ELKHORN SLOUGH TIDAL MARSH RESTORATION PROJECT

Initial Study/Mitigated Negative Declaration

Prepared for
California Department of Fish and Wildlife

June 2015

ESA

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ELKHORN SLOUGH TIDAL MARSH RESTORATION PROJECT

Initial Study/Mitigated Negative Declaration

A. Initial Study Checklist

1. Project Title:	Elkhorn Slough Tidal Marsh Restoration Project
2. Lead Agency Name and Address:	California Department of Fish and Wildlife Central Region (4) 1234 East Shaw Avenue Fresno, CA 93710
3. Contact Person and Phone Number:	Dave Feliz 831-728-2822 x302
4. Project Location:	Lower Elkhorn Slough, Seal Bend and Minhoto-Hester Marsh
5. Project Sponsor's Name and Address:	Elkhorn Slough National Estuarine Research Reserve (Department of Fish & Wildlife) 1700 Elkhorn Road Watsonville, CA 95076
6. General Plan Designation(s):	Wetlands & Coastal Strand/ Agricultural Preservation/Agricultural Conservation
7. Zoning Designation(s):	Resource Conservation (Coastal Zone)

8. **Description of Project:** (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)

   See below.

9. **Surrounding Land Uses and Setting.** (Briefly describe the project's surroundings.)

   See below.

10. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement. Indicate whether another agency is a responsible or trustee agency.)

    See below.

Introduction

This Initial Study (IS) and Mitigated Negative Declaration (MND) has been prepared pursuant to the California Environmental Quality Act of 1970 (CEQA), as amended (commencing with Section 21000 of California's Public Resources Code), and State CEQA Guidelines. The Lead Agency for the project, as defined by CEQA, is the California Department of Fish and Wildlife (CDFW), which has primary jurisdiction over the project site in partnership with the National Oceanic and Atmospheric Administration (NOAA). The project would be undertaken on lands owned by CDFW and would be implemented by the Elkhorn Slough Foundation (ESF).

CDFW has determined that the proposed project is subject to environmental assessment under CEQA. Early identification of potential environmental impacts provides the basis for necessary revision to the project design. The analysis in this document focuses on aspects of the project that could have a significant effect on the environment, and identifies feasible measures to mitigate (i.e., reduce or avoid these impacts. The CEQA Guidelines define "significant effect on the environment" as a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project…." (CEQA Guidelines, Section 15382).

The document consists of the following major sections:

- Project Description – provides a brief description of existing site conditions and facilities, the proposed modifications and improvements, and the discretionary approvals required for the project to proceed.
- Environmental Checklist and Discussion – provides specific environmental topic chapters within which the following are addressed:
    1. Environmental setting or conditions that may affect or be affected by the proposed project.
    2. Potential environmental effects and level of significance likely to result from the project as proposed.
    3. Mitigation measures that can be implemented to eliminate or substantially reduce the identified potentially significant environmental effects.
    4. References used in the analyses.
- Appendices – including information regarding construction methodology and equipment, air pollutant emissions modeling, and the site's biological resources.

Project Description

Background

The Elkhorn Slough Tidal Marsh Restoration Project ("project") would restore 147 acres of vegetated tidal salt marsh, upland ecotone, and native grasslands in Monterey County. The project would restore the marsh to one that is higher in elevation and thus possibly more resilient to climate change than other Elkhorn Slough marshes, reduce tidal scour in the system, and improve scientific understanding of salt marsh restoration techniques for the benefit of future projects in the estuary.

The Elkhorn Slough estuary is one of the largest estuaries in California and contains the State's largest salt marshes south of San Francisco Bay. The slough provides important habitat for an exceptionally broad range of resident and migratory birds, fish, and other wildlife, and plays a crucial role in the local estuarine and nearshore food web. The Elkhorn Slough watershed encompasses 45,000 acres. The Elkhorn Slough Ecological Reserve is owned and managed by CDFW. Those lands are also designated as the Elkhorn Slough National Estuarine Research Reserve (ESNERR) with administrative and research funding provided by NOAA to CDFW through the Elkhorn Slough Foundation. The Elkhorn Slough Foundation (ESF) is a land trust and partner to CDFW. ESF owns nearly 3,300 acres and manages easements on an additional 300 acres of private land in the Elkhorn Slough watershed (Elkhorn Slough Foundation, 2014). A large portion of Elkhorn Slough is designated by CDFW as the Elkhorn Slough Marine Protected Area. The boundary of this designation extends to the mean high tide level. Therefore, some of this project area occurs within the Marine Protected Area.

The slough system is currently facing unprecedented rates of tidal wetland loss and degradation. Over the past 150 years, human activities have altered the tidal, freshwater, and sediment processes which are essential to support and sustain Elkhorn Slough's estuarine habitats. Fifty percent of the tidal salt marsh in Elkhorn Slough has been lost in the past 150 years. This habitat loss is primarily a result of two historic land use changes, 1) construction of a harbor at the mouth of the slough which lead to increased tidal flooding (and subsequent drowning of vegetation) and 2) past diking and draining of the marsh for use as pasture land The act of draining the wetlands led to sediment compaction and land subsidence, from 1-6 feet. Decades later, the dikes began to fail, reintroducing tidal waters to the reclaimed wetlands. Rather than converting back to salt marsh, the areas converted to poor quality, high elevation intertidal mudflat, as the lowered landscape was inundated too frequently to support tidal marsh, and insufficient sediment supply was available in the tidal waters to rebuild elevation. The loss of riverine sediment inputs, continued subsidence of marsh areas, sea level rise, increased salinity, and increased nutrient inputs may also contribute to marsh loss (Watson et al. 2011). Bank and channel erosion in Elkhorn Slough are leading to deepening and widening tidal creeks, causing salt marshes to collapse into the channel, and eroding sediments that provide important habitat and support estuarine food webs.

In 2004, ESNERR initiated a planning effort to evaluate marsh dieback and tidal erosion at Elkhorn Slough and to develop restoration and management strategies. Experts from multiple disciplines agreed that without intervention, excessive erosion would continue widening the tidal channels and that salt marsh would continue to convert to mudflat. Continued erosion at present rates will result in a significant loss of habitat function and decrease in estuarine biodiversity. Habitat loss is expected to become more severe with accelerating sea level rise. As described more fully in the following subsections, the Elkhorn Slough Tidal Marsh Restoration Project proposes restoration and experimental designs to address these issues across a range of impacted tidal marshlands, including subsided marsh areas that now support substantially less emergent marsh and more mudflat than was historically present.

Project Goals and Objectives

The project goals and objectives were developed by ESNERR staff and are listed below:

Goal 1: Increase the extent of tidal marsh in Elkhorn Slough

Objective 1.1**:** Restore salt marsh ecosystem in 47 acres of historically diked and drained areas through adding sediment.

Goal 2: Reduce tidal scour in Elkhorn Slough

Objective 2.1**:** Add sediment to 47 acres of historically diked and drained areas, thereby decreasing the tidal prism.

Goal 3: Protect and improve surface water quality in Elkhorn Slough

Objective 3.1**:** Establish a permanent vegetated buffer to absorb upland sediment and contaminants.

Goal 4: Provide resilience to climate change to estuarine ecosystems in Elkhorn Slough

Objective 4.1**:** Increase the extent of tidal marsh from one to two feet to be resilient to moderate sea level rise.

Goal 5: Increase understanding of how best to restore salt marsh

Objective 5.1**:** Conduct a well-designed and monitored project so that lessons learned can inform future salt marsh restoration projects in the estuary.

Project Location and Setting

The proposed project site is located in the Elkhorn Slough estuary, situated 90 miles south of San Francisco and 20 miles north of Monterey (**Figure 1**). The project site is located on land owned and managed by CDFW as part of ESNERR. The 147-acre (ac) project site comprises two stretches of salt marsh and mudflat in lower Elkhorn Slough, Seal Bend Marsh and Minhoto-Hester Marsh (104 ac), and upland areas adjacent to Minhoto Marsh described as the Buffer Area (43 ac) (**Figure 2**). Two Marine Protected Areas (MPA)'s, Elkhorn Slough State Marine Conservation Area (SMCA) and State Marine Reserve (SMR), are located within the Project site and a third, Moro Cojo Slough SMR is located within one mile (Figure 8).Regional access to the site is provided by U.S. Highway 101 (U.S. 101), State Route 1 (SR 1), State Route 156 (SR 156), and State Route 183 (SR 183). Local access is provided by Dolan Road and Via Tanques Road in the unincorporated area of Monterey County known as Elkhorn, between Moss Landing and Prunedale.

Overview of Existing Land Use

The Elkhorn Slough system is a network of intertidal marshes, mudflats, and subtidal channels located at the center of the Monterey Bay shoreline. Elkhorn Slough has an average depth of 4.6 feet, and is deepest at the SR 1 bridge overcrossing where it measures 25 feet deep at mean lower low water (MLLW). The main channel in Elkhorn Slough becomes narrower and shallower as it winds inland. Tidal marshes in the slough are dominated by pickleweed and occur at higher intertidal elevations than the mudflats that lie below the tidal marshes. Pickleweed provides

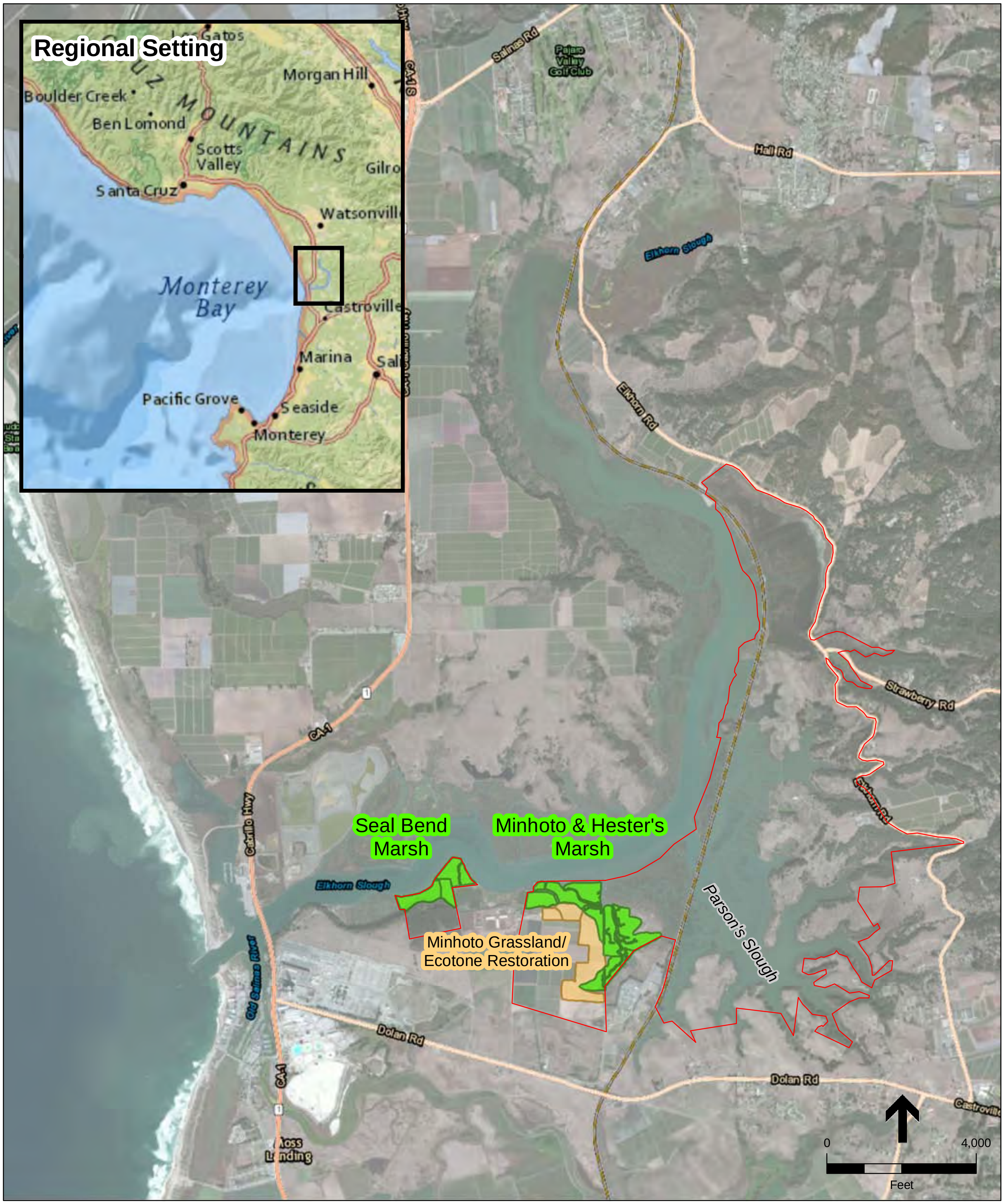

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Figure 1
Regional Setting

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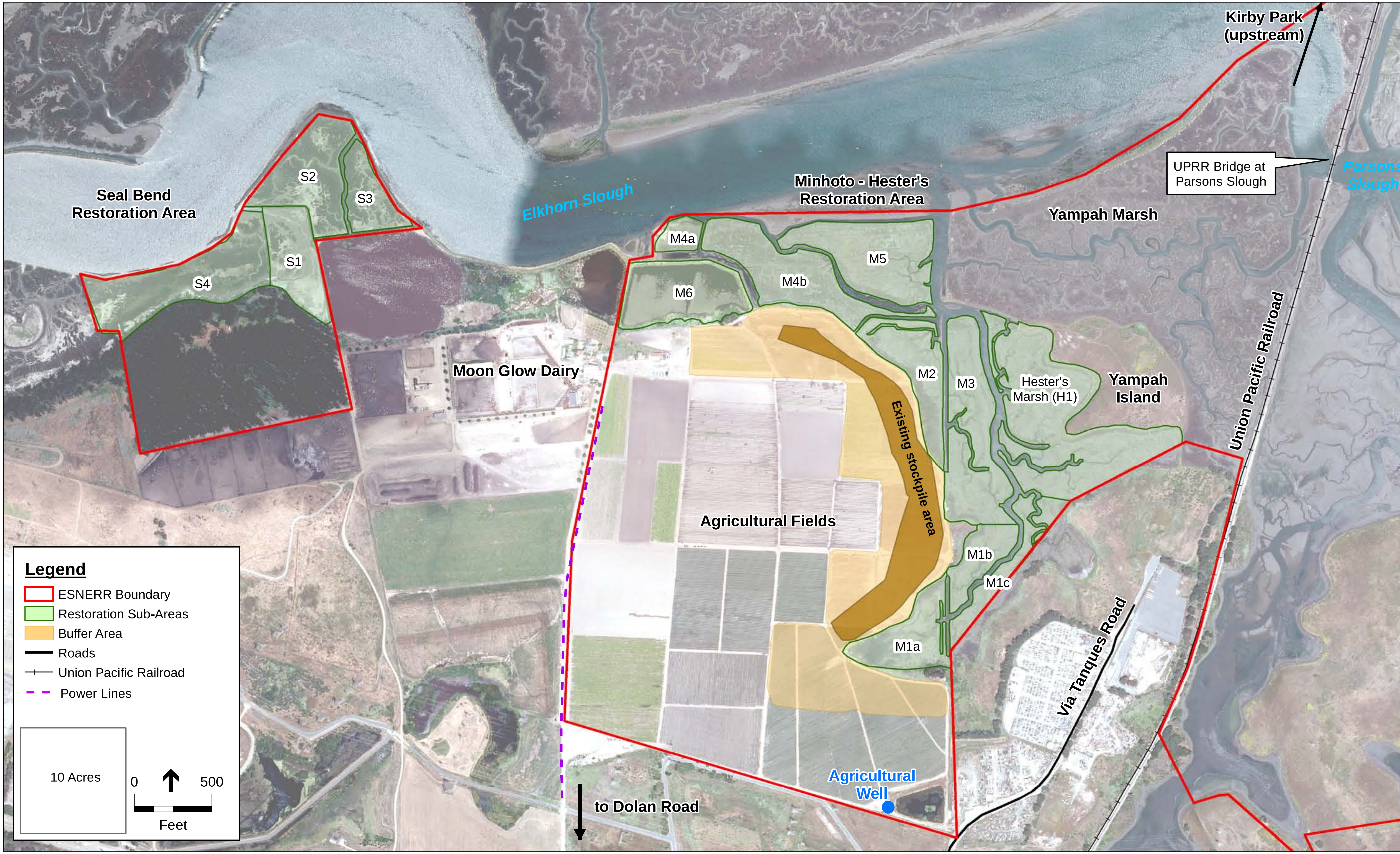

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Figure 2
Site Map

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important habitat for a variety of aquatic and terrestrial species and pickleweed-dominated marshes are generally recognized as having significant ecological value (Woolfolk and Labadie 2012).

Surrounding Elkhorn Slough are the hilly uplands and marine terraces that lie between the Pajaro and Salinas valleys. Upland areas drain into Elkhorn Slough through numerous small ephemeral creeks. The largest of these is Carneros Creek at the head of the estuary. Land use in these uplands consists of agriculture (primarily strawberries and other row crops), cattle grazing, rural residences, and the small town of Las Lomas. Wetlands, mudflats, and marsh areas on both sides of Elkhorn Slough characterize the immediate project setting. Uplands surrounding Elkhorn Slough are primarily undeveloped.

Restoration Areas

The project would restore three areas of ESNERR, which comprise the project site. **Figure 3** depicts the restoration areas: Seal Bend restoration area (consisting of sub-areas S1 through S4); Minhoto-Hester restoration area (consisting of sub-areas M1a-c, M2, M3, M4a-b, M5, M6, and H1); and the buffer area between the remnant marsh and agricultural fields, containing the existing stockpile area.

