dominated by freshwater wetlands bordered by a strip of forested wetlands (**Appendix A, Figure 3**). The low, flat land adjacent to Mad River Slough was converted to agricultural land use by the construction of a levee on the west bank of Mad River Slough, construction of drainage ditches, and installation of a tide gate (**Appendix A, Figure 2**).

Salt water has begun to seep into the former agricultural lands through the failing tide gate, creating a small pocket of estuarine wetlands. Forested wetlands border the Lanphere Dunes to the west (**Appendix A, Figure 3**). Freshwater seeps from the dunes via groundwater discharge and flows into the forest, maintaining wetland conditions.

Predevelopment conditions have been gleaned through a U.S. Coast and Geodetic Survey of Humboldt Bay from 1870 (USFWS 2023a). Overlay of the Project boundary on the map indicates that a large portion of the pasture area was once intertidal mudflat or sub-tidal prior to levee construction and drainage of the parcel. The map indicates a margin of salt marsh vegetation bordered the mudflat and buffered the forested wetlands. The Project seeks to restore the natural tidal regime to the Project Area and anticipates similar habitat outcomes as those that were recorded over a century ago (tidal mudflat transitioning to salt marsh and freshwater-influenced wetlands). Additionally, the Project will be designed to increase sea level rise resiliency for post-construction habitats, and will be managed in alignment with the USFWS Comprehensive Conservation Plan (CCP) (USFWS 2009). The CCP is further discussed in **Section 4**.

The Project is located adjacent to the Lanphere Dunes Unit of Humboldt Bay NWR, which is the only place on Humboldt Bay where the transition from slough to salt marsh to freshwater wetlands to upland (dunes) is preserved. The Project is an opportunity to expand upon this adjacent unique habitat, and restore a natural shoreline with a transition from slough to salt marsh to forested wetlands (located within the western/interior portion of the site). The Project will restore salt marsh, which has significantly declined within Humboldt Bay compared to historical conditions. This loss of salt marsh habitat within Humboldt Bay is an important factor contributing to the decline of numerous plant and wildlife species, including Lyngbye's sedge (*Carex lyngbyei*), Bald Eagle (*Haliaeetus leucocephalus*), American Peregrine Falcon (*Falco peregrinus anatum*), American Kestrel (*F. sparverius*), Merlin (*F. columbarius*), Sharp-shinned Hawk (*Accipiter striatus*), Cooper's Hawk (*Accipiter cooperii*), Osprey (*Pandion haliaetus*), White-tailed Kite (*Elanus leucurus*), Red-tailed Hawk (*Buteo jamaicensis*), Northern Harrier (*Circus hudsonius*), and Northern Red-legged Frog (*Rana aurora*). Furthermore, diking and draining of salt marshes has contributed to substantial population declines of local salmonid species, including Coho Salmon (*Oncorhynchus kisutch*), Chinook Salmon (*O. tshawytscha*), and Steelhead Trout (*O. mykiss*), as well as Tidewater Goby (*Eucyclogobius newberryi*).

Restoration of tidal channels, eelgrass beds, and salt marsh will enhance and provide critical fish refugia and nursery habitat that result in long-term net benefit to these sensitive species. Juvenile salmonids utilize the estuary, especially areas with eelgrass, as nursery areas for extended periods before entering the ocean. Estuaries provide food sources and habitat where juvenile fishes obtain the size needed to increase their chances of survival at sea. Similarly, studies of other northern California estuaries and lagoons show that Steelhead Trout and Coastal Cutthroat Trout (*O. clarkii clarkii*) use these habitats year-round. Created habitat will also benefit Tidewater Goby which prefer salt marshes that border freshwater wetlands for both spawning and rearing. The Project will play an important role in the recovery of these sensitive wildlife species (and numerous native wildlife species not considered sensitive) by providing suitable habitat that is limited throughout Humboldt Bay as compared to historical conditions (CDFW 2015; NMFS 2014; NOAA 2016; USFWS 2005).

In restoring coastal marsh habitat, the Project will contribute to climate resiliency. Restoration of coastal marsh habitat is widely recognized as a priority nature-based strategy for sea level rise and climate adaptation (Ocean Protection Council 2022). Currently, the altered tidal regime in the Project Area makes it vulnerable to sea level rise from significantly reduced sediment deposition within much of the Project Area. Increased tidal exchange and connectivity will promote natural sedimentation and marsh accretion that will allow marsh development to keep pace with sea level rise naturally, thereby increasing the long-term

climate resiliency of marsh habitat. Estuarine restoration in particular provides improved water quality over the long term by increasing filtration, nutrient retention, and removal of pollutants and toxins.

1.3 Project Description

The Project's limits of disturbance are planned across 28.9 acres. Ground disturbance includes the placement of fill to form salt marsh ridges, excavation of tidal lagoons, lowering of approximately 1,650 feet of Mad River Slough levee, removal of the existing tide gate, and excavation where the existing tide gate is located to provide full tidal connectivity between Mad River Slough and the excavated tidal lagoon channel network (**Appendix A, Figure 4**). The completed Project will restore and protect a total of 52 acres of intertidal salt and brackish marsh, and freshwater emergent wetlands (**Attachment A, Figure 5**), and will restore the natural shoreline with a transition from slough to salt marsh to freshwater forested wetlands (**Appendix A, Figure 6**).

The components of the Project include the following, and are shown in **Appendix A, Figure 4**:

– Lowering of approximately 1,650 linear feet of the Mad River Slough Levee;
– Excavating and grading of approximately 9.35 acres to a suitable elevation for creation of a tidal lagoon channel network which will support eelgrass establishment and provide low-tide refugia for multiple fish species, including Coho Salmon, Tidewater Goby, and Longfin Smelt due to the perched pools that will hold water during low tide. The tidal lagoon channels will be graded to range from approximately -1.5 to 2.0 feet;
– Placement of approximately 27,000 cubic yards of native fill to raise low-lying areas to elevations that will support salt marsh (all fill will be generated on site by excavating tidal channels and eelgrass habitat and levee lowering and removal). Specifically, fill will be placed and graded to create the salt marsh ridges (which will be interconnected with the tidal lagoon channel network and offer habitat variability) and within the marsh fill areas both at elevations ranging from 5.5 to 8.0 feet. The existing ditch will be filled to match adjacent contours. Placement of fill will not result in the creation of upland conditions;
– Placement of fill at the northern and southern parcel boundaries to create cross levees that will contain tidal waters and minimize the potential for flooding on adjacent properties. Each cross levee will be built to approximately 11.5 feet. Currently, only a cross levee exists along the southern parcel boundary which will be augmented to create the cross levee under this Project. The cross levees will contain a 3 to 1 slope from approximately 11.5 feet to 8.5 feet and then will contain 10 to 1 slopes from 8.5 feet and below to integrate into the marsh plain elevation;
– Placement of gravel along Refuge Access Road to increase the elevation to approximately 10.5 feet including fill slopes of 1 to 1 and replacement of up to three culverts depending on their condition;
– Removal of the existing tide gate and breaching of the levee. Breaching will not occur until other Project elements are completed (after its use as a barrier to isolate the work area from incoming tide); and,
– Replacement of one culvert located aligned with the proposed ditch fill at the southern cross levee, and installation of one culvert to be located perpendicular to the proposed northern property boundary cross levee.

An additional component of the Project is invasive species management, which will occur indirectly due to the reintroduction of tidal waters into the site resulting in the mortality of existing invasive species. Currently the Project Area is dominated by non-native pasture grasses including creeping bent-grass (*Agrostis stolonifera*), sweet vernal grass (*Anthoxanthum odoratum*), tall fescue (*Festuca arundinacea*), perennial rye

grass (*Festuca perennis*), velvet grass (*Holcus lanatus*), Kentucky blue grass (*Poa pratensis*), meadow false rye grass (*Schedonorus pratensis* = *Festuca arundinacea*), and rough blue grass (*Poa trivialis*). Patches of spreading rush (*Juncus patens*) persist in the grazed wetland pastures due to their unpalatability. Reintroduction of tidal waters is anticipated to result in mortality of the pasture grasses. At the close of construction, areas at or higher than 7.5 feet elevation will be seeded with native seed mix, and all areas lower in elevation will passively revegetate with salt tolerant species such as pickleweed (*Salicornia pacifica*), saltgrass (*Distichlis spicata*), spreading rush and other *juncus* spp. varieties, slough sedge (*Carex obnupta*), and pacific silverweed (*Argentinia pacifica*). Invasive dense-flowered cordgrass (*Spartina densiflora,* hereafter referred to as Spartina) was observed in relatively low numbers (approximately 15 occurrences) on the outboard side of the Mad River Slough levee. During levee removal, patches of Spartina will be buried onsite as much as is feasible, however due to the prolific seed bank of Spartina at the regional level, some presence of Spartina is anticipated to occur onsite. The USFWS will treat Spartina at the Project site in accordance with its CCP which is utilized to manage all of the Humboldt Bay Wildlife Refuge units, which includes a combination of manual, mechanical and chemical control approaches (USFWS 2009). The Wadulh site is in the process of being added to the USFWS's CCP (Villa personal communication 2024) and will be in the CCP prior to construction.

1.4 Project and Regulatory Background

This is a habitat restoration Project that is exempt from the requirements of CEQA pursuant to SERP (Public Resources Code § 21080.56). The USFWS has completed National Environmental Policy Act (NEPA) compliance via the National Oceanic & Atmospheric Administration Restoration Center (NOAA RC) Programmatic Environmental Impact Statement for Coastal Habitat Restoration.

The Project Area includes wetlands within the jurisdiction of the USACE, the NCRWQCB, and the CCC. Required permits and approvals are listed in **Table 1.4-1**.

Table 1.4-1. Regulatory permits and approval required for Project.

Permit	Agency
Clean Water Act (CWA) Section 404—Nationwide Permit (NWP) 27	USACE
Endangered Species Act (ESA) Section 7—Salmonids	NOAA RC Programmatic Biological Opinion (PBO)
ESA Section 7—Tidewater Goby	USFWS PBO
CWA Section 401—Statewide Restoration General Order (SRGO)	NCRWQCB
Coastal Act Federal Consistency Determination	CCC
Harbor Development Permit	Humboldt Bay Harbor, Conservation and Recreation District
Section 106 Consultation	USACE

2. Baseline Information

The Project Area was previously owned by Caltrans who purchased the site for use as a wetland mitigation bank. The Project site has been the subject of environmental studies undertaken by Caltrans starting in 2015. The site hasn't been grazed or used for agricultural productivity since approximately 2015 and agriculture infrastructure (i.e., fencing) has not been maintained and is in disrepair. Portions of the drainage ditches are blocked, and have begun to support dense patches of invasive plant species. The site drains poorly due to the blockages and dense vegetation in these channels. The site contains subsided marsh-land and former bay-lands. It seasonally floods with rainwater in low spots that are disconnected from the drainage network. There is leakage of saltwater through the tide-gate on Mad River Slough causing conversion of pasture to more salt tolerant species which are not suitable fodder for agricultural purposes. Although the parcel was diked along its boundary with the Mad River Slough and converted to agricultural purposes, the majority of the parcel contains aquatic resources (i.e. wetlands or flowing waters) (**Appendix A, Figure 3**).

2.1 Existing Environmental Studies

The Humboldt County Resource Conservation District (HCRCD) acts as lead agency for the Project, and the USFWS as the partnering federal agency who is developing preliminary concept plans for the restoration and tidal enhancement of Wadulh Lagoon (USFWS 2023a). The concept plan is informed by the previous extensive studies conducted for Caltrans by their consultants (AECOM, Inc. and ICF, Inc.), and investigations by USFWS staff.

The following studies and reports have been completed to date:

- Wetland and Waters of the U.S. Delineation Report (ICF 2018a)
- Biological Assessment (ICF 2018b)
- Biological Opinion (USFWS 2018)
- Section 106 of the National Historic Preservation Act and State Historic Preservation Act (USFWS 2023 [includes sensitive information, therefore, not included in references])
- Basis of Design Report (USFWS 2023a), which includes data from:
    - Restoration Project Concept Design Report (AECOM 2015a)
    - Sediment Availability and Transport Analysis; Site Evolution (AECOM 2015b)
    - Topographic, Vegetation Survey and Hydrologic Monitoring Report (AECOM 2015c)
- 30% Conceptual Design Plans (USFWS 2023b)

The USFWS is in the process of completing an updated Endangered Species Act consultation for Project implementation through their PBO. USFWS will provide management and long-lasting stewardship of the site as it is a component of the Lanphere Dunes Unit of the Humboldt Bay NWR.

These studies document the existence and condition of special status wildlife species habitat, natural communities, and aquatic resources observed in the Project Area. All species, vegetation communities, and aquatic resources identified in the Project Area are listed in these studies. The accompanying data collected from these studies has been used to inform post-construction wetland conditions based on proposed Project design components and modelling and are summarized in **Section 3**, and displayed in **Appendix A, Figure 6**.

The following sections summarize the findings of the studies and analyses involving wetlands and hydrologic influence in the Project Area, including location and extent of existing aquatic resources, and discuss anticipated temporary impacts that may result from implementation of the Project and anticipated post-construction wetland conversions. The Project will result in no net loss of wetlands, only a conversion of wetland types (e.g., palustrine emergent wetlands that convert to subtidal or open tidal waters). The focus of this document is to outline what wetland conversions are anticipated, as elevation and tidal regime will largely influence what plant species passively recruit to areas of the Project (based on duration of inundation and salinity), and what habitat types will become available for aquatic and terrestrial species (pools and mudflats versus vegetated marsh).

2.2 Existing Jurisdictional Wetlands in the Project Area

A wetland investigation and delineation was conducted by an ICF plant and wetland scientist across several dates in May and June of 2018 (ICF 2018a) which covered the entire Project Area within the parcel.

The purpose of the wetland delineation was to identify and describe the presence and extent of jurisdictional waters of the United States, including wetlands, within the Project Area under Sections 404 and 401 of the Clean Water Act (CWA), or Section 10 of the Rivers and Harbor Act, the Porter-Cologne Water Quality Control Act, and the California Coastal Act (CCA).

Wetlands and Other Waters within the Project Area are classified by the Cowardin system, based on *The Classification of Wetlands and Deepwater Habitats of the United States* (FGDC 2013) and include subtidal and intertidal estuarine wetlands, palustrine emergent wetlands, palustrine forested wetlands, and Other Waters of the U.S. (open waters, which include the estuarine ditch running along the west base of the levee, and freshwater ditch in southern portion of Project Area) (**Table 2.2-1**).

Levees and other higher-elevation areas of the Project Area were investigated for potential uplands, defined herein as areas that do not meet Army Corps of Engineers (USACE 2010) three-parameters wetland definition based on hydrophytic vegetation, hydric soils, and wetland hydrology. Due to the location of the Project Area within the Coastal Zone boundary, the areas that did not meet the USACE three-parameter wetland definition were also investigated to determine whether they meet CCA one-parameter wetland definition.

The study documented three-parameter wetlands and Other Waters of the U.S. and/or State, Coastal Act one-parameter wetlands, and dominant vegetation communities associated with each wetland type (ICF 2018a). A total of 47.4 acres of potential CWA Section 404 three-parameter wetland and Waters of the U.S. were mapped in the Project Area (**Appendix A, Figure 3**). Coastal Act wetlands were also mapped in the Project Area, but for the purpose of this WHRP, CCA one-parameter wetlands are not included in further analyses because all mapped CCA resources are also considered CWA Section 404 resources (ICF 2018a) and are therefore encapsulated in this impact analysis. A total of 6.8 acres of CWA Section 404 non-wetland upland habitat (uplands) were mapped in the Project Area (**Appendix A, Figure 3**).

Results of the 2018 investigations and datasheets documenting conditions observed during the investigations are included in **Appendix B** (ICF 2018a).

Table 2.2-1. Jurisdictional wetlands in Project Area.

Wetland Type	Aquatic Feature	Cowardin Type[1]	Area (acres)
CWA Section 404 Waters: 3-parameter wetlands	Tidal Waters	E1UB3: Estuarine, subtidal, unconsolidated bottom, mud	2.4

Wetland Type	Aquatic Feature	Cowardin Type[1]	Area (acres)
	Ditches	E2SB and R1/R: Open water ditched habitats comprised of a gradient from estuarine intertidal near levee to riverine tidal and intermittent waters	1.4
	Emergent wetlands	PEM2: Palustrine emergent wetland, persistent	35.8
	Forested wetlands	PFO: Palustrine forested	7.8
		Total CWA Section 404 Waters	47.4

1. Cowardin types are a system of classification for wetlands that use landscape position, vegetation cover, and hydrologic regime to define a wetland type.

2.3 Species Composition of Existing Wetlands

Wetland vegetation varies across the Project Area, as some portions are relatively undisturbed and some have experienced high disturbance from an altered hydrologic regime and land management practices (i.e., grazing). The vegetation communities that currently inhabit the wetland areas are anticipated to largely influence the post-construction conditions, as they are the species for which a seed source is in proximity to the proposed restoration area. Furthermore, the Project will allow for passive revegetation of restored salt marsh, and species that are already known to occur on-site have the highest likelihood of recruitment. The following descriptions are sourced from the wetland investigation (ICF 2018a).

Grazed portions of the parcel are currently occupied by a matrix of common non-native grasses, including creeping bent-grass (*Agrostis stolonifera*), sweet vernal grass (*Anthoxanthum odoratum*), tall fescue (*Festuca arundinacea*), perennial rye grass (*Festuca perennis*), velvet grass (*Holcus lanatus*), Kentucky blue grass (*Poa pratensis*), meadow false rye grass (*Schedonorus pratensis = Festuca arundinacea*), and rough blue grass (*Poa trivialis*). Patches of spreading rush (*Juncus patens*) persist in the grazed wetland pastures due to their unpalatability (ICF 2018a). The grazed areas extend to a ditch at the base of the existing levee (west side), where salt water has begun to infiltrate through a failing tide-gate that overflows during high tides. Consequently, portions of the pasture near the levee ditch are dominated by brackish salt-tolerant species including pickleweed (*Salicornia pacifica*), brass buttons (*Cotula coronopifolia*), sicklegrass (*Parapholis incurva*), tufted hairgrass (*Deschampsia cespitosa*), and saltgrass (*Distichlis spicata*). Other native herbaceous species persist in the grazed areas due largely to their unpalatable nature, including patches of saltgrass, spike-rush (*Eleocharis macrostachya*), mariposa rush (*Juncus dubius*), and spreading rush.

Ungrazed but wet portions of the Project Area that contain more natural herbaceous plants include meadow foxtail (*Alopecurus geniculatus*), spike-rush, giant horsetail (*Equisetum telmateia*), spreading rush, water parsley (*Oenanthe sarmentosa*), pacific silverweed (*Potentilla anserina* ssp. *pacifica*), small-fruited bulrush (*Scirpus microcarpus*), bracken fern (*Pteridium aquilinum*), and California blackberry (*Rubus ursinus*). Nonnative herbaceous species in these areas include patches of manna grass (*Glyceria occidentalis*), velvet grass, Reed canarygrass (*Phalaris arundinacea*), creeping buttercup (*Ranunculus repens*), and broadleaf cattail (*Typha latifolia*). The freshwater ditches running north/south contain patchworks of open water and hardstem bulrush (*Schoenoplectus acutus*).

Forested wetlands exist at the western border of the Project Area and are comprised of mixtures of coastal dune willow (*Salix hookeriana*) and wax myrtle (*Morella californica*). Other species present within these areas include red alder (*Alnus rubra*), salmon berry (*Rubus spectabilis*), chain fern (*Woodwardia fimbriata*), giant horsetail, Watson's wild cucumber (*Marah watsonii*), evergreen huckleberry (*Vaccinium ovatum*), skunk cabbage (*Lysichiton americanus*), poison oak (*Toxicodendron diversilobum*), and slough sedge (*Carex obnupta*).

Upland communities were comprised of beach pine (*Pinus contorta*) forest that intergrades with forested wetlands in the west of the Project Area; ruderal (dominated by non-native grasses observed in the grazed wetlands, as they are facultative and can grow across a wide ecological range of conditions); and discrete areas of Scotch broom (*Cytisus scoparius*) and California/Himalayan blackberry brambles (*Rubus ursinus* and *R. armeniacus*).

The species observed on-site are summarized in **Table 2.3-1**, along with the wetland type and disturbance regime that they associate with; their lifeform; wetland indicator status; native or non-native designations; and California Invasive Plant Council (Cal-IPC) rating, where applicable. This information is valuable to inform what species may passively recruit to restored areas of the Project based on level of saltwater influence, and which invasive non-native species should be monitored post-construction.

The species' wetland indicator status is drawn from the standard reference: *National USACE 2020 Wetland Plant List* (USACE 2020) for the Western Mountains, Valleys, and Coast Region. This list classifies species based on the probability that they are found in wetlands (USACE 1987) as follows:

– Obligate (OBL): almost always in wetlands (99% probability)
– Facultative Wetland (FACW): usually occurring in wetlands (67% to 99% probability)
– Facultative (FAC): commonly occurring in wetlands and uplands (34% to 66% probability of occurring in wetlands)
– Facultative Upland (FACU): usually occurring in uplands (1% to 33% probability of occurring in wetlands)
– Upland (UPL): upland obligate, rarely in wetlands (1% in wetlands)

Invasive species encroachment will be monitored post-construction (see **Section 4**). Invasive non-native plants can inhibit successful establishment of native species, and therefore reduce the value of the created wetland habitats. Invasive species that will be monitored for removal include those with Cal-IPC moderate to high ratings, or those known to be ecologically detrimental.

Table 2.3-1. Plant species observed on-site during 2018 wetland delineation with associated wetland type and relative disturbance regime.

Wetland Type	Scientific Name	Common Name	Lifeform	Wetland Indicator Status	Native or Non-native	Cal-IPC Rating[1]
Palustrine Emergent wetland, high disturbance (grazed)	*Agrostis stolonifera*	Creeping bentgrass	Grass	FAC	Non-native	Limited
	Anthoxanthum odoratum	Sweet vernal grass	Grass	FACU	Non-native	Limited
	Festuca arundinacea	Reed fescue	Grass	FAC	Non-native	Moderate

Wetland Type	Scientific Name	Common Name	Lifeform	Wetland Indicator Status	Native or Non-native	Cal-IPC Rating[1]
	Festuca perennis	perennial rye grass	Grass	FAC	Non-native	Moderate
	Holcus lanatus	Common velvetgrass	Grass	FAC	Non-native	Moderate
	Juncus patens	spreading rush	Rush	FACW	Native	
	Poa pratensis	Kentucky blue grass	Grass	FAC	Non-native	Limited
	Poa trivialis	rough blue grass	Grass	FAC	Non-native	
Palustrine Emergent wetland, low disturbance	*Alopecurus geniculatus*	meadow foxtail	Herb	OBL	Native	
	Eleocharis macrostachya	spike-rush	Herb	FACW	Native	
	Equisetum telmateia	giant horsetail	Herb	FACW	Native	
	Glyceria occidentalis	western manna grass	Grass	OBL	Native	
	Juncus dubius	mariposa rush	Rush	FACW	Native	
	Juncus patens	spreading rush	Rush	FACW	Native	
	Oenanthe sarmentosa	water parsley	Herb	OBL	Native	
	Phalaris arundinaceae	reed canarygrass	Grass	OBL	Native / Non-native	High
	Potentilla anserina ssp. pacifica	Pacific silverweed	Herb	FACU	Native	
	Pteridium aquilinum	bracken fern	Herb	FACU	Native	
	Rubus armeniacus	Himalayan blackberry	Shrub	FAC	Non-native	High
	Schoenoplectus acutus	California blackberry	Shrub	FACW	Native	
	Scirpus microcarpus	hardstem bulrush	Herb	OBL	Native	
	Typha latifolia	small-fruited bulrush	Herb	OBL	Native / Non-native	High
	Cotula coronopifolia	brass buttons	Herb	OBL	Non-native	Limited

Wetland Type	Scientific Name	Common Name	Lifeform	Wetland Indicator Status	Native or Non-native	Cal-IPC Rating[1]
Estuarine wetland, low disturbance	*Deschampsia cespitosa*	tufted hairgrass	Grass	FACW	Native	
	Distichlis spicata	saltgrass	Grass	FACW	Native	
	Parapholis incurva	sicklegrass	Grass	FACU	Non-native	
	Salicornia pacifica	pickleweed	Herb	OBL	Native	
Palustrine Forested wetland, undisturbed	*Alnus rubra*	red alder	Tree	FAC	Native	
	Carex obnupta	slough sedge	Sedge	OBL	Native	
	Lysichiton americanus	skunk cabbage	Herb	OBL	Native	
	Marah watsonii	Watson's wild cucumber	Herb	UPL	Native	
	Morella californica	wax myrtle	Shrub	FACW	Native	
	Rubus spectabilis	salmonberry	Shrub	FAC	Native	
	Rubus ursinus	California blackberry	Shrub	FACU	Native	
	Salix hookeriana	coastal dune willow	Shrub	FACW	Native	
	Toxicodendron diversilobum	poison oak	Herb	UPL	Native	
	Vaccinium ovatum	evergreen huckleberry	Shrub	FACU	Native	
	Woodwardia fimbriata	chain fern	Herb	FACW	Native	
Uplands, variable disturbance	*Cytisus scoparius*	Scotch broom	Shrub	UPL	Non-native	High
	Pinus contorta	shore pine	Tree	UPL	Native	
	Rubus ursinus	creeping buttercup	Herb	OBL	Non-native	

1. Footnotes: Cal-IPC Rating Definitions.

High

These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Wetland Type	Scientific Name	Common Name	Lifeform	Wetland Indicator Status	Native or Non-native	Cal-IPC Rating[1]

Medium

These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited

These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

3. Project Impact Analyses

The data collected and organized from Project studies have been used to inform post-construction conditions based on proposed Project design components, and are summarized below.

Under existing conditions, the Project Area is generally isolated from slough estuary water levels by an earthen levee (Mad River Slough levee) that was constructed for agricultural purposes. The earthen levee is located at the eastern perimeter of the Project Area. A tide gate was installed through the levee to prevent saltwater inflow and allow drainage or rainfall runoff outflow. Additionally, a cross-levee was constructed at the southern boundary to protect the adjacent landowner from flooding as a result of levee failures that allow tidal overflow. The eastern levee has reduced the frequency of tidal inundation and consequent sediment accumulation throughout the Project Area, and as a result the interior land elevations have been deprived of natural sediment accumulation (USFWS 2023a).

The nature of direct temporary and permanent impacts are entirely for the purpose of habitat restoration and enhancement. Based on the current design, the Project will restore and protect approximately 52 acres of intertidal salt marsh, brackish marsh, and freshwater emergent wetlands, and will restore the natural shoreline with a transition from slough to salt marsh to freshwater forested wetlands. The Project's limits of disturbance are planned across 28.9 acres. The Project's habitat and infrastructure objectives include:

– Lowering existing levees to salt marsh elevations in one or more places;
– Excavating low-lying areas of pasture to create a channel network at elevations that will support eelgrass (*Zostera marina*);
– Excavating a tidal channel network to restore tidal flows to the site;
– Using excavated fill in strategic areas to create suitable conditions for establishment of salt and brackish marsh. The freshwater that drains from the adjacent dune system will support the creation of fringing brackish marsh;
– Placing fill strategically to create conditions to trap tidally transported suspended sediment and promote salt marsh expansion;

– Placing fill against an existing levee that protects the property owner to the south, and along Lanphere Road to the north to a height of 11.5 feet NAVD88 to contain tidal waters within the Project Area and minimize the potential for flooding to adjacent properties; and,
– Placing road fill gravel on Refuge Access Road to increase elevation to approximately 10.5 feet to reduce likelihood of nuisance flooding;

See **Appendix A**, **Figure 4** for proposed location of Project components, including levee lowering, excavation, and placement of fill.

3.1 Impacts to Wetlands and Other Waters of the U.S.

Field surveys, ground elevations, and modelling of surface water levels within the Project Area provided baseline elevational estimates of the Project's existing tidal conditions (ICF 2018a, USFWS 2023a). Based on this data, wetlands in the Project Area were determined to exist at or below approximately 8.0 feet NAVD88. This threshold has been used to discern wetlands from uplands in the Project Area, and inform how the elevations within the Project Area would be altered to achieve the Project goals. For the purpose of salt marsh creation, the Project will establish ground elevations in the range between 6.0-7.0 feet NAVD88 which mimics the average range of marsh plain elevations at the reference salt marsh site on Mad River Slough used in previous design iterations (USFWS 2023a). It is anticipated that areas between 6.0 and 8.0 feet NAVD88 that are exposed to full tidal influence will be colonized by salt marsh vegetation within a three-year period (USFWS 2023a). Areas that are vegetated with non-salt tolerant vegetation at the time of breaching will die off within one to two years, and salt marsh will begin to passively colonize to the limits of viability. The range of salt marsh vegetation will shift and expand over time as sediment is trapped in the Project Area with natural tidal cycles and sedimentation.

Permanent impacts to jurisdictional wetlands (permanent placement of fill above 8.0 feet NAVD88) will occur in discrete locations at the southern cross-levee to fortify the existing levee and in discrete locations along Lanphere Road to the north to contain tidal waters and prevent flooding to adjacent properties. Additionally, minor impacts may occur at the edges of Refuge Access Road to the west to raise low-lying portions of the road to similarly fortify the stability of the road for access (**Appendix A, Figure 5**). Permanent impacts to wetlands in the Project Area total approximately 0.71 acres and are entirely from construction of the two cross levees and Refuge Access Road raising.

Temporary impacts to jurisdictional wetlands include grading and/or placement of soil at or below 8.0 feet NAVD88 to raise low-lying areas to elevations that will support salt marsh, and to fill the existing ditch to match adjacent contours. Additionally, existing wetlands will be excavated to suitable elevations to create tidal lagoon channels that will support eelgrass establishment and provide low-tide refugia for fish species (**Appendix A, Figure 5**). Fill below 8.0 feet NAVD88 is considered a temporary impact to wetlands, as the wetlands will remain at elevations to sustain them as wetlands. The wetland types will shift over time as full tidal influence is reintroduced to the Project Area (e.g., palustrine emergent wetlands shifting to estuarine wetlands, mudflat, and open water). Temporary impacts to wetlands in the Project Area total approximately 25.60 acres, which includes approximately 23.57 acres of existing wetlands that will convert to a different wetland type, and 2.03 acres of existing wetlands that will remain the same type of wetland. See **Table 3.3-1** for an overview of wetland impacts.

Temporary impacts also include the placement of erosion control materials, all of which occur below the High Tide Line (HTL) mark. All erosion control materials will be organic, i.e., no plastic or non-compostable materials will be utilized, and areas above 7.5 feet NAVD88 will be reseeded with a native seed mix appropriate for the ecology of the site.

The designed Project topography is variable via the salt marsh ridges, for which the design intent is to accrete sediment in a heterogeneous manner which will result in a mosaic of habitat features including intertidal mudflat, low, medium and high salt marsh habitat, and brackish marsh habitat.

Following Project implementation, full tidal range will be restored to the Project Area which is expected to promote recovery and maintenance of tidal marsh habitats that support native fish, invertebrates, wildlife, and plant species while enabling marsh elevations to keep pace with sea level rise. Although there will be temporary and permanent impacts, the functional improvement of the tidal marsh will increase substantially through the transition from minimal tidal inundation to restored full tidal inundation. Impacts to wetlands will result in a less than significant impact. Anticipated wetland type conversions are discussed in **Section 3.3**.

3.2 No Net Loss of Wetlands

A goal of the Project, from a regulatory standpoint, is no net loss of wetlands. Both the state and the federal government have no-net-loss (functional) wetlands mandates (although some restoration projects are approved by regulatory agencies that contain a loss of wetlands). The Project will result in no net loss of wetlands.

In the Project Area, all wetland areas proposed to be excavated would remain wetlands (slough excavation) and salt marsh ridges would not be built taller than elevation 7.0 feet (NAVD88), therefore would also remain wetlands (USFWS 2023a).

Approximately 0.71 acres of wetlands will be permanently impacted for creation of the southern and northern cross levees, and raising Refuge Access Road. Approximately 1.05 acres of wetlands will be created from uplands. See **Table 3.3-1** for a summary of the wetland areas that will be permanently and temporarily impacted, and the nature of the impact based on the proposed Project component.

The seed mix used to revegetate disturbed areas from construction (above 7.5 feet NAVD88) will include species appropriate to the ecology of the planting site, and will contain species that would naturally colonize these areas.

3.3 Conversion of Wetland Types

The results of a wetland conversion analysis are summarized in **Table 3.3-1** and displayed in **Appendix A, Figure 6**. The analysis is based on field surveys, ground elevations, and modelling of surface water levels within the Project Area to estimate the Project's existing tidal conditions relative to proposed conditions based on design components. This analysis helps summarize how wetland types may transition in the Project Area once full tidal influence is restored.

The majority of the Project Area is comprised of three-parameter wetlands. As summarized in **Section 2**, only 6.8 acres within the Project Area are uplands. Native and non-native vegetation assemblages are components of the various wetland types. Included in wetland conversions are broad vegetation assemblages that associate with wetland types, based on those grouped in **Table 3.3-1**. The importance of understanding post-construction conversions is primarily to establish anticipated ecological outcomes of the Project. Vegetation assemblages and wetland types are expected to evolve over time, and consequently will alter habitat potential for both sensitive and non-sensitive plant and wildlife species. Calculations of existing habitat types that will be affected by Project components are approximated based on existing mapping of wetlands (ICF 2018a) and existing limits of ground disturbance. Temporary impacts to wetlands in the Project Area total approximately 25.60 acres, which includes approximately 23.57 acres of existing wetlands that will convert to a different wetland type, and 2.03 acres of existing wetlands that will remain the

same type of wetland. **See Table 3.3-1** for an overview of wetland impacts. Bolded text represents permanent wetland impacts (0.71 acres), italicized text represents temporary impacts to wetlands that will be converted from one wetland type to another (23.57 acres), and underlined text represents created wetlands (1.05 acres). Temporary impacts to wetlands that will not be converted are not accounted for in the table

Note, the total area of existing habitat within the limits of ground disturbance does not equal the total area created post-construction. Projected habitat types post-construction encompasses the entire Project Area, including areas outside the limit of ground disturbance.

Table 3.3-1. Post-construction wetland type conversions

Project Component	Existing Habitat within Limit of Ground Disturbance	Area of Existing Habitat within Limits of Ground Disturbance (acres)	Proposed Habitat Post-Construction	Total Area Created Post-construction (acres)[1]
- Levee Creation Enhancement: Lanphere Roa Ecolevee & Cross Levee Enhancement - Raise Refuge Access Road	**Estuarine Communities**	**0.05**	Uplands (Roads / Cross Levee)	2.9
	Palustrine Emergent Wetlands	**0.60**		
	Palustrine Forest Wetland	**0.06**		
	Other Waters of the U.S.	**0.002**		
- Mad River Sloug Levee Breac - Wadulh Lagoo Channels - "Other": Areas th lie between Projec Compone boundaries	*Estuarine Communities*	*2.84*	Subtidal / Permanently Flooded[2]	16.5
	Palustrine Emergent Wetlands	*13.73*		
	<u>Upland Communities</u>	<u>0.11</u>		
- Mad River Slough Levee Lowering - Marsh Fill Areas - Ditch Fill - Salt Marsh Ridges - Sills	*Palustrine Emergent Wetlands*	*5.28*	Salt Marsh / Mudflat	9.6 / 13.0
	Other Waters of the US	*1.18*		
	Palustrine Forest Wetland	*0.55*		
	<u>Upland Communities</u>	<u>0.94</u>		
	--	--	Forested Wetlands	11.5

Project Component	Existing Habitat within Limit of Ground Disturbance	Area of Existing Habitat within Limits of Ground Disturbance (acres)	Proposed Habitat Post-Construction	Total Area Created Post-construction (acres)[1]
Outside Limit of Ground Disturbance	--	--	Dunes	0.7

1. The Project Area totals 54.2 acres. Post-construction habitat created includes areas outside the limit of ground disturbance, but are likely to be influenced by the post-construction tidal regime. These totals also include upland areas that will remain uplands, and wetland types that will not be converted to different wetland types post-construction.
2. Subtidal areas with depths greater than 0.65 feet NVD88 meet conditions to support eelgrass (10.8 acres).

Impact calculation summary:

- Permanent impacts (wetlands to uplands): 0.71 acres
- Temporary impacts (wetlands to wetlands): 25.60 acres
    - Temporary impact (conversion between types of wetlands): 23.57 acres
    - Temporary impact (no conversion between wetland types): 2.03 acres (not shown in wetland conversion table above)
- Wetland creation (uplands to wetlands): 1.05 acres
- Uplands that will remain uplands: 1.50 acres

4. Monitoring Approach

Following initial construction, the restoration area is expected to be self-maintaining and dynamic over the long term. The restoration of tidal influence in the Project Area would permanently restore tidal salt marsh habitat. The restoration enhancement would occur in a tidal setting where inundation occurs on a daily basis. Channels are being constructed to provide a more frequent connection between the restoration area and Mad River Slough. Channel and habitat evolution is expected and desired, specifically to promote channel complexity and natural processes preferred by anadromous salmonids.

It is anticipated that existing vegetation communities will shift in response to the restoration of a full tidal regime. During Project construction, vegetation disturbance will be avoided and minimized to the extent practicable. Reintroduction of tidal waters is anticipated to result in mortality of the existing pasture grasses and proliferation of spreading rush and other salt tolerant species. At the close of construction, areas at or higher than 7.5 feet elevation will be seeded with native seed mix, and all areas lower in elevation will passively revegetate with salt tolerant species that are already documented in the Project Area (**Table 2.3-1**). Disturbance to existing grades and native vegetation shall be limited to the actual site of the Project, necessary access routes, and staging areas.

Immediately following construction, the restoration design anticipates the establishment of approximately 16.5 acres of subtidal to permanently flooded conditions, 13 acres of mudflat, and 9.6 acres of salt marsh. Over time, it is anticipated that these areas will adjust in response to tidal influence, specifically sediment

deposition and routing, and tidal scour. For this reason, holding the Project accountable to maintain static habitat type outcomes for any period of time would not be applicable and could limit more meaningful ecological outcomes (dynamic and complex habitat). As discussed in **Section 3**, there would be no net loss of wetlands or waters, just conversion from one wetland type to another.

Discrete actions are required for post-construction monitoring and reporting per the water quality certification (SRGO) and ESA Section 7 compliance with the NOAA and USFWS PBO, which are outlined below and for which reporting forms are included in **Appendix C**. Non-regulatory performance monitoring may occur throughout the restored portions of the Project Area and may be used to track Project evolution and efficacy beyond the scope of regulatory monitoring as funding allows, but will not be considered required to comply with permit conditions or agency approvals.

4.1 Quantitative Monitoring

The NOAA and USFWS PBO require the Project to track discrete metrics regarding the restoration area, including:

– As-built design plans;
– Numeric description of site conditions at the time of construction and prior to fish relocation (water temperature, dissolved oxygen, other pertinent data as deemed necessary by trained fisheries biologist);
– Total acres restored;
– Actual amount of incidental take of protected species, if applicable; and
– Total linear feet of stream (i.e., channels) disturbed and/or dewatered.

4.2 Qualitative Monitoring Methodology

Post-construction qualitative monitoring will occur immediately after Project implementation. The qualitative monitoring events will evaluate the potential success of the restoration area in meeting Project goals outlined in **Section 1**. Observations of the restoration area may include the following considerations:

– Qualitative summary of post-construction condition, including identification and discussion of issues achieving Project goals, if applicable (i.e., did any General Protection Measures, Avoidance and Minimization Measures, and/or Species Protection Measures outlined in the SRGO and NOAA/USFWS PBOs create unique challenges for the Project in achieving goals);
– Evaluation of re-established populations of invasive species, or new populations of invasive species;
– Captioned photographs capturing post-construction condition of proposed Project components;
– Amount and type of disturbance to critical habitat;
– Evaluation of restoration techniques; and
– Adaptative management and stewardship considerations.

Field notes will document if seeded areas have germinated successfully and/or survived. These observations (along with quantitative metrics) will be incorporated into the post-construction monitoring reports required by SRGO and NOAA/USFWS PBOs.

4.2.1 Photo Monitoring

Pre- and post-Project photo monitoring in accordance with CDFW photo-monitoring guidelines will occur prior to Project implementation and at least once in the year following implementation, via drone imagery and/or established photo points. Post-project photo monitoring will include captioned photographs with comparative pre- and post-Project imagery with text highlighting observed changes within the Project Area, and will demonstrate that the Project Area achieved Project objectives (restoration of full tidal influence). The photo monitoring report will be submitted to agencies within 18 months following Project completion, and in accordance with post-construction agreements per the water quality certification (SRGO) and ESA Section 7 compliance with the NOAA and USFWS PBO.

Pre-project photo documentation of general site conditions is included in **Appendix D.**

4.3 Reporting

Following monitoring, the USFWS or HCRCD would submit to the NCRWQCB, NOAA RC, and USFWS one brief annual report summarizing the above quantitative and qualitative monitoring results, according to the post-construction monitoring form requirements for each (**Appendix C**).

Reporting would include captioned photographs and as-built design plans, and would highlight how the Project Area has changed from a wet pasture to a dynamic and complex habitat area for salmonids.

4.4 Invasive Species Management

An additional component of the Project is invasive species management, which will largely occur indirectly due to the reintroduction of tidal waters into the site resulting in the mortality of existing non-native pasture grass species (**Table 2.3-1**). Currently, discrete patches of Himalayan blackberry, manna grass (*Glyceria* sp.) and reed canarygrass are growing intermixed with pasture grasses. These areas are going to be either (1) excavated, and/or (2) exposed to saltwater inundation, and are expected to be inhibited from re-growing, or those that are left intact will die back as a result of high salinity. Additionally, the dune area is covered by non-native dune mat and patches of Scotch broom, which will be treated by manual removal after Project construction. Nonetheless, the Project will also conduct annual monitoring for re-establishment of invasive species populations in accordance with the property CCP, and new population occurrences of invasive species not observed on-site (to date), but for which seed source exists within the Mad River Slough watershed. Continued control of new invasive plant populations during the life of the Project will ensure that newly created tidal habitat will not be invaded.

4.4.1 Invasive Plant Species Observed in Project Area

The primary invasive species of concern currently observed in the Project Area are reed canary grass and cattails (*Typha* spp.), both of which have native and non-native strains and all of which are considered invasive in wetlands. Both reed canary grass and cattails are rhizomatous perennials that form dense monocultures in wetlands that can block stream channels and prevent fish passage (Apfelbaum 2001, Apfelbaum and Sams 1987).

A species not observed in the Project Area, but is immediately outside of the Project boundaries, is dense-flowered cordgrass (*Spartina densiflora*), colloquially referred to as Spartina. Spartina is designated a red-alert species with a High ecological impact rating in the Cal-IPC, a priority management species for the Humboldt Weed Management Association, and a Noxious Weed by the California Department of Food and Agriculture. A report on the state of California's wetlands ranked Spartina as the top threat to the biological

value of California's North Coast wetlands (Sutula et al. 2008), and specifically Humboldt Bay (Mitchell 2012). Spartina degrades estuarine habitat by excluding native salt marsh plants, altering the benthic macroinvertebrate community (Mitchell 2008), reducing net primary productivity, and potentially transforming mudflats to salt marsh.

4.4.2 Invasive Plant Species Management Approach

Ground disturbance and creation of new tidal areas could result in new habitat availability to Spartina specifically, should existing populations on the east side of the levee proliferate and/or seed source is recruited to the Project Area. Visual inspections will occur annually (at a minimum) to assess vegetation composition relative to the past year and trends. If invasive vegetation is observed to be dominating an area, and the actual or potential spread threatens critical native habitat, USFWS will implement weed management strategies per the USFWS CCP which is further described below (USFWS 2009). Weed management and/or invasive species control will occur 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. Monitoring frequency will increase until the infestation is under control.

4.4.2.1 USWFS Comprehensive Conservation Plan (CCP)

The USFWS manages their refuge lands via a CCP (USFWS 2009). The purpose of the CCP is to provide long term guidance regarding management of fish, wildlife, plants, and other natural resources within the refuge.

Specifically, Goals 1, 2, 3, and 4 of the CCP address objectives and strategies for managing habitats within the refuge, and prevention and control of invasive species (plants and wildlife). These goals are qualitative and convey a purpose, but do not define measurable outcomes; however, each goal is supported by measurable, achievable objectives and strategies (USFWS 2009).

Goal 3 in the CCP specifically addresses invasive plants. Text in Objective 3.1 and Objective 3.2 is reflective of impending updates to the CCP to include the Project Area parcel in the management plan, which include minor changes to objectives and strategies outlined for Goal 3. The most up-to-date goal reads:

Goal 3. Conserve and restore all refuge habitats through the prevention and control of invasive plants and animals.

> *Objective 3.1. Prevention and early detection: Over the next 5 years, develop and implement an Early Detection Rapid Response (EDRR) Plan for the refuge. Within 10 years, develop and enhance the refuge's capacity to identify, report, and effectively respond to newly discovered, localized invasive species. Over the next 15 years, increase organizational collaboration on invasive species issues with Federal, State, and local entities, tribes, private organizations, and individuals.*
>
> *Objective 3.2. Control and reduce the spread of established invasive species populations in refuge habitats: Within 15 years, monitor and strategically remove, control, or eradicate invasive plant infestation. Within 5 years, expand the existing volunteer program for invasive plant control to achieve maintenance-level control of high priority target invasive species. Within 10 years, use and additional contract-based control program to achieve maintenance-level control of all targeted invasive plants.*

Objective 3.3. Control of Spartina densiflora: Within 10 years, control Spartina on all refuge locations. Within 15 years, participate in collaborative interagency effort to eradicate Spartina on the majority of coastal habitats of Humboldt County, if found to be feasible.

There are numerous strategies outlined for all objectives that further describe the approach to advance progress of each with discrete actionable steps. Management of two of the three species of concern in the Project Area (Spartina and reed canary grass) are addressed within these strategies (USFWS 2009).

The recruitment of cattails can be discouraged by maintaining water depth over 2 feet (DiTomaso et al. 2013); however, the restoration area would contain a variety of elevations and water depths. If cattails invade the restoration area, mechanical control by cutting the stems underwater may be the best means to prevent the formation of a monoculture. Increased saline influence would also suppress the establishment of cattails.

4.5 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, as funding is available. These voluntary monitoring events are not proposed as conditions of permit agreements. 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.
- Vegetation Monitoring – either qualitative or quantitative assessments of vegetation composition may occur throughout the Project Area.
- 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 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. 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. 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.
- 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.