Seal Bend Restoration Area

The Seal Bend restoration area (28.6 ac) is a low-lying area consisting of low quality subsided pickleweed marsh, intertidal mudflats, tidal channels and remnant levees. The area has been divided by multiple cross-levees, and has the heavily eroded remnants of a perimeter levee along its outboard side. A large borrow channel is adjacent to the interior of the perimeter levee. Dendritic channel networks drain the area; many of these channels exhibit evidence of historic dredging, straightening, and/or rerouting.

Minhoto-Hester Restoration Area

The Minhoto-Hester restoration area (75.4 ac) is, like the Seal Bend area, a low-lying area consisting of subsided pickleweed marsh, intertidal mudflats, tidal channels and remnant levees. Similar to Seal Bend, the area has multiple cross-levees and both natural and dredged channels. A major dredged channel (over 100 feet wide in some locations) runs north-south through the remnant marsh. The perimeter levee at the Minhoto-Hester area shows signs of erosion.

Minhoto Stockpile Area and Adjacent Uplands (buffer area)

The buffer area (41 ac) upslope of the Minhoto-Hester restoration area is located on gently sloping uplands adjacent to the tidal marsh and mudflats. Historically, both the buffer area and the adjacent agricultural fields were used to grow crops such as strawberries and artichokes as well as bulb/flower production (Andrea Woolfolk, pers. comm.). Since 2012, the buffer area has been planted in sterile barley. In July of 2013, approximately 50,000 cubic yards (cy) of sediment were delivered from the Pajaro River Bench Excavation Project and stockpiled within the buffer area for use in the Elkhorn Slough Tidal Marsh Restoration Project. The stockpile presently covers an area of approximately 11 acres and has been re-planted in triticale to prevent erosion. The buffer area was probably not historically tiled for drainage (Monique Fountain, pers. comm.).

The fields outside of the buffer area are not currently in active production. The last agricultural lease for the fields expired in 2014, however, future leases could include flowers/bulbs or food crops.

The physical conditions and processes of the project site are detailed in the Existing Conditions Report for this project (ESA, 2014a) and the restoration plan specifics are included separately in the Restoration Plan (ESA, 2014b) developed for the project.

Project Characteristics

Overview

The Elkhorn Slough Tidal Marsh Restoration project would restore 147 acres of vegetated tidal salt marsh, ecotone, and native grasslands in Monterey County (**Figure 4**). The project site includes 104 acres of former tidal marsh that have experienced approximately two feet of subsidence and no longer support extensive areas of vegetated marsh. It also supports up to 43 acres of ecotone and ruderal grassland. The overall approach would use imported and onsite sediments to raise marsh and mudflat elevations and restore tidal marsh habitats in these areas. Sediment sources could include imported sediment from the existing stockpile as well as future sources as available and from the hillside adjacent to the marsh.

The entire remnant marsh plain would be raised to a more sustainable elevation, at which emergent wetland vegetation could reestablish and persist. Marsh, ecotone and native grassland would be created in the buffer area along the western edge of the Minhoto-Hester restoration area. The project would improve marsh sustainability with sea level rise, as the restored marsh would be higher in the tidal frame, further from the drowning threshold, and marsh vegetation in the restored areas would accrete organic material that would help the restored marsh plain rise with sea level. The project would also reduce tidal prism in Elkhorn Slough, reducing the potential for ongoing tidal scour and associated marsh loss.

Design Elements and Grading

Design elements of the project would include raising the subsided marsh plain, maintaining the existing tidal channels, and excavating within the upland buffer area to restore marsh plain, ecotone, and native grassland habitat.

Restored Marsh Plain

The subsided former marsh plain (currently mostly too low to sustain vegetation) would be raised over an area of 104 acres to mid-high marsh plain elevations. Based on vegetation-elevation data collected for the project (ESA, 2013), this target elevation would support a healthy growth of pickleweed as well as a diverse high marsh community. Sediment would be placed to a fill elevation slightly higher than the target marsh plain elevation to allow for settlement and consolidation of the underlying soils. The average fill depth would be 2.1 feet, including 25% overfill. Imported earth fill and onsite borrow would be used as fill sources. The project would rely primarily on natural vegetation recruitment in the restored marsh areas.

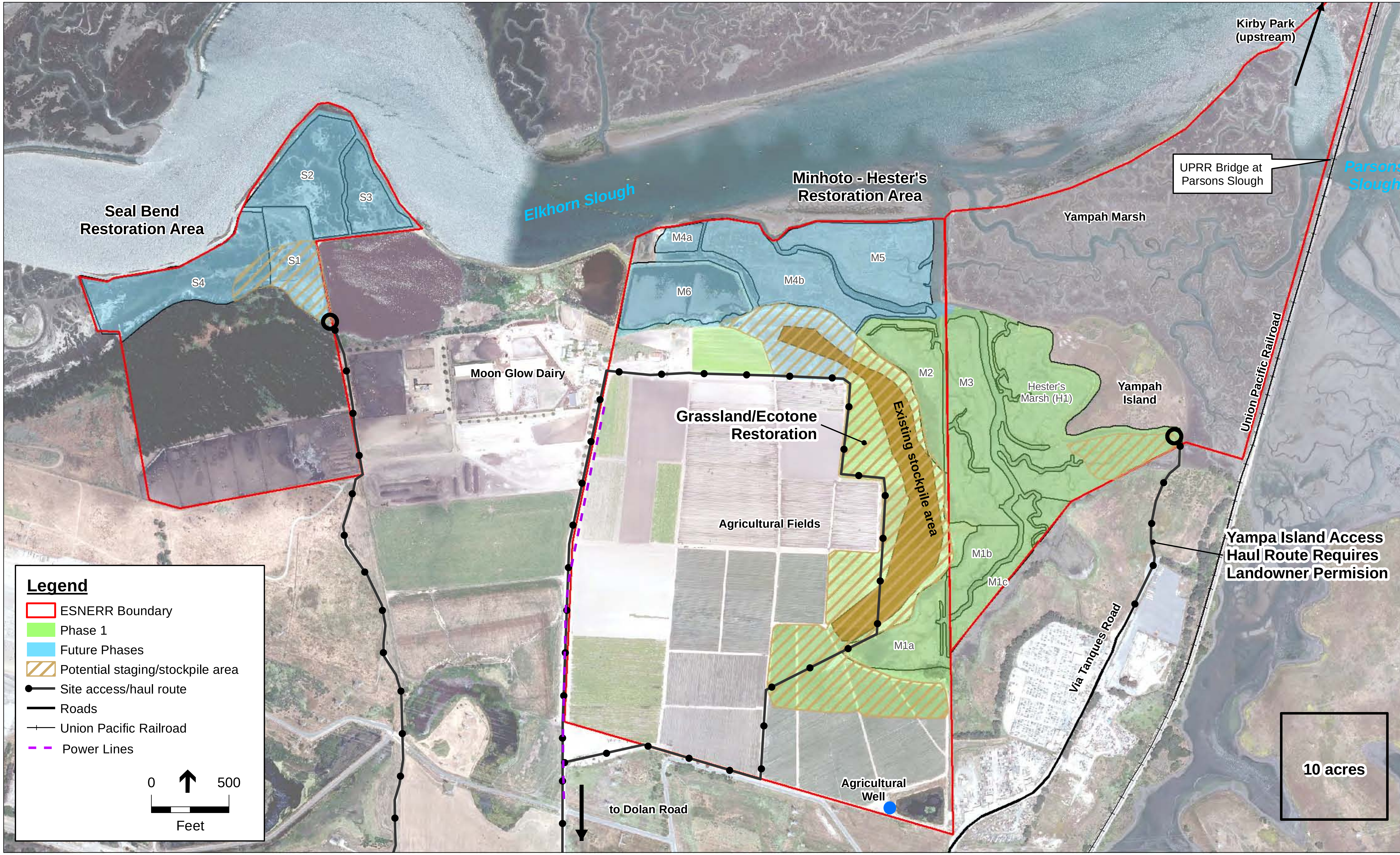

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Figure 3

Restoration Plan

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Figure 4

Restoration Plan - Long Term Habitats

A natural marsh plain is very gently sloped, more gently than can be graded during construction. Where permeable soils are used for marsh fill, the marsh plain would be approximately flat to simplify design and construction. Where less permeable soils are used, the design may include a slightly sloped marsh plain to improve drainage. The stockpiled Pajaro Bench soils are relatively permeable, while onsite upland borrow sediments are expected to be less permeable.

Tidal channels

Remnant historic channels onsite would generally be left in place or filled and re-excavated in the same place. As needed for marsh access, smaller channels would be filled. Avoidance of channel fill, temporary and permanent, is preferred. As much of the existing tidal channel network would be maintained as is economically feasible. The density of channels (length of channel per acre of marsh) after restoration would be comparable to the density in natural reference marshes.

Low levees (less than 0.5 feet above the marsh plain) composed of fill material would be constructed along the larger channels to simulate natural channel levees. The project would recreate natural levee features along the sides of the main channel into the Minhoto-Hester area and the main channel into Seal Bend. Fill would be placed as close to the edge of the channel as possible to simulate the form and function of a natural channel bank.

Borrow ditches (dating from historical wetland reclamation in these areas) would be blocked or filled completely if fill is available after raising the marsh plain. Blocking borrow ditches would route more flow through the natural channels and slightly increase hydraulic resistance, which may achieve benefits from reducing tidal prism and associated scour in the Elkhorn Slough system.

Marsh, Ecotone and Grasslands in the Buffer Area

The buffer area would be graded to increase marsh area and create a gently sloping ecotone band along the edge of the restored marsh. Specifically, excavation would widen the existing marsh (by 100 to 150 feet) and create a band of gentle slope (e.g., 1:30) on the hillside, fostering creation of a wider ecotone habitat. The remaining buffer area would be restored to native grassland habitat. The north end of the buffer area (adjacent to M4 and M6) would be restored in a later phase so this area could be used to stockpile material for future placement on subareas M4, M5, and M6.

Experimental Design

Field experiments would be built into the Phase 1 design, with the results of these experiments helping to refine the design for subsequent phases. Experiments would utilize different approaches to marsh plain fill elevation, tidal creek construction, sediment texture and organic matter amendment, marsh plain slopes, ecotone/grassland revegetation and weed control, followed by monitoring.

Proposed Construction

Project Phasing

The project would restore 147 acres of vegetated tidal salt marsh, upland ecotone, and native grasslands in its entirety (see Figure 4). The project would be implemented in multiple phases, as fill and funding become available. The low-lying areas of the site are divided into 14 sub-areas, defined primarily by remnant dikes and major tidal channels. Each project phase would restore one or more of these areas depending on the amount of fill and funding available.

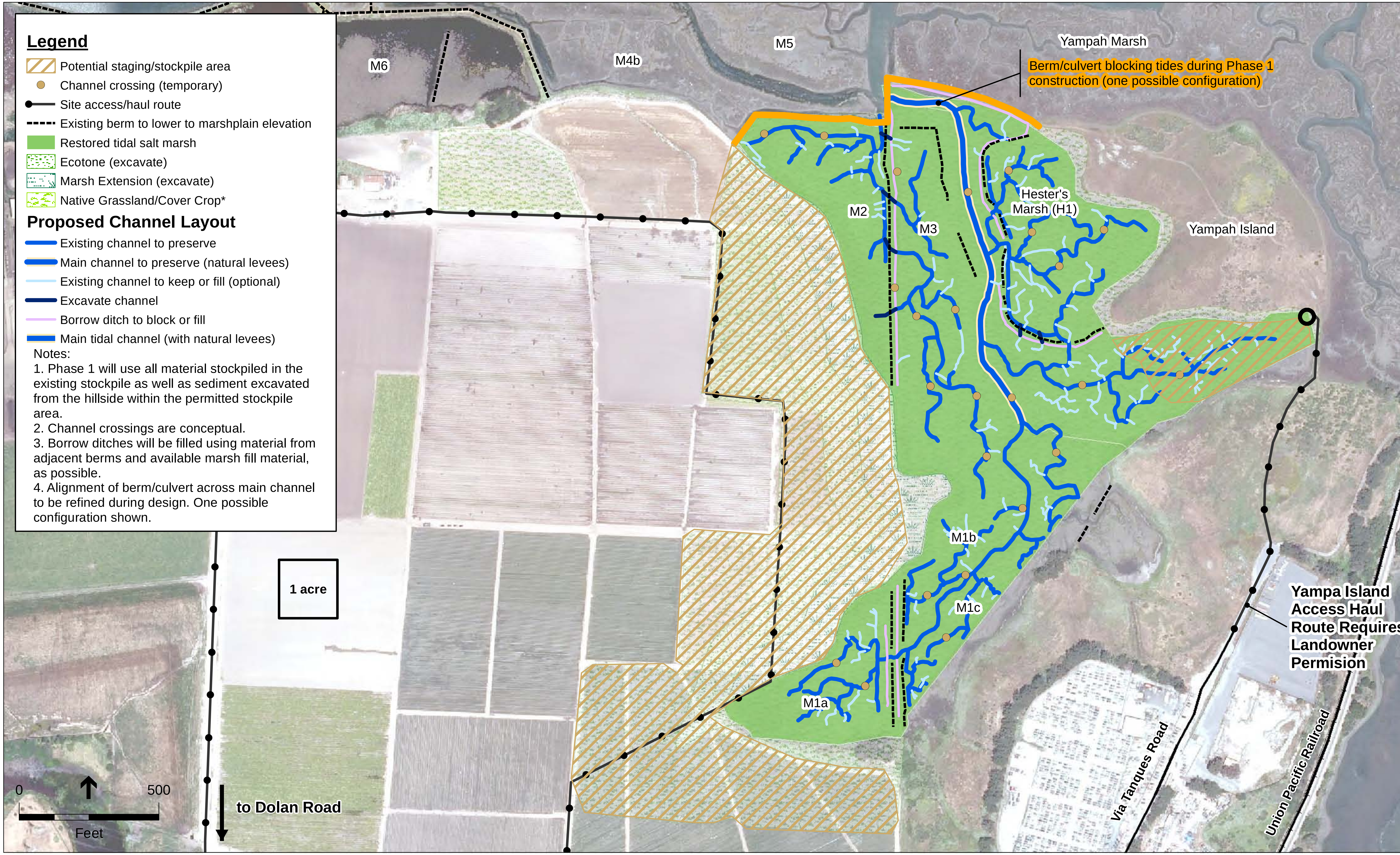
Raising subsided tidal areas to more sustainable marsh elevations would require approximately 275,000 cy of sediment for the project as a whole. As shown in **Figure 5**, Phase 1 includes the restoration of a portion of Minhoto-Hester restoration area (subareas M1-3 and H1) and most of the buffer area. **Figure 6** depicts future construction phases, which would occur in the northern portion of the Minhoto-Hester restoration area (subareas M4-6) and the remaining buffer area, and the Seal Bend restoration area (subareas S1-4).

Phase 1

Phase 1 would restore approximately 47 acres of tidal marsh within the Minhoto-Hester Marsh area and additional tidal marsh, upland ecotone and native grassland within the buffer area. These restoration areas are shown in greater detail in Figure 5 and include subareas M1, M2, M3, H1, and the adjacent buffer area. This phase would require approximately 139,400 cy of fill to raise the marsh plain an average height of 2.4 feet, or 1.9 feet after one year of consolidation. Upon completion of Phase 1 construction, a 35 acre portion of the buffer area would be revegetated. The remaining 6 acre area portion of the buffer area would be used as a stockpile location for future phases and be revegetated upon completion of that work. The revegetation process would include reducing the weed seed bank, decompacting the soil, and potentially adding an organic matter amendment. The native grassland area would be similarly re-vegetated by reducing the weed seed bank and planting native grasses/forbs. A weed-resistant border of rhizomatous perennial plants that readily spread (e.g., creeping wild rye (*Elymus triticoides*), Santa Barbara sedge (*Carex barbarae*)) would be planted between the grassland and ecotone.

Sediment Source for Phase 1

In 2013, approximately 50,000 cy of sediment was delivered to the existing stockpile area from Santa Cruz County’s Pajaro Bench Excavation Project. The volume of soil delivered from the Pajaro Bench Excavation leaves a deficit of approximately 90,000 cy for implementation of the proposed Phase 1 project. ESF is considering two primary options for addressing this deficit. One option would be to continue looking for a source of offsite sediment, as was done with the Pajaro Bench Excavation Project. A second option would be to utilize a combination of offsite and excavated sediment, as available. While sediment sources are potentially available in the vicinity of Elkhorn Slough, these may not be available immediately and would need to be evaluated for quality, timing, feasibility and affordability.



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Source: Air photo from NAIP 2010.