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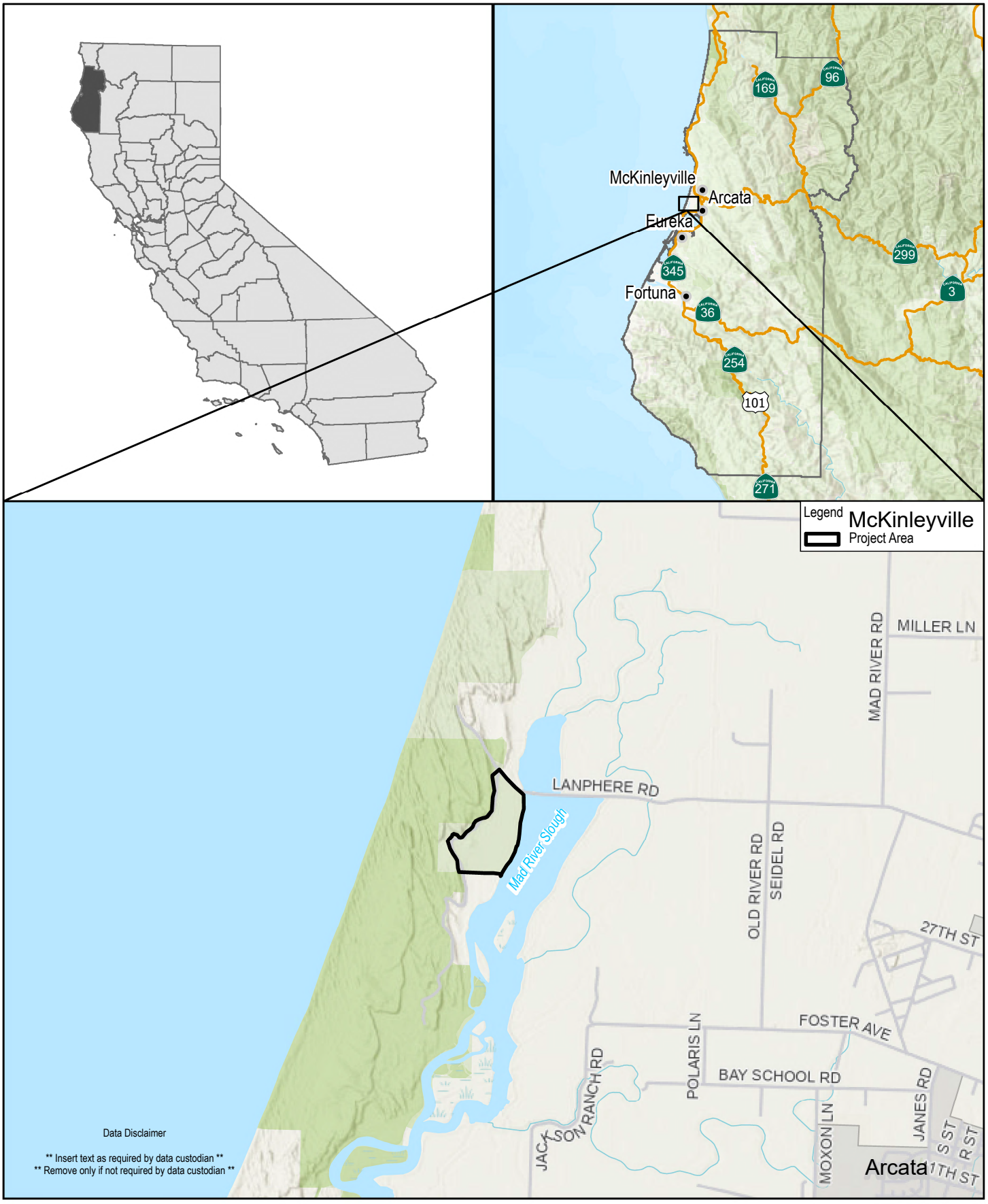
→ **The Power of Commitment**

Appendix A

Figures



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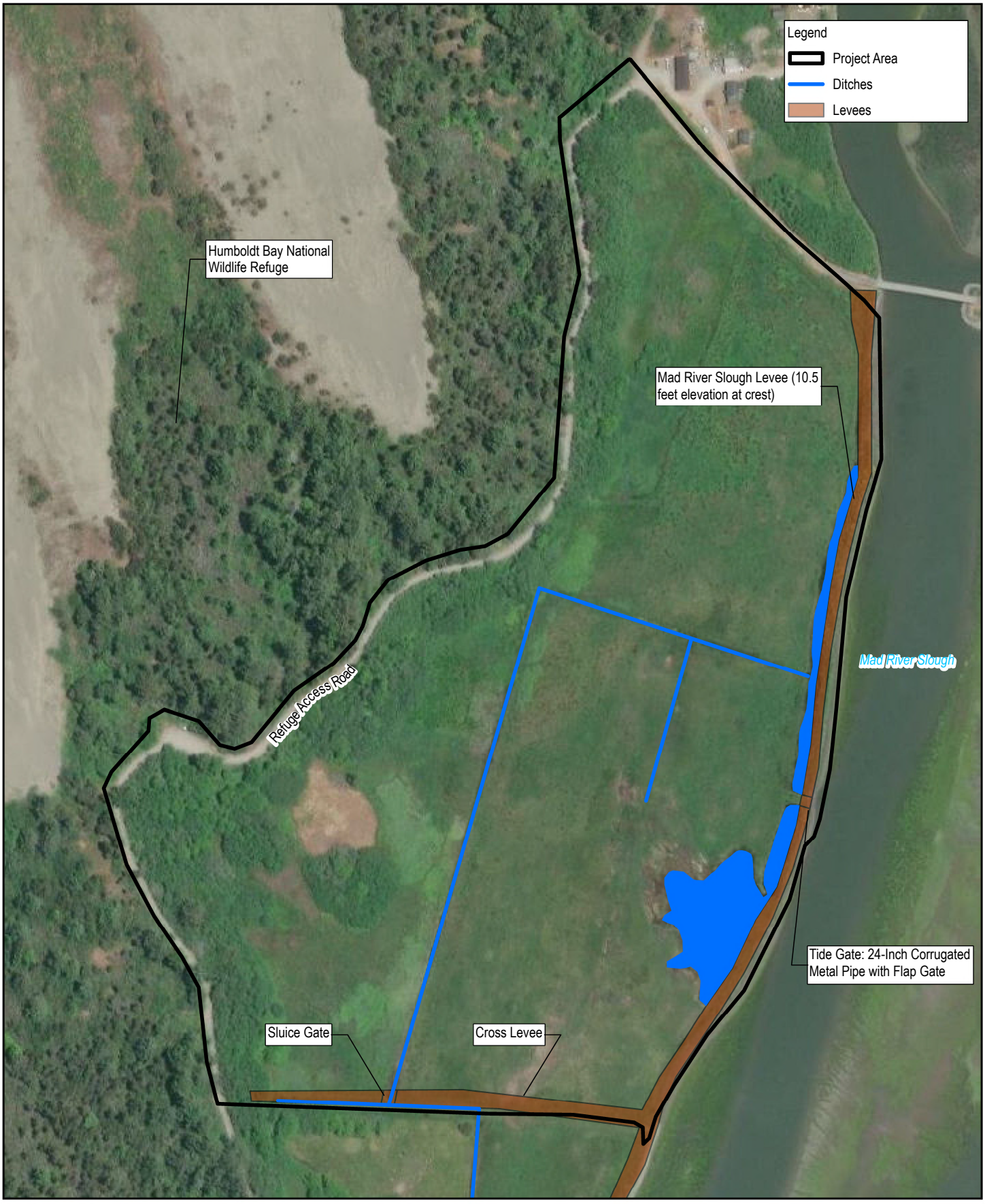
Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

Vicinity Map

FIGURE 1



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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project Area with Existing Conditions

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

FIGURE 2

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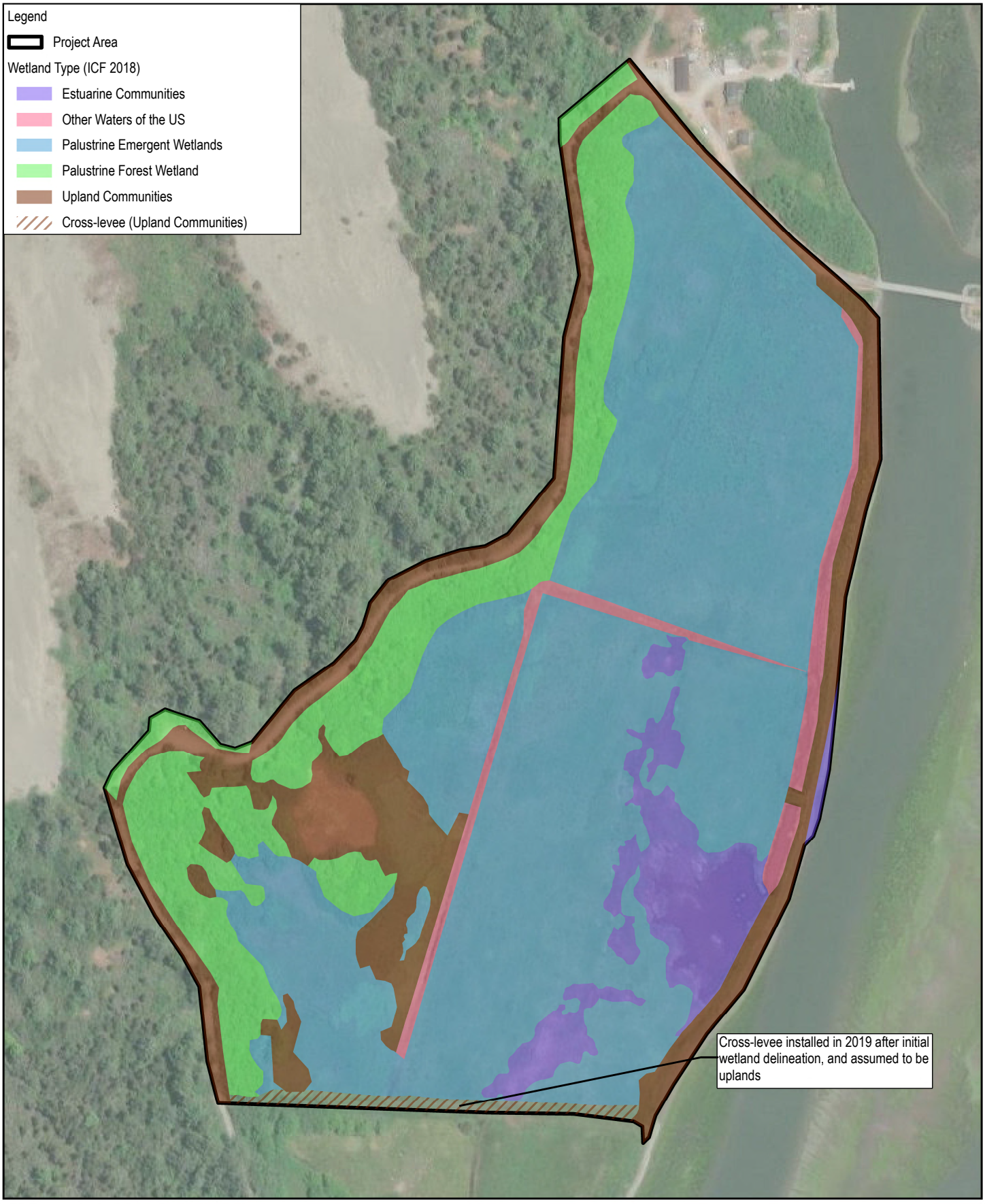

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

Existing Wetlands

FIGURE 3

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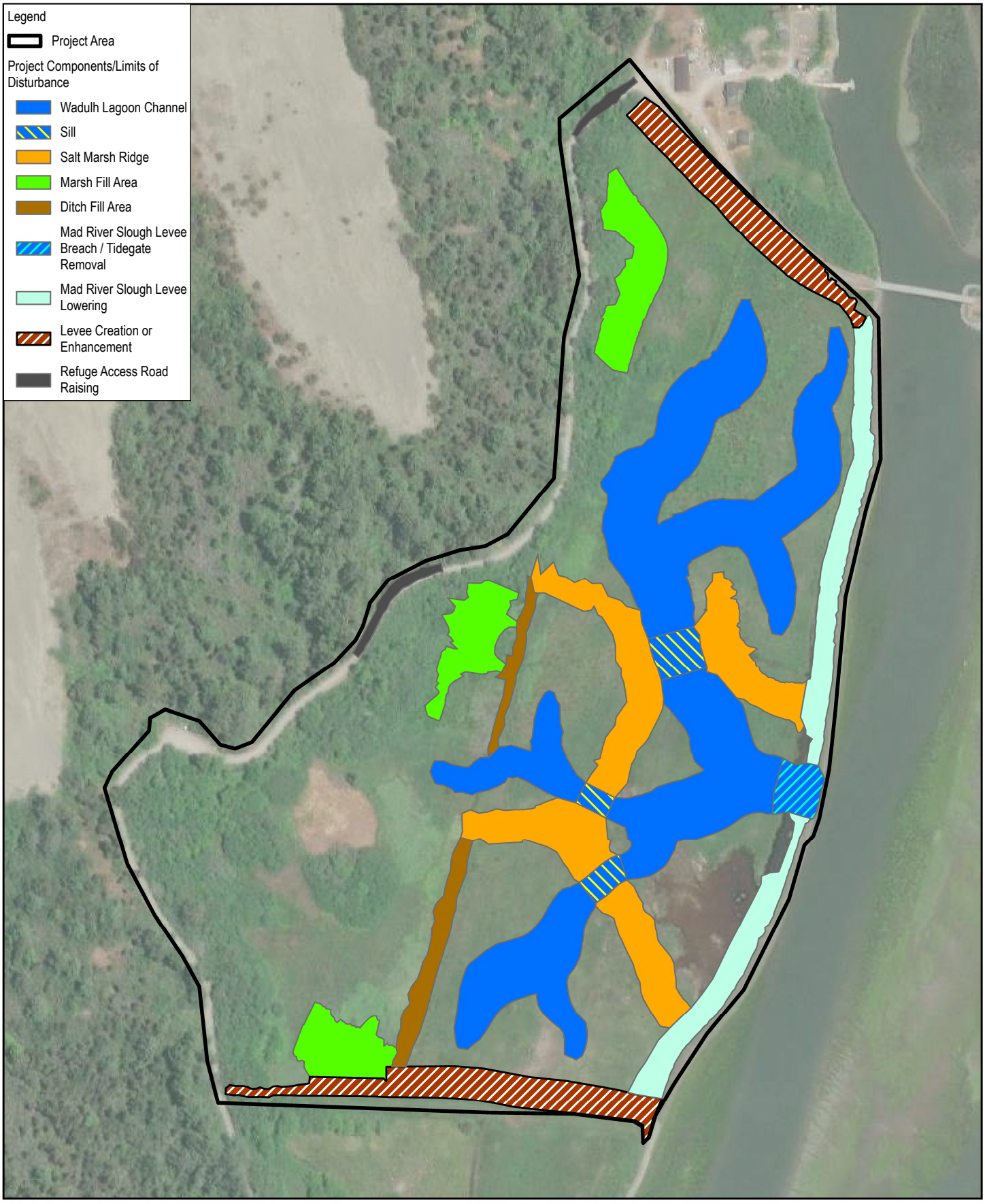

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project No. **12632975**
Revision No. **-**
Date **4/25/2024**

Project Components

FIGURE 4

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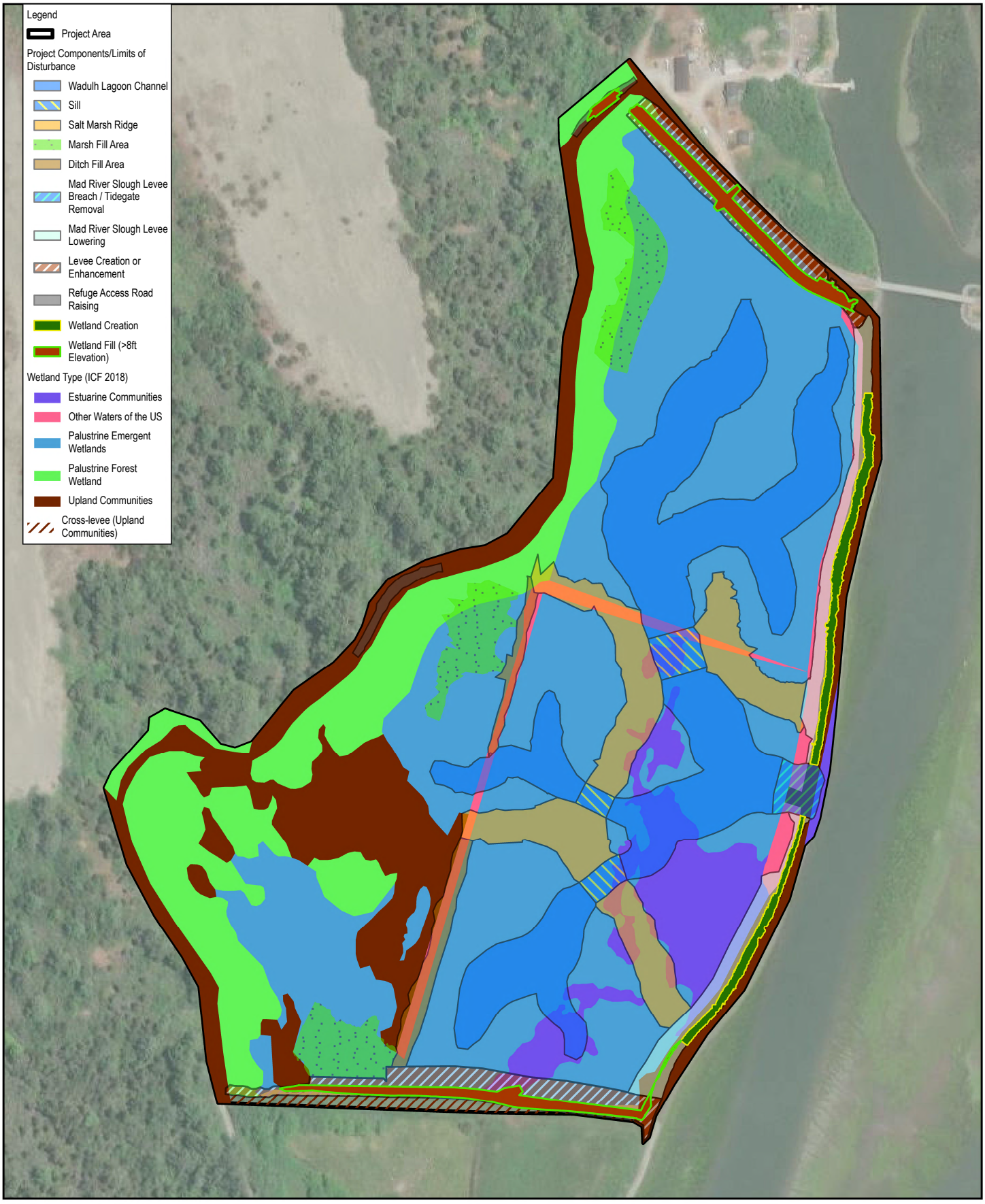

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Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Project Components & Existing Wetlands

Project No. **12632975**
Revision No. **-**
Date **4/25/2024**

FIGURE 5

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Data source: World Imagery: Maxar. Created by: zporteous

TIDAL DATUMS	
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0.0	NAVD88
0.1	MLW
3.2	MTL
6.3	MHW
7.1	MHHW
9.9	5-YEAR
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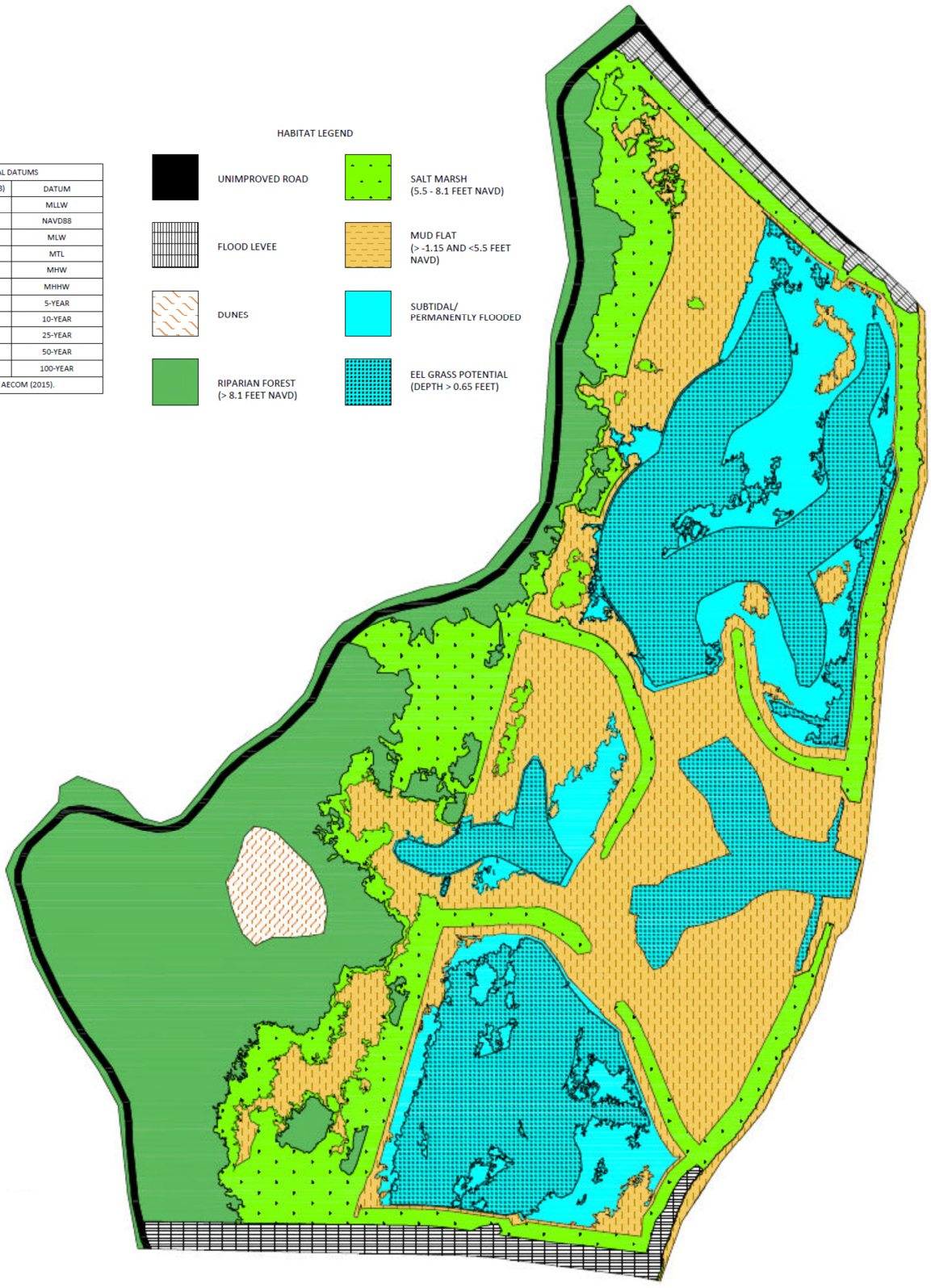
10.5	25-YEAR
10.8	50-YEAR
11.1	100-YEAR
SOURCE: AECOM (2015).	



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GHD

Humboldt County Resource Conservation District
Wadulh Lagoon Tidal
Wetland Enhancement Project

Proposed Post-construction Habitat Based on 30% Design

Project No. **12632975**
Revision No. **-**
Date **4/23/2024**

FIGURE 6

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Appendix B

Wetlands & Waters of the U.S. Delineation Report (ICF 2018a)

Humboldt Bay Area Mitigation Project – Lanphere Parcel, Humboldt County, CA

Wetland & Waters of the U.S. Delineation Report

Humboldt County, California
Tyee City 7.5-Minute Quadrangle,
Township 6 North and Range 1 West, Section 30 SW ¼,
Section 13 SW ¼, Section 23 NE ¼, and Section 24 NW ¼
Caltrans, District 1
1-HUM-101. Post Miles 79.9 to 86.3
EA: 01-36001
EFIS ID# 0114000065

November 2018

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Humboldt Bay Area Mitigation Project – Lanphere Parcel, Humboldt County, CA

Wetland & Waters of the U.S. Delineation Report

Humboldt County, California
Tyee City 7.5-Minute Quadrangle,
Township 6 North and Range 1 West, Section 30 SW ¼,
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Caltrans, District 1
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EA: 01-36001
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November 2018

Prepared By: _____ Date: 11/29/2018

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Caltrans North Region
Coastal Stewardship Branch E1

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List of Tables and Figures

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List of Abbreviated Terms

1987 Manual	1987 U.S. Army Corps of Engineers Wetlands Delineation Manual
APN	Assessor's Parcel Number
Caltrans	California Department of Transportation
CCA	California Coastal Act
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CWA	Clean Water Act
DOQ	Digital Orthophoto Quadrangles
ESHA	environmentally sensitive habitat area
ESL	environmental study limit
F	Fahrenheit
GPS	Global Positioning System
HBAM	Humboldt Bay Area Mitigation
LANDSAT	Land Satellite
LCP	Local Coastal Program
MHW	Mean High Water
MSL	mean sea level
NAIP	National Agriculture Imagery Program
NCSC	Natural Communities of Special Concern
NES	natural environment study
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
redox	Redoximorphic
RPWs	Relatively permanent waters
RWQCB or Water Board	Regional Water Quality Control Board
TNW	traditional navigable water
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlifie Service
USGS	U.S. Geological Survey

Summary

This report summarizes the results of the wetland investigation for the Humboldt Bay Area Mitigation (HBAM) project at the Lanphere parcel and provides technical documentation for all delineated wetlands. Included in this report are the wetland delineation data necessary to obtain 1) a jurisdictional determination by the U.S. Army Corps of Engineers (USACE), and 2) confirmation of the extent of jurisdiction regulated by the Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), and the California Coastal Commission (CCC). This wetland delineation is subject to review and approval by the USACE, RWQCB, CDFW, and the CCC.