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Figure 5

Phase 1 Restoration Areas

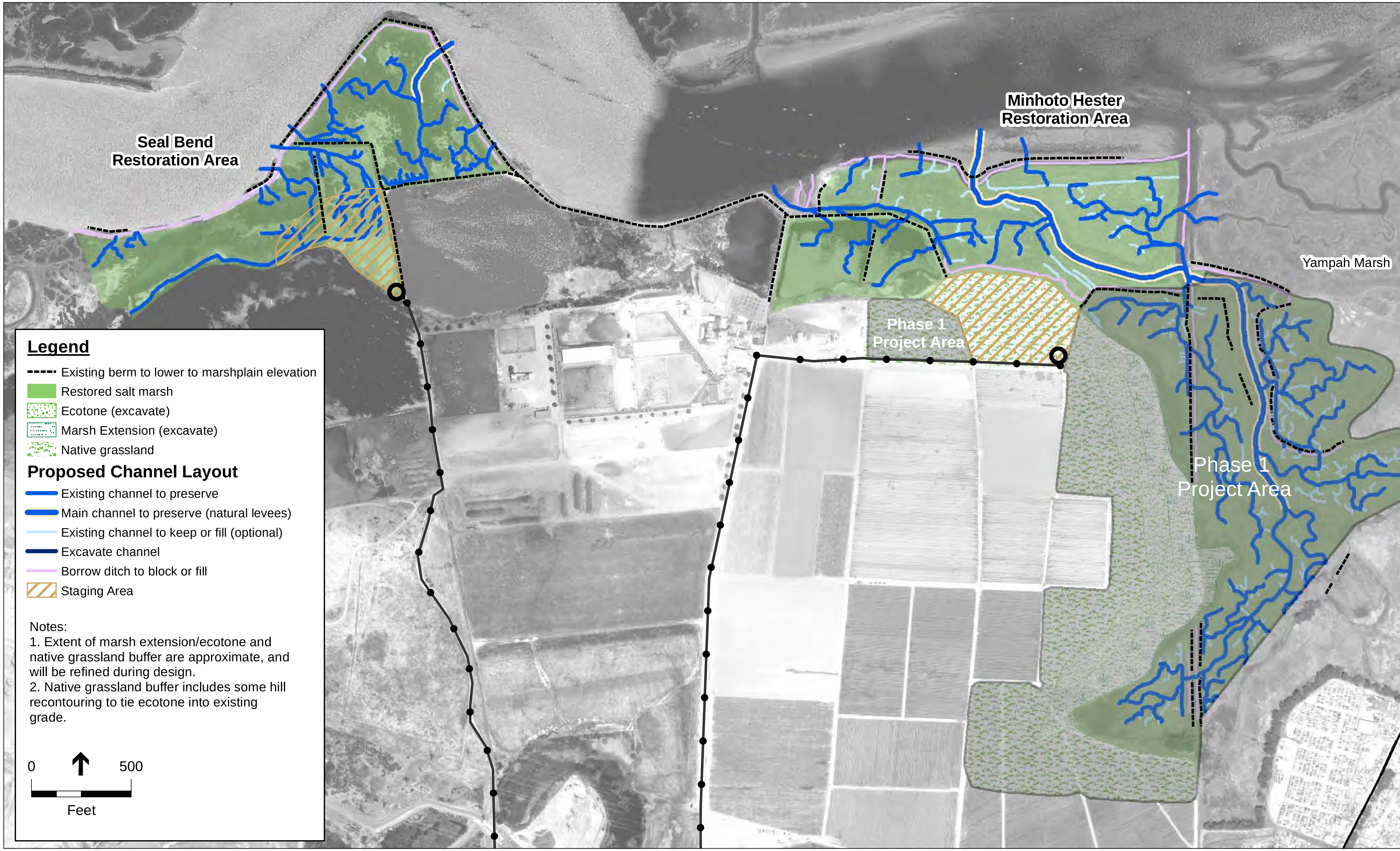

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Figure 6

Future Phases Restoration Areas

With respect to on-site sourcing, additional sediment would be supplied by excavating upland soils from the adjacent ruderal grassland hillside in the buffer area. These sediments have been tested for sediment chemistry and deemed suitable for use as marsh fill (ESNERR, 2014).

Future Phases

Lessons learned during implementation and experimentation in Phase 1 would inform the design and implementation of future phases (see Figure 6). Selection of subareas to be restored during future phases would be based on availability of sediment and funding. To the extent feasible, future phases would involve placement of sediment directly onto the marsh plain (rather than stockpiling) to reduce costs. Each phase would include an experimental design component, with designs for future phases incorporating lessons learned from the previous phases and experiments. Upon completion of construction for future phases, the 6 acre portion of the buffer area that was not restored during Phase 1 would be revegetated. The approach to revegetation would be the same as that described in Phase 1 for the buffer area.

Sediment Sources for Future Phases

Future phases of the restoration project would require approximately 136,500 cy of sediment to be imported to the site. ESF is actively seeking off-site sources of sediment to support the restoration effort. An inventory of potential upland sediment sources within 50 miles of the project site was conducted as part of the marsh restoration planning effort (ESA, 2014b).

Potential sources were evaluated in terms of quantity, soil type, transportation costs, and other factors. Aquatic sources (e.g., dredged material) were not considered, although they could be considered and pursued later, with appropriate regulatory compliance. Dredge materials would require dewatering. Potential sources include agricultural areas, quarries, Caltrans projects, County land and municipalities. An alternative option to acquiring sediment from offsite sources would be to excavate a portion of the upland area adjacent to Minhoto marsh. A third approach would be to use some combination of the first two options. Any upland excavation would include contouring to tie naturally into the surrounding grade.

Construction Sequencing

Construction sequencing would begin with ESF identifying a sediment source available for placement at the project site. The sediment would be tested for chemical and horticultural suitability. Suitable sediment would then be transported to the site and placed directly onto the marsh or in a stockpile for later placement. As discussed more fully in the subsections below, water management and/or turbidity control measures would be constructed around the work areas prior to placing material on the marsh. After fill placement on the marsh, any temporary features, such as water management berms, sheet pile and culverts, would be removed. The following sections describe each of these steps.

Material Delivery

Material may be delivered to the restoration areas by trucks or, less likely, by rail. If delivered by trucks, material could be stockpiled in the vicinity of the restoration site in locations shown on Figure 3, or placed directly on the marsh for spreading. If delivered by rail, material would have to be trucked or conveyed from an unloading area near the rail tracks to a stockpile near or on the marsh, requiring an additional handling step compared to delivery via trucks. The analysis in this document conservatively assumes all sediment would be delivered by truck, which would be the more impactful of the two approaches.

Haul Routes

Haul trucks would access their ultimate dump sites via temporary truck routes close to the edge of the wetland so as to allow progressive placement of material and minimize re-handling of sediment.

Haul roads would be at most 30 feet wide to allow traffic in two directions. The roads would be narrower if a one-way circular path can be defined. The optimum scenario would consist of a truck haul ingress route directly to the working/stockpile area, and a separate truck egress route directly back to Dolan Road. One primary circular route would likely be used to access the Minhoto Marsh area and a separate non-circular route would be used to access Seal Bend. These routes are shown in Figure 3. No such circular route is possible for accessing Hester Marsh, as only a narrow land bridge connects the mainland to Yampah Island. As such, the Hester Marsh staging area would include a turn-around point for trucks delivering sediment. Access to Hester Marsh from Via Tanques Road shown in Figure 3 would require permission and collaboration with the land owners, as ESF and CDFW do not own these properties.

Construction Equipment

Trucks would transport fill material from upland sources to the site. **Table 1** presents the estimated number of truck trips that the project could potentially generate for hauling sediment from off-site locations. This document conservatively assumes all sediment required for the project would be sourced off site, which is the more impactful of the potential sources, while also analyzing the potential effects of using sediment from the upland buffer area. Because these sediment source locations are still unknown, the round-trip travel distance and the rate of delivery remains unknown. This document assumes the sediment would be sourced from locations within 50 miles from the project site, although it is expected that actual sites of the sediment would be closer. It is also assumed that sediment delivery would include up to 150 one-way haul truck trips per day during the peak delivery day.

Aside from haul trucks, other construction equipment would include heavy earthmoving equipment, such as dozers, backhoes, loaders, and excavators to transport dry material out onto the marsh. A conveyor system could also be used to transport material from a stockpile out to the marsh, in lieu of dozers. In such cases, timber matting could be temporarily placed on the marsh to provide a stable footing for the conveyors. A mobile radial stacker at the end of the conveyor belt would be rotated to spread the material.

Staging Areas and Stockpile Locations

Working/stockpile areas would be approximately 10,000 square feet (.25 acre) in area to support the operation. Stockpiles may serve as longer-term sediment storage areas, such as the existing stockpile at Minhoto, or short-term storage/working areas. The existing and proposed future stockpile areas are shown in Figure 3. Stockpile areas would be positioned near their corresponding restoration area. The stockpile areas would be large enough to accommodate haul truck offloading and a bulldozer to push the material placed by the trucks into a stockpile or directly onto the marsh. The stockpile areas would encompass the shoreline along the proposed marsh restoration areas to enable progressive placement as needed within the wetlands.

Two stockpile locations could be used for work associated with Phase 1. The first, which could be used for restoration of subareas M1, M2, M3, and possibly H1, would be located just west of the Minhoto Marsh on farmland and encompasses the existing Pajaro Bench sediment stockpile. A second stockpile, which could be used for restoration of subareas M1c and H1, could be located just east of H1, if trucks could access the hillside by driving Via Tanques Road through the adjacent auto dismantling ("Pick-N-Pull").

TABLE 1
APPROXIMATE TRUCK TRIPS FOR SEDIMENT DELIVERY

Project Component / Staging Area	Area (acres)	Fill Area (acres)	Fill volume (cubic yards)	Number of Truck trips (using 16 cy trucks)
Phase 1				
Sub-area M1	12.1	9.5	36,300	2,269
Sub-area M2	5.6	4.5	14,300	894
Sub-area M3	11.1	8.3	34,400	2,150
Sub-area H1	17.8	14.1	54,400	3,400
Subtotal Phase 1	*47*	*36*	*139,400*	*8,713*
Existing Stockpile[b]				***(3,125)***
Total Phase 1	**47**	**36**	**139,400**	**5,588**
Future Phases				
Sub-area M4a	2.5	1	3,400	212
Sub-area M4b	9.7	7.3	22,000	1,375
Sub-area M5	10.2	7.8	28,400	1,775
Sub-area M6	6.8	5.5	16,700	1,044
Sub-area S1	4.8	4.5	16,300	1,019
Sub-area S2	8.6	6.4	18,200	1,137
Sub-area S3	4.1	3.0	9,400	587
Sub-area S4	11.1	8.8	22,000	1,375
Future Phases	**57.7**	**44.5**	**136,500**	**8,531**
Total Phase 1 & Future Phases	**104**	**81**	**275,900**	**17,244**

[a] Volumes in presented in this table are mid-range estimates; actual volumes may be higher or lower.
[b] Approximately 50,000 cy of sediment is already stockpiled adjacent to the restoration area, which would reduce the Phase 1 deficit to approximately 90,000 cy and eliminate the need for 3,125 truck trips.

SOURCE: ESA, 2014b, Final Elkhorn Slough Tidal Marsh Restoration Project Restoration Plan, July 1, 2014

Stockpile locations for future phases would include the one above and to the west of Minhoto Marsh and one within the Seal Bend restoration area. The latter stockpile location would be located within and just south of the S1 subarea. Sediment would be stockpiled on the remnant marsh plain prior to spreading and grading. Material stockpiled in the fields would be re-handled and either trucked again to the marsh at the time of placement, or a conveyor system would be installed to transport the material.

Material Placement

Once the material is stockpiled onsite and water control and/or turbidity measures are in place, the sediment would be transported from the stockpile to the marsh by means of earthmoving equipment, possibly supplemented with a conveyor system. All heavy equipment used to transport dry material out onto the marsh would be of low ground pressure to prevent sinking in the mud. Mats would be temporarily placed on the marsh, as needed, to spread the weight of the equipment. A conveyor system could also be used to transport dry material from a stockpile out to the marsh, in lieu of dozers pushing the material the full distance. In the latter case, a loader would continuously load the conveyor system with material near the stockpile, and a dozer at the marsh drop off location would spread the material. The estimated numbers and types of equipment required for each area in the project site are presented in **Appendix A**. At the end of construction in each cell/stage, any elevated haul roads and/or berms constructed to aid in material placement would be excavated to design grades, with the resulting earth used to fill adjacent restoration areas.

Water Control and Turbidity Management

For Phase 1 and possibly future phases, work areas on the remnant marsh plain would for the most part be isolated from the tides and dewatered to allow construction in non-tidal conditions. Water control structures such as temporary berms would be utilized to isolate the fill placement area during the construction period. Existing berms would be used, where possible. Tidal channels into such areas would be blocked. The isolated work areas would be drained using a combination of gravity and pumps. Water levels within the blocked areas would be managed to keep them mostly free of water (with some ponded areas remaining) and to allow fill placement at all stages of the tides. To reduce the potential for fish to become entrained in isolated ponded areas blocking of tidal channels would occur at low tide. When sediment placement is completed, the berms would be lowered to the target marsh elevation, reintroducing tidal inundation.

For future phases, it may be more economical to allow for tidal inundation of the working area, with essentially no water control. In such cases, fill would be placed directly on the subsided marsh, with the marsh subject to regular tidal inundation. Placement of fill would occur at low and moderate tide levels, and could occur with some depth of water over the marsh. During high tides, deeper standing water may make access and placement infeasible.

For construction with tidal inundation of the working area, specific turbidity management would be applied to the working area. Turbidity is generated when dry material is placed in ponded waters and as tides or rainfall runoff drain from newly-placed material. Within the work area, the deeper tidal channels containing water would mostly be avoided when placing material, so only limited turbidity would be expected when dozers push material out onto the marsh. This approach would use sediment-control BMPs, such as hay bales, silt fences, or straw wattles. No pumping would be required. As in any earthmoving project, the turbidity generated during the project would be required to comply with applicable water quality laws and regulations.

Phase 1 would be constructed in “dry” conditions, without tidal influence; the Phase 1 area configuration makes it relatively easy to block the tides at the mouth of the main channel and connect into existing remnant berms. Future phases of the project may be constructed in wet or dry conditions depending on what is learned from this phases. For the purposes of CEQA, this report analyzes the impacts of the approach with the greatest potential for physical impact on the environment, which may vary by type of impact.

Tidal Channels

Tidal channels are an important design feature of the restoration plan. For earthmoving equipment, however, tidal channels present a challenge to navigating the marsh. The most efficient method of earthmoving would be to fill the marsh plain to the target elevation, with straight paths throughout the fill footprint to push the material. Working around the channels and extending the trip paths from the stockpile to the fill locations would increase the time, and therefore cost, of restoring the marsh.

To limit trip distances onto the marsh, the project would employ one or more of the following placement approaches. Temporary channel crossings may be constructed, or tidal channels may be temporarily filled and then re-dug with an excavator or backhoe. If re-excavation of the smaller channels proves infeasible, these channels may be permanently filled, the resulting channel extent consisting of the larger channels only. The resulting channel extent would be sufficient to provide drainage and tidal exchange to support natural marsh functions.

The number and locations of channel crossings would depend on the tradeoff between haul distances and the ease of installing and removing the crossings. Where tidal channels were maintained in place, turbidity control measures (i.e., BMPs, such as hay bales or weed free straw wattles) could be staked down in or adjacent to the channels to be preserved. Bulldozers would push fill up to the hay bales and wattles, but not into the channels. Channel crossings and BMPs would be removed at project completion.

Construction Workforce

The construction workforce during Phase 1 would require approximately 6 full-time workers and approximately 3 part-time workers plus occasional engineer visits and supplies delivery. The future phases would require the same workforce but with one additional full-time laborer.

Construction Schedule

It is anticipated that Phase 1 construction would begin in October 2015 and last approximately 11 months (if continuous) and may be implemented over two construction seasons. Construction of future phases would begin at the completion of Phase 1 and last approximately 11 months (if continuous) and may be implemented over several construction seasons. It is assumed that some work associated with future phases (e.g., delivery and stockpile of sediment from off-site sources) could begin prior to completion of Phase 1. The construction period assumes that the construction contractors would work between the hours of 5:00 a.m. to 6:00 p.m., Monday through Friday. However, some construction activity may also be required during these times on Saturdays.

Operations and Maintenance

Following construction, it is expected that the restored marsh plain would be self-maintaining; no active management would be anticipated. CDFW would maintain the upland ecotone and grasslands revegetation area in a manner consistent with its other properties in the area. Maintenance activities would generally include periodic visits to the site for removing trash, pulling weeds, and reseeding, as necessary. As a primary purpose of the restoration project is to garner scientific information about the effectiveness of various restoration techniques, all areas of the restoration project would be monitored for several years following project construction.

Approvals

The Elkhorn Slough estuary includes a State Marine Reserve, a State Marine Conservation Area, a State Ecological Reserve and State Wildlife Area, a National Estuarine Research Reserve, and is part of a National Marine Sanctuary. Another State Marine Reserve (Moro Cojo) is just south of Elkhorn Slough.

The project would affect lands and resources under the jurisdiction of multiple regulatory agencies. As a result, numerous federal, state, and local authorizations and permits would be required for project implementation. The following is a list of potentially affected agencies and the corresponding type of approval that may be required.

- U.S. Army Corps of Engineers (USACE): A Section 404 Clean Water Act (CWA) permit and a Section 10 Rivers and Harbors Act (RHA) permit would be required for placement of dredge or fill material into waters of the United States and work within navigable waters respectively.

- National Marine Fisheries Service (NMFS): Federal Endangered Species Act (FESA) compliance would be required for potential effects on anadromous fish species federally listed as threatened or endangered and for compliance with the Marine Mammal Protection Act (MMPA).

- U.S. Fish and Wildlife Service (USFWS): FESA compliance would be required for potential effects on wildlife and resident aquatic species federally-listed as threatened or endangered, as well as compliance with the MMPA. Compliance with the Migratory Bird Treaty Act (MBTA) would be necessary to protect active nests of native birds.

- Monterey Bay National Marine Sanctuary: A Monterey Bay National Marine Sanctuary Permit may be required for construction activities that could affect Sanctuary resources.

- California Coastal Commission, Central Coast District: A Coastal Development Permit would be required from the CCC for work within its retained jurisdiction (e.g., tidelands, submerged lands, public trust lands).

- Central Coast Regional Water Quality Control Board (RWQCB): Several permits would be required from the RWQCB including a Storm Water General Permit for Construction Activities in accordance with Section 402 of the CWA; Water Quality Certification in accordance with Section 401 of the CWA; and Waste Discharge Requirements in accordance with the Porter-Cologne Water Quality Control Act.