The purpose of this wetland delineation was to identify and describe the presence and extent of jurisdictional waters of the United States, including wetlands, within the 54-acre project area (Figure 1, 2) under Sections 404 and 401 of the Clean Water Act (CWA), or Section 10 of the Rivers and Harbor Act, the Porter-Cologne Water Quality Control Act, and the California Coastal Act (CCA).

Dr. Jordan Mayor, an ICF Plant and Wetland Scientist, visited the site with Caltrans staff on May 29, then independently evaluated the 54-acre ESL on May 29 and 31 and June 1 and 4, 2018. During these site evaluations, approximately 30 soil pits were excavated across the site to determine the boundaries between hydric and non-hydric soils and between corresponding hydrophytic and non-hydrophytic plant communities. Care was taken to evaluate representative conditions of both the grazed and non-grazed wetlands across the site and to specifically target the center of previously mapped non-wetland "uplands". Wetland delineation data forms were completed for 12 sampling points from locations that aligned as paired transects spanning wetland boundaries with one upland and one wetland sampling point (two additional wetland points did not have associated upland points) (Figure 6). Wetland determination data forms are provided in Appendix B. The ICF delineator conducted wetland delineations in all areas of the ESL during which they identified 47.4 acres of potential CWA Section 404 three-parameter wetlands and waters of the United States and 1.1 acres of additional potential one- and two-parameter CCA defined wetlands (totaling 46.2 acres of strictly defined CCA wetland waters, a value that excluded 2.4 acres of tidal waters in Mad River Slough). As a result, Delineators identified 6.8 acres of CWA Section 404 non-wetland upland habitat, including approximately 0.8 acres of remnant dune, and 5.7 acres of CCA non-wetland uplands in the ESL.

Chapter 1 Introduction

1.1 Project Location

The Humboldt Bay Area Mitigation project's Lanphere Parcel is in Humboldt County, California, bordering Lanphere Road behind an existing levee along Mad River Slough in the northern portion of Humboldt Bay. From the intersection of U.S. Highway 101 and Giuntoli Lane, the site is approximately 0.6 mile south on Janes Road, then 0.7 mile west on Upper Bay Road, which transitions to Lanphere Road for an additional 1.6 miles. The project area is approximately 1.8 miles south of the unincorporated town of Tyee City, 2.3 miles north of Manila, and 0.5 mile east from the immediate coastline in Humboldt County. The project area lies along the south and east sides of Lanphere Road, which can be found on the Tyee City 7.5-minute U.S. Geological Survey (USGS) quadrangle, Township 6 North, Range 1 West, Sections 23 and 24. The location of the project area is shown on Figure 1. The Assessor's Parcel Number (APN) is 506-291-014, and the parcel owner is the California Department of Transportation (Caltrans).

1.2 Environmental Study Limit

The environmental study limit (ESL) defines the area where waters of the United States, including wetlands, were examined. The ESL includes the area where all proposed project elements associated with a compensatory mitigation project would take place (e.g., excavation and fill associated with removal of an existing levee, restoration of tidal mudflat, and construction of an inland eco-levee). The ESL area is approximately 54 acres and encompasses the conceptual plan for the compensatory mitigation project (Figure 2).

The Lanphere parcel is adjacent to public lands (Lanphere Dunes Unit of the Humboldt Bay National Wildlife Refuge Complex), low-density rural residential land, and the Mad River Slough which leads to Humboldt Bay. Vegetation found within and directly adjacent to the ESL includes riparian wetland forest fore-dune communities (e.g., coastal dune willow thickets, wax myrtle scrub, and beach pine forest) in the west, sedge or forb dominated wetlands and non-wetland shrub communities (e.g., coastal brambles) that have been historically shielded from grazing, and agriculturally modified wetland pastures in the low lying flat areas to the east of diked drainage ditches that bisect the parcel. A muted tidally influenced (estuarine) reach of the Mad River Slough flows through a failed tide gate within the ESL, creating pockets of salt-tolerant estuarine plant communities within a portion of the modified wetland pastures.

1.3 Project Description

Proposed compensatory mitigation within the 54-acre Lanphere Parcel includes the reestablishment of approximately 30 acres of estuarine intertidal emergent and unconsolidated shore (mudflat), including tidal channels, as well as 6 acres of forested wetland expansion and

upland buffer restoration. Some non-wetlands would be converted to palustrine and estuarine wetlands and some palustrine wetland pastures would be enhanced and re-established as estuarine wetlands with muted tidal influence.

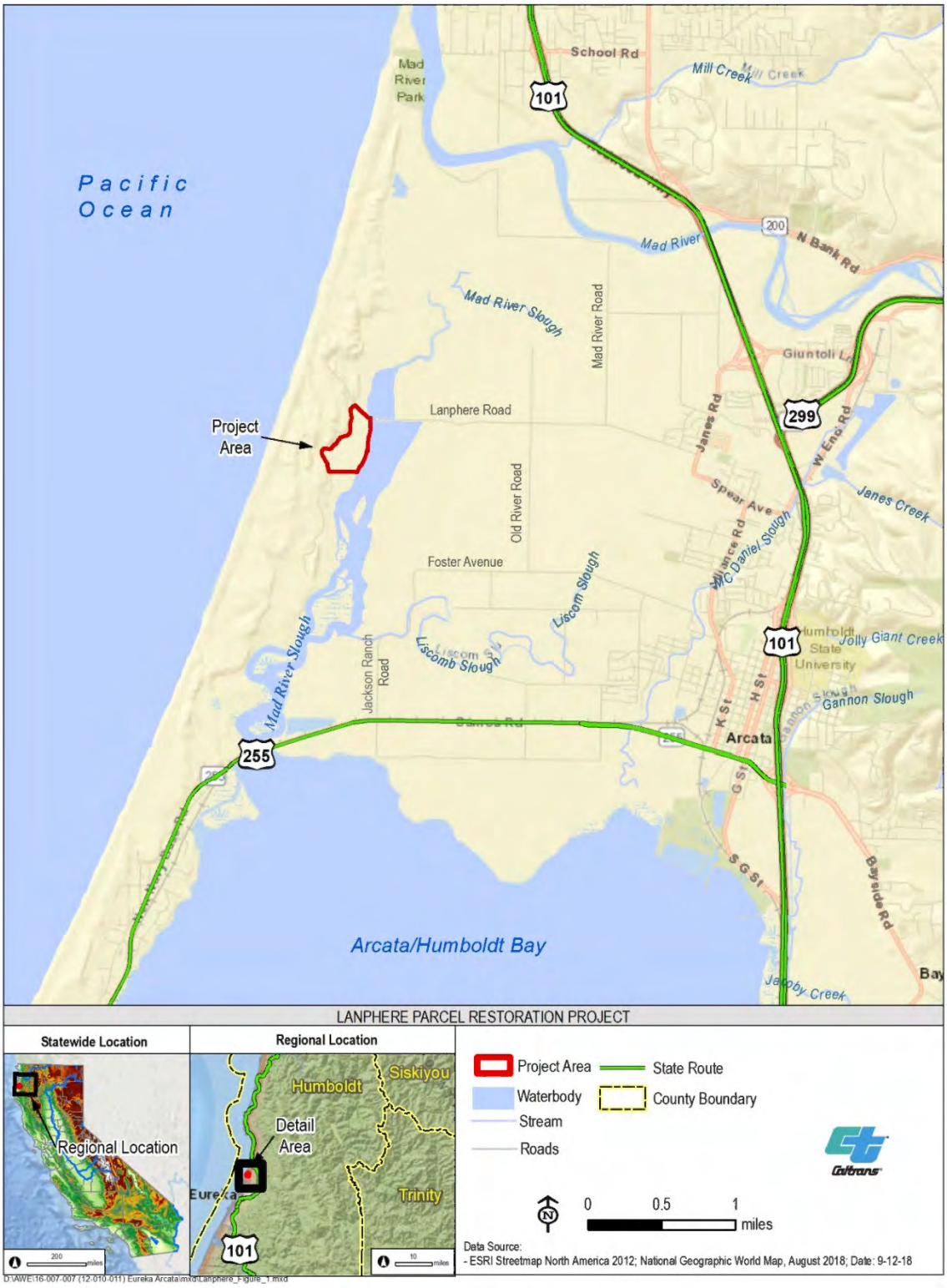

Figure 1. Project Vicinity

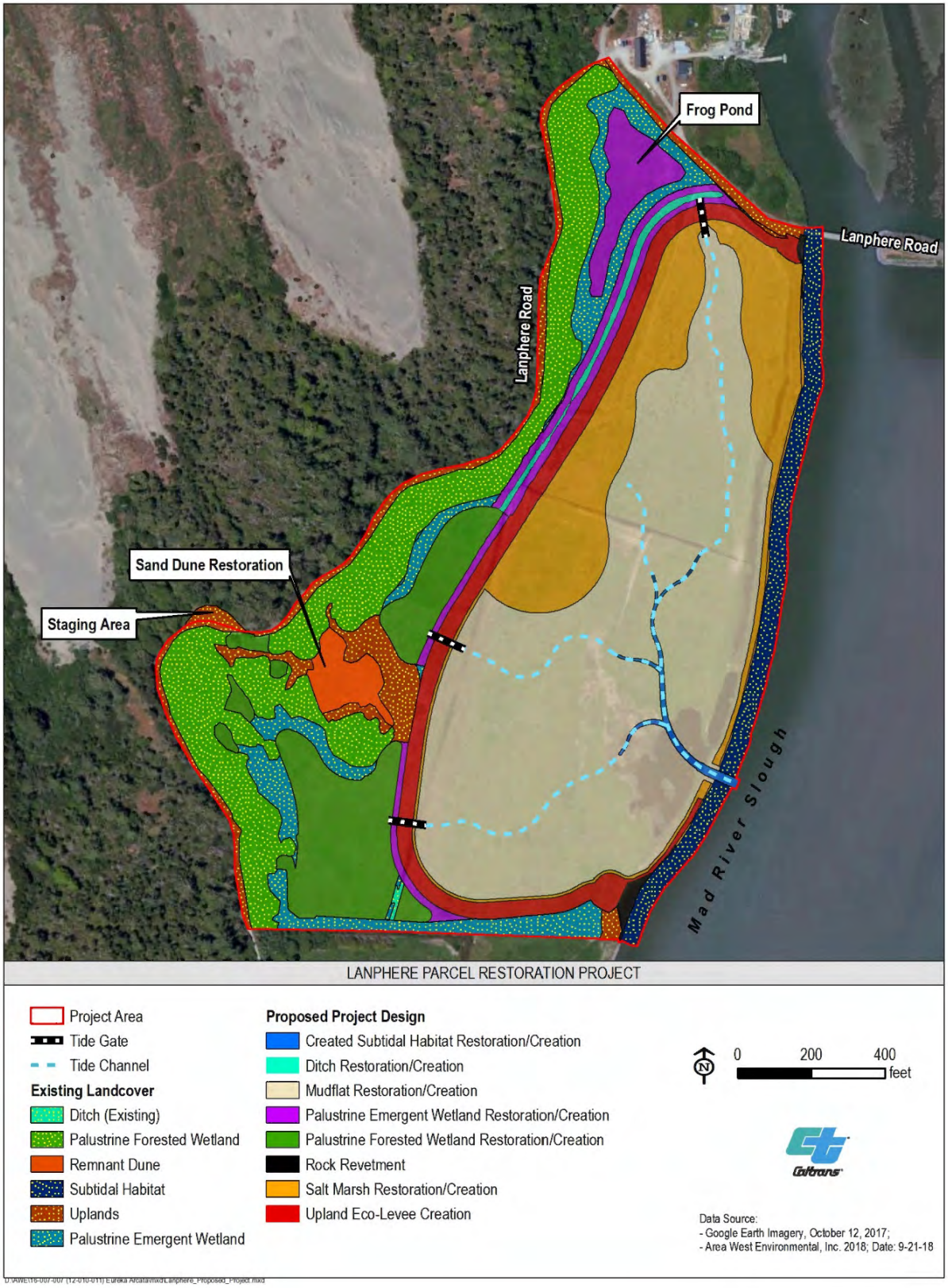

Figure 2. Draft Conceptual Plan for the Project Defining the Environmental Study Limit

The site has a history of previous wetland delineation efforts. Between December 12, 2006 and April 12, 2007, staff from Caltrans and the U.S. Fish and Wildlife Service (USFWS) hand-dug 10 open soil pits and monitored groundwater hydrology by recording the depth to the water table. Six of the 10 pits contained water within 12 inches of the soil surface for 18 or more consecutive days. Four of the 10 pits were saturated or contained water for less than 18 days and were, therefore, considered to exhibit non-wetland (upland) hydrological conditions. The location of these pits were limited to the eastern side of the site in grazed areas. No estimates of upland and wetland acreages at the site were attempted from this spatially limited hydrologic dataset. The associated wetland determination datasheets for these ten soil pits were not fully complete and did not report plant relative cover, limiting further conclusions. They did, however, indicate that all 10 soil pits contained hydric soil field indicators.

In the summer of 2008, Caltrans staff consulted with Dan Martel (U.S. Army Corps of Engineers [USACE], San Francisco District) on how to best evaluate the site given grazing pressure has made plant-based metrics problematic. They settled on an exhaustive point intercept method where 315 sample plots were evaluated for hydrophytic vegetation between July 14 and 23, 2009. This resulted in 241 plots with hydrophytic vegetation and 74 without. Most of the non-wetland (upland) plots were clustered in an area of approximately 14.4 acres, and this area was described as a wetland/non-wetland mosaic. The proportion of wetland plots within this mosaic was then used to calculate 8.5 acres of non-wetland (upland) across the site. No soil data accompanied this vegetative survey, thus the resulting acreages were based solely on the presence or absence of hydrophytic vegetation at a site determined by USACE to contain problematic vegetation.

In winter of 2010, Caltrans and USFWS staff revisited the site and applied a set of parameters defined by Dan Martel (USACE) to determine wetland and non-wetland boundaries. These parameters appear to be based on the cutoff for Redox Dark Surface [F6] Field Indicator of hydric soil when a soil matrix value is 3 or less and the chroma is 2 or less (U.S. Army Corps of Engineers 2010). These included defining upland area as having:

- convex topography,
- <5% redox features within 9 inches of the soil surface (in chroma 2 soils),
- a water table at >10 inches deep (due to a wet season assessment period), and
- dominance by either FAC or FACU plants.

The winter 2010 delineation consisted of six transects and 16 data points. All data forms provided from this effort were incomplete with missing plant absolute cover estimates, site condition information, or presence/absence of hydric soil or hydrology indicators. Soils in the uplands identified by this 2010 study were reported to contain less than 5% redox concentrations. This resulting map depicted 16.5 acres of uplands and was jurisdictionally approved by Dan Martel in March 23, 2010 based upon two soil pits examined in the northern end of the parcel. There is no accompanying documentation apart from a map dated March 23, 2010, and then a map re-verified by USACE in April 2015, thus the validity and defensibility of this effort has been questioned by Caltrans and CDFW staff.

1.4 Delineator qualifications

Jordan Mayor, Ph.D. in Plant and Ecosystem Ecology, University of Florida, December 2010; M.A. in Botany, Humboldt State University, May 2005; 5-day Wetland Delineation course, GHD Inc. March 2016; Advanced 2-day Wetland Delineation course, National Estuarine Research Reserve, November 2017; 3 years' experience conducting wetland delineations, including along the Humboldt Bay Area Trail North, and 6 years' experience conducting rare plant surveys and vegetation mapping in Northern California and Southern Oregon.

Chapter 2 Setting

2.1 Climate

The ESL is within the California Floristic Province, North West Region, North Coast subregion, along the Pacific Ocean, and experiences wet, cool winters, and dry, mild, foggy summers (Baldwin et al. 2012). The climate in this region is mild with average monthly temperatures ranging from a low of approximately 41°F to a high of approximately 64°F during summer months. Mean annual rainfall in the ESL is approximately 40 inches as reported in WETS tables available from the NRCS National Water and Climate Center (Woodley Island WETS Station 1971-2018).

2.2 Topography

The ESL is along the fore-dune forest approximately 0.5 mile east of the Pacific Ocean and adjacent to the Mad River Slough at the northern end of Humboldt Bay. Topography is relatively flat except where the fore-dune slopes down to the modified wetland pasture. Lanphere Road defines the western and northern boundary, and a levee separates Mad River Slough on the eastern boundaries. Elevation within the ESL ranges from approximately 0 to 180 feet above mean sea level (MSL).

2.3 Hydrology/Watershed Information

The project is in the Humboldt Bay watershed (Hydrologic Unit Code 180101020605); a watershed extending 74.5 square miles (47,706 acres) (WATERS 2018). Special-status species that could occur in the watershed include 44 plant species and 30 wildlife species according to the California Natural Diversity Database (CNDDB) maintained by the California Department of Fish and Wildlife (CDFW) and species lists maintained by USFWS and National Marine Fisheries Service (NMFS). The likelihood of a subset of these species being present in the ESL are detailed in an accompanying natural environment study (NES) being prepared by Caltrans. In addition to special-status species, the California Coastal Act (CCA) provides protections to environmentally sensitive habitat areas (ESHAs) identified within the coastal zone of this watershed.

Humboldt Bay, to which the Mad River Slough flows into some 2 miles to the south, is on the U.S. Environmental Protection Agency 303(d) list of waterbodies impaired by sediment. The Mad River Slough, on the border of ESL, is a traditional navigable water (TNW) that drains directly to the Pacific Ocean via Humboldt Bay.

Wetland features shown on the National Wetlands Inventory (NWI) wetlands map (Figure 3) include palustrine forest and emergent vegetation in the ESL and estuarine and marine deepwater and non-deepwater habitats influenced by the Pacific Ocean just beyond the levee.

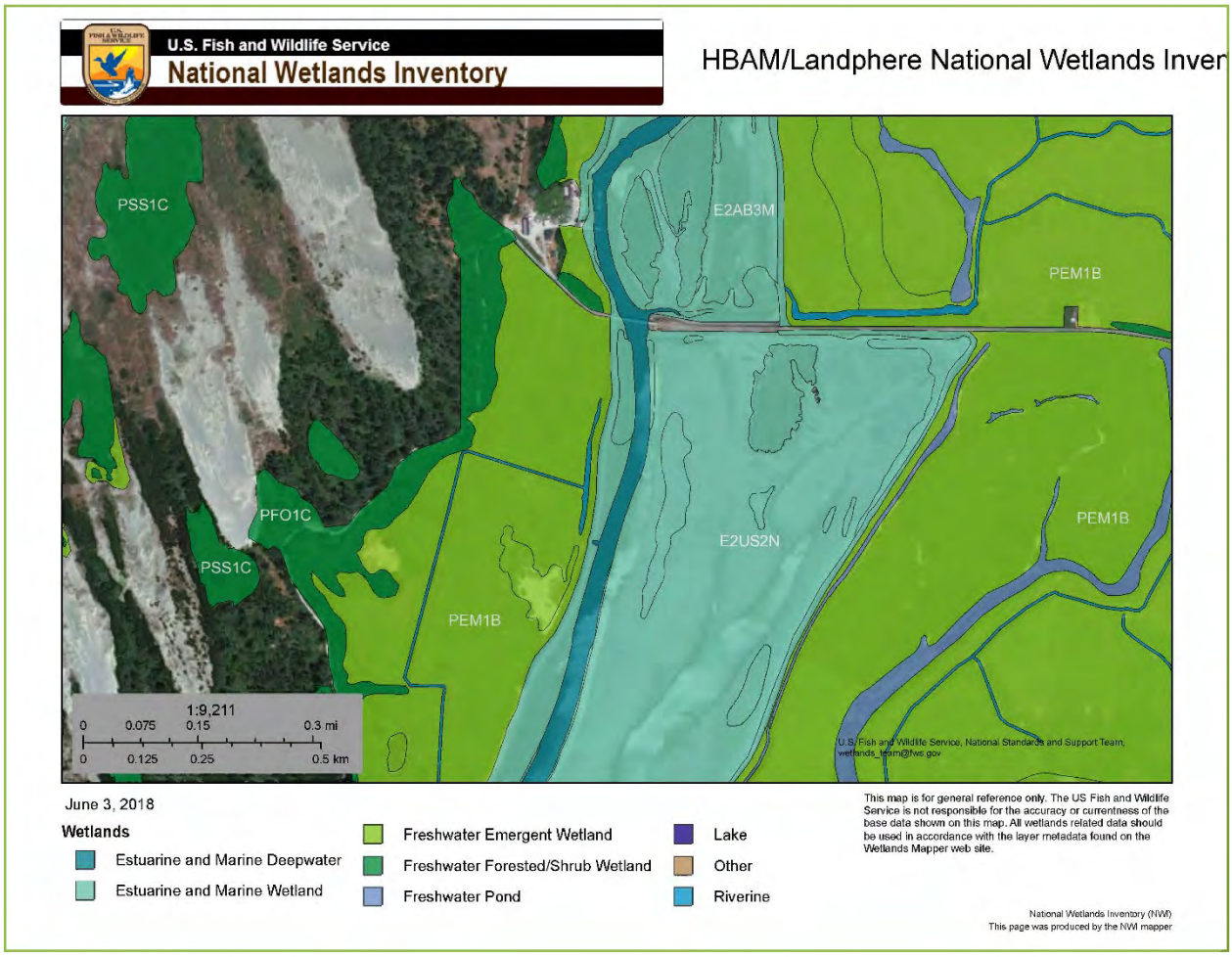

Figure 3. National Wetlands Inventory Map

2.4 Soils

According to the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) (2018), soil map units present within the ESL include:

- Arlynda, 0–2% slopes
- Lanphere, 2–75% slopes

The following descriptions are derived from USDA NRCS (2018).

The Arlynda series, mapped over 90% of the ESL (Appendix A), consists of very deep, very poorly drained soils on backswamps, depressions, meander scars, and low flood-plain steps on alluvial plains near the Pacific Ocean and along lower reaches of rivers and streams. Slopes can range from 0–9% according to the type location of this soil 2 miles west of Loleta in Humboldt County; steeper slopes occur only on short meander scar side slopes. Soils tend to be moist from 5–16 inches in most years and saturated in some parts during the months of December through April. The soils have an aquic moisture regime with anaerobic conditions, typically contain 25–

34% clay in the A horizon (3–14 inches), and redoximorphic features within 4 inches of the soil surface.

The Lanphere series, mapped over 10% of the ESL (Appendix A), consists of very deep, somewhat excessively drained soils formed in aeolian sands on dune fields and coastal plains. Slopes can range from 2–75% according to the type location of this soil 3 miles west of Arcata in Humboldt County. Soils have an udic (humid) moisture regime, sandy texture, and redoximorphic features may develop from brief and localized saturated conditions around root channels during the winter months.

2.5 Vegetation

Much of the wetland areas on the eastern side of the grazed portion of the parcel, areas beyond the north/south drainage ditches and electric fencing, are comprised of mixtures of native and nonnative species in a grazed wetland pasture, as shown in Figure 4. Common nonnative grasses in this grazed wetland matrix include: creeping bent-grass (*Agrostis stolonifera*), sweet vernal grass (*Anthoxanthum odoratum*), tall fescue (*Festuca arundinacea*), perennial rye grass (*Festuca perennis*), velvet grass (*Holcus lanatus*), Kentucky blue grass (*Poa pratensis*), meadow false rye grass (*Schedonorus pratensis = Festuca arundinacea*), and rough blue grass (*Poa trivialis*). Patches of spreading rush (*Juncus patens*) persist in the grazed wetland pastures due to their unpalatability. This wetland pasture extends east to an interior ditch along the base of the existing levee. This ditch floods at high tide due to a failing tide gate and, consequently, some areas of pasture near the levee ditch are dominated by brackish salt-tolerant species, such as pickleweed (*Salicornia pacifica*), brass buttons (*Cotula coronopifolia*), sicklegrass (*Parapholis incurva*), tufted hairgrass (*Deschampsia cespitosa*), and saltgrass (*Distichlis spicata*). Other native herbaceous species persist in the grazed areas due largely to their unpalatable nature, including patches of saltgrass, spike-rush (*Eleocharis macrostachya*), mariposa rush (*Juncus dubius*), and spreading rush.