- California Department of Fish and Wildlife (CDFW): A Lake or Streambed Alteration Agreement, in accordance with Section 1602 of the California Fish and Game Code, would be required for work within the bed, channel or bank of the marsh. The project would also be required to comply with Section 2080 of the Fish and Game Code (protection of State-listed special status species), as applicable. CDFW is also the landowner and manager of ESNERR and is acting as the State lead agency under CEQA. In addition, all native bird species that occur in the project site are protected by the California Fish and Game Code. Fish and Game Code §§3503, 2513, and 3800 (and other sections and subsections) protect native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by CDFW.

- California State Lands Commission (SLC): The SLC has jurisdiction over California's "sovereign lands," including tidelands and submerged lands; however, due to the specific land ownership and management of lands in Elkhorn Slough, the SLC has determined that no authorization for the proposed project is required from their agency (CSLC, 2013).

- California State Historic Preservation Office (SHPO): National Historic Preservation Act (NHPA) implementing regulations, as set forth in Title 36 Code of Federal Regulations (CFR) Parts 800 et. seq., require federal agencies to take into account the effects of their undertakings on historic properties and consult with stakeholders, including the State Historic Preservation Office (SHPO), on potential effects to resources that are listed or eligible for listing in the National Register of Historic Places. As the federal agency with the broadest discretionary authority over the project, it is expected that the NOAA would take the lead in consulting with the SHPO.

- Moss Landing Harbor District (MLHD): The MLHD regulates activities within the main channel of Elkhorn Slough. The Moss Landing Ordinance Code Section 26.010 sets forth MLHD the types of activities that require a permit from MLHD. Pursuant to Section 26.010(C), the project would not require a permit because: (1) it is not within the MLHD jurisdiction, (2) would not utilize district facilities or lands subject to MLHD jurisdiction, and (3) would not interfere with the public's safe and enjoyable use of areas under MLHD jurisdiction.

- Monterey County: A Coastal Development Permit (CDP) would be required from Monterey County, as a portion of the project would occur on lands that are subject to the County's Local Coastal Program (LCP) permit jurisdiction. However, as a portion of the project would also occur within the CCC's retained permit jurisdiction, and the Coastal Act provides for consolidated CCC permit review and issuance in such cases (section 30601.3), it is expected that the CCC would issue a single permit for the proposed work.

B. Environmental Factors Potentially Affected

The proposed project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology, Soils and Seismicity
☐ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials	☐ Hydrology and Water Quality
☐ Land Use and Land Use Planning	☐ Mineral Resources	☐ Noise
☐ Population and Housing	☐ Public Services	☐ Recreation
☒ Transportation and Traffic	☐ Utilities and Service Systems	☒ Mandatory Findings of Significance

C. Determination

On the basis of this initial study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

Terry L. Palmisano
Signature

6/23/15
Date

TERRY L. PALMISANO
Printed Name ACTING REGIONAL MANAGER

CDFW
For

D. Evaluation of Environmental Effects

The Environmental Checklist and discussion that follow are based on sample questions provided in the CEQA Guidelines (Appendix G of the California Code of Regulations, Title 14, Division 6, Chapter 3), which focus on various individual concerns within 16 different broad environmental categories, such as air quality, cultural resources, land use, and traffic (and arranged in alphabetical order). The Guidelines also provide specific direction and guidance for preparing responses to the Environmental Checklist. Each question in the Checklist essentially requires a “yes” or “no” reply as to whether or not the project would have a potentially significant environmental impact of a certain type, and, following a Checklist table with all of the questions in each major environmental heading, citations, information and/or discussion that supports that determination. The Checklist table provides, in addition to a clear “yes” reply and a clear “no” reply, two possible “in-between” replies, including one that is equivalent to “yes”, but with changes to the project that the proponent and the Lead Agency have agreed to that result in a “no” reply; and another “no” reply that requires a greater degree of discussion, supported by citations and analysis of existing conditions, threshold(s) of significance used, and project effects resulting in a “no” reply. Each possible answer to the questions in the Checklist, and the different type of discussion required, are discussed below:

A. **Potentially Significant Impact.** Checked if a discussion of the existing setting (including relevant regulations or policies pertaining to the subject) and project characteristics with regard to the environmental topic demonstrates, based on substantial evidence, supporting information, previously prepared and adopted environmental documents, and specific criteria or thresholds used to assess significance, that the project would have a potentially significant impact of the type described in the question.

B. **Less Than Significant With Mitigation.** Checked if the discussion of existing conditions and specific project characteristics, also adequately supported with citations of relevant research or documents, determine that the project clearly would or would be likely to have particular physical impacts that would exceed the given threshold or criteria by which significance is determined, but that with the incorporation of clearly defined mitigation measures into the project, that the project applicant or proponent has agreed to, would be avoided or reduced to less-than-significant levels.

C. **Less Than Significant Impact.** Checked if a more detailed discussion of existing conditions and specific project features, also citing relevant information, reports or studies, demonstrates that, while some effects may be discernible with regard to the individual environmental topic of the question, the effect would not exceed a threshold of significance, which has been established by the Lead or a Responsible Agency. The discussion may note that due to the evidence that a given impact would not occur or would be less than significant, no mitigation measures are required.

D. **No Impact.** Checked if brief statements (one or two sentences) or cited reference materials (maps, reports or studies) clearly show that the type of impact could not be reasonably expected to occur due to the specific characteristics of the project or its location (e.g., the project falls outside the nearest fault rupture zone, or is several hundred feet from a 100-year flood zone, and relevant citations are provided). The referenced sources or information may also show that the impact simply does not apply to projects like the one involved. A response to the question may also be "No Impact" with a brief explanation of adequately supported project-specific factors or general standards (e.g., the project would not expose sensitive receptors to pollutants, based on a basic screening of the specific project).

The discussions of the replies to the Checklist questions must take account of the whole action involved in the project, including off-site as well as on-site effects, both cumulative and project-level impacts, indirect and direct effects, and construction as well as operational impacts. Except when a "No Impact" reply is indicated, the discussion of each issue must identify:

a) the significance criteria or threshold, if any, used to evaluate each question; and

b) the mitigation measure identified, if any, to reduce the impact to less than significant, with sufficient description to briefly explain how the mitigation measure would reduce the effect to a less than significant level.

Numbering of Impacts and Mitigation Measures

Environmental impact discussions are generally presented in their order of appearance in the CEQA Guidelines Appendix G Environmental Checklist. For example, the first checklist question related to Cultural Resources impacts is numbered 5(a). Mitigation measures are titled to correspond to the impact topics; for example, Mitigation Measure CULT-1 addresses impacts associated with cultural resources, while Mitigation Measure BIO-1 addresses impacts associated with biological resources. Cumulative impacts are discussed at the end of each environmental topic impact discussion.

Approach to Cumulative Impact Analysis

Two approaches to a cumulative impact analysis are provided in CEQA Guidelines Section 15130(b)(1): (1) the analysis can be based on a list of past, present, and reasonably foreseeable probable future projects producing closely related impacts that could combine with those of a project, and (2) a summary of projections contained in a general plan or related planning document can be used to determine cumulative impacts. The following factors were used to determine an appropriate list of individual projects to be considered in this cumulative analysis:

- **Similar Environmental Impacts—**A relevant project contributes to effects on resources that are also affected by the project. A relevant future project is defined as one that is "reasonably foreseeable," such as a project for which an application has been filed with the approving agency or whose funding has been approved.

- **Geographic Scope and Location—**A relevant project is one within the geographic area where effects could combine. The geographic scope varies on a resource-by-resource basis. For example, the geographic scope for evaluating cumulative effects on air quality consists of the affected air basin.

- **Timing and Duration of Implementation—**Effects associated with activities for a relevant project (e.g., short-term construction or long-term operations) would likely coincide with the related effects of the project.

Table 2 lists the plans and projects in the project vicinity (see **Figure 7**) considered in the cumulative impact analysis, based on the above-referenced factors. Cumulative projects which could have implementation schedules that overlap with the construction of the proposed restoration project are listed in **bold**. The assessment of potential cumulative impacts for the remaining environmental issue areas is provided in the relevant subsections of Section E, Evaluation of Environmental Impacts.

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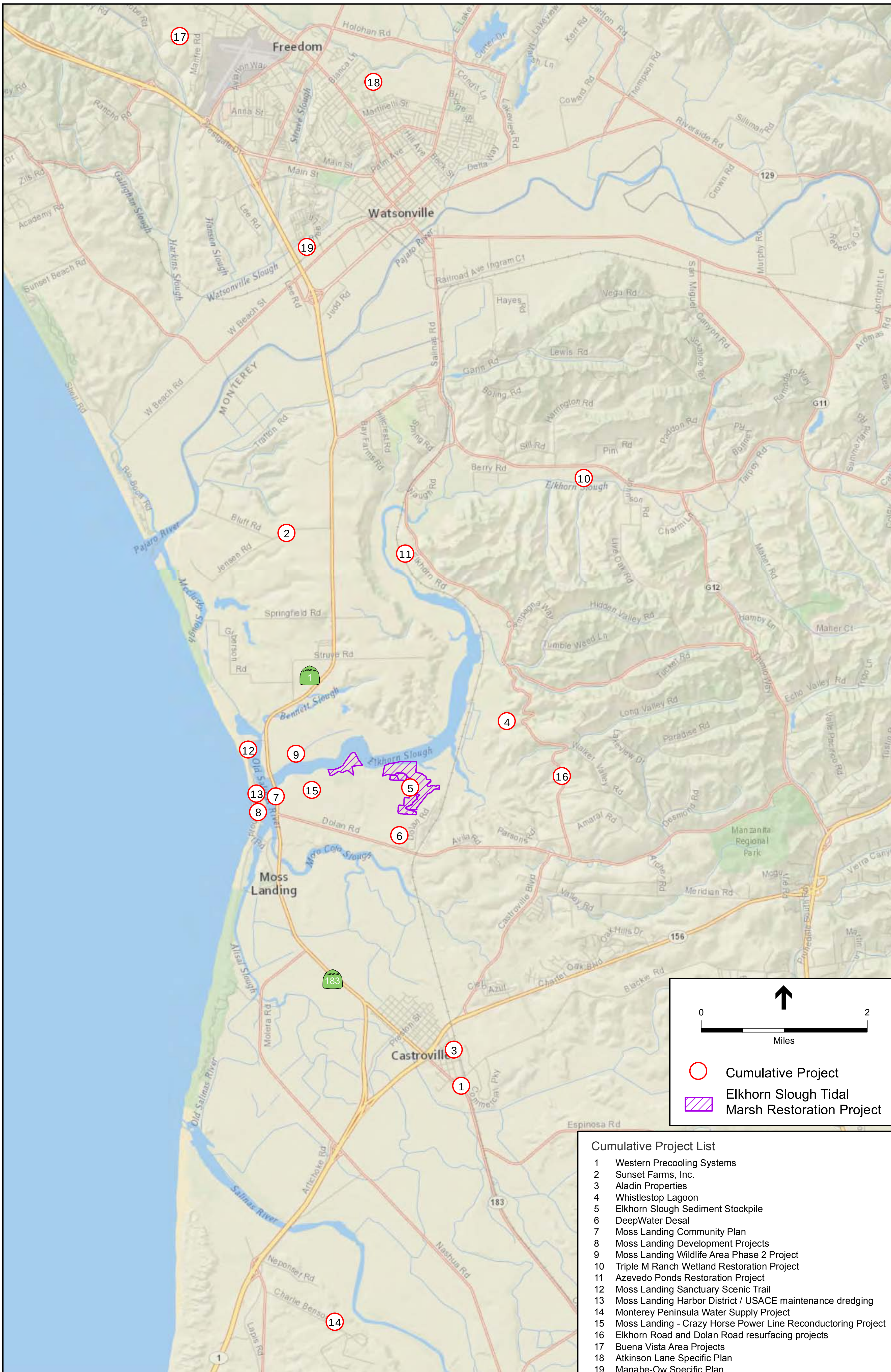

SOURCE: ESA, 2014

Elkhorn Slough Tidal Marsh Restoration Project . D120505.00

Figure 7
Cumulative Projects

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TABLE 2
PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

Project No.	Project Name (Jurisdiction)	Project Description	Estimated Implementation Schedule
1	**Western Precooling Systems** (Monterey County)	Demolition of an existing 15,355 square foot agricultural processing building and the construction of a 4,655 square foot warehouse in approximately the same location. Project to also include the addition of two unenclosed shade structures (approx. 5,300 square feet) at adjacent cold storage building. Grading to consist of approximately 50 cubic yards of cut and 15 cubic yards of fill. (Monterey County 2012)	Unknown
2	**Sunset Farms, Inc.** (Monterey County)	Demolition of four agricultural support buildings totaling 84,824 square feet and the construction, in three phases, of four new agricultural support buildings totaling 42,750 square feet. Grading to consist of approximately 189 cubic yards of cut and 1,376 cubic yards of fill. One single family dwelling and one storage building totaling 6,560 square feet are to remain for 49,310 square feet of total structural coverage. (Monterey County 2012)	Unknown
3	**Aladin Properties** (Monterey County)	General Development Plan to outline allowable uses, operation standards and design regulations at an existing commercial-industrial facility comprising three buildings totaling 28,438 square feet. The property is located at 11455 Wood Street, Castroville (Assessor's Parcel Number 030-231-006-000) and is bounded by Del Monte Avenue, Wood Street and the Union Pacific Railroad, Castroville Community Plan, North County Area Plan. (Monterey County 2012)	Unknown
4	Whistlestop Lagoon (Monterey County)	Wetland and Public Access Enhancement at Whistlestop Lagoon. This project included: a) Replacing three failed culverts located under the existing 325 foot long Whistlestop levee with a new 20 foot long bridge to maintain muted tidal flow in Whistlestop Lagoon, improve water quality and fish passage, and maintain/improved trail safety for recreational users in the area; b) Relocating an existing dock that extends off the Whistlestop levee to deeper water to reduce disturbance to mudflat habitat at low tides and improve boat access to Parsons Slough. (Monterey County 2012)	Completed 2013
5	Elkhorn Slough Sediment Stockpile (Monterey County)	Temporary placement of approximately 200,000 cubic yards of sediment stockpiled over a 40 acre portion of a 204 acre property. (Monterey County 2013a).	Completed 2013
6	**DeepWater Desal, LLC** (Santa Cruz County)	Construction of a 15-million-gallon-per-day seawater desalination facility located on a 110-acre site in Moss Landing, on Dolan Road, approximately 1,500 feet east of the Moss Landing Power Plant. This project would serve the City of Salinas (Monterey County Planning Department, 2013b).	Beyond 2017
7a	**Moss Landing Community Plan** (Monterey County)	The Moss Landing Community Plan would guide planning and development decisions within Moss Landing for the next 10 to 20 years. The Community Plan focuses mainly on activities within the Moss Landing Harbor area, but does extend to lands east of Highway 1. The Community Plan does not propose and would not authorize any development. Presently in draft form, the final Community Plan will be a chapter within the North County Land Use Plan. (Monterey County 2014a)	2016-2045
7b	**Moss Landing Development Projects**	• The MBARI General Development Plan calls for 150,700 square feet of new structures, including a 900 square-foot dock extension, and for the demolition of an existing 14,725 square-foot structure. MBARI has identified several short-term and long-term development projects in its proposed master plan. MBARI has proposed phased development of these facilities over a 35-year timeframe. • Moss Landing Marine Labs conceptual development plans include: 1) a combined Marine Operations, Research Diving and Sustainable Fishery Offloading Facility; 2) modifications to existing facilities at their northern Shore Laboratory Complex, 3) a southern Shore Laboratory complex that combines a research pier/coastal observatory, large animal holding tanks, lab space and an integrated aquaculture research facility; and 4) housing and visitor-serving facilities for the accommodations of students during the academic year and workshops, classes and special programs	2016-2045

Project No.	Project Name (Jurisdiction)	Project Description	Estimated Implementation Schedule
		during the summer.	