More natural ungrazed herbaceous plants exist in generally wetter areas to the west of the north/south drainage ditches and electric fencing, including: meadow foxtail (*Alopecurus geniculatus*), spike-rush, giant horsetail (*Equisetum telmateia*), spreading rush, water parsley (*Oenanthe sarmentosa*), pacific silverweed (*Potentilla anserina* ssp. *pacifica*), small-fruited bulrush (*Scirpus microcarpus*), bracken fern (*Pteridium aquilinum*), and California blackberry (*Rubus ursinus*). Nonnative herbaceous species in these areas include patches of manna grass (*Glyceria occidentalis*), velvet grass, Reed canarygrass (*Phalaris arundinacea*), and creeping buttercup (*Ranunculus repens*), and broadleaf cattail (*Typha latifolia*). The freshwater ditches running north/south contain patchworks of open water and hardstem bulrush (*Schoenoplectus acutus*).

Woodland vegetation exists along the western edge of the property and is comprised of mixtures of coastal dune willow (*Salix hookeriana*) and wax myrtle (*Morella californica*). Other species present within these areas include red alder (*Alnus rubra*), salmon berry (*Rubus spectabilis*), chain fern (*Woodwardia fimbriata*), giant horsetail, Watson's wild cucumber (*Marah watsonii*), evergreen huckleberry (*Vaccinium ovatum*), skunk cabbage (*Lysichiton americanus*), poison oak (*Toxicodendron diversilobum*), and slough sedge (*Carex obnupta*). These areas are considered

palustrine forest wetlands, and each are described in detailed forest alliance descriptions in an accompanying NES being prepared by Caltrans.

Much of the wetlands identified at the site are also considered Natural Communities of Special Concern (NCSC) can be found in the ESL (Table 1). These include: coastal dune willow thickets, coastal brambles, Pacific silverweed marshes, slough sedge swards, small-fruited bulrush marsh, water parsley marsh, and wax myrtle scrub. Beach pine forest is located outside of the ESL along the western border of Lanphere Road. These natural vegetation types have been assigned Global and State Rankings based on the NatureServe's Network Core Methodology described here: *http://vegetation.cnps.org/faq*. Existing NCSC's within the ESL are also considered ESHA's by the California Coastal Commission (CCC) and consideration of such habitats within a 100 foot buffer of the Project Area (i.e., ESL) may be of interest to the CCC. Such a 100 foot buffer is mapped on Figure 4 as the Biological Study Area (BSA).

Table 1. Vegetation Alliance Types Present in the Lanphere Environmental Study Limits and Assigned Global and State Rankings Based on the NatureServe's Network Core Methodology

Vegetation Alliance Name	Global and State Rarity	Acreages in the Lanphere Mitigation Parcel
Forest Alliances		
Wax Myrtle Scrub	G3 S3	0.453
Coastal Dune Willow Thickets	G4 S3	5.718
Beach Pine Forest	G5 S3	outside of mitigation parcel
Red Alder Forest	G5 S4	1.628
Herbaceous Alliances		
Small-Fruited Bulrush Marsh	G4 S2	0.724
Pacific Silverweed Marsh	G4 S2	2.294
Water Parsley Marsh	G4 S2?	0.021
Slough Sedge Sward	G4 S3	0.150
Coastal Brambles	G4 S3	2.015
Water Foxtail Meadow	G3? S3?	0.242
Non-Rare Herbaceous Alliances		
Pale Spike Rush Marsh	G4 S4	0.499
Hardstem Bulrush Marsh	G5 S4	0.108
Salt Grass Flats	G5 S4	2.096
Cattail Marsh	G5 S5	0.139

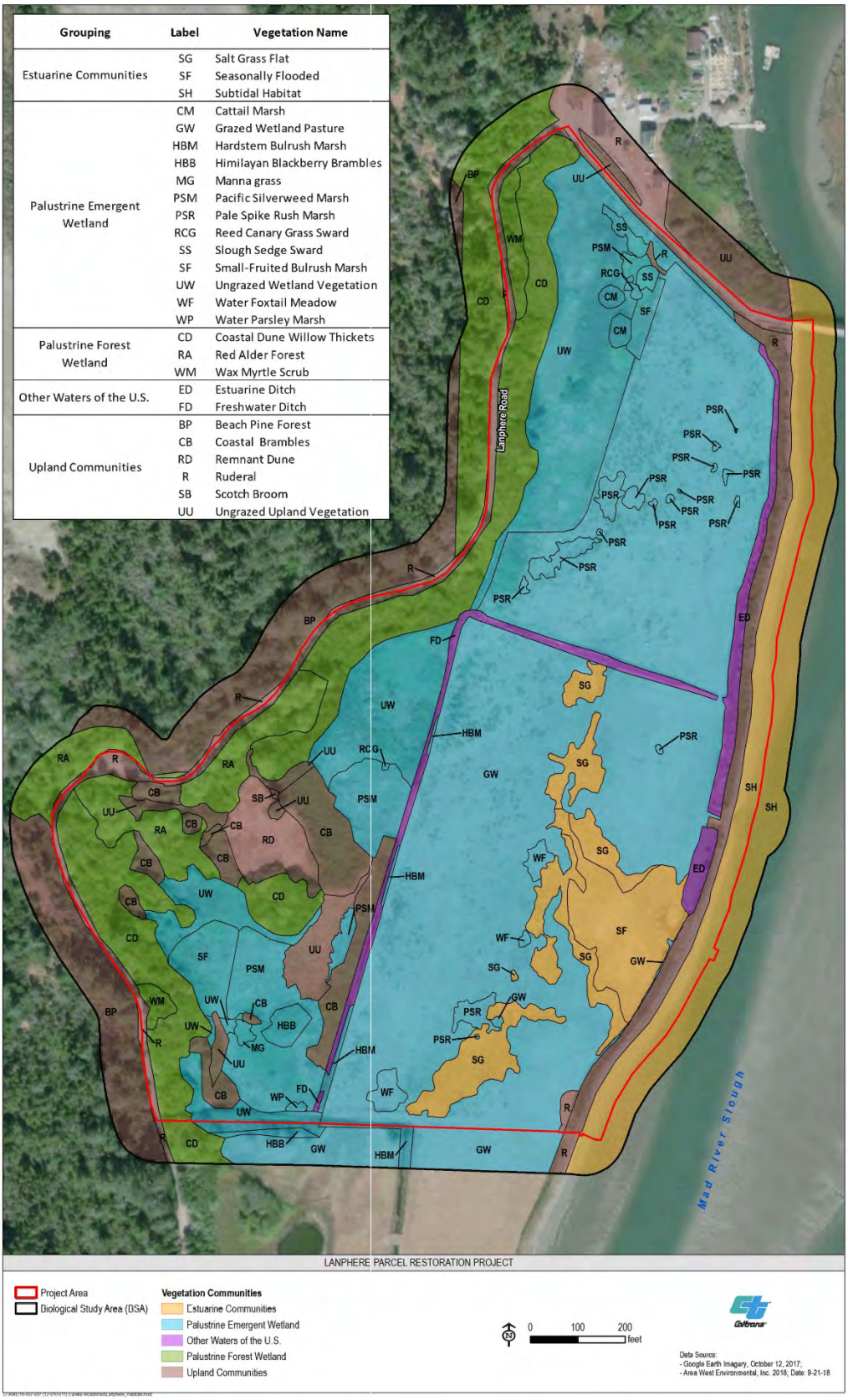

Figure 4. Existing Habitats within the Project Area plus a 100 foot Buffer (BSA)

Chapter 3 Methods

USACE defines jurisdictional wetlands under CWA Section 404 as areas that exhibit positive field indicators for all three wetland parameters (discussed below in Section 3.2). Within the Coastal Zone, the CCC and associated Humboldt County and Local Coastal Zone ordinances adopted by the City of Arcata may require only one of these parameters to be present for the area to be considered a wetland (California Coastal Commission 2011).

The Mad River Slough, just east of the levee, is tidally influenced and, therefore, also regulated under Section 10 of the Rivers and Harbor Act. Thus, the extent of USACE Section 10 jurisdiction in this segment of the slough was determined by delineating the mean high water (MHW) elevation. The limits of USACE Section 404 jurisdiction for non-tidal, non-wetland waters would instead be delineated by locating the ordinary high water mark (OHWM) in the field.

The maps included in this report were generated from field measurements, interpretation of aerial photography, and field mapping using a Trimble Geo7X brand Global Positioning System (GPS) with sub-meter accuracy, and existing geospatial datasets.

Prior to field investigations, previous studies as well as topographical, soil, and wetland inventory maps were studied in conjunction with aerial images to preliminarily identify areas where wetlands were likely to occur.

3.1 Sources of Information

The sources of information reviewed in conjunction with field work are summarized below.

3.1.1 USGS Topographic Quadrangle Maps

The ESL occurs in the Tyee City quadrangle of the USGS (2015) 7.5-minute topographic map (Figure 5). The most recent map available is from 2015 and shows that the ESL varies in elevation from sea level to approximately 20 feet above MSL.

3.1.2 Aerial Imagery

Aerial photographs or satellite imagery can be particularly useful for the identification of saturated soils where plant cover is sparse, ponding occurs, or where drainage patterns become evident. Particularly, a comparison of the same site over time and at different times during the year can show areas of inundation or saturation or patterns of vegetation reflecting hydric conditions. Numerous sources of imagery are available such as National Agriculture Imagery Program, Land Satellite, Digital Orthophoto Quadrangles, and Google Earth. These types of images are also useful in the identification of riparian vegetation and prominent wetland features that are not accessible or that occur adjacent to but outside the ESL. Saturation visible on aerial

imagery is considered by USACE as a secondary indicator for the presence of hydrology in a study area. These signatures of wetland hydrology can be examined in the office and then confirmed during a field site visit. For this delineation, Basemap World Imagery was used because it has the most recent and clear (unpixelated) aerial image of the ESL (Environmental Systems Research Institute 2017).

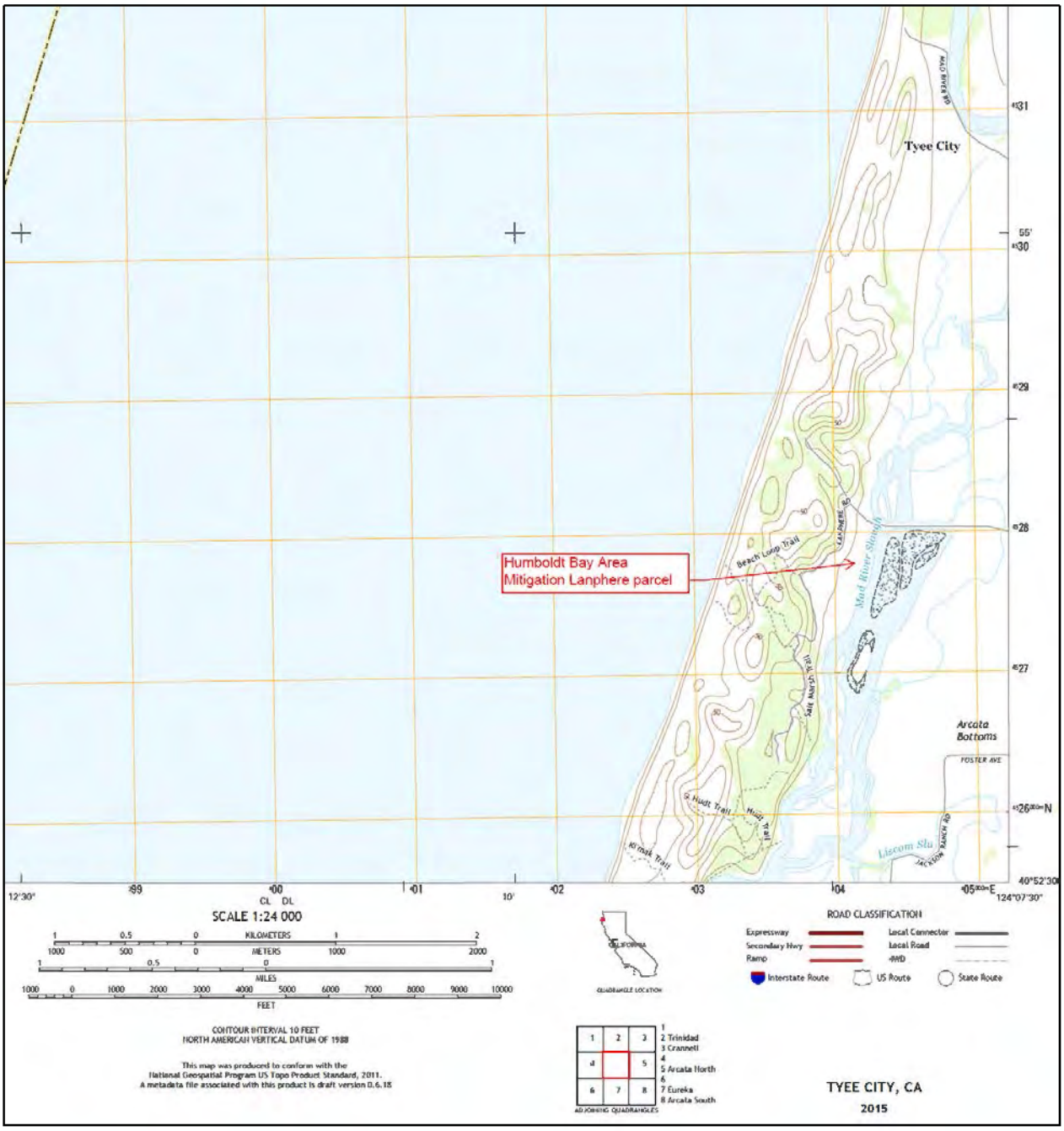

Figure 5. Detail of USGS Topographic Map, Tyee Quadrangle

3.1.3 National Wetlands Inventory Maps

The National Wetlands Inventory (NWI) provides maps and information on the status, extent, characteristics, and functions of wetland, riparian, deepwater, and related aquatic habitats. The mapping is provided by USFWS at a scale of 1:24,000 and classifies aquatic features in the Cowardin system (Federal Geographic Data Committee 2013) as adapted from Cowardin et al. (1979). The wetland definition differs from the USACE definition in that it requires the presence of only a single wetland parameter compared to USACE's requirement of positive indicators of all three wetland factors (hydrophytic vegetation, hydric soils, and wetland hydrology). These maps are a supplemental tool for onsite wetland investigations and should be used with caution as all wetlands have not been mapped and the maps can be limited by scale. A NWI map was created by using the NWI web application (Figure 3) (U.S. Fish and Wildlife Service 2018).

In summary, the NWI mapping can provide useful background information on the broad types of wetland and riparian vegetation communities but cannot be used to delineate wetlands and other waters of the United States.

3.1.4 Soil Survey

The NRCS maintains published soil surveys for counties across the United States that provide information on the origin of soils, their composition and texture, and their use for agriculture. Additionally, NRCS keeps a list of hydric soils in California which contains soils from county soil surveys that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. Of the soils mapped in the ESL, the Arlynda series, 0–9% slopes is recognized as a hydric soil that meets Criteria 4, frequent flooding for a long duration of the growing season (Natural Resources Conservation Service 2018; Appendix A).

3.2 Field Methods

Evaluations of USACE jurisdictional waters of the United States under Section 404 of the CWA were based on the routine onsite determination methods described in: the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* (1987 Manual) (Environmental Laboratory 1987); and, the supplemental procedures and wetland indicators provided in: the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*, *Version 2.0* (U.S. Army Corps of Engineers 2010); *A Field Guide to the Identification of the Ordinary High Water Mark in the Western Mountains, Valleys, and Coast Region of the United States* (U.S. Army Corps of Engineers 2014); *Ordinary High Water Mark Identification* Regulatory Guidance Letter (U.S. Army Corps of Engineers 2005); the *State of California 2016 Wetland Plant List* (Lichvar et al. 2016); *Jurisdictional Determinations* Regulatory Guidance Letter (U.S. Army Corps of Engineers 2016a); *Information Requested for Verification of Corps Jurisdictions* (U.S. Army Corps of Engineers 2016b); *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* (U.S. Army Corps of Engineers 2016c); and, the *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils*, *Version 8.1* (U.S. Department of Agricultural Natural Resources Conservation Service 2017).

Wetlands and other waters of the United States in the ESL consist of the following categories of jurisdictional features.

- California Coastal Act Wetlands – For the purposes of this report, wetlands identified as CCA wetlands are one-parameter and two-parameter wetlands that are in addition to the three-parameter wetlands described below as CWA Section 404 wetlands and are preliminarily determined to be under the jurisdiction of the CCC or a Local Coastal Program (LCP). CCA Section 30121 defines a wetland as: *lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*
- Clean Water Act Section 404 Wetlands – The three parameters used to determine the presence of CWA Section 404 wetlands are (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. According to the 1987 Manual, "*…[E]vidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland delineation* (p. 12)." However, according to the *Regional Supplement* (U.S. Army Corps of Engineers 2010), "…*Some wetlands can be difficult to identify because wetland indicators may be missing due to natural processes or recent disturbances,"*… and… "*wetland determinations on difficult or problematic sites must be based on the best information available to the field inspector, interpreted in light of his or her professional experience and knowledge of the ecology of wetlands in the region*" (p. 98).
- Traditional Navigable Water – Includes all waters subject to the ebb and flow of the tide, or waters that are presently used, have been used in the past, or may be used in the future to transport interstate or foreign commerce and all waters that are navigable under federal law for any purpose. The portion of the tidally influenced TNW Mad Rivers Slough within the ESL was delineated by the MHW elevation using detailed contour lines, National Oceanic and Atmospheric Administration tide datum for the North Spit, Humboldt Bay (9418767), aerial images, and field verification.
- Relatively Permanent Waters – Waters that flow continuously at least seasonally (typically at least 3 months of the year) and are not navigable, but are tributaries to a TNW. Relatively permanent waters (RPWs) within the ESL were delineated by observations of the OHWM, if present, or mapped as linear contours where exceedingly narrow.
- Non-RPW – Waters that do not have continuous flow at least seasonally but have a significant nexus to a TNW. As with RPW, non-RPW waters within the ESL were delineated by observations of the OHWM, if present, or mapped as linear contours where exceedingly narrow.

Section 13577(b) of the California Code of Regulations[1] provides additional guidance regarding establishment of the boundary of a wetland for the purpose of permit and appeal jurisdiction boundary determinations:

[1] Section 13577 of the California Code of Regulations is found in Title 14 (Natural Resources), Division 5.5 (California Coastal Commission), Chapter 8 (Implementation Plans), Subchapter 2 (Local Coastal Programs and State University or College Long Range Development Plans), Article 18 (Map Requirement and Boundary Determination Criteria).

(1) Measure 100 feet landward from the upland limit of the wetland. Wetland shall be defined as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent and drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salts or other substances in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deep-water habitats. For purposes of this section, the upland limit of a wetland shall be defined as:

(A) the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover;

(B) the boundary between soil that is predominantly hydric and soil that is predominantly nonhydric; or

(C) in the case of wetlands without vegetation or soils, the boundary between land that is flooded or saturated at some time during years of normal precipitation, and land that is not.

(2) For the purposes of this section, the term "wetland" shall not include wetland habitat created by the presence of and associated with agricultural ponds and reservoirs where:

(A) the pond or reservoir was in fact constructed by a farmer or rancher for agricultural purposes; and

(B) there is no evidence (e.g., aerial photographs, historical survey, etc.) showing that wetland habitat pre-dated the existence of the pond or reservoir. Areas with drained hydric soils that are no longer capable of supporting hydrophytes shall not be considered wetlands.

3.2.1 Vegetation

All plant species encountered during fieldwork were recorded. The indicator status assigned to a plant species designates the probability of that species occurring in a wetland. The wetland occurrence probability and abbreviations utilized in the lists are presented in Table 2. A species with an indicator of OBL, FACW, or FAC is considered to be typically adapted for life in a wetland (i.e., hydrophytic vegetation). A species indicator of FACU and UPL indicates an upland species.

The dominant vegetation at each sampling point was noted and evaluated for prevalence of hydrophytes. Indicator status follows Lichvar et al. (2016). Scientific names follow Lichvar et al. (2016) and *The Jepson Manual, second edition* (Baldwin et al. 2012).

Table 2. Wetland Indicator Status

Wetland Indicator Status	Definition
Obligate Wetland (OBL)	Almost always occur in wetlands
Facultative Wetland (FACW)	Usually occur in wetlands, but may occur in non-wetlands
Facultative (FAC)	Occur in wetlands or non-wetlands
Facultative Upland (FACU)	Usually occur in non-wetlands, but may occur in wetlands
Obligate Upland (UPL)	Almost never occur in wetlands

3.2.2 Hydrology

Wetland hydrology is a term which encompasses hydrologic characteristics of areas that are periodically inundated or saturated near the surface. The wetland hydrology standard is considered met when soils are saturated within 12 inches of the surface in most years (>50%) for more than 12.5% of the growing season (Environmental Laboratory 1987) or a conventional standard of 14 consecutive days unless USACE Districts have adopted a different standard at the local or regional level (U.S. Army Corps of Engineers 2010). The growing season is defined as periods of time where soil temperatures fall below biological zero, a value that is approximated as the number of frost-free days greater than 28 °F (−2.2 °C) air temperatures (Malone and Williams 2010). At Lanphere, frost free periods typically extend for greater than 338 days of the year in 70% of the last 47 years (Woodley Island WETS Station 1971-2018) so 12.5% of the growing season would equal 42 days of inundation during a year of normal rainfall. Observation of inundation or saturation within 12 inches of the surface for 5–12.5% of the growing season may be considered a wetland depending upon other parameters (hydrophytic vegetation and hydric soils), however areas with standing water or water saturation to the surface for less than 5% of the growing season will not meet the definition of a wetland (Environmental Laboratory 1987).

Evidence of wetland hydrology can include primary indicators, such as visible inundation or saturation, surface sediment deposits, and drift lines, or less reliable secondary indicators such as dry season water table or a FAC-neutral test. Dry seasons are the period of the year when soil moisture is normally being depleted and water tables are falling in response to decreased precipitation and increase evapotranspiration; conditions that vary by locale and year (U.S. Army Corps of Engineers 2010). Typical dry seasons along Humboldt Bay would correspond to the months of June to September when monthly rainfall averages are below 1 inch (Woodley Island WETS Station 1971-2018). When studies are conducted at a time of year when surface water, ground water, or saturated soils cannot be observed, the wetland is considered naturally problematic and evidence of wetland hydrology is based on observation of the secondary hydrology indicators described in the 1987 Manual. At least two secondary indicators must be present to conclude that an area has wetland hydrology. However, some wetlands may lack any of the listed hydrology indicators, particularly during the dry season or in a dry year (U.S. Army Corps of Engineers 2010, p. 116). The potential wetlands in the ESL were examined for these hydrologic indicators. The presence of any primary or secondary wetland hydrologic indicators was noted at each sampling point.

3.2.3 Soils

The National Technical Committee for Hydric Soils defines a hydric soil as "a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (Federal Register 1994). Soils formed over long periods of time under wetland (anaerobic) conditions sometimes possess characteristics that indicate that they meet the definition of hydric soils. For instance, most hydric soils exhibit characteristic morphologies (e.g. redoximorphic concentrations or depletions) that result from repeated periods of saturation or inundation that last more than a few days. Saturation, when combined with anaerobic microbial activity in the soil, causes depletion of oxygen. Prolonged anaerobic conditions promote certain biogeochemical processes, such as the accumulation of organic matter due to inhibited decomposition and the reduction, translocation, or accumulation of iron, manganese, and other reducible elements (Vepraskas et al. 2016). These processes result in distinctive characteristics that persist in the soil during both wet and dry periods, making them particularly useful for identifying hydric soils in the field. The indicators are used to identify the hydric soil component of wetlands; however, there are some hydric soils that lack any of the currently listed indicators. Therefore, the lack of any listed indicator does not necessarily preclude classification of the soil as hydric (U.S. Department of Agricultural Natural Resources Conservation Service 2017).