TABLE 2 (Continued)
PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

Project No.	Project Name (Jurisdiction)	Project Description	Estimated Implementation Schedule
7b (cont.)		• The proposed Gregg Drilling development includes a new 22,000 square-foot building, a bulkhead or other shoreline protection, a 3,000 to 4,000 square foot wharf/dock, and dredging of the harbor. The project would occur on several parcels on the east side of Sandholdt Road with access to the harbor. The parcels are presently used for marine goods sales (ship's chandlery), a fueling dock, boat maintenance, launching, and related maritime uses, and most of these uses would remain, although some uses would be rearranged and consolidated within the site. • The County of Monterey plans to install storm drain facilities along Sandholdt Road and Moss Landing Road. The new facilities would collect storm water and release it into the harbor and Moro Coho Slough. In addition to reconstructing Moss Landing Road with new curb, gutters, and sidewalks, this project is being done in tandem with the undergrounding of utilities (Project 20A and 20B) by Pacific Gas & Electric. (Monterey County 2014b)	
8	Moss Landing Wildlife Area Phase 2 Project (Monterey County)	CDFW project on a managed wildlife area with goals to maximize habitat variety and quality for nesting and foraging birds, particularly breeding and rearing habitat for the Western snowy plover; provide additional opportunities for wildlife viewing; improve public access; and create access compliant with the Americans with Disabilities Act. (CDFG 2010)	Completed 2011
9	Triple M Ranch Wetland Restoration Project (Monterey County)	Restoration project to improve water quality, restore sensitive and special-status species habitat, and demonstrate compatibility between natural areas and production farming. The project site would be located in the Elkhorn Slough watershed east of Sill Road and south of Hall Road. (CDFG 2010)	Completed 2012
10	Azevedo Ponds Restoration Project (Monterey County)	Replace two water control structures for the purpose of improving water quality to a 13-acre wetland on land owned by The Nature Conservancy. Project implementation will be complete in Spring 2010. (CDFG 2010)	Completed 2010
11	**Moss Landing Sanctuary Scenic Trail** (Monterey County)	This project would be a component of the Monterey Bay Sanctuary Scenic Trail, and would extend about 1.17 miles from Moss Landing Road to Jetty Road. It would include construction of a new bridge over the mouth of Elkhorn Slough just west of the Highway 1 bridge. About 0.8 miles have already been constructed. (CDFG 2010)	Unknown
12	**Moss Landing Harbor District / USACE maintenance dredging** (Monterey County)	Regular maintenance dredging of the Moss Landing Harbor and channel that occurs every 2 to 4 years. (CDFG 2010)	Ongoing
13	**Monterey Peninsula Water Supply Project** (Monterey County)	This project would include construction of a desalination plant sized to produce up to 9.6 million gallons per day of desalinated water. It would also include a seawater intake system using intake wells located beneath the sea floor, an open-water brine discharge system through the Monterey Regional Water Pollution Control Agency's existing Wastewater Treatment Plant ocean outfall and diffuser, and a variety of conveyance and storage facilities, including 28 miles of pipeline and an aquifer storage and recovery system.	2016-2018
14	**Moss Landing - Crazy Horse Power Line Reconductoring Project** (Monterey County)	This project would add 477 steel-supported aluminum conductors and 10 miles of new wiring from the Moss Landing substation to a new Crazy Horse Substation at Lagunitas Junction in Prunedale, between Moss Landing and Salinas. In order to maintain minimum ground clearance as required by the Commission's General Order 95, approximately	Completed 2013

TABLE 2 (Continued)
PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

Project No.	Project Name (Jurisdiction)	Project Description	Estimated Implementation Schedule
		16 towers would be raised approximately 10 feet, and 2 towers located in pastureland would be raised approximately 15 feet. The project is designed to avoid sensitive biological and cultural resources. (CDFG 2010)	
15	**Elkhorn Road and Dolan Road resurfacing projects** (Monterey County)	Pavement resurfacing of Dolan and Elkhorn Roads, each involving up to two weeks of lane closures. (Essick 2014)	2017-2018
16	**Buena Vista Area Projects** (City of Watsonville)	The Watsonville Vista 2030 General Plan envisions the Buena Vista Area as the focus of substantial new population and employment growth over the next 20 years. Preliminary concepts for the Buena Vista Area include a mix of commercial, mixed use, residential, public, parklands, and agricultural uses over the approximately 466 acre plan area. (City of Watsonville 2013)	After 2018
17	**Atkinson Lane Specific Plan** (City of Watsonville & Santa Cruz County)	The Atkinson Lane Specific Plan calls for up to 600 residential units on a 65.8 acre site located within City of Watsonville and unincorporated Santa Cruz County. The Plan calls for a mix of housing densities and types (e.g., affordable and market rate), expansion of the existing Crestview Park, and establishment and preservation of wetlands and agricultural buffer areas. (City of Watsonville 2009).	2014 – 2020
18	**Manabe-Ow Specific Plan** (City of Watsonville)	The 95 gross-acre Manabe-Ow Business Park Specific Plan proposes the development of a business park, a small retail center, and workforce housing units to be developed over the next 25 years. The Plan envisions approximately 61 gross-acres of business park. Approximately 25 acres of the site will be set aside as permanent restoration area for the Watsonville Slough. A majority (18 acres) of this land has already been set aside and restored. These restoration efforts will continue as the project is built out. (City of Watsonville 2010)	2015-2040

NOTE: Projects identified in rows colored grey have been completed.

E. Evaluation of Environmental Impacts

Aesthetics

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
1. AESTHETICS — Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☒

Discussion

a, b, c) The Elkhorn Slough system is a network of intertidal marshes, mudflats, and subtidal channels located at the center of the Monterey Bay shoreline. Wetlands, mudflats, and marsh areas on both sides of Elkhorn Slough characterize the immediate project setting. Uplands surrounding Elkhorn Slough consist of primarily undeveloped and agricultural lands. Existing lands uses and features in the surrounding area include agriculture uses and heavy equipment, disturbed soils, working farms, hardened shoreline and a degraded and eroded marsh. *The Monterey County General Plan* (1982) designates areas of visual sensitivity; however none are within the project area. The project would restore 147 acres of vegetated tidal salt marsh, upland ecotone, and native grasslands. The historically diked and drained marsh area would be restored to a higher elevation through adding sediment. No permanent infrastructure would be added to the site and therefore **no impact** would occur on any scenic vistas.

As described in Section E.14, ***Recreation***, there are publicly accessible trails within the Elkhorn Slough system, but none are present in the project area. The nearest trail along the edge of the Slough is approximately 1.25 miles northeast of the project site near Hummingbird Island. The Slough is also used by kayakers and boaters; however the restoration area is off limits to watercraft. The project site may be visible from long-range views from trails and sloughs used for recreation.

Potential visual impacts to the site and its surroundings would be associated primarily with construction. These temporary impacts would be due to the presence of construction equipment and staging areas. Construction activities would potentially be visible from trails and kayakers and other boaters around Elkhorn Slough. This impact would be temporary, lasting approximately 2 years and would not substantially degrade the existing visual character or quality of the site and its surroundings. These temporary impacts would also be consistent with the existing visual character of the ongoing farm activities and use of heavy earthmoving equipment and disturbed soils. With the project completion there would be a visual improvement from the restored marshland and upland vegetation plantings. Therefore implementation of the project would have a **less-than-significant** impact on scenic vistas and the existing visual character of the site and its surroundings.

Monterey County has designated three scenic routes in the region: Highway 1, Highway 156, and portions of Elkhorn Road. However, the project area is generally not visible from these routes. Nevertheless, any visual effect resulting from project construction would be limited to the presence of construction equipment and exposed soil, consistent with nearby ongoing agricultural operations, and would be temporary in nature. Over the long-term, the project would be expected to improve the scenic character of the site through restoration and enhancement of the marsh, degraded grassland and ecotone habitats. There are also designated areas of visual sensitivity within the County, though none are in the vicinity of the project site. Therefore the project would have a **less-than-significant** impact on scenic resources.

d) The project would not introduce a new source of substantial light or glare to the area. Night-time construction is not anticipated; therefore construction activities would not require the use of lights. Project construction would not include use of equipment or material that would introduce sources of substantial glare. The completed project would not include any lighting or reflective materials, and so would not introduce a new source of substantial light or glare to the area. Therefore, project implementation would cause **no impact** with respect to lighting or glare.

Cumulative Aesthetic Impacts

The geographic scope for potential cumulative aesthetic impacts encompasses the Elkhorn Slough National Estuarine Research Reserve and Moss Landing Wildlife Area, and land uses along the banks of the Elkhorn Slough which generally include open space and agricultural uses.

As discussed in responses to checklist questions 1(a) through 1(c), construction of the project would have a less-than-significant effect with respect to an adverse effect on a scenic vista, scenic resources, or the degradation of the existing visual character of the site and its surroundings. While there would be temporary effects to the visual character and quality of the site due to the presence of construction equipment, these impacts are less than significant. The identified cumulative projects that may also include a temporary presence of construction equipment, materials and staging that may overlap with the project's construction schedule (i.e., Western Precooling Systems, Sunset Farms, Inc., and Aladin Properties, shown in Figure 7) are not close enough to the project site to be visible. Therefore, cumulative impacts related to effects on a scenic vista, scenic resources, or the visual character of the site would be **less than significant**.

As discussed in response to checklist question 1(d), the proposed project would not introduce a new source of light or glare. The cumulative projects located within close proximity to the project would not introduce a significant source of light or glare. For the reasons described above, the effects of the proposed project, when combined with those of past, present, and reasonably foreseeable projects in the area, would not be expected to be cumulatively considerable. As a result, the project's contribution to cumulative aesthetic impacts in the region would be **less than significant**.

Agricultural and Forest Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
2. AGRICULTURAL AND FOREST RESOURCES — In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. **Would the project:**				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

Discussion

a, e) As outlined in the Project Description, both the buffer area and the adjacent agricultural fields were historically used to grow crops such as strawberries and artichokes, as well as bulb/flower production (Andrea Woolfolk, pers. comm.). Since 2010 the buffer area has been planted in sterile barley. The fields outside of the buffer area are not currently farmed but have been used for bulb flower and food production (e.g., artichokes and strawberries).

The California Department of Conservation (CDC), Division of Land Resource Protection, maps important farmlands throughout California. Important farmlands are classified into categories listed below on the basis of soil conditions (their suitability for agriculture) and current land use. The following categories are relevant to the understanding of the project area's farmland classification.

Prime Farmland is defined as: Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Farmland of Statewide Importance is defined as: Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Unique Farmland is defined as: Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

The California Department of Conservation’s Important Farmland Map shows the project area as containing Farmland of Statewide Importance and Unique Farmland (DOC, 2010). Within the 41 acre buffer area upslope of the Minhoto-Hester marsh restoration area, 23 acres of land are designated as Farmland of Statewide Importance and 17 acres are designated as Unique Farmland. Since these lands have not been farmed since 2010 the project would not remove an active agricultural use from production.

As discussed in Section E.9, *Land Use*, the upland portion of the restoration area (i.e., buffer area) has a Monterey County General Plan land use designation of Agricultural Preservation. While restoration of the parcel’s edge would shift the use from agricultural to open space, it would not preclude future use of the site for farming or other agricultural uses, nor would it limit the use of adjacent portions of the property for continued crop production. In addition to farmland preservation, the Monterey County General Plan’s Agriculture Element supports and promotes programs aimed at reducing soil erosion and protecting water quality – key objectives of the proposed restoration project. Therefore, the project would have a **less-than-significant** impact with respect to the conversion of important farmland to non-agricultural use.

b) According to the California Department of Conservation and the Monterey County General Plan, there are no Williamson Act contracts on project lands (Monterey, 1982; DOC, 2012). As a result there would be **no impact** to an existing Williamson Act contract.

c, d) Land in the vicinity of the project site is not zoned as forest land or timberland. Construction and operation of the project would not conflict with zoning regulations for forest land and would have no impact on forest land or timberland zoning. Therefore the project would not result in any direct loss of forest land or lands currently in timber reserve. For these reasons, project implementation would have **no impact** on forestry resources.

Cumulative Agricultural and Forest Resources Impacts

The geographic scope for potential cumulative agricultural and forest impacts encompasses the Elkhorn Slough National Estuarine Research Reserve and Moss Landing Wildlife Area, and land uses along the banks of the Elkhorn Slough which generally include open space and agricultural uses.

As discussed in responses to checklist questions 2(a) through 2(e), construction of the project would have a less-than-significant effect with respect to conflicts with agricultural and forest uses. With the exception of the Moss Landing Community Plan and Area Developments, and Deep Water Desal Project, none of the Cumulative Projects identified in Table 2 involve new land uses that would be expected to disrupt existing nearby land uses or preclude use of those lands for agricultural activities. The Community Plan does extend to lands east of Highway 1 and does not propose and would not authorize any development. The Deep Water Desal project is proposed for property zoned for Heavy Industrial (HI) land uses. Therefore, cumulative impacts related to conversion of farmland for non-agricultural use would be less than significant.

For the reasons described above, the effects of the proposed project, when combined with those of past, present, and reasonably foreseeable projects in the area, would not be expected to be cumulatively considerable. As a result, the project's contribution to cumulative agricultural and forest impacts in the region would be **less than significant**.

Air Quality and Greenhouse Gases

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
3. Air Quality and Greenhouse Gases — Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan.	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations.	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people.	☐	☐	☐	☒
f) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
g) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion

a) If a project is proposed in a city or county with a general plan that is consistent with the most recently adopted air quality plan, and if the project is consistent with that general plan, then the project is considered to be consistent with applicable air quality plans and policies. The project area is located within Monterey County and the Monterey Bay Unified Air Pollution Control District (MBUAPCD). The MBUAPCD's jurisdiction is the North Central Coast Air Basin (NCCAB), composed of Monterey, Santa Cruz, and San Benito counties. The most recently adopted air quality plan is the 2012 Triennial Plan Revision of the 2008 Air Quality Management Plan, which includes strategies for MBUAPCD to reach attainment of the State's 8-hour ozone air quality standards (MBUAPCD, 2013). The Monterey County General Plan (Monterey County, 1982) governs land use in the project area and recognizes the need to provide for growth and to maintain good air quality.

The proposed project would be consistent with the current land use designation for the project area within Monterey County (i.e., Resource Conservation and Agricultural Preservation [Coastal Zone]), and the General Plan is consistent with the strategies identified in the 2012 Triennial Plan Revision of the 2008 Air Quality Management Plan. Please see Section E.9, *Land Use*, for additional discussion of the project's General Plan consistency. The proposed project would not conflict with or obstruct implementation of the applicable air quality plan and would have **no impact** on this environmental factor.

b, d) The NCCAB lies along the central coast of California and covers an area of 5,159 square miles. The semi-permanent high-pressure cell in the eastern Pacific Ocean controls the air basin's climate. The generally northwest-southeast orientation of mountainous ridges tends to restrict and channel the basin's summer onshore air currents. In the fall, north or east winds develop to transport pollutants from either the San Francisco Bay area or the Central Valley into the NCCAB. The general absence of deep, persistent atmospheric inversions and the occasional storm systems usually result in good air quality for the basin as a whole in winter and early spring (MBUAPCD, 2008).

Dust generated during construction may result in emissions of particulate matter, including particulate matter less than 10 microns in diameter (PM10). The entire NCCAB is a nonattainment area for the state PM10 standards. Thus, a substantial increase in PM10 emissions is considered a significant impact by the MBUAPCD. Construction of both Phase 1 and the future phases would require equipment and materials that would temporarily generate dust and emit ozone precursor emissions (i.e., reactive organic gases [ROG] and nitrogen oxide [NOx]). Both Phase 1 and the future phases would include the use of dozers, loader, backhoes, conveyors and dump trucks. Construction-related emissions would vary from day to day, depending on the level and type of activity.

The MBUAPCD's CEQA Guidelines establish a threshold of significance for the PM10 related construction emissions of 82 pounds per day. Construction-related ROG and NOx emissions from typical construction equipment are accommodated in the emissions inventories of State- and federally-required air quality plans and are therefore not considered significant.

Phase 1

Construction-period air pollution emissions have been modeled using the California Emissions Estimator Model (CalEEMod) for Phase 1 and the future phases. **Appendix B** provides additional information regarding the air emission calculations, assumptions and methodologies. PM10 emissions would be generated by fuel combustion in construction equipment (as PM10 exhaust) and by vehicles operating on unpaved surfaces (as fugitive PM10 emissions). **Table 3** shows Phase 1 emissions. Phase 1 would generate emissions that exceed the MBUAPCD's PM10 construction related emissions threshold of 82 pounds per day. This exceedance is primarily attributed to the generation of dust associated with construction traffic along the 1.04 miles of unpaved haul routes that would be used to deliver materials and soil to the staging areas. Worker commute trips along this unpaved haul route would also generate PM10 fugitive dust emissions. Grading activities at each of the sub areas would also be a major contributor of dust emissions during Phase 1, but because the number of off-road grading equipment would be limited to, on average, two dozers at each sub area, PM10 emissions would not be as high as on-road dust emissions. The PM10 emission estimates are based on the maximum number of daily truck trips expected during Phase 1 of project construction and off-road equipment use. The unmitigated PM10 impacts associated with Phase 1construction activities would be significant.

TABLE 3
ESTIMATED DAILY CONSTRUCTION AIR POLLUTANT EMISSIONS DURING PHASE 1

Scenario	Criteria Air Pollutant (pounds/day) PM10
Daily Project Emissions (Unmitigated)	135
Daily Project Emissions (Mitigated)	44
MBUAPCD Thresholds of Significance	82

NOTE: Emissions estimated using the CalEEMod model, version 2013.2.2. Detailed CalEEMod output results are included in Appendix B.

PM10 = particulate matter less than 10 microns in diameter (fine particulate matter)

Assumptions:
Construction Start and Length - October 2015 and 11 months
Equipment List - dozers, conveyors, loaders, excavators and dump trucks

Implementation of **Mitigation Measure AIR-1**, detailed below, would reduce PM10 emissions associated with Phase 1 activities from 135 to 44 pounds per day, well below the 82 pounds per day MBUAPCD PM10 threshold. The primary dust emission generators during Phase 1 would be associated with construction traffic along the unpaved haul routes and grading. Mitigation Measure AIR-1 lists actions which would reduce PM10 emissions from these two sources. Actions outlined in Mitigation Measure AIR-1 include watering haul routes and active construction areas, and reducing traffic speeds. This would reduce the impact level associated with Phase 1 construction activities from significant to **less-than-significant with mitigation**.

Future Phases

Construction-period emissions have also been modeled using CalEEMod for future phases and the results are presented in **Table 4**. Like Phase 1, construction activities during future phases would generate emissions that exceed the MBUAPCD's PM10 threshold of 82 pounds per day. This exceedance is primarily due to fugitive dust emissions associated with the 0.94 miles of unpaved haul routes that would be used to deliver materials and soil to the staging areas. The modeling results shown in Table 4 are based on the maximum number of daily truck trips that would be expected during the project's future phases of construction. The unmitigated impacts associated with construction activities during future phases would be significant.

Implementation of the Mitigation Measure AIR-1, detailed below, would reduce PM10 emissions associated with future phases from 152 to 48 pounds per day, well below the 82 pounds per day MBUAPCD PM10 threshold. The primary dust emission generators during future phases are associated with construction traffic along the unpaved haul routes and grading. Mitigation Measure AIR-1 lists actions that would reduce PM10 emissions from these two sources. Actions outlined in Mitigation Measure AIR-1 include watering haul routes and active construction areas, and reducing traffic speeds. This would reduce the impact level associated with future phases construction activities from significant to **less-than-significant with mitigation**.

TABLE 4
ESTIMATED DAILY CONSTRUCTION AIR POLLUTANT EMISSIONS DURING FUTURE PHASE

Scenario	Criteria Air Pollutant (pounds/day) PM10
Daily Project Emissions (Unmitigated)	152
Daily Project Emissions (Mitigated)	48
MBUAPCD Thresholds of Significance	82

NOTE: Emissions estimated using the CalEEMod model, version 2013.2.2. Detailed CalEEMod output results are included in Appendix B.

PM10 = particulate matter less than 10 microns in diameter (fine particulate matter)

Assumptions:
Construction Start and Length - October 2015 and 11 months
Equipment List - dozers, conveyors, loaders, excavators and dump trucks

Operations

As discussed in the Project Description, periodic monitoring of the restoration site may be required following completion of construction. Such monitoring would likely involve monthly or bimonthly visits to the project site to evaluate and document site conditions. No heavy equipment or off-road vehicles would be required. Beyond such monitoring visits, neither Phase 1 nor future phases would be expected to have any operational emissions. As a result, post-construction project operations would have a **less-than-significant** impact with respect to conflicts with established air quality standards and sensitive receptors.

Mitigation Measure AIR-1: Implementation of a Dust Control Plan

The following mitigation measure applies to activities associated with project construction. Implementation of this measure would reduce PM10 emissions from 135 to 44 pounds per day during Phase 1 and from 152 to 48 pounds per day for future phases. The measures to reduce construction related PM10 emissions reflect basic dust control measures recommended in the MBUAPCD's CEQA Air Quality Guidelines.

- All active construction areas shall be watered to minimize dust
- All trucks hauling soil, sand, and other loose materials shall be covered with tarpaulins or other effective covers
- All construction haul routes shall be watered to minimize dust
- The contractor shall limit traffic speeds along the unpaved haul route to 15 miles per hour
- All grading activities during periods of high wind (over 15 mph) will be prohibited
- Haul trucks shall maintain at least 2'0" of freeboard.
- Seed disturbed upland areas as soon as possible
- Cover or seed inactive storage piles.

- Post a publicly visible sign which specifies the telephone number and person to contact regarding dust complaints. This person shall respond to complaints and take corrective action within 48 hours. The phone number of the Monterey Bay Unified Air Pollution Control District shall be visible to ensure compliance with Rule 402 (Nuisance).
- Limit the area under construction at any one time.

As discussed above, the project's unmitigated construction air pollution emissions associated with both Phase 1 and future phases would exceed the MBUAPCD's 82 pounds per day PM10 construction emissions threshold. However, implementing Mitigation Measure Air-1 would reduce PM10 emissions for both Phase 1 and future phases to levels less than the MBUAPCD's PM10 significance thresholds. As a result, the project would have a **less than significant impact with mitigation**.

c) Elkhorn Slough restoration, with implementation of Mitigation Measure Air-1, would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment. While restoration generates construction emissions, those emissions would be temporary and, with mitigation, would not exceed MBUAPCD's significance threshold. The project would not result in any operational emissions. Consequently, the project would result in a **less than significant impact with mitigation**.

e) The MBUAPCD defines odors as emissions of one or more pollutants that are a nuisance to healthy persons and may trigger asthma episodes in people with sensitive airways (MBUAPCD 2008b). The proposed project would have no odor-generating components. Therefore, project implementation would have **no impact** with respect to the creation of objectionable odors.

f) In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), which requires the California Air Resources Board (CARB) to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions would be reduced to 1990 levels by 2020.

California now recognizes seven greenhouse gases (GHG): carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6) (California Health and Safety Code section 38505(g)), and nitrogen trifluoride (NF3) (Senate Bill No. 104, Chapter 331). Carbon dioxide is the reference gas for climate change because it is emitted in the greatest quantity and therefore is considered the most important GHG. To account for the warming potential of different GHGs, GHG emissions are quantified and reported as CO2 equivalents (CO2e). The effects of GHG emission sources (i.e., individual projects) are reported in metric tons/year of CO2e.

State Bill 97, 2007 Statutes, Chapter 185, acknowledges that local agencies must analyze the environmental impact of GHG under CEQA. The Natural Resources Agency adopted the CEQA Guidelines Amendments on December 30, 2009. The Amendments become effective on March 18, 2010. There is currently no plan, policy, or regulation adopted by

Monterey County for the purpose of reducing GHG emissions; however, as part of the Conservation/Open Space Element of the 2010 General Plan, Monterey County has identified a potential policy stating that within 24 months of the adoption of the General Plan, Monterey County will develop a Greenhouse Gas Reduction Plan to reduce emissions by 2020 to a level that is 15% less than 2005 emission levels. Since then, the County of Monterey developed a *Municipal Climate Action Plan* (MCAP) (County of Monterey, 2013a), which documents the following:

- Provides a description of the steps being taken by the County to reduce GHG emissions associated with its municipal operations (i.e., the County's day to day activities providing services to Monterey residents and businesses).
- Describes three potential paths towards the county's goal of reducing GHG emissions to a level that is 15% below the 2005 emissions level before 2020.
- Serves as one component of the County's larger, community-wide climate action plan (CAP), which addresses GHG emissions from the community at large.

The County of Monterey MCAP does not directly provide significant thresholds for short-term construction-related GHG emissions; therefore, GHG emissions would be evaluated based on guidance developed by the South Coast Air Quality Management District (SCAQMD). In addition, the MBUAPCD has not adopted CEQA significance thresholds for GHG emissions (MBUAPCD, 2014). However, in February 2013, MBUAPCD staff recommended that its Board of Directors approve an operational significance threshold of 10,000 metric tons CO2e per year for stationary source projects that rely on operational processes and equipment that are subject to MBUAPCD permitting requirements, and for land use projects. The MBUAPCD staff recommended to its board that staff should further review a significance threshold of 2,000 metric tons CO2e per year or compliance with an applicable adopted GHG reduction plan/climate action plan (MBUAPCD, 2013). As of July 2014, the MBUAPCD Board of Directors has not adopted the threshold recommended by its staff.

For construction-related GHGs, SCAQMD recommends that total emission from construction be amortized over 30 years and added to operational emissions, and then compared to the significance threshold (SCAQMD, 2008). The sum of the 30-year amortized construction GHG emissions that would be associated with the proposed project is approximately 26 metric tons CO2e per year. The GHGs estimated do not include operations as the project would not contribute any additional emissions during operations. The emissions of CO2e would not exceed the MBUAPCD recommended GHG significance threshold of 2,000 metric tons CO2e per year, and therefore, would be considered **less-than-significant impact** with respect to GHG emissions.

g) As stated in response to checklist question 12(f) above, the project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHG. Thus, project implementation would have a **less-than-significant** impact with respect to conflicts with estimated GHG plans, policies, or regulations.

Cumulative Air Quality Impacts

Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts. A significant cumulative impact would result if the combined emissions of criteria air pollutants from the proposed project and anticipated new projects in the surrounding area would contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. As discussed in response to checklist question 12(b), above, the project's construction emissions would exceed the MBUAPCD's PM10 construction-related emissions threshold of 82 pounds per day, resulting in a significant cumulative impact. However, through implementation of Mitigation Measure AIR-1, which would include watering haul routes and active construction areas, and reducing traffic speeds along unpaved roads, would reduce the project's cumulative impact level to **less-than-significant**.

Biological Resources

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
4.	**BIOLOGICAL RESOURCES — Would the project:**				
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

This section describes potential impacts on biological resources that may occur from implementation of the Elkhorn Slough Tidal Marsh Restoration Project ("project"), which involves the restoration of 147 acres of tidal salt marsh, salt marsh–upland ecotone habitat, and native grasslands in the Elkhorn Slough Estuary. The following sections describe project effects on biological resources, including beneficial aspects of habitat restoration and potential impacts on existing biological resources. Conceptual mitigation measures are proposed to offset or minimize the potential impacts identified below.

Environmental Setting

H. T. Harvey & Associates (HTH) conducted a biological resources evaluation to determine whether any sensitive biological resources, such as wetlands or habitats for special-status species, are located close to the proposed project site, and whether project activities would result in significant impacts on these resources. The geographic scope of this biological evaluation was limited to the areas that are in and adjacent to the project site (i.e., the proposed restoration areas).

"Sensitive biological resources" include the following:

1. Plants or animals that are listed as rare, threatened, or endangered or as species of special concern, pursuant to federal or State law, and habitat essential to special-status species of plants or wildlife
2. Natural communities indicated as rare or threatened by the California Natural Diversity Database (CNDDB) of the California Department of Fish and Wildlife (CDFW) – formerly the California Department of Fish and Game (CDFG)
3. Wetlands and streams, and the riparian vegetation surrounding them, or natural vegetation designated as significant natural habitat
4. Natural communities and associated buffers protected pursuant to applicable plans, policies, and regulations

The evaluation of the project's biological resource impacts is based on the following field investigations and review of existing information:

- CNDDB (2014) data on special-status species and sensitive habitat occurrences in the vicinity of the Elkhorn Slough
- California Native Plant Society (CNPS) (2014) data on rare and endangered plants that may occur in the vicinity of Elkhorn Slough
- Available literature related to hydrology, water quality, and land use in the Elkhorn Slough area (Zimmerman and Caffrey 2002; Van Dyke and Wasson 2005; Elkhorn Slough Tidal Wetland Project Team [ESTWPT] 2007; Hughes et al. 2010; Wasson et al. 2012)
- Available literature related to habitats and botanical resources in the Elkhorn Slough area (Caffrey et al. 2002b; Van Dyke and Wasson 2005; ESTWPT 2007; Palacios 2010; Hammerstrom and Grant 2012; Van Dyke 2012)
- Available literature related to wildlife in the Elkhorn Slough area (Ramer et al. 1991; Harvey and Connors 2002; Wasson et al. 2002; Yoklavich et al. 2002; Ritter et al. 2008; Carlisle and Starr 2009; Oliver et al. 2009; McCarthy 2010a, 2010b; Ruegg 2010; Vinnedge Environmental Consulting 2010; Woolfolk and Labadie 2012)
- The Final Initial Study and Mitigated Negative Declaration from the nearby Parsons Slough Project (Van Dyke 2012)
- Site visits conducted by HTH biologists, and HTH biological experts' understanding of wildlife distribution in the vicinity of the project area.

The following is a summary of biological resources, including habitats and special-status species, with potential to occur in the project area. A more detailed description of the biological resources present in the project area is located in **Appendix C**.

Biotic Habitats

The biotic habitats found on the Project site are: subtidal, intertidal mudflat, intertidal salt marsh, diked salt marsh, diked brackish marsh, willow thicket, and cultivated field/ruderal grassland. The distribution of habitats on the project site is shown in Appendix C, and their approximate acreages (shown here in **Table 5**) are summarized in the *Elkhorn Slough Tidal Marsh Restoration Project Existing Conditions Report* (ESA, 2014a).

TABLE 5
ACREAGES OF BIOTIC HABITATS ON THE PROJECT SITE

Biotic Habitat	Area on Project Site (acres)
Subtidal	13.02
Intertidal mudflat	48.47
Intertidal salt marsh	32.47
Diked salt marsh	5.25
Diked brackish marsh	0.49
Willow thicket	0.12
Cultivated field/ruderal grassland	47.17
Total	**146.99**

Historically, the Minhoto-Hester Marsh and Seal Bend restoration areas comprised tidal salt marsh with a complex network of tidal slough channels. These areas were diked and drained sometime after 1872. Drainage caused the marsh sediments to dry out, compact, decompose, and subside by approximately 1–2 feet. Most of the dikes around these areas failed, and by 1983, tidal action had been returned to most areas (Van Dyke and Wasson 2005). When tidal inundation was reintroduced, the elevations throughout the majority of these subsided lands were too low to support salt marsh vegetation, resulting in the development of extensive areas of mudflat. The tidal marshes of the Elkhorn Slough system are being lost a result of increased tidal flooding caused by past diking and draining, as well as construction of a harbor at the slough mouth in 1947. Other factors including the loss of riverine sediment inputs, subsidence of marsh areas, sea level rise, increased salinity, and increased nutrient inputs may also contribute to loss of tidal marsh in the system (Watson et al. 2011). Tidal marshes are also eroding due to deepening and widening tidal creeks, causing salt marshes to collapse into the channel, thus habitats and functions that support estuarine food webs are being lost or degraded in Elkhorn Slough.

Sensitive Habitats

Tidal Mudflats and Wetlands. Approximately 32.5 acres of tidal wetlands occurs in the project site. The intertidal and diked salt marsh habitats in the project area are dominated by pickleweed. Elkhorn Slough supports one of the largest tracts of pickleweed (*Salicornia pacifica*; formerly, *Sarcocornia pacifica*) -dominated salt marsh in California outside of San Francisco Bay. Marsh is more extensive in the Seal Bend restoration area compared to the Minhoto/Hester Marsh restoration area. The *Salicornia pacifica* alliance is listed as a sensitive natural community by CDFG (2010), with a global/state conservation status rank of G4 S3 (apparently secure globally, vulnerable at state level). The CNDDB Element Occurrence Report generated for the Project's Existing Conditions Report (ESA, 2014a; see also Appendix C) includes the occurrence of

Northern Coastal Salt Marsh at Elkhorn Slough as a significant occurrence of this sensitive habitat type, with a rank of G3 S3.2 (vulnerable at global and state levels) (CNDDB 2014).

The project site includes 0.5 acres of diked brackish marsh and 0.2 acres of willow thicket. Both of these habitats are wetlands and therefore are considered environmentally sensitive habitat areas (ESHAs) under the federal Clean Water Act and the California Coastal Act.

Eelgrass. Eelgrass is the dominant seagrass species in Elkhorn Slough system. No eelgrass beds occur in the project site but eelgrass beds occur in the lower main channel of Elkhorn Slough. The main eelgrass bed is located on the north side of the channel approximately 375 ft north of the northern extent of the Seal Bend restoration site (Figure 1) and thus is well outside the project area. On the south side of the channel, a smaller patch occurs within about 100 ft from the Seal Bend Restoration site. Eelgrass beds are considered essential fish habitat under the Magnuson Stevens Act and ESHAs under the California Coastal Act.

Eucalyptus Grove. A grove of eucalyptus and Monterey pine on the south side of the Seal Bend Restoration Area provides habitat for several sensitive wildlife species. This grove supports a rookery of great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), and double-crested cormorants (*Phalacrocorax auritus*). Additionally, a large diversity of migratory birds have been documented in this grove. The eucalyptus trees also provide wintering roost sites for monarch butterflies (*Danaus plexippus*) and nest sites for raptors, such as red-tailed hawks (*Buteo jamaicensis*). Although not within the project boundary indirect impacts to this area are considered in the impact assessment for the project.

Special-status Plant Species

Ninety-three special-status plant species that occur in the project region were assessed for their potential to occur on the project site and all species are considered absent (Appendix C; ESA, 2014a). No special-status plants have been observed by staff biologists. Many of the special-status plants that occur in the project region are associated with habitat types or soil types that did not occur on the project site historically, or that no longer occur on the project site because of the extensive land disturbance associated with agricultural use and hydrologic alterations at the site. Habitat types that are absent from the project site include chaparral and cismontane woodland or other forested habitat. Absent soil types include serpentine soils, gypsum, shale, and sandy dune soils. Additionally, some regionally known special-status plant species occur only at elevations higher than the project site or have highly endemic ranges centered in specific areas that do not include the project site.

Special-status Wildlife Species

A list of special-status animal species documented in the CNDDB as occurring within a 5-mile radius of the project site, and more detailed descriptions of special-status species that could occur on the project site, as well as an evaluation of their likelihood to do so, are provided in in Appendix C.

Special-status fish species are unlikely to occur on the project site. Salmonids including the central California coast steelhead distinct population segment (DPS) (*Oncorhynchus mykiss*), Central Valley spring-run evolutionarily significant unit (ESU) (*Oncorhynchus tshawytscha*), Central Valley fall-run Chinook salmon ESU (*Oncorhynchus tshawytscha*), central California coast coho salmon ESU (*Oncorhynchus kisutsch*), Sacramento River winter-run Chinook salmon ESU (*Oncorhynchus tshawytscha*), and south-central California coast steelhead DPS (*Oncorhynchus mykiss*) occur in the Monterey Bay region but are not expected to stray into Elkhorn Slough. North American green sturgeon (*Acipenser medirostris*) may also occur in coastal waters. The tidewater goby (*Eucyclogobius newberryi*) occurs in Moro Cojo Slough to the south and may occasionally disperse into smaller channels of Elkhorn Slough. These species have not been detected during numerous sampling events in the Elkhorn Slough system (M. Fountain pers. comm.).

Marine mammals that are known to occur in the Elkhorn Slough system include southern sea otters (*Enhydra lutris nereis*) and harbor seals (*Phoca vitulina richardsi*). California sea lions (*Zalophus californianus*) are regularly seen near the Highway 1 bridge west of the project site. Special-status birds that may occur regularly on the project site (but are not expected to breed there) include California least tern (*Sterna antillarum browni*), western snowy plover (*Charadrius nivosus nivosus*), California brown pelicans (*Pelecanus occidentalis californicus*), white-tailed kites (*Elanus leucurus*), northern harriers (*Circus cyaneus*), and western burrowing owls (*Athene cunicularia hypugaea*). California red-legged frogs (*Rana aurora draytonii*) and California tiger salamanders (*Ambystoma californiense*) are known to occur in freshwater habitats within 0.5 miles of the site and they could occur in other off-site freshwater habitats; there is a low probability that these two species disperse onto upland portions of the project site. Santa Cruz-long-toed salamanders (*Ambystoma macrodactylum croceum*) are known to occur within 1.5 mi of the site but are very unlikely to disperse onto the site.