During the May 29 to June 4, 2018 ICF field survey, multiple soil pits were excavated in each potential wetland area until the delineator was confident that they had located the boundary between hydric and non-hydric soils and were in areas representative of the vegetation community in the associated wetland and adjacent upland. Following this, sampling points were excavated at locations that align as paired sampling points spanning wetland boundaries with one upland and one wetland sampling point. At each sampling point, a soil pit was dug to a minimum depth of 20 inches when possible. In each soil pit, the distinct soil layer depths were noted and their matrix and secondary soil colors (if present) were compared to the Munsell soil color chart (GretagMacbeth 2000) for color appearance (hue), intensity (value), and shade (chroma). Redoximorphic ("redox") features were noted and quantified and soil texture was noted. In addition to documented soil excavations, additional soil sampling points were excavated, but not mapped or recorded on data forms, to ensure that wetland boundary mapping was consistent with documented soil conditions (Figure 6).

Chapter 4 Results

ICF identified 47.4 acres of potential CWA Section 404 three-parameter wetlands (a value that includes 2.4 acres of CWA Section 401 navigable waterways) and 1.4 acres of non-wetland waters of the U.S. within the ESL (Figure 6, Table 3). Within this area, 6.8 acres of CWA Section 404 non-wetland uplands were identified. ICF also identified 46.2 acres of potential one- and two-parameter wetlands that only meet the CCA definition (Figure 6, Table 4). Of these, 5.7 acres are non-wetland waters. The wetland determination data forms for each sampling point are included in Appendix B. A full-size, accurately scaled version of Figure 6 is provided in Appendix C. The indicators of wetland hydrology, hydric soils, and hydrophytic vegetation used to make wetland determinations at each sampling point are described in detail below and summarized in Table 5. These results and the mapped extent of delineated features depicted on Figure 6 are subject to verification by the USACE San Francisco District and the CCC.

Table 3. Clean Water Act Section 404 Waters of the United States in the ESL

Aquatic Feature	Cowardin Type [a]	Length (feet)	Width (feet) [b]	Area (acres) [c]
Tidal Waters	E1UB3	~2,050	~42.5	2.365
Ditches D1a/b, D2a/b	E2SB and R1/R4	~1,300	~10	1.413
Wetlands (emergent)	PEM2	–	–	35.845
Wetlands (forest)	PFO	–	–	7.799
Total				**47.422**

[a] Cowardin types are:
E1UB3 = Estuarine, subtidal, unconsolidated bottom, mud
E2SB and R1/R4 = Open water ditched habitats comprised of a gradient from Estuarine intertidal (>0.5 ppm dissolved salts) near levee to Riverine tidal and intermittent waters (<0.5 ppm dissolved salts) and occasional rooted plants. Salinity was not mapped during the delineation effort.
PEM2 = Palustrine Emergent Wetland, persistent
PSS = Palustrine Scrub-Shrub
PFO = Palustrine Forested

[b] Average width of tidal waters measured at Mean High Water; average width of non-tidal waters measured at Ordinary High Water Mark.

[c] Subject to verification by the U.S. Army Corps of Engineers.

Table 4. Wetlands and Deepwater Habitats within California Coastal Act Jurisdiction in the ESL

Aquatic Feature	Type	Length (feet)	Width (feet) [a]	Area (acres) [b]
Ditches D1a/b, D2a/b	E2SB and R1/R4	~1,300	~10	1.413
Wetlands (emergent)	PEM2	–	–	36.987
Wetlands (forest)	PFO	–	–	7.799
Total				**46.199**

[a] Average width of tidal waters measured at Mean High Water; average width of non-tidal waters measured at Ordinary High Water Mark.

[b] Subject to verification by the California Coastal Commission.

Table 5. Summary of Results at Sampling Points

Sampling Point	Date Sampled	Wetland Indicator			CWA Section 404—3 parameter wetland	CCA—1 or more parameter wetland
		Vegetation	Soils	Hydrology		
W1	5/29/18	Y	Y	Y	Y	Y
U1	5/29/18	Y [1]	N	N	N	N [1]
W2	5/29/18	Y	Y	Y	Y	Y
U2	5/29/18	Y [1]	N	N	N	N [1]
W3	5/29/18	Y	Y	Y	Y	Y
U3	5/29/18	Y [1]	N	N	N	N [1]
W4	5/31/18	Y	Y	Y	Y	Y
W5	5/31/18	N [2]	Y	Y	Y	Y
U5	5/31/18	Y [3]	N	N	N	N [1,3]
W6	6/1/18	Y	Y	Y	Y	Y
W7	6/4/18	Y	Y	Y	Y	Y
U7	6/4/18	N	N	N	N	N

CWA = Clean Water Act

CCA = California Coastal Act [1] 65-70% dominated by non-native grasses (i.e., *Holcus lanatus, Festuca arundinacea*) not acting as hydrophytes.

[2] Problematic vegetation in grazing area.

[3] Coastal vegetation excluded from grazing behind electric fence, not acting as hydrophytes.

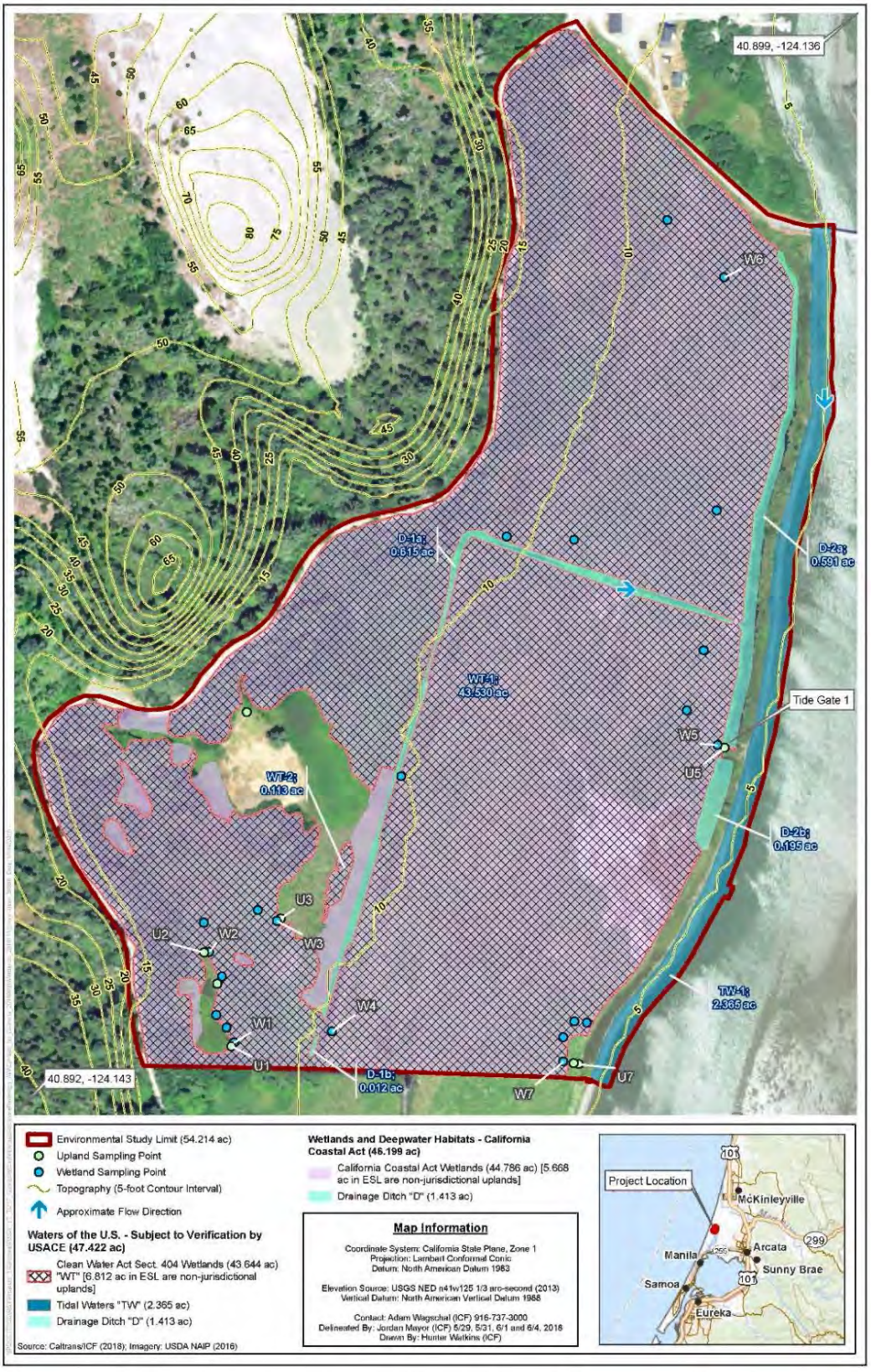

Figure 6. Wetlands and Other Waters of the U.S. Humboldt Bay Area Mitigation Project – Lanphere Parcel

4.1 Sampling Points

The labeling of sampling points reflects those that correspond to completed wetland determination data forms. Other, non-labeled sample pits were test pits used to confirm that wetland soil conditions matched those of the mapped feature and conditions already documented on the associated wetland determination data form(s).

4.1.1 Sampling Points W1/U1, W2/U2, W3/U3

This wetland area has been historically enclosed by an electric fence that excluded grazing animals. As a result, the vegetation represents more natural conditions.

Sampling point W1 is within a wetland dominated by the obligate (OBL) wetland plant known as Pacific silverweed and the facultative (FAC) nonnative wetland plant known as velvet grass. Water parsley [OBL] was present in patches nearby (Figure 7) but not in the sampling point near the edge of the wetland. This area did not contain vegetation in the tree, shrub or vine strata; therefore, herbaceous vegetation was assessed in a representative 10.76-square-foot (1-meter-square) plot area around the sampling points. The paired upland sampling point U1 represented a vegetation transition to a plant community dominated by meadow false rye grass [FAC] that passed the Dominance test but not the Prevalence Index. This pasture grass was determined to not be acting as a hydrophyte.

Sampling point W1 soils were saturated at the time of sampling despite occurring in the dry season (May 29, 2018) and recorded as a primary indicator of wetland hydrology (A3). The sandy loam soils had a matrix value of 3 and a chroma of 2 starting at a depth of 5 inches from the soil surface. The depleted soil matrix (10YR 3/1) extended from 5–13 inches from the soil surface. Redoximorphic (redox) concentrations (10YR 3/3) constituted 10% of the soil ped faces throughout the 5–13 inch soil layer, increasing to 25% of soil ped faces at depth (13–18 inches). These conditions qualify this soil as either the A11-Depleted Below Dark Surface or S5-Sandy Redox Hydric Soil Indicator. The paired upland sampling point U1 did not possess indicators of either hydric soils or wetland hydrology.

Similar to sampling point W1, sampling points W2 and W3 were also dominated by the obligate (OBL) wetland plant known as Pacific silverweed (along with meadow false rye grass in W3), exhibited the hydric soil indicator S5, and contained two secondary indicators of wetland hydrology. The paired upland sampling points U2 and U3 passed the Dominance test and Prevalence test for hydrophytic plant communities but it is believed the dominant members of the nonnative plant community in these areas, meadow false rye grass and velvet grass, were not acting as a hydrophytes in this wet northern coastal environment. This determination corresponds to the lack of hydric soil or wetland hydrology indicators in corresponding soil samples. Redox concentrations were found only in the soil layer from 8–16 inches from the soil surface at U2; a depth outside of either the A11 or S5 hydric soil indicator conditions. As such, these transitional areas, and areas with corresponding vegetative communities and soil conditions (including the upland “test pit” sampling point in the vicinity) were delineated as uplands surrounded by wetlands.

Figure 7. Ungrazed Silverweed and Water-Parsley Marsh, Located West of the Fence Line Near Wetland Soil Sampling Point W1; View is to the East Toward a Hardstem Bulrush Lined Ditch and the Levee Visible in the Distance

4.1.2 Sampling Point W4 and W6

These wetland areas have historically been on the east side of the electric fence and regularly subjected to grazing pressures including during the time period preceding this wetland delineation effort. As a result, approximately 21 acres of grazed wetland vegetation could be considered problematic.

Sampling point W4 was placed south of the north/south running drainage ditch in an area representative of the vegetation in this grazed pasture and at a slight rise in elevation. The largely facultative wetland pasture plant community contained four dominant species: sweet vernal grass [FAC], spreading rush [FACW], white clover (*Trifolium repens* [FAC]), and velvet grass [FAC]. Sampling point W6 was placed in the north end of the approximately 21 acre grazed pasture in an area representative of this area (Figure 8). Similar to W4, the plant community at sampling point W6 was dominated by facultative wetland plants was dominated by velvet grass, rough blue grass [FAC], and perennial ryegrass [FAC].

Sampling point W4 soils exhibited loamy or clay loam textures with a depleted matrix (10YR 4/1) with 10–15% redox concentrations (2.5YR 3/6) 0–14 inches from the soil surface. Sampling point W6 soils were similar to W4 but more depleted at depth (10YR 4/1 from 3–16 inches from surface soils) and with 15% redox concentrations (2.5YR 4/6) most apparent below 3 inches. Both of these indicators meet the criteria for a Depleted Matrix (F3) Hydric Soil Indicator (Figure 9). Oxidized rhizospheres along some living roots (W4) and the prominent contemporary redox concentrations (W4 and W6) were interpreted as primary field indicators of wetland hydrology.

No paired upland sample points accompanied sampling points W4 and W6 as no uplands were adjacent to these points. This sampling point, along with seven other test pits (Figure 6), were taken to document wetland conditions in an areas previously mapped as upland in a 2009 wetland delineation report (Caltrans 2009).

Figure 8. Condition of Grazed Wetland Pasture near Sampling Point W6; Viewing Southeast toward the Levee in the Distance, Lanphere Road on the Left of Picture to the North

Figure 9. Soils Exhibiting a Depleted Matrix and Prominent Redox Concentrations Excavated at Sampling Point W4

4.1.3 Sampling Points W5/U5 and W7/U7

These sampled areas typify where the wetland pastures terminate at the bottom of the constructed levee and where open water ditches are absent. The base of the levee is lined with an electric fence that has historically kept cattle from grazing vegetation on the levee. As a result, these two wetland sampling points were at slightly lower elevations where grazing had occurred and the paired upland sampling points were at slightly higher points where cattle grazing was excluded.

Sampling point W5, at the bottom of a ramp leading to the top of the levee, was dominated by a facultative wetland plant community consisting of meadow false rye grass and rough-stalked blue grass with minor components of perennial ryegrass, spreading rush, and curly dock (*Rumex crispus* [FAC]). Sampling point W7, located at the southeastern corner of the ESL, was dominated by a facultative wetland plant community consisting of perennial ryegrass and meadow false rye grass. Both W5 and W7 sample point plant communities passed the Dominance Test for hydrophytic vegetation. The paired upland sampling points U5 and U7 contained abundant spreading rush (U5) or large sweet vernal grass (U7) along with meadow false rye grass and velvet grass. Both plant communities in these sampling points passed the Dominance Test for hydrophytic vegetation despite not exhibiting any indicators of hydric soils or wetland hydrology. The levee vegetation, however, was excluded from mapping as a 1-parameter wetland as these communities were determined, in consultation with local CCC staff members during a visit to the site, to not be acting as hydrophytes in this wet northern coastal environment.

Sampling point W5 soils were loamy or clay loam soils with low value and low chroma at depth (10YR 2/2) and with 15% redox concentrations (2.5YR 3/6) throughout the soil layer extending 6–15 inches from the soil surface. These indicators meet the criteria for a Redox Dark Surface (F6) Hydric Soil Indicator. Sampling point W7 soils were also loamy soils but the soil color values were higher at 4 inches from the soil surface (10YR 3/2). Prominent redox concentrations (2.5YR 4/6) were evident (5% of ped faces) throughout a 4–14 inch soil layer. These indicators also meet the criteria for a Redox Dark Surface (F6) Hydric Soil Indicator.

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Appendix A Natural Resources Conservation Service Custom Soil Map

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Humboldt County, Central Part, California

November 14, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,650 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humboldt County, Central Part, California
Survey Area Data: Version 4, Sep 13, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 11, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
119	Arlynda, 0 to 2 percent slopes	48.0	68.0%
156	Lanphere, 2 to 75 percent slopes	19.1	27.0%
1009	Hydraquents-Wassents mucky silt loam, strongly saline, 0-3 percent slopes, very frequently flooded	3.5	5.0%
Totals for Area of Interest		**70.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Humboldt County, Central Part, California

119—Arlynda, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hs3p
Elevation: 0 to 160 feet
Mean annual precipitation: 35 to 80 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 275 to 330 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Arlynda and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arlynda

Setting

Landform: Backswamps, depressions, flood-plain steps, meander scars
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from mixed sources

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
A - 3 to 14 inches: silty clay loam
Bg1 - 14 to 22 inches: silty clay loam
Cg1 - 22 to 63 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 4 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Wigi, occasionally flooded

Percent of map unit: 5 percent

Landform: Salt marshes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Worswick

Percent of map unit: 5 percent
Landform: Natural levees, flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Loleta

Percent of map unit: 5 percent
Landform: Alluvial fans, fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

156—Lanphere, 2 to 75 percent slopes

Map Unit Setting

National map unit symbol: 221w7
Elevation: 0 to 80 feet
Mean annual precipitation: 35 to 80 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 275 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Lanphere and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lanphere

Setting

Landform: Dunes, longitudinal dunes
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Mixed eolian sands

Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material
A - 4 to 11 inches: sand
AC - 11 to 26 inches: sand
C - 26 to 63 inches: sand

Properties and qualities

Slope: 5 to 75 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Sitka spruce-shore pine/California huckleberry, foredunes, mixed eolian sands, sand (F004BX116CA)
Hydric soil rating: No

Minor Components

Clambeach

Percent of map unit: 10 percent
Landform: Deflation basins
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Samoa

Percent of map unit: 5 percent
Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

1009—Hydraquents-Wassents mucky silt loam, strongly saline, 0-3 percent slopes, very frequently flooded

Map Unit Setting

National map unit symbol: 2t150
Elevation: 0 to 10 feet
Mean annual precipitation: 35 to 80 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 275 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Hydraquents, low tidal, and similar soils: 50 percent
Wassents and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hydraquents, Low Tidal

Setting

Landform: Tidal flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mucky, silty, and clayey estuarine deposits

Typical profile

Czg1 - 0 to 9 inches: mucky silty clay loam
Cg2 - 9 to 16 inches: mucky silty clay loam
Cg3 - 16 to 26 inches: mucky silty clay loam
Cg4 - 26 to 39 inches: mucky silty clay loam
Cg5 - 39 to 59 inches: mucky silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 0 inches to salic; 20 to 79 inches to sulfuric
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Salinity, maximum in profile: Strongly saline (30.0 to 80.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 75.0
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D

Hydric soil rating: Yes

Description of Wassents

Setting

Landform: Tidal flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mucky, silty, and clayey estuarine deposits

Typical profile

Asez - 0 to 6 inches: mucky silt loam
Cg1 - 6 to 14 inches: mucky silty clay loam
Cg2 - 14 to 31 inches: mucky silty clay loam
Cg3 - 31 to 59 inches: mucky silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 0 inches to sulfuric; 0 inches to salic
Natural drainage class: Subaqueous
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Strongly saline (30.0 to 80.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 75.0
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Water, marine

Percent of map unit: 5 percent
Landform: Channels

Hydraquents, high tidal

Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

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Appendix B **Wetland Determination Data Forms**

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landplane City/County: Arcata / Humboldt Sampling Date: 5/29/18

Applicant/Owner: Caltrans State: CA Sampling Point: W1

Investigator(s): Jordan Mayor Section, Township, Range: S23, T6N, R1W

Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope (%): 2%

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEM 1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Outside of grazed area, natural vegetation conditions

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1 m²)			
1. Potentilla anserina ssp. pacifica	60%	Y	OBL
2. Holcus lanatus	20	Y	FAC
3. Ranunculus repens	5	N	FAC
4. Alopecurus pratensis	10	N	FAC
5. Poa trivialis	5	N	FAC
6. Festuca arundinacea (Schedonorus)	–	N	FAC
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	95		0%			sandy loam	soil saturated
5-13	10YR 3/2	90					sandy loam	" "
5-13	10YR 3/1	80	10R 3/3	10%	C	M	Sandy	
13-18	10YR 3/1	75	10R 3/3	25%	C	M	Sandy	
13-18	charcoal	25						charcoal layer present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1-18"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landplane City/County: Arcata / Humboldt Sampling Date: 5/29/18

Applicant/Owner: Caltrans State: CA Sampling Point: U1

Investigator(s): Jordan Mayor Section, Township, Range: S23 T6N R1W

Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope (%): 2%

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X*	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: * Dominance by non-native FAC pasture grass led to Prevalence Index of less than 3.0. Plant community not acting as hydrophytes.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1 m²)			
1. Festuca arundinacea	70	Y	FAC
2. Potentilla anserina ssp pacifica	2	N	OBL
3. Rubus ursinus	8	N	FACU
4. Holcus lanatus	15	N	FAC
5. Ranunculus repens	5	N	FAC
6. ~~Alopecurus pratensis~~ Anthoxanthum odoratum	–		FAC
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	0	x 2 =	–
FAC species	94	x 3 =	294
FACU species	0	x 4 =	–
UPL species	0	x 5 =	–
Column Totals:	100 (A)		296 (B)

Prevalence Index = B/A = 2.96

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X* No ____

Remarks: * see above comments

SOIL

Sampling Point: U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	3/3 10YR	95	10R 3/3	2	C	M	sandy loam	chroma too high for S5
12-18	3/2 10YR	90	10R 3/3	10	C	M	Sandy	too deep for S5

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landplane City/County: Arcata / Humboldt Sampling Date: 5/29/18

Applicant/Owner: Caltrans State: CA Sampling Point: W2

Investigator(s): Jordan Mayor Section, Township, Range: S23 T6N R1W

Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope (%): 2%

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: Outside of grazed area, natural vegetation conditions.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1 m²)			
1. Potentilla anserina ssp. anserina	55	Y	OBL
2. Festuca arundinacea	10	N	FAC
3. ~~Alopecurus pratensis~~ Anthoxanthum odora	15	N	FAC
4. Poa trivialis	1	N	FAC
5. Ranunculus repens	5	N	FAC
6. Holcus lanatus	10	N	FAC
7. Juncus patens	3	N	FACW
8. ~~Epilobium brachycarpum~~	~~4~~	N	~~UPL~~
9. Cerastium fontanum	1	N	FACU
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR 3/2	90	5YR 3/4	10	C, CS	M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landphere City/County: Arcata / Humboldt Sampling Date: 5/29/18

Applicant/Owner: Caltrans State: CA Sampling Point: U2

Investigator(s): Jordan Mayor Section, Township, Range: S23 T6N R1W

Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X*	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 2m²)			
1. Festuca arundinaceae	70	Y	FAC
2. Holcus lanatus	15	N	FAC
3. Rubus ursinus	6	N	FACU
4. ~~Alopecurus pratensis~~ Anthoxanthum odoratum	5	N	FAC
5. Poa trivialis	2	N	FAC
6. Lotus corniculatus	2	N	FAC
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ✓	x 1 =	
FACW species ✓	x 2 =	
FAC species 100	x 3 =	300
FACU species ✓	x 4 =	
UPL species ✓	x 5 =	
Column Totals: 100 (A)		300 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X* No ____

Remarks: * Dominance by non-native FAC pasture grass led to Prevalence Index of 3.0. Plant community not acting as hydrophyte.