Regulatory Considerations

The following is a summary of applicable laws and regulations that govern biotic resources in the project area. As noted in Section A, *Project Description,* the project would be subject to the jurisdiction of several state and federal agencies, and would require a number of regulatory agency approvals. Through securing regulatory agency approvals and by compliance with recommended mitigation measures and conditions of permit approval, the project would be consistent with the state and federal laws and regulations described below.

Waters of the United States/Waters of the State

Areas meeting the regulatory definition of "Waters of the United States" (i.e., jurisdictional waters) are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) under provisions of Section 404 of the Clean Water Act (1972) and Section 10 of the Rivers and Harbors Act (1899). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the United States," tributaries of waters otherwise defined as "Waters of the United States," the territorial seas, and wetlands (termed Special Aquatic Sites) adjacent to "Waters of the United States" (Title 33, Code of Federal Regulations [CFR], Part 328, Section 328.3). Wetlands on nonagricultural lands are identified using the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987).

Areas not considered to be jurisdictional waters include nontidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water-filled depressions (33 CFR 328).

Construction activities within jurisdictional waters are regulated by USACE. The placement of fill into such waters must be in compliance with permit requirements of USACE. No USACE permit would be effective in the absence of State water quality certification pursuant to Section 401 of the Clean Water Act. The State Water Resources Control Board is the State agency (together with the Regional Water Quality Control Boards [RWQCBs]) charged with implementing water quality certification in California.

The RWQCB is responsible for protecting surface, ground, and coastal waters within its boundaries, pursuant to the Porter-Cologne Water Quality Control Act of the California Water Code. The RWQCB has both federal and State jurisdiction under Section 401 of the Clean Water Act, for activities that could result in a discharge of dredged or fill material to a water body. Federal authority is exercised whenever a proposed project requires a Clean Water Act Section 404 permit from USACE in the form of a Section 401 Water Quality Certification. State authority is exercised when a proposed project is not subject to federal authority, in the form of a Notice of Coverage, Waiver of Waste Discharge Requirements. Many wetlands fall into RWQCB jurisdiction, including some wetlands that are not subject to USACE jurisdiction. RWQCB jurisdiction of other waters, such as streams and lakes, extends below the ordinary high-water mark.

The RWQCB has no formal technical manual or expanded regulations to help in identifying its jurisdiction. The only guidance can be found in Porter-Cologne Water Quality Control Act, Chapter 2 (Definitions), which states that "'waters of the State' means any surface water or ground water, including saline waters, within the boundaries of the state."

Habitats Regulated by the California Coastal Commission under the California Coastal Act and Federal Coastal Zone Management Act

The California Coastal Act of 1976 and the federal Coastal Zone Management Act give state coastal management agencies regulatory control (with federal consistency review authority) over all federal activities and federally licensed, permitted, or assisted activities if the activity affects coastal resources, including highway improvement projects assisted with federal funds. The primary agency is the California Coastal Commission (CCC). CCC's jurisdiction relative to development activities in the coastal zone applies to all private and public entities, and development within the coastal zone may not commence until either CCC or a local government that has a CCC-certified Local Coastal Program (LCP) has issued a coastal development permit. The California Coastal Act provides for protection of Environmentally Sensitive Habitat Areas (ESHAs) that generally cannot be removed by a project within the coastal zone. The CCC is responsible for designation of ESHAs.

Wetlands and Environmentally Sensitive Habitat Areas. In 1981, CCC adopted its Statewide Interpretive Guidelines for Wetlands and Other Wet Environmentally Sensitive Habitat Areas.

Wetlands, including riparian habitat found in the "coastal zone," are regulated under the California Coastal Act and the federal Coastal Zone Management Act, and are within jurisdiction of CCC. Under the California Coastal Act and the Coastal Zone Management Act, wetlands are defined as:

Land 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. (Public Resources Code Section 30121)

In the California coastal zone, CCC, with the assistance of CDFW, is responsible for determining the presence of wetlands subject to regulation under the California Coastal Act. As the primary wetland advisor to the CCC, CDFW essentially relies on the USACE wetland definition and classification system, with some minor changes in classification terminology, as the methodology for wetland determinations:

> …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 types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent, drastic fluctuations of surface water levels, wave action, water flow, turbidity, or high concentration of salts or other substances in the substrate.

However, one important difference in the CCC delineation process compared to the USACE process is that the CCC requires the presence of only one attribute (e.g., hydrology, hydric soils, or hydrophytic vegetation), rather than of all three attributes, for an area to qualify as a wetland.

The Migratory Bird Treaty Act

MBTA (Title 16, United States Code, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment, a violation of MBTA.

California Endangered Species Act

Under the California Endangered Species Act (CESA), CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code §2070). CDFW also maintains a list of candidate species, which are those formally under review for addition to either the list of endangered species or the list of threatened species. In addition, CDFW maintains a list of "species of special concern," which serves as a watch list.

The CESA prohibits the take of plant and animal species that the California Fish and Game Commission has designated as either threatened or endangered in California. "Take" in the context of the CESA means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill a listed species (California Fish and Game Code §86). The take prohibitions also apply to candidates for listing under the CESA. However, Section 2081 of the CESA allows CDFW to authorize exceptions to the state's take prohibition for educational, scientific, or management purposes.

In accordance with the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine if any state-listed endangered or threatened species could be present in the project area. The agency also must determine if the project could have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any project that could affect a candidate species.

California Fish and Game Code

Fully Protected Species

Certain species are considered *fully protected*, meaning that the code explicitly prohibits all take of individuals of these species except for take permitted for scientific research. Section 5050 lists fully protected amphibians and reptiles, Section 5515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals.

It is possible for a species to be protected under the California Fish and Game Code, but not fully protected. For instance, mountain lion (*Puma concolor*) is protected under Section 4800 et seq., but is not a fully protected species.

Protection of Birds and Their Nests

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 of the code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Migratory non-game birds are protected under Section 3800, while other specified birds are protected under Section 3505.

Stream and Lake Protection

CDFW has jurisdictional authority over streams and lakes and the wetland resources associated with these aquatic systems, including sloughs, under California Fish and Game Code Sections 1600 et seq. through administration of lake or streambed alteration agreements. Such agreements are not a permit, but rather a mutual accord between CDFW and the project proponent. California Fish and Game Code Sections 1600-1616 authorize CDFW to regulate work that will "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river lake or stream." Because CDFW includes under its jurisdiction streamside habitats that may not qualify as waters or wetlands under the federal Clean Water Act definition (see Section 3.4.2.1), CDFW jurisdiction may be broader than Corps jurisdiction.

CDFW enters into a streambed alteration agreement with the project proponent and can impose conditions in the agreement to minimize and mitigate impacts to fish and wildlife resources. A project proponent must submit a notification of streambed alteration to CDFW before construction.

Under Fish and Game Code Section 1602 (Streambed Alteration Agreements), CDFW takes jurisdiction over the stream zone which is defined as the top of bank or outside extent of riparian vegetation, whichever is the greatest. Within the stream zone, waters of the State of California are typically delineated to include the streambed to the top of the bank and adjacent areas that would meet any one of the three wetland parameters in the USACE definition (vegetation, hydrology, and/or soils). Whereas federal jurisdiction requires meeting all three parameters, in practice meeting one parameter, or even the presence (rather than dominance) of wetland plants in an area associated with a jurisdictional streambed would qualify an area as waters of the State of California.

Marine Life Protection Act

The Marine Life Protection Act (MLPA) of 1999 is part of the Fish and Game Code (Sections 2850-2863) and it directs the state to redesign California's system of marine protected areas (MPAs) to function as a network in order to: increase coherence and effectiveness in protecting the state's marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational and study opportunities provided by marine ecosystems subject to minimal human disturbance.

Discussion- Biological Resource Impacts and Mitigation

The below evaluation of project impacts on biological resources is structured to reflect the project's phasing of restoration activities that would occur at Minhoto-Hester Marsh Restoration Area and Seal Bend Restoration Area. Phase 1 includes restoration of 47 acres of tidal marsh in the Minhoto-Hester Marsh area and in the buffer area. Future phases would occur in other portions of Minhoto-Hester Marsh Restoration Area and Seal Bend Restoration Area. Because Phase 1 would occur under "dry" conditions (i.e., restoration areas would be blocked from tidal action), but future phases may occur in wet conditions, the impact assessment below reflects differences in how restoration could affect biological resources in Phase 1 and future phases. The impact assessment for future phases assumes that restoration could occur under either wet or dry conditions.

a) **Special-status Species**

Phase 1

Potential Effects on Marine Mammals (Less than Significant with Mitigation Incorporated)

Southern sea otters and harbor seals are known to occur in Elkhorn Slough and have the potential to occur in slough channels and marshes within the project area during all project phases. Approximately 100 sea otters frequently use Elkhorn Slough for resting, foraging, and pupping (McCarthy 2010a). Sea otters occur in Yampah Marsh and Parsons Slough adjacent to the Minhoto/Hester Marsh restoration area (Eby and Scoles 2010) and may occasionally traverse some of the deeper channels on the project site. They also haul-out on pickleweed areas adjacent to the slough and may haul-out on the project site.

Harbor seals, numbering in the hundreds, are year-round residents in Elkhorn Slough, occurring individually or in small groups in the main channel, and they often haul out on channel banks and mudflats, especially at Seal Bend (Harvey and Connors 2002). Haul-out sites have varied in the slough, with Seal Bend being the most frequented historically, and other sites being used as well, including mudflat use at Rubis Creek, the entrance to Parsons Slough, and tidal creeks within the Parsons Slough complex (McCarthy 2010b; Eby and Scoles 2010). Harbor seals also can haul-out in the project site as well.

Project-related construction activities could result in an increase in noise and human activity relative to existing conditions that may affect the behavior of sea otters and harbor seals. Disturbance may disrupt normal behaviors that are essential to growth and survival, such as pupping, loafing, and feeding. Disrupting these behaviors could result in increased energetic costs as animals locate to other areas, and possibly an increase in competition for food and space in other areas. Loud percussive noises and shock waves, especially those generated from driving of sheet piles, may cause hearing loss or other sublethal effects to sea otters and harbor seals if they are present near construction activities, and particularly when they are underwater. Because of the importance of Elkhorn Slough to both southern sea otters and harbor seals, the harassment or injury of marine mammals due to project-related construction would be considered potentially significant under CEQA.

Implementation of **Mitigation Measures BIO-1a (Seasonal Avoidance)**, **BIO-1b (Education Program)**, and **BIO-1c (Biological Monitoring)** during Phase 1 and future phases would minimize the potential for project-related construction to disturb or injure sea otters and harbor seals by avoiding or buffering construction activities during the otter and harbor seal pupping season, educating construction personnel about the potential presence and sensitivity of these species, and through the presence of an onsite biological monitor. These measures were incorporated into the Parsons Slough Project to minimize and avoid impacts to marine mammals (Vinnedge Environmental Consulting 2010). With implementation of these measures, the project's potential effects on marine mammals would be reduced to **less-than-significant** levels.

Potential Effects on Special-status Fish (Less than Significant)

Special-status fish are not expected to occur in the project area. Tidewater gobies occur in Bennett Slough, to the north of Elkhorn Slough (U.S. Fish and Wildlife Service [USFWS] 2013). They are also known to occur in the Moro Cojo Slough system to the south of Elkhorn Slough. Tidewater gobies are likely absent from the Elkhorn Slough system because of high tidal flows; there is only a low probability that this species could enter the system as occasional dispersants but they are not expected to persist (if present at all) in the project area. North American green sturgeon spend most of their lives in coastal marine waters, coastal bays, and estuaries along the Pacific coast, and Monterey Bay provides habitat for adults and subadults (Huff et al. 2012). Green sturgeon have not been documented within Elkhorn Slough (Brown 2002, M. Fountain pers. comm.); although very unlikely, the species could enter the Elkhorn Slough system to forage but the probability of occurrence on the project site is extremely low. Salmonids (*Oncorhynchus* spp.) occur in coastal waters in the Monterey Bay region but are unlikely to stray into Elkhorn Slough and these species are not expected to occur on the project site. Numerous surveys have not detected any of these special-status species in the project vicinity (M. Fountain pers. comm) further indicating these species are extremely unlikely to occur on the site.

During Phase 1 restoration activities, and possibly during future phases (depending on contractor preference), work areas on portions of the remnant marsh plain would be isolated from the tides and dewatered to allow construction in nontidal conditions. Dewatering would occur at low tide. Water control structures, such as temporary berms, would isolate restoration areas during construction. Because there such a low probability that special-status fish could occur on the site (and, if present, occurrence of stray individuals would be in very low numbers), impacts on special-status fish through entrainment are considered **less than significant**.

Potential Effects on Special-status Birds (Less than Significant)

Several special-status bird species occur in the Elkhorn Slough area and could occur in the project area during construction. California least terns could occur as occasional foragers in aquatic habitats in the project area during their migration, and California brown pelicans roost in Elkhorn Slough and may occasionally use channels on the project site for foraging. Western snowy plovers nest on the sandy beaches near Moss Landing Harbor and in the former salt pond on the north side of the slough; however, they are not expected to breed on the project site (because suitable sandy or salt pan areas are lacking). Nevertheless, they may occur as an occasional forager on tidal flats on the project site. These occasional foraging or roosting special-status birds could be disturbed by construction activities associated with restoration. Disturbance of least terns, pelicans, or plovers in or near foraging or roosting habitat could reduce foraging efficiency and increase energetic demands as birds locate alternative habitats. In-water work associated with restoration activities could reduce water quality by increasing turbidity and suspended sediment, thereby interfering with foraging, reducing foraging efficiency, and reducing the probability that the birds would forage in the project area. However, these species are expected to forage in waters in or very near to the project site infrequently, and abundant alternative foraging and roosting habitats occur nearby, such that these species are expected to avoid construction areas without experiencing substantial loss of foraging or roosting opportunities. Furthermore, as discussed in Section E.8, *Hydrology and Water Quality*, measures to avoid or minimize water quality impacts would be implemented, so no reduction in prey or substantial degradation of foraging conditions is expected to occur outside of the project site. Therefore, potential impacts on foraging or roosting California least terns, California brown pelicans, and western snowy plovers are considered **less than significant**.

Potential Effects on Nesting Birds (Less than Significant with Mitigation Incorporated)

White-tailed kites and northern harriers could forage in marsh or upland habitats on the project site, and they have the potential to breed in the project vicinity. Because these species occur in low densities, only one or two pairs (at most) are likely to breed near the project site. There are no trees on the project site suitable for nesting white-tailed kites, but these birds could nest in adjacent areas, such as the eucalyptus and Monterey pine grove on the south side of the Seal Bend Restoration Area. There is potential for northern harriers to breed in marshes or grasslands on the project site; however, this species is unlikely to breed in the low-elevation tidal marshes or other low-quality upland habitats on the project site, because there are higher quality marshes and uplands in other portions of the Elkhorn Slough area. If these special-status raptors breed in or near the project site, there is potential for nesting habitat to be affected directly through habitat modification during restoration activities or indirectly through disturbance. However, any impacts on potential nesting habitat (i.e., for northern harriers) would be offset by increased habitat quality in the restored marshes and adjacent upland areas. The short-term loss of nesting habitat is considered less than significant under CEQA because the affected habitat (and thus the number of affected pairs) represents a very small proportion of the regionally available habitat.

In addition to special-status species described above, a variety of common birds, such as western meadowlarks (*Sturnella neglecta*) and savannah sparrows (*Passerculus sandwichensis*) could potentially nest within the project area, particularly in upland areas within and adjacent to the stockpile area. If project activities occur during the nesting season (1 February to 31 August), nests with eggs or young may be lost during vegetation removal or placement of materials in storage or restoration areas. The loss of a small number of nesting birds that may occur in the project area would represent a less than significant impact under CEQA; however, a large number of more common nesting birds may also nest in vegetated areas (such as the upland stockpile area) and the loss of a large number of nesting birds would represent a potentially significant impact. Further, the project would need to take measures to comply with the federal Migratory Bird Treaty Act (MBTA; 16 U.S.C., §703, Supp. I, 1989) and California Fish and Game Code (§§3503, 2513, and 3800), which protect active bird nests from destruction. Implementation of **Mitigation Measures BIO-2a (Seasonal Avoidance)**, **BIO-2b (Pre-Construction Surveys)**, and **BIO-3c (Buffer Zones)** would reduce potential impacts to less than significant levels.

Potential Effects on Special-status Amphibians (Less than Significant)

The California red-legged frog (*Rana draytonii*), California tiger salamanders (*Ambystoma californiense*), and Santa Cruz long-toed salamanders (*Ambystoma macrodactylum croceum*) breed in freshwater habitat. California red-legged frogs often inhabits perennial freshwater pools, streams, and ponds and the California tiger salamander's preferred breeding habitat consists of temporarily ponded environments (e.g., vernal pool, ephemeral pool, or human-made ponds) surrounded by uplands that support small mammal burrows. Santa Cruz long-toed salamanders also use vernal pools and ponds for breeding where small mammal burrows (aestivation habitat) and moist vegetated habitats (particularly oak woodlands) occur nearby.

No suitable freshwater habitats for these species occur on the site. California red-legged frogs and California tiger salamanders are known to occur in a seasonal swale approximately 0.5 miles to the west of the stockpile area (Bland 2014) and they may occur in freshwater habitats in other areas in the vicinity of the project. There is a low probability that individuals could disperse from this location onto upland portions of the site. Tiger salamanders are known to seasonally reside in California ground squirrel burrows and because ground squirrels have occupied this habitat since tilling has ceased, it is possible that tiger salamanders occur in burrows on the site. California red-legged frogs can also take refuge in such burrows. Santa Cruz long-toed salamanders are known to occur in the Lower Cattail Pond approximately 1.5 miles to the northeast of the project site (Bland 2014).