SOIL

Sampling Point: U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/3	95					Sandy loam	
8-16	10YR 3/2		5YR 4/6	5	C,CS	M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: Not A11 (Depleted Below Dark) because redox concentrations do not start at a depth ≤ 8 inches from mineral soil surface. Not S5 (Sandy Redox) for the same reason (≤6 inches from surface the chroma is >2).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landphere City/County: Arcata / Humboldt Sampling Date: 5/29/18

Applicant/Owner: Caltrans State: CA Sampling Point: W3

Investigator(s): Jordan Mayor Section, Township, Range: S23 T6N R1W

Landform (hillslope, terrace, etc.): gentle to flat slope Local relief (concave, convex, none): _____ Slope (%): 1

Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Ardyndra NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:
Outside of grazing area in POAN dominated wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: 2m²)			
1. Potentilla anserina ssp. pacifica	50	Y	OBL
2. Festuca arundinacea	30	Y	FAC
3. Holcus lanatus	10	N	FAC
4. Alopecurus pratensis	6	N	FAC
5. Ranunculus repens	4	N	FAC
6. Rumex crispus	–	N	FAC
7. Poa trivialis	–	N	FAC
8. Anthoxanthum odoratum	–	N	FAC
9.			
10.			
11.			
	100 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: W3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	95	5YR 4/4	5	C, CM	M	Sandy loam	
8-18	10YR 3/2	85	5YR 4/4	20	C, CM	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): >20"

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Assumed hydrology

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landplane City/County: Arcata / Humboldt Sampling Date: 5/29/18

Applicant/Owner: Caltrans State: CA Sampling Point: U3

Investigator(s): Jordan Mayor Section, Township, Range: S23 T6N R1W

Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: 1- parameter wetland due to dominance by non-native velvet grass, Not acting as hydrophytes. + tall fescue.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1 m²)			
1. Festuca arundinacea	25	Y	FAC
2. Holcus lanatus	65	Y	FAC
3. Poa pratensis	4	N	FAC
4. Galium aparine	2	N	FACU
5. Poa trivialis	2	N	FAC
6. Potentilla anserina ssp pacifica	2	N	OBL
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 2	x 1 = 2
FACW species –	x 2 =
FAC species 96	x 3 = 288
FACU species 2	x 4 = 8
UPL species –	x 5 =
Column Totals: 100 (A)	298 (B)

Prevalence Index = B/A = 2.98

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X* No ____

Remarks: * see above

SOIL

Sampling Point: U3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 3/2	95	—	—				no redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landphere City/County: Arcata/Humboldt Sampling Date: 5/31/18
Applicant/Owner: Caltrans State: CA Sampling Point: W64
Investigator(s): Jordan Mayor Section, Township, Range: 323 T6N R1W
Landform (hillslope, terrace, etc.): bench next to ditch Local relief (concave, convex, none): convex Slope (%): 2%
Subregion (LRR): LRR A Lat: Long: Datum:
Soil Map Unit Name: Arlynda NWI classification: PEM1B
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ✓, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Area on high point adjacent to ditch, soil possibly "borrow" as a result. Also, are subject to grazing = problematic vegetation; outside of wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 1m²)			
1. Anthoxanthum odoratum	20	Y	FAC
2. Poa pratensis	18	N	FAC
3. Juncus patens	20	Y N	FACW
4. Trifolium repens	20	Y	FAC
5. Hypochaeris radicata	1	N	FACU
6. Holcus lanatus	20	Y	FAC
7. Rumex acetosella	1		FAC
8.			
9.			
10.			
11.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4. (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	~	x 1 =	
FACW species	20	x 2 =	40
FAC species	79	x 3 =	237
FACU species	1	x 4 =	4
UPL species	~	x 5 =	
Column Totals:	100 (A)		278 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:
- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: W4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	60	2.5YR 3/6	10	C	PL, M	clay	
	10YR 4/3	40					loamy	
6-14	10YR 4/1	80	2.5 YR 3/6	15	C	PL, M	clay	
	10 YR 4/3	20					loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 4-8 inches

Hydric Soil Present? Yes ✓ No ___

Remarks:

Despite location being in high elevation (relatively) the clay layers restrict drainage during wet season resulting in depleted soils high in redox concentrations. Soils appear naturally stratified, not mixed from tilling etc.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ~~X Presence of Reduced Iron (C4)~~
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ✓* No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

* Assumed due to prominent redox concentrations, some w/ diffuse boundaries suggesting contemporary hydric soil conditions

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landplane City/County: Arcata / Humboldt Sampling Date: 5/31/18

Applicant/Owner: Caltrans State: CA Sampling Point: US

Investigator(s): Jordan Mayor Section, Township, Range: S24, T6N, R1W

Landform (hillslope, terrace, etc.): levee road Local relief (concave, convex, none): _____ Slope (%): 10

Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Arbyndale NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓* No _____

Are Vegetation ✓, Soil ✓, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X*	No _____	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
* normal for a constructed levee road outside of wet season; area behind electric fence (grazing not present)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1m²)			
1. Juncus patens	50	Y	FACW
2. Holcus lanatus	20	Y	FAC
3. Festuca arundinacea	20	Y	FAC
4. Poa trivialis	5	N	FAC
5. Rumex acetosella	5	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X*

Remarks:
* Plants inside electrified fence that excludes cattle; vegetation in wet coastal area and co-dominated by non-native grasses.

SOIL

Sampling Point: US

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	80	2.5YR 3/6	2	C	M	loamy	likely borrowed fill from the adjacent ditch
~~15~~								
10-12	10YR 4/1	90	2.5YR 3/6	10	C	M		
12-13	10YR 2/2	90	–					buried organic horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

This soil is apparently borrowed fill to make levee road this retains some historic redox characteristics but is not likely in a wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Redox concentrations from borrowed soils; not in a wetland

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landphere City/County: Arcata/Humboldt Sampling Date: 5/31/18

Applicant/Owner: Caltrans State: CA Sampling Point: WS

Investigator(s): Jordan Major Section, Township, Range: S24, T6N, R1W

Landform (hillslope, terrace, etc.): levee road Local relief (concave, convex, none): _____ Slope (%): 3%

Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Arbuda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes * No _____

Are Vegetation ✓, Soil ✓, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No *	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: * Plants in area previously heavily grazed and disturbed; not typical of native community; outside of wet season and on levee road (borrow)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 1 m²)			
1. Festuca perennis	10	N	FAC
2. Poa bulbosa	20	Y	FAC
3. Juncus patens	10	N	FACW
4. Festuca arundinacea	50	Y	FAC
5. Rumex crispus	10	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: W5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	90	2.5YR 3/6	5	C	M	Loamy	
6-15	10YR 2/2	90	2.5YR 3/6	15	C	M	Loamy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Loamy clay

Depth (inches): 6

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ~~*~~ ~~Presence of Reduced Iron (C4)~~
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓* No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Assumed hydrology during wet season

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Landphere City/County: Arcata, Humboldt Sampling Date: 6/1/18

Applicant/Owner: Caltrans State: CA Sampling Point: W6

Investigator(s): Jordan Mayor Section, Township, Range: S24 T6N R1W

Landform (hillslope, terrace, etc.): flat pasture Local relief (concave, convex, none): ~ concave Slope (%): 1%

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ✓, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓*	No ____	

Remarks:
Vegetation disturbed by history of grazing. Only 6-10" tall at time of sampling.
*High clay soils prevent drainage during rainy season. No water table to 18"

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 2m²)			
1. Holcus lanatus	30	Y	FAC
2. Festuca arundinacea	5	N	FAC
3. Phalaris aquatica	10	N	FACU
4. Ranunculus repens	5	N	FAC
5. Poa trivialis	20	Y	FAC
6. Trifolium repens	10	N	FAC
7. Festuca perennis	20	Y	FAC
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: W6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	95	2.5YR 4/6	5	C	M	loamy clay	root zone, more organics
3-16	10YR 4/1	85	2.5YR 4/6	15	C	M, PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes ✓* No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: *Dry season survey. High clay depleted soils preclude drainage during winter months. Assumed hydrology

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Lanphere City/County: Arcata / Humboldt Sampling Date: 6/4/18

Applicant/Owner: Caltrans State: CA Sampling Point: W7

Investigator(s): Jordan Mayor Section, Township, Range: S24 T6N R1W

Landform (hillslope, terrace, etc.): pasture Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR A Lat: Long: Datum:

Soil Map Unit Name: Arlynda NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1m²)			
1. Festuca perennis	40 (42)	Y	FAC
2. Holcus lanatus	10 (11)	N	FAC
3. Agrostis stolonifera	10 (11)	N	FAC
4. Festuca arundinacea	25 (26)	Y	FAC
5. Trifolium repens	5 (5)	N	FAC
6. Plantago lanceolata	3 (3)	N	FAC
7. Poa trivialis	2 (2)	N	FAC
8. bare ground	(5)		
9.			
10.			
11.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: W7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1 - 4	10YR 3/2	98	2.5YR 4/6	2	C	PL,M	loamy	
4 - 14	10YR 3/2	95	2.5YR 4/6	5	C	PL,M	loamy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ✓* No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

*Assumed hydrology in wet season i previous monitoring wells in area.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: HBAM / Lanphere City/County: Arcata / Humboldt Sampling Date: 6/4/18
Applicant/Owner: Caltrans State: CA Sampling Point: U7
Investigator(s): Jordan Mayor Section, Township, Range: S24 T6N R1W
Landform (hillslope, terrace, etc.): toe of levee Local relief (concave, convex, none): convex Slope (%): 10%
Subregion (LRR): CRR A Lat: Long: Datum:
Soil Map Unit Name: Arlynda NWI classification: PEMiB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ✓, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:
Toe of levee comprised of fill from off site. Chosen to characterize fill material and demonstrate upland conditions on levee

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1m²)			
1. Rubus ursinus	25	Y	FACU
2. Festuca arundinacea	20	Y	FAC
3. Anthoxanthum odoratum	40	Y	FAC
4. Rumex crispus	10	N	FAC
5. Bromus hordeaceus	1	N	FACU
6. Plantago lanceolata	1	N	FACU
7. Rumex acetosella	1	N	FAC
8. Equisetum telm	1	N	FACW
9. Festuca perennis	1	N	FAC
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓*

Remarks:
* Coastal plants not acting as hydrophytes. Non-native grasses in coastal zone on grazed lands.

SOIL

Sampling Point: U7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR 2/2	75	—				loamy	25% gravel
4-16	10YR 3/6	75	—				loamy	unconsolidated fill
4-16	10YR 3/3	25	—				loamy	" "

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C Full Size Wetlands and Other Waters of the U.S. Humboldt Bay Area Mitigation Project – Lanphere Parcel Map

Environmental Study Limit (54.214 ac)
Upland Sampling Point
Wetland Sampling Point
Topography (5-foot Contour Interval)
Approximate Flow Direction

Waters of the U.S. - Subject to Verification by USACE (47.422 ac)

Clean Water Act Sect. 404 Wetlands (43.644 ac) "WT" [6.812 ac in ESL are non-jurisdictional uplands]
Tidal Waters "TW" (2.365 ac)
Drainage Ditch "D" (1.413 ac)

Wetlands and Deepwater Habitats - California Coastal Act (46.199 ac)

California Coastal Act Wetlands (44.786 ac) [5.668 ac in ESL are non-jurisdictional uplands]
Drainage Ditch "D" (1.413 ac)

Source: Caltrans/ICF (2018); Imagery: USDA NAIP (2016)

Map Information

Coordinate System: California State Plane, Zone 1
Projection: Lambert Conformal Conic
Datum: North American Datum 1983

Elevation Source: USGS NED n41w125 1/3 arc-second (2013)
Vertical Datum: North American Vertical Datum 1988

Contact: Adam Wagschal (ICF) 916-737-3000
Delineated By: Jordan Mayor (ICF) 5/29, 5/31, 6/1 and 6/4, 2018
Drawn By: Hunter Watkins (ICF)

0 100 200 400 Feet
1:2,400 1 inch = 200 feet

N

\\PDCCITRDSGIS1\Projects_1\Caltrans\00301_17_TO17_HumboldtBayMit\mapdoc\LeveeRedesign_AWI\Exhibits_for_Caltrans_20180801\Wetlands_20181113.mxd; User: 38868; Date: 11/14/2018

Figure 6
Wetlands and Other Waters of the U.S.
Humboldt Bay Area Mitigation Project – Lanphere Parcel

Appendix C

Post-construction Environmental Reporting Forms

USFWS

STATEWIDE RESTORATION PROGRAMMATIC BIOLOGICAL OPINION
POST-CONSTRUCTION REPORT FORM

INSTRUCTIONS

- Report all injury or mortality of listed species to USFWS ES within 48 hours.
- Submit the Post-Construction Report Form to USFWS ES (and copy the Action Agency) by December 1st each year. If there are ongoing revegetation or species monitoring beyond the report due date, provide a report annually on December 1st until success criteria have been met, or monitoring has ceased[1].
- Any incidental take that occurred during project construction must also be reported on page 2 of this form.

General Information

Project Proponent

Lead Action Agency

Project Name

USACE Action ID Number

Project Start Date Project

End Date

Stream

Watershed

Latitude (decimal degrees)

Longitude (decimal degrees)

Project Details

List of affected Covered Species and/or Critical Habitat. List must correspond to the Covered Species listed on the USFWS-approved ESA Section 7(a)(2) Review Form.

Disturbance/ Restoration

- Total linear feet of stream disturbed.....
- Total linear feet of stream dewatered.....
- Total acres restored.....
- Total linear feet of upstream habitat made accessible.....
- Total linear feet of stream bank stabilized or planted with riparian species.....

Covered Species Relocation

- Name/contact information for the USFWS-Approved Biologist(s) involved in the relocation.
- Where were the Covered Species relocated?
- Number of captures, releases, injuries, and mortalities.
- Please attach monitoring data for all relocation events. Attach as a separate file.

USFWS

STATEWIDE RESTORATION PROGRAMMATIC BIOLOGICAL OPINION
POST-CONSTRUCTION REPORT FORM

Project Details

Actual amount of incidental take :

Amount of disturbance to critical habitat :

Amount of disturbance to suitable habitat :

Summarize any challenges or information associated with the implementation of the General Protection Measures, Conservation Measures, and Species Protection Measures.

Provide any other information that was not included in the ESA Section 7(a)(2) Review Form or that has changed from what was provided in the ESA Section 7(a)(2) Review Form.

Construction

- If fencing or irrigation was installed, have all materials been removed?.....
- Is photo documentation provided for erosion control?.....
- If so, please attach. Attach as a separate file .
- Were there any leaks/ spills during implementation (incl. petroleum products)?.....
- If yes, explain (i) how the leak or spill was contained on site, (ii) if any chemicals were directly in contact with surface waters, and (iii) who was informed at the time of the accident.
- Attach a full copy of the as-built drawings. Attach as a separate file .

Project Details

Revegetation

- Was revegetation proposed as part of the approved project?.....
- Revegetation duration ..... From to
- Was revegetation implemented as proposed? .....
- Is your revegetation summary report attached (see General Protection Measure VDHR-5)?
- If no, when will your summary report be provided?

Monitoring

- If a monitoring plan was submitted and approved during the ESA Section 7(a)(2) Review Form process, please summarize the results here or attach. Please attach photo documentation of pre- and post-project conditions. Attach as a separate file. Photos should be taken from the four cardinal directions and from established photo points for comparison to pre-project photo documentation.

[1]VHDR-5, Revegetation Monitoring and Reporting:

All revegetated areas will be maintained and monitored for a minimum of 2 years after replanting is complete, or until success criteria are met, to ensure that the revegetation effort is successful. The standard for success is 60% 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.

NOAA

RC ARCATA OFFICE PROGRAMMATIC 2022 BIOLOGICAL OPINION POST-PROJECT MONITORING FORM

INSTRUCTIONS

- Fill out the NOAA RC Arcata Office Programmatic Biological Opinion Post-Project Monitoring Form below.
- Send the completed form to the NOAA Restoration Center at bob.pagliuco@noaa.gov.

General Information

Applicant Name

Landowner Name

Project Name

Project Location

Project Start Date

Project End Date

Stream

Watershed

Latitude (decimal degrees)

Longitude (decimal degrees)

General Questions (applicable to all projects to quantify impacts and benefits to fishes)

Target Species (check all that apply)

- ☐ SONCC Coho
- ☐ CCC Chinook
- ☐ NC Steelhead

Restoration/ Disturbance

- Total acres restored
- Total linear feet of upstream habitat made accessible
- Total linear feet of stream bank stabilized or planted with riparian species
- Total linear feet of stream disturbed
- Total linear feet of stream dewatered
- For bioengineering projects, provide the total length of bioengineered streambank restored and the active channel width of the project

Fish Relocation

- Was NMFS notified at least two weeks prior to relocation activities?
- Name / contact information for the qualified biologist(s) involved in relocation.
- Name / contact information for the qualified assistant(s) involved in relocation.
- Where were fish relocated?
- What (if any) unanticipated circumstances arose during fish relocation activities?
- Please attach monitoring data for all relocation events. Attach as a separate file.

GENERAL QUESTIONS (continued)

Please summarize the total number of fish captured, injured, and/or killed across all relocation events.

Species	Captured	Injured	Killed
Southern Oregon / Northern California Coast (SONCC) Coho			
California Coastal (CC) Chinook			
Northern California (NC) Steelhead			
Green Sturgeon, Southern DPS			
Eulachon, Southern DPS			

Project Terms and Conditions

Overall

- Please describe the activities that occurred during implementation including the problems addressed by the project, timing, restoration techniques, unforeseen issues, restoration metrics (acres/miles restored), and anything else that will describe the work that has been completed during the implementation season. Also describe which year of construction was implemented if this project will be implemented over several years.

- Please provide a narrative summary of the project objectives met, any project objectives that were not met, and a discussion of possible reasons for any that were not met including any variances that were granted for this project.

Construction

- Construction duration..... From to
- Is photo documentation provided for erosion control? .....
- If so, please attach. Attach as a separate file.
- Were there any toxic leaks/ spills during implementation (incl. petroleum products)? .....
- If yes, explain (i) how the leak or spill was contained on site, (ii) if any chemicals were directly in contact with spurface waters, and (iii) who was informed at the time of the accident.
- Please attach a full copy of the as-built drawings. Attach as a separate file.

PROJECT TERMS AND CONDITIONS (continued)

Revegetation

- Was revegetation proposed as part of the approved project?.....
- Revegetation duration ..... From to
- Was revegetation implemented as proposed? .....
- If no, please explain.

Monitoring

- Please attach photo documentation of pre- and post-project conditions. Attach as a separate file. Photos should be taken from the four cardinal directions and from established photo points for comparison to pre-project photo documentation.

Final Attachment D
Reporting and Notification Requirements

Report Submittal Instructions

1. Check the box on the Report and Notification Cover Sheet next to the report or notification you are submitting.
   - **Part A (Project Reporting):** Annual reports will be submitted annually within one month of the anniversary of the effective date of the NOA until a Notice of Project Complete Letter is issued. Post-construction monitoring reports will be submitted in accordance with the Monitoring Plan schedule.
   - **Part B (Project Status Notifications):** Used to notify the approving Water Board of the status of the Project schedule that may affect Project billing.
   - **Part C (Conditional Notifications and Reports):** Required on a case-by-case basis for accidental discharges of hazardous materials, violation of compliance with water quality standards, or other reports.
2. Sign the Report and Notification Cover Sheet and attach all information requested for the Report Type.
3. **Electronic Report Submittal Instructions:**
   Submit signed Report and Notification Cover Sheet and required information via email to the approving Water Board contact provided in the NOA. If the contact name on the NOA is no longer valid, contact information can be obtained from the Telephone and Address Directory for the 401 Certification and Wetlands Program (http://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/staffdirectory.pdf).
   - Include in the subject line of the email:
     Subject: ATTN: [Name of Project]; Identification Number [Reg. Measure ID # or WDID # # or Place ID] Report

Terms

1. **Notice of Intent (NOI):** The application to enroll a project under this Order. The NOI form is found in Attachment B, Notice of Intent Form.

2. **Notice of Applicability (NOA):** The authorization for enrollment under this Order. The NOA is issued by the approving Water Board upon approval of the NOI.

3. **Request for Notice of Project Complete Letter:** This request by the project proponent to the approving Water Board pertains to projects that either have completed post-construction monitoring and achieved performance standards or have no post-construction monitoring requirements, and no further Project activities are planned. The project proponent submits a project completion report to the approving Water Board stating that the project is complete and permit requirements have been met. The approving Water Board reviews the permit requirements and issues correspondence (usually by email) that the project has met the requirements and will be un-enrolled from the Order. Annual fees will be terminated with receipt of project complete correspondence from the approving Water Board.

Map/Photo Documentation Information

When submitting maps or photos, please use the following formats.

1. **Map Format Information**:
   Preferred map formats of at least 1:24000 (1" = 2000') detail (listed in order of preference):
   - **GIS shapefiles**: The shapefiles must depict the boundaries of all project areas and extent of aquatic resources impacted. Each shape should be attributed with the extent/type of aquatic resources impacted. Features and boundaries should be accurate to within 33 feet (10 meters). Identify datum/projection used and if possible, provide map with a North American Datum of 1983 (NAD38) in the California Teale Albers projection in feet.
   - **Google KML files** saved from Google Maps: My Maps or Google Earth Pro. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. Include URL(s) of maps. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
   - **Other electronic format** (CAD or illustration format) that provides a context for location (inclusion of landmarks, known structures, geographic coordinates, or USGS DRG or DOQQ). Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
   - Aquatic resource maps marked on paper **USGS 7.5-minute topographic maps** or **Digital Orthophoto Quarter Quads (DOQQ)** printouts. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.

2. **Photo-Documentation**: Include a unique identifier, date stamp, written description of photo details, and latitude/longitude (in decimal degrees) or map indicating location of photo. Successive photos should be taken from the same vantage point to compare pre/post construction conditions.

REPORT AND NOTIFICATION COVER SHEET (Includes Signature Page)
Project:
Project Proponent:
Reg. Meas. ID# / WDID #:
Place ID:
Order Effective Date:

Report Type Submitted	
Part A – Project Reporting	
Report Type 1	☐ **Annual Report**
Report Type 2	☐ **Post-Construction Monitoring Report**
Part B - Project Status Notifications	
Report Type 3	☐ **Commencement of Construction Notification**
Report Type 4	☐ **Request for Notice of Project Complete Letter**
Part C - Conditional Notifications and Reports	
Report Type 5	☐ **Accidental Discharge of Hazardous Material Report**
Report Type 6	☐ **Violation of Compliance with Water Quality Standards Report**
Report Type 7	☐ **In-Water Work and Diversions Water Quality Monitoring Report**
Report Type 8	☐ **Transfer of Property Ownership Notification**
Report Type 9	☐ **Transfer of Long-Term GPM Maintenance Notification**

"I certify under penalty of law that this application and all attachments were prepared under my direction or supervision in accordance with a process designed to assure that qualified personnel properly gather and evaluate the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print Name [1]	**Affiliation and Job Title**
Signature	**Date**

[1] **STATEMENT OF AUTHORIZATION (include if authorization has changed since application was submitted)**

I hereby authorize_____to act in my behalf as my representative in the submittal of this report, and to furnish upon request, supplemental information in support of this submittal.

Legally Responsible Person's Signature Date

* **This Report and Notification Cover Sheet must be signed by the legally responsible person or a duly authorized representative and included with all written submittals.**

Part A – Project Reporting

Report Type 1	Annual Report
Report Purpose	Notify the approving Water Board staff of Project status during the active discharge monitoring period.
When to Submit	If required by the NOA, annual reports shall be submitted each year within one month of the anniversary of the effective date of the NOA. Annual reports shall continue until a Notice of Project Complete Letter is issued to the project proponent.
Report Contents	The contents of the annual report shall include the topics indicated below for each project period. Report contents are outlined in Annual Report Topics below. **<u>During the Active Discharge Period</u>** • **Topic 1: Construction Summary**

Annual Report Topics

Annual Report Topic 1	Construction Summary
When to Submit	With the annual report during the Active Discharge Period.
Report Contents	1. Project progress and schedule including initial ground disturbance, site clearing and grubbing, road construction, site construction, and the implementation status of general protection measures (GPMs). If construction has not started, provide estimated start date and reasons for delay. 2. Map showing general Project progress. 3. Planned date or progress of any plant installations. If installation is in progress, provide a map of what has been completed to date. If installations are complete, provide a map of the locations of plant species installed along with photographs. 4. If applicable: Summary of Conditional Notification and Report Types 5, 6, and 7 (Part C below).

Report Type 2	**Post-Construction Monitoring Report**
Report Purpose	Notify the approving Water Board staff of Project status during the post-discharge monitoring period.
When to Submit	Post-construction monitoring reports shall be submitted on the anniversary of the date that the project restoration activities were completed. Monitoring reports shall continue in accordance with the monitoring schedule provided in the Monitoring Plan.
Report Contents	Post-construction monitoring reports shall document the status of achievement of performance standards and project goals. The monitoring reports shall include: 1. Summary of monitoring results, including monitoring data and status of performance standards and goals as applicable. 2. Identification and discussion of issues achieving performance standards, as applicable. 3. Proposed corrective measures, as applicable (requires Water Board approval). 4. Photo documentation of restoration sites.

Part B – Project Status Notifications

Report Type 3	Commencement of Construction Notification
Report Purpose	Notify the approving Water Board staff of the date of commencement of Project construction.
When to Submit	Must be received by Water Board staff at least seven (7) days prior to commencement of initial ground-disturbing activities.
Report Contents	1. Date of commencement of Project construction. 2. Overall Project construction schedule.

Report Type 4	Request for Notice of Project Complete Letter
Report Purpose	Notify the approving Water Board staff that construction and/or any post-construction monitoring is complete, or is not required, and no further Project activity is planned.
When to Submit	Must be received by Water Board staff within thirty (30) days following completion of all Project activities.
Report Contents	**Part A: Post-Construction Storm Water GPMs** 1. Date of storm water Notice of Termination(s), if applicable. 2. Report status and functionality of all post-construction GPMs. **Part B: Habitat Restoration Success** 1. A final monitoring report that summarizes the annual post-construction monitoring efforts and demonstrates the performance standards outlined in the Monitoring and Reporting Plan have been met for the Project site, including upland areas of temporary disturbance which could result in a discharge to waters of the state. 2. Pre- and post-photo documentation of habitat restoration sites.

Part C – Conditional Notifications and Reports

Report Type 5	Accidental Discharge of Hazardous Material Report
Report Purpose	Notifies the approving Water Board staff that an accidental discharge of hazardous material has occurred.
When to Submit	Within five (5) working days following the date of an accidental discharge. Continue reporting as required by Water Board staff.
Report Contents	1. The report shall include the OES Incident/Assessment Form, a full description and map of the accidental discharge incident (i.e., location, time and date, source, discharge constituent and quantity, aerial extent, and photo documentation). If applicable, the OES Written Follow-Up Report may be substituted. 2. If applicable, any required sampling data, a full description of the sampling methods including frequency/dates and times of sampling, equipment, locations of sampling sites. 3. Locations and construction specifications of any barriers, including silt curtains or diverting structures, and any associated trenching or anchoring.

Report Type 6	Violation of Compliance with Water Quality Standards Report
Report Purpose	Notifies the approving Water Board staff that a violation of compliance with water quality standards has occurred.
When to Submit	The project proponent shall report any event that causes a violation of water quality standards within three (3) working days of the noncompliance event notification to Water Board staff.
Report Contents	The report shall include: the cause; the location shown on a map; and the period of the noncompliance including exact dates and times. If the noncompliance has not been corrected, include: the anticipated time it is expected to continue; the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and any monitoring results if required by Water Board staff.

Report Type 7	**In-Water Work and Diversions Water Quality Monitoring Report**
Report Purpose	Notifies the approving Water Board staff of completion of work in water or stream diversions.
When to Submit	Within three (3) working days following completion of work in water or stream diversions.
Report Contents	1. The report shall include a brief description of the in-water work activities and dates in-water work was performed. 2. If applicable, any required water quality sampling data, a full description of the sampling methods including frequency/dates and times of sampling, sampling equipment used, and locations of sampling sites.

Report Type 8	**Transfer of Property Ownership Notification**
Report Purpose	Notifies the approving Water Board staff of change in ownership of the Project or project proponent-responsible mitigation area.
When to Submit	At least 10 working days prior to the transfer of ownership.
Report Contents	1. A statement that the project proponent has provided the purchaser with a copy of this Order and that the purchaser understands and accepts: a. the Order's requirements and the obligation to implement them or be subject to administrative and/or civil liability for failure to do so; and b. responsibility for compliance with any long-term maintenance plan requirements in this Order. 2. A statement that the project proponent has informed the purchaser to submit a written request to the Water Board to be named as the project proponent in a revised order.

Report Type 9	**Transfer of Long-Term GPM Maintenance Notification**
Report Purpose	Notifies the approving Water Board staff of transfer of long-term maintenance responsibility.
When to Submit	At least 10 working days prior to the transfer of maintenance responsibility.
Report Contents	A copy of the legal document transferring maintenance responsibility of post-construction measures.

Appendix D

Photographs of Pre-project Site Conditions

Photo 1—Southern cross levee in its current condition, looking east toward Mad River Slough levee. The cross levee was constructed circa 2019 when the Mad River Slough levee breached and the adjacent property flooded to the south (picture right). The Project Area still receives intermittent brackish water intrusion from the impaired Mad River Slough levee.

Photo 2— Ponding water in the interior of the Project Area near the southern cross levee, looking northwest toward the Lanphere Dune Unit in the far background, and the forested wetlands in front of them. This area is invaded by non-native facultative pasture grasses, and is proposed to become salt marsh that grades into mudflat and subtidal channels with eelgrass.

Photo 3—At the eastern-most extent of the southern cross levee, looking north at the Mad River Slough Levee. The levee is variable in height along its length due to scour, which has compromised its longevity and has allowed for salt water to seep to the west of it.

Photo 4—Outboard edge (east) of Mad River Slough levee, where the breach has occurred (the “saddle” seen in the background), and location of the failing tide gate (out of frame). Portions of the levee will be lowered during Project construction to allow tidal waters to flow into the Project Area. Portions of the levee are expected to become salt marsh.

Photo 5—The tide gate “bubbling” as ponding water from the west of the levee drains. The tide gate will be removed in the final stages of Project construction to complete the levee breach and allow the Mad River Slough to infiltrate into the Project Area uninhibited, and restore a natural tidal regime.

Photo 6—Inboard edge (west) of the Mad River Slough levee, where the interior drains through the tide gate. This area will be excavated to form a subtidal to permanently flooded channel that supports eelgrass, and is the main “entrance” for tidal waters to feed the rest of the lagoon channel system.

Photo 7—Looking south along the west base of the levee, where ditches currently exist at the base of the levee along most of its length. These ditches have brackish influence from the failing tide gate, and salt-tolerant plant communities have begun to inhabit this area at its margins. This area will become a mix of slough channel, mudflat, and salt marsh post-construction.

Photo 8—Looking north along the west base of the levee at the extension of the ditch with ponded water. This area, too, will become a mix of slough channel, mudflat, and salt marsh post-construction.

Photo 9—At the northern-most extent of Mad River Slough levee, looking northwest at Lanphere Road and the site of the proposed northern cross levee that will be adjacent to Lanphere Road. The foreground will become a mix of slough channel, mudflat, and salt marsh post-construction.

Photo 10—On Lanphere Road looking southeast at the existing groundcover and Mad River Slough levee. The Project Area is expansive and offers an opportunity to restore a large area back to natural tidal conditions, and most importantly, restore native habitats that support an array of native species.

Photo 11—Another view from Lanphere Road looking southeast at the existing Project Area, with derelict agricultural fencing in the foreground. The former pasture will be restored back to native salt marsh, and derelict infrastructure removed during construction.

Photo 12—View of a dip in Refuge Access Road on the west boundary of the Project Area, where the road will be raised to prevent flooding and deterioration of the road. The road is bordered on either side by forested wetlands (photo left) and forested wetlands grading to dune forest (photo right).

Photo 13—View of another low point in Refuge Access Road that will be raised to prevent flooding, looking south.

Photo 14—View of the forested wetlands (looking northwest) that currently border the west of the Project Area, comprised of willow species and other freshwater wetland vegetation due to the freshwater influence from the groundwater discharge of the dunes to the west (no ground disturbance is proposed in this area).

Photo 15—Looking northwest from the southern cross levee at the forested wetland in the background, and berry brambles intermixed with a mosaic of pasture grasses. This area (not including the forested wetland) will receive fill to raise the elevations and create variability in salt marsh topography, to better capture sediment as the area inundates with tides. In the immediate foreground is a freshwater ditch that runs through the middle of the Project Area that is currently clogged with dense cattail growth. The ditch will be filled to match salt marsh elevations.

Attachment 8

Statutory Exemption for Restoration Projects Concurrence Letter

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Director's Office
Post Office Box 944209
Sacramento, CA 94244-2090
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

January 16, 2024

Doreen Hansen
Watershed Program Manager
Humboldt County Resource Conservation District
5630 South Broadway
Eureka, CA 95503
doreen@hcrcd.org

California Environmental Quality Act Statutory Exemption for Restoration Projects – Wadulh Lagoon Tidal Wetland Enhancement Project (Request No. 21080.56-2023-045-R1)

Dear Doreen Hansen:

I am pleased to inform you as the Director of the California Department of Fish and Wildlife (CDFW) that I concur with the lead agency determination by the Humboldt County Resource Conservation District that the Wadulh Lagoon Tidal Wetland Enhancement Project qualifies as a statutorily exempt restoration project under the California Environmental Quality Act (CEQA). (Pub. Resources Code, § 21080.56, subd. (e).) My concurrence as the CDFW Director is based on CDFW's independent review of the Humboldt County Resource Conservation District request for concurrence, which CDFW received on December 4, 2023. In my opinion, informed by the best available science and described in the separate CDFW concurrence, the Wadulh Lagoon Tidal Wetland Enhancement Project meets all the qualifying criteria in Public Resources Code section 21080.56, subdivisions (a) to (d), inclusive.

This concurrence signifies the continued commitment by CDFW and its partners in advancing the "Cutting the Green Tape" initiative, which is a collaborative effort to increase the pace and scale of restoration projects in California in a way that protects the environment and results in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery. CDFW stands ready to continue this effort in coordination with the Humboldt County Resource Conservation District.

CDFW's concurrence will be posted on our website as provided by Public Resources Code section 21080.56. If you have any related questions, please contact Brad Henderson, Cutting the Green Tape Program Manager, at (530) 351-5948, or by email at Brad.Henderson@wildlife.ca.gov.

Sincerely,

Charlton H. Bonham
Director

ec: California Department of Fish and Wildlife

Valerie Termini
Chief Deputy Director

Josh Grover, Deputy Director
Ecosystem Conservation Division

Steven Ingram, Assistant Chief Counsel
Office of the General Counsel

Tina Bartlett, Regional Manager
Northern Region

Rebecca Garwood
Environmental Program Manager
Northern Region Coastal Habitat Conservation Program

Brad Henderson
Environmental Program Manager
Watershed Restoration Grants Branch

Michael van Hattem
Senior Environmental Scientist (Supervisor)
Coastal Conservation Humboldt/Del Norte

Nicholas Van Vleet
Environmental Scientist
Coastal Conservation Humboldt/Del Norte

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
DIRECTOR'S OFFICE
POST OFFICE BOX 944209
SACRAMENTO, CA 94244-2090

CALIFORNIA ENVIRONMENTAL QUALITY ACT STATUTORY EXEMPTION FOR RESTORATION PROJECTS
CONCURRENCE NO. 21080.56-2023-045-R1

Project:	Wadulh Lagoon Tidal Wetland Enhancement Project
Location:	Humboldt County
Lead Agency:	Humboldt County Resource Conservation District
Lead Agency Contact:	Doreen Hansen; doreen@hcrcd.org

Background

Project Location: The Wadulh Lagoon Tidal Wetland Enhancement Project (Project) is located within a 78-acre parcel along the upper western portion of and adjacent to the Mad River Slough on Humboldt Bay; approximately 1.25 miles west of the City of Arcata, in Humboldt County, California. Approximate coordinates are 40.891815, -124.139325.

Project Description: The United States Fish and Wildlife Service (USFWS) proposes to conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, and the habitat upon which they depend and restore or provide habitat for California native fish and wildlife. The Project is designed to benefit native fish, wildlife, and plant species by restoring tidal process and ecosystem function to a diked agricultural pasture. The Project includes 1) breaching and lowering approximately 2,000 linear feet of the Mad River Slough Levee, 2) excavating and grading 3.5 acres of low-lying areas of the pasture to elevations that will support eelgrass (*Zostera marina*), 3) excavating a tidal channel network, 4) placing approximately 27,000 cubic yards of native fill to raise low-lying areas to elevations that will support salt marsh, 5) constructing two cross levees, and 6) removal of invasive plant species. The completed project will restore and protect 62.1 acres of intertidal salt marsh, brackish marsh, freshwater emergent wetlands, and fringe wetlands. The Project provides an opportunity to restore a natural shoreline with a transition from slough to salt marsh to freshwater riparian wetlands.

Tribal Engagement: Wadulh is the word for dunes in the Wiyot language, and the name Wadulh Lagoon was selected in recognition of the Wiyot Tribe's significant cultural connection to the Project area. The USFWS has engaged with the Wiyot Tribe and other tribes in the region (i.e., Table Bluff, Bear River Band of the Rohnerville Rancheria, Blue Lake Rancheria, and Cher-Ae Heights Indian Community of the Trinidad Rancheria) since 2021. In early 2023, the USFWS held an in-person meeting with tribal representatives to provide updates and receive input on designs, funding, upcoming cultural surveys, and restoration elements. The Wiyot Tribe will be an active participant in concept, design, and final

interpretive signage around the restoration site and will use the site to educate its members and provide eco-cultural interpretation.

Interested Party Coordination: The Project has been in development for nearly a decade, and the USFWS, as landowner of the Project area, is the partnering federal agency on the Project. Prior to the transfer of the Project parcel to USFWS, in August 2015, Caltrans, the previous landowner, held conceptual design coordination meetings with neighbors, stakeholders, and agencies to present and choose a restoration option to use the site for Caltrans' mitigation needs. Since the transfer of ownership of the property, the Project designs have continued to be refined. The Project is supported by California Senator Mike McGuire, Assemblymember Jim Wood, and Humboldt County Supervisor Mike Wilson. The Project is also supported by local non-profit organizations Friends of the Dunes and Redwood Region Audubon Society.

Anticipated Project Implementation Timeframes: Start date: June 1, 2024
Completion date: December 30, 2026

Lead Agency Request for CDFW Concurrence: On December 4, 2023, the Director of the California Department of Fish and Wildlife (CDFW Director) received a concurrence request from the Humboldt County Resource Conservation District (Lead Agency) pursuant to Public Resources Code section 21080.56, subdivision (e) (Request). The Request seeks the CDFW Director's concurrence with the Lead Agency's determination on December 1, 2023, that the Project meets certain qualifying criteria set forth in subdivisions (a) to (d), inclusive, of the same section of the Public Resources Code (Lead Agency Determination). The CDFW Director's concurrence is required for the Lead Agency to approve the Project relying on this section of the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

Concurrence Determination

The CDFW Director concurs with the Lead Agency Determination that the Project meets the qualifying criteria set forth in Public Resources Code section 21080.56, subdivisions (a) to (d), inclusive (Concurrence).

Specifically, the CDFW Director concurs with the Lead Agency that the Project meets all of the following conditions: (1) the Project is exclusively to conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, and the habitat upon which they depend; or is exclusively to restore or provide habitat for California native fish and wildlife; (2) the Project may have public benefits incidental to the Project's fundamental purpose; (3) the Project will result in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery; and includes procedures and ongoing management for the protection of the environment; and (4) Project construction activities are solely related to habitat restoration. Pursuant to Public Resources Code section 21080.56, subdivision (g), CDFW will post this Concurrence on its CEQA Notices and Documents internet page: https://wildlife.ca.gov/Notices/CEQA.

This Concurrence is based on best available science and supported, as described below, by substantial evidence in CDFW's administrative record of proceedings for the Project.

This Concurrence is also based on a finding that the Project is consistent with and that its implementation will further CDFW's mandate as California's Trustee Agency for fish and wildlife, including the responsibility to hold and manage these resources in trust for all the people of California.

Discussion

A. Pursuant to Public Resources Code section 21080.56, subdivision (a), the CDFW Director concurs with the Lead Agency that the Project will exclusively conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, and the habitat upon which they depend; or restore or provide habitat for California native fish and wildlife.

   The purpose of the Project is to restore 62.1 acres of a diked agricultural pasture to a combination of estuarine and palustrine wetland habitats, including salt marsh, brackish marsh, mudflat, subtidal/intertidal eelgrass habitat, while enhancing and protecting existing forested wetlands. This will be achieved by reconnecting and restoring the Project area to the larger Humboldt Bay tidal system where native species will benefit and thrive from the complex habitat creation.

B. Pursuant to Public Resources Code section 21080.56, subdivision (b), the CDFW Director concurs with the Lead Agency that the Project may have incidental public benefits, such as public access and recreation.

   The creation of off-channel habitat in the Project area will provide critical salmonid rearing and refugia habitat that will contribute to the recovery of the area's commercial and recreational fisheries. Multiple tidal and riverine restoration projects have demonstrated the utilization of created or enhanced habitats through post-construction fish surveys to measure project effectiveness. Additionally, the Project will improve public access. The Wadulh Lagoon Project area will be available to the public as part of the current permit and guided tour access options. Additionally, the Wiyot Tribe will use the site to educate its tribal members and provide eco-cultural interpretation.

C. Pursuant to Public Resources Code section 21080.56, subdivision (c), the CDFW Director concurs with the Lead Agency that the Project will result in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery, and includes procedures and ongoing management for the protection of the environment.

   Long-term Net Benefits to Climate Resiliency: The Project will build resilience for coastal communities and endangered species regarding future sea level rise by utilizing a nature-based approach. When the Project is completed, there will be several mechanisms that will capture suspended sediment within the Project area. Tidal currents in the tidal lagoons will have low velocity and the water will be sufficiently

deep to produce conditions that promote settling of sediment carried by tidal flooding. At higher tides, flood tide flows will overtop the lowered levees, the salt marsh ridges, and fringing salt marsh. Salt marsh vegetation is effective at trapping suspended sediment when overtopping occurs. Ebb flows will circulate through the network of channels within the lagoons providing more opportunity to trap sediment. There is evidence that suggests that there is sufficient sediment to maintain salt marshes within the Project area under projected local rates of sea level rise until 2100. Project design elements are intended to trap suspended sediment brought in by tides which may allow marshes to keep pace with sea level rise for a longer time. To allow for ecological development, barriers to upslope migration of salt marsh will be removed. Thus, the Project is designed around process-based restoration where individual features will likely evolve due to the dynamic nature of a tidal setting. The Project is expected to persist and provide value for at least 50 years given sea level rise.

Long-term Net Benefits to Biodiversity: The Project will result in long-term net benefits for coastal wetlands and associated dependent species, including restoration and protection of 62.1 acres of intertidal salt, brackish marsh, freshwater emergent wetlands, and fringe wetlands. It will restore diked and drained salt marsh and intertidal areas, reestablish a natural transition from uplands to shoreline and the slough, and provide nursery and significant off-channel habitat for federally and state-listed fish species and habitat for shorebirds and raptors. Creation of aquatic habitat will also promote eelgrass beds in the northern Humboldt Bay and Mad River Slough, which in turn are known to support among the highest diversity and abundance of shorebirds in the western hemisphere as well as significant rearing and refugia habitat for fish and invertebrate species.

The loss of salt marsh habitat within Humboldt Bay is an important factor contributing to the decline of numerous plant and wildlife species, including Lyngbye's sedge (*Carex lyngbyei*), bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), American kestrel (*F. sparverius*), merlin (*F. columbarius*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), and northern red-legged frog (*Rana aurora*). The Project will play an important role in the recovery of these wildlife species. The Project is located adjacent to the Lanphere Dunes Unit of Humboldt Bay National Wildlife Refuge, which is the only place on the Bay where the transition from slough to salt marsh to freshwater wetlands to upland (dunes) is preserved. The Project is an opportunity to restore a natural shoreline with a transition from slough to salt marsh to freshwater riparian wetlands. The Project's salt marshes will support a broad array of shorebirds and raptors including osprey (*Pandion haliaetus*), white-tailed kite (*Elanus leucurus*), red-tailed hawk (*Buteo jamaicensis*), and northern harrier (*Circus hudsonius*). Fringing brackish marsh areas will be used by northern red-legged frogs. The Project will also enhance and protect existing riparian habitat. This habitat has been monitored for bird use for the past 30 years by the Humboldt Bay Bird Observatory and is used by a variety of neotropical migrants and other songbirds.

Long-term Net Benefits to Sensitive Species Recovery: Diking and draining of salt marshes has contributed to the substantial population declines of local salmonid

species, including Coho Salmon (*Oncorhynchus kisutch*), Chinook Salmon (*O. tshawytscha*), and steelhead trout (*O. mykiss*), as well as Tidewater Goby (*Eucyclogobius newberryi*). Restoration of tidal channels, eelgrass beds, and salt marsh will restore and provide critical fish refugia and nursery habitat that result in long-term net benefit to these sensitive species. Juvenile salmonids utilize the estuary, especially areas with eelgrass, as nursery areas for extended periods before entering the ocean. Estuaries provide habitat where juvenile fishes obtain the size needed to increase their chances of survival at sea. Similarly, studies of other northern California estuaries and lagoons show that steelhead trout and Coastal Cutthroat Trout (*O. clarkii clarkii*) use these habitats year-round. Created habitat will also benefit Tidewater Goby which prefer salt marshes that border freshwater wetlands for both spawning and rearing.

Procedures for the Protection of the Environment: The following procedures and best management practices will be followed to minimize impacts to the environment.

General Construction

- Work will occur during the dry season – July 15th to October 15th.
- 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.
- 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.
- All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location with secondary containment to prevent spills from traveling to surface water.
- 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.

Water Quality

- Silt curtains may be installed as required to prevent the delivery of turbid water to open water areas connected to the Project area.
- Construction equipment shall not be stored in inundation areas or 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).

- During excavation, management of groundwater and saturated soils may be required. Water management may be required to reduce nuisance water within the active work area. Dewatering may be required to remove groundwater seepage in excavation areas. Water shall be treated for sediment removal and discharged onto areas that are not susceptible to damage from saline water.

Erosion Control

- Installation of temporary fiber rolls, as needed.
- Silt fence installed around proposed construction staging area.
- Seed mix applied to all disturbed areas above elevation 7.5 ft.
- Sufficient erosion control supplies will always be 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.

Invasive Species

- 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 area 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.

Biological

- A Qualified Biologist will relocate/protect aquatic species.
- Nesting Bird surveys will be performed by a Qualified Biologist to avoid impacts on native nesting birds during the breeding season. Restoration activities will be preceded by a nesting bird survey to identify any active nests. If nests are found, the biologist will create appropriately sized buffer areas around the active nest. Active nests will be avoided until they become inactive.

<u>Ongoing Management for the Protection of the Environment:</u> The following post construction monitoring and management will occur across the Project area.

- Monitoring and management of planted riparian vegetation.
- Invasive species control will continue for the life of the project.
- Annual fish monitoring for presence and species richness for three years.
- Water quality parameters will be collected during fish surveys.
- Avian surveys will continue.
- General observational project oversite will occur multiple times a year to guide any required adaptive management.

D. Pursuant to Public Resources Code section 21080.56, subdivision (d), the CDFW Director concurs with the Lead Agency that the Project does not include any construction activities, except those solely related to habitat restoration.

   All Project construction activities are solely related to the overall goal of the Project to restore and manage wetland habitat.

Scope and Reservation of Concurrence

This Concurrence is based on the proposed Project as described by the Lead Agency Determination and the Request. If there are any subsequent changes to the Project that affect or otherwise change the Lead Agency Determination, the Lead Agency, or any other public agency that proposes to carry out or approve the Project, shall submit a new lead agency determination and request for concurrence from CDFW pursuant to Public Resources Code section 21080.56. If any other public agency proposes to carry out or approve the Project subsequent to the effective date of this Concurrence, this Concurrence shall remain in effect and no separate concurrence from CDFW shall be required so long as the other public agency is carrying out or approving the Project as described by the Lead Agency Determination and the Request.

Other Legal Obligations

The Project shall remain subject to all other applicable federal, state, and local laws and regulations, and this Concurrence shall not weaken or violate any applicable environmental or public health standards. (Pub. Resources Code, § 21080.56, subd. (f).)

CDFW Director's Certification

By:_____ Date: 1/17/24

Charlton H. Bonham, Director
California Department of Fish and Wildlife