Because no suitable freshwater habitat occurs on the project site and the project is separated from potential freshwater breeding sites by unsuitable habitats such as tilled agricultural fields, dairy operations, saline marshes and mudflats, and development, the probability of special-status amphibians dispersing onto upland portions of the project site is low (although the possibility of occurrence cannot be discounted). Dispersing individuals could be killed or injured by the movement of personnel or equipment, particularly during wet periods when amphibians are more likely to disperse from freshwater areas. However, because the probability of occurrence is low and thus the potential for injury or mortality to occur is also low, and would be expected to affect few individuals (if any), the potential for the project to impact special-status amphibians is considered **less than significant**.

Future Phases

Potential impacts on marine mammals, special-status fish, and special-status birds during future phases would be identical to those described for Phase 1, addressed above.

Mitigation Measures

The following Mitigation Measures apply to the project's Phase 1 and future phase activities:

Mitigation Measure BIO-1a: Seasonal Avoidance

Construction activities shall be timed to avoid the peak of the pupping season for sea otters and harbor seals, as determined by consultation with regulatory agency staff. Marine mammals in the project vicinity shall be monitored by a qualified biological monitor (see Mitigation Measure BIO-1c below); the monitor shall establish disturbance-free buffers established through agency consultation.

Mitigation Measure BIO-1b: Education Program

A qualified biologist shall conduct mandatory biological resources awareness training for construction personnel. The awareness training shall be provided to all construction personnel to brief them on the need to avoid effects on marine mammals and other special-status species. If new construction personnel are added to the project, the contractor shall ensure that the personnel receive the mandatory training before starting work.

Mitigation Measure BIO-1c: Biological Monitoring

A qualified biologist shall be present during all construction activities to ensure that impacts on marine mammals are avoided to the extent feasible. The biological monitor shall have the authority to stop project activities before any marine mammals are harassed by project activities (as defined by the Marine Mammal Protection Act). Biological monitoring shall begin ½ hour before work begins and shall continue until ½ hour after work is completed each day. Work shall commence only with approval of the biological monitor, to ensure that no marine mammals are present in the vicinity of construction activities. In addition, biological monitors will, to the extent feasible, monitor for fish, including listed species that may occur within the project site.

Mitigation Measure BIO-2a: Seasonal Avoidance of Nesting Birds

Construction should be scheduled to avoid the nesting season to the extent feasible. CDFW recognizes the period between 1 February and 31 August as nesting season in the Elkhorn Slough area. If it is not possible to schedule construction to occur between September and January, then measures **BIO-2b (Pre-Construction Surveys)** and **BIO-2c (Buffer Zones)** are applicable.

Mitigation Measure BIO-2b: Pre-construction Surveys

Prior to commencement of new activities (i.e., activities that are not currently ongoing in any given area) during the breeding season, pre-construction surveys will be conducted by a qualified ornithologist no more than 7 days prior to the initiation of new disturbance in any given area. Pre-disturbance surveys should be used to ensure that no nests of species protected by the MBTA or California Fish and Game Code will be disturbed during project implementation. During this survey, the ornithologist will inspect all potential nesting habitats (e.g., trees, shrubs, buildings, and various substrates on the ground) in the project area for nests. Surveys will be conducted within search radii corresponding to disturbance-free buffer zones described below for non-listed raptors (500 feet) and non-raptors (250 feet), including in off-site areas adjacent to the project (where such areas are accessible).

Mitigation Measure BIO-2c: Buffer Zones

If an active nest is found, a qualified biologist will determine the extent of a disturbance-free buffer zone to be established around the nest until nesting has been completed. Disturbance-free buffer zones are typically 500 feet for non-listed raptors and 250 feet for non-raptors. Nests will be considered active until surveys conducted by a qualified ornithologist confirm nesting is complete. However, construction within 100 feet of these nests may proceed if, based on monitoring of the birds behavior, a qualified biologist determines that such activities are not likely to result in the abandonment of the nest. Per CDFW recommendations, monitoring should be conducted as follows:

- A qualified biologist should monitor activity at each nest for three days (8 hours of monitoring each day) prior to the onset of construction activities to develop a baseline of the normal behavior of the birds attending the nest. If the behavior observed at the nest is consistent on Days 1 and 2 of monitoring, Day 3 of monitoring may be skipped.

- A qualified biologist should monitor activity at each nest for 8 hours on the first day that construction occurs within the standard buffer (e.g., within 250 feet of a non-raptor nest). If the biologist determines that the birds' behavior is not adversely affected, project activities may continue. The biologist should continue to monitor the nests for 1 hour/day on any day when construction activities occur within the standard buffer around an active nest.

If at any time the biologist determines that project activities within the standard buffer is adversely affecting the behavior of the birds such that the nest is in jeopardy of failing, construction activities should retreat to honor the standard buffer until the nest is no longer active (i.e., the young have fledged).

In addition to the above-described mitigation measures, nesting deterrence can be implemented to minimize the potential for nesting birds to constrain project activities or to be impacted by those activities. The most effective nesting deterrence in non-developed areas includes vegetation removal to remove nesting substrate. Also, removal of nest-starts (incomplete nests that do not yet contain eggs or young) by qualified biologists could also be conducted. Such nest-start removal will begin early in the breeding season (e.g., February) and continue regularly until vegetation can be removed and construction commences.

b) **Riparian or Sensitive Communities**

Phase 1 and Future Phases

Loss of Willow Thicket (Less than Significant)

A small (0.2-acre) patch of willow trees is present along the western upland edge of the Minhoto/Hester Marsh Restoration Area. The willow thicket is likely supported by groundwater, fresh water runoff, and potentially drainage from the adjacent agricultural fields.

In estuaries and riverine systems, large extents of willows (e.g., willow sausal habitat, riparian corridors) can provide roosting, foraging, and breeding habitat for migratory birds. However, the willow thicket on the project site consists of just a few trees, and is too small and isolated from similar habitat to provide these functions. Furthermore, the willow trees do not constitute riparian habitat and so do not provide functions typically associated with willow riparian habitat. Thus, this small willow thicket is not important for migratory or locally breeding birds.

Conversion of the diked marsh habitat to fully tidal conditions would substantially increase soil salinity in the root zone of the willow trees in the thicket. Over time, elevated salinity is expected to lead to permanent loss of the willow thicket and conversion to salt marsh habitat. However, the permanent loss of this willow thicket would not result in a substantial loss of breeding or foraging habitat for migratory or resident birds. Moreover, the permanent loss of willow thicket habitat would be compensated by the overall increase in ecological functions and services associated with increased tidal salt marsh habitat and a decreased tidal prism in Elkhorn Slough. Therefore, conversion of willow thicket to intertidal salt marsh habitat is considered **less than significant**.

c) **Wetland and Aquatic Habitats**

Over the past 150 years, human activities have altered the tidal, freshwater, and sediment processes that are essential to support and sustain Elkhorn Slough's tidal wetland and aquatic habitats. Fifty percent of the tidal salt marsh in Elkhorn Slough has been lost in the past 70 years. This habitat loss is primarily a result of increased tidal flooding, which "drowns" marsh vegetation, caused by past diking and draining of the marsh and by construction of a harbor at the mouth of Elkhorn Slough in 1947, which enlarged Elkhorn Slough's tidal prism (PWA et al. 2008). Increased tidal exchange in Elkhorn Slough is deepening and widening tidal creeks, causing erosion of salt marshes and tidal channels, increased turbidity, and loss of habitats that support estuarine food webs. Erosion of marsh and channel habitat is expected to accelerate with sea level rise (PWA et al. 2008).

In 2004, ESNERR initiated a planning effort to evaluate marsh dieback and erosion at Elkhorn Slough and to develop restoration and management strategies. Experts from multiple disciplines agreed that, without intervention, excessive erosion would continue widening the tidal channels and that salt marsh would continue to convert to mudflat. No intervention would result in a significant loss of habitat function and decrease in estuarine biodiversity (PWA et al. 2008; Wasson et al 2012). Among other measures, experts recommended raising the elevation of salt marshes that have subsided because of earlier diking through sediment addition (PWA et al. 2008, Wasson et al. 2012). This method has been successfully used in the San Francisco Estuary to restore tidal marshes (PWA and Faber 2004). The proposed project is the first to implement this recommendation in Elkhorn Slough. The Project site is a formerly diked tidal salt marsh that subsided in elevation before being returned to tidal action. Because of the area's low elevation, most of the salt marsh vegetation in the project area is stressed by excessive inundation. Both the mud flats and remnant salt marsh have lower function and lower biodiversity than salt marshes in Elkhorn Slough that haven't been diked.

Phase 1 and Future Phases

Potential Effects on Eelgrass Habitat (Less than Significant)

Eelgrass is the dominant seagrass species in Elkhorn Slough system. Dense eelgrass beds occur in only a few areas along the lower main channel, with the largest bed located near Seal Bend (Palacios 2010), but no eelgrass beds occur in the project site. The main eelgrass bed is located on the north side of the main Elkhorn Slough channel approximately 375 ft north of the northern extent of the Seal Bend restoration site. A smaller patch occurs within about 100 ft from the Seal Bend Restoration site. Because turbidity would be managed during Phase 1 restoration to substantially reduce the potential for sediment to enter Elkhorn Slough, turbidity resulting from project actions is not expected to result in temporarily decreases in light availability for eelgrass patches located at Seal Bend.

The project would incorporate standard BMPs to protect the estuary from turbidity impacts during construction; a summary of BMPs to protect water quality is provided in the above discussion of *Temporary Impacts on Water Quality in Wetlands and Aquatic Habitats during Construction*, and in Section E.8, *Hydrology and Water Quality*. In Phase 1, temporary berms or sheet piles would be used to isolate the fill area during the construction period. If necessary, water pumped from the site to further dewater the construction area would be subject to standard BMPs (e.g., filtration via temporary sediment detention basins, filtration via a Baker tank) prior to discharge to protect the water quality of Elkhorn Slough. As for any earthmoving project, the turbidity generated during project implementation must be managed to comply with water quality guidelines. The water quality BMPs referenced above would minimize the project's potential to increase turbidity, which could affect adjacent eelgrass beds in Elkhorn Slough. The project would therefore have a **less-than-significant** impact on eelgrass habitat.

Phase 1

The project would temporarily affect intertidal salt marsh and subtidal slough channels in the project area during Phase 1 restoration. Phase 1 restoration construction is expected to take up to 11 months total (not including work window restrictions), depending on weather and other logistical factors. Restoration would also permanently convert all intertidal mudflats and some subtidal slough channels to intertidal salt marsh (**Table 6**). However, all but the smallest (lower-order) slough channels would be preserved or excavated during restoration. Following restoration, the drainage density of channels in the project area would be, at minimum, at the low end of the range for natural reference marshes. A monitoring and evaluation program would be implemented in Phase 1 to characterize the trajectory of target intertidal salt marsh habitat establishment, inform restoration actions in future phases, and ensure project outcomes (ESA, 2014b). A primary goal of the project is to increase the ecological health of Elkhorn Slough through restoration of high-quality intertidal salt marsh habitat and reduction in scour of surrounding marshes via a reduced tidal prism.

TABLE 6
WETLAND HABITAT IMPACT AND RESTORATION ACREAGES—
PHASE 1 OF ELKHORN SLOUGH TIDAL MARSH RESTORATION PROJECT

Wetland Habitat Type	Impact Type	Impact Surface Area (acres)	Restored Habitat Surface Area (acres)	Net Gain/Loss Surface Area (+/- acres)
Intertidal salt marsh	Temporary	7.15	46.80	+ 39.65
Intertidal mudflat	Permanent (converted to intertidal salt marsh)	31.17	0.0	- 31.17
Subtidal (slough channels)	Temporary	4.46	4.46	0
Subtidal (slough channels)	Permanent (converted to intertidal salt marsh)	1.70	0.0	- 1.70
Totals		**44.48**	**51.26**	**+ 6.78**[1]

NOTES:
[1] Conversion of adjacent cultivated field/ruderal grassland to salt marsh (ESA, 2014b) accounts for the increase in the wetland habitat surface area of the Phase 1 project site.

Temporary Loss of Intertidal Salt Marsh Habitat (Less than Significant)

Intertidal salt marsh in the project area consists mostly of patches of pickleweed on the marsh plain, separated by intertidal mudflat. A mixture of salt marsh species is present along the upland edges of the marsh and near the high-tide line on earthen berms (degraded dikes) that extent into the marsh; the mixture includes pickleweed, saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), jaumea (*Jaumea carnosa*), and spearscale (*Atriplex triangularis*). During Phase 1 restoration, low-ground-pressure earthmoving equipment would be used to raise the elevation of intertidal salt marsh habitat and grade earthen berms to target marsh plain elevations. Earthwork would bury and crush existing salt marsh vegetation. As a result, intertidal salt marsh habitat would be temporarily affected throughout the Phase 1 area (Table 6). The temporary loss of pickleweed habitat would temporarily eliminate associated wildlife habitat functions for some species (e.g., cover and foraging), and temporarily reduce detrital inputs to the estuarine food web, as well as water quality benefits such as nutrient uptake and erosion protection.

Following restoration, native tidal salt marsh vegetation, primarily pickleweed, would rapidly recolonize the marsh plain, because the project's grading plan is designed to restore suitable hydrologic and substrate conditions for this plant community. Portions of the marsh plain where pickleweed would be shallowly buried would be expected to recover rapidly via vegetative spread. The remainder of the marsh plain would be revegetated via passive recruitment by pickleweed seed. Pickleweed recruits readily by seed to marshes restored near Mean Higher High Water (PWA and Faber 2004). Marsh plain elevations would be grade-checked during construction to ensure that construction remained within a tolerance of at least ±0.5 feet relative to the target elevation. The marsh plain would be constructed with a slight slope to promote drainage on the marsh plain, thereby reducing inundation stress on native salt marsh plant seedlings and speeding natural, passive revegetation. Therefore, dense, native-dominated salt marsh vegetation would be expected to become established within 5 years of construction. Following restoration, the marsh plain would be dominated primarily by pickleweed, with increased cover of saltgrass, alkali heath, jaumea, spearscale, and other tidal marsh plants near the high-tide line.

Restoration of intertidal salt marsh habitat would result in increased pickleweed cover and height relative to the current condition. This change would facilitate increased marsh function, including nutrient uptake, detrital input to the estuarine food web, and enhanced marsh plain foraging opportunities and cover for wildlife species. The increased elevation of the tidal marsh would also increase the resilience of the marsh to sea level rise and reduce scour in other marshes in Elkhorn Slough (by reducing the tidal prism), thereby slowing the further loss of marsh habitat in surrounding marshes. The temporary loss of pickleweed intertidal salt marsh habitat would be more than compensated for by the increase in salt marsh habitat extent, quality, and function following restoration. Therefore, the temporary loss of intertidal salt marsh habitat is considered **less than significant**.

Conversion of Intertidal Mudflat to Intertidal Salt Marsh Habitat (Less than Significant)

Restoration would result in the permanent conversion of intertidal mudflat to intertidal salt marsh habitat (Table 6). The loss of intertidal mudflat would result in a reduction in habitat extent for foraging waterbirds and fish, and for resident invertebrates in the project area. However, intertidal mudflat habitat has increased substantially throughout Elkhorn Slough, owing to the loss of intertidal salt marsh and slough channel habitat via scour and marsh “drowning.” Because of the expanded availability of this habitat type in the estuary, the permanent loss of intertidal mudflat in Phase 1 would not result in a substantive loss of habitat for waterbirds and invertebrate species in Elkhorn Slough. Furthermore, loss of intertidal mudflat would be compensated for by the overall increase in ecological functions and services associated with increased tidal salt marsh habitat and a decreased tidal prism in Elkhorn Slough. Therefore, conversion of intertidal mudflat to intertidal salt marsh habitat is considered **less than significant**.

Temporary Loss of Subtidal Habitat in Slough Channels (Less than Significant)

Subtidal habitat in the Phase 1 project site consists of tidal slough channels that are not dewatered during natural low-tide cycles (i.e., substrate elevations are below Mean Lower Low Water). Restoration construction work would temporarily cut off tidal exchange to subtidal habitat, and some subtidal habitat would be temporarily filled during earthwork (ESA, 2014b). These actions would result in the temporary loss of subtidal habitat in slough channels (Table 6), temporarily decreasing foraging habitat for fish, birds, mammals, and invertebrates that rely on subtidal channels. However, the project would preserve or excavate primary and secondary slough channels during construction, and would result in a drainage density of channels after restoration that would be at least at the low end of the range for natural reference marshes. The temporary loss of slough channels would be compensated for by the overall increase in ecological functions and services associated with increased tidal salt marsh habitat and a decreased tidal prism in Elkhorn Slough. Therefore, temporary impacts on subtidal slough channel habitat are considered **less than significant**.

Conversion of Subtidal Habitat in Borrow Ditches and Lower-order Slough Channels to Intertidal Salt Marsh Habitat (Less than Significant)

A small proportion of subtidal habitat in slough channels at the project site would be permanently converted to intertidal salt marsh habitat (Table 6). These slough channels are borrow ditches and small, lower-order slough channels. This change would decrease the extent of subtidal foraging habitat for fish, birds, mammals, and invertebrates in the project area. However, the project would include filling borrow ditches to promote the development of a more natural, sinuous slough channel system. Furthermore, the project would result in a drainage density of channels after restoration that is, at minimum, at the low end of the range for natural reference marshes. As a result, following restoration, the project area would provide a suitable extent of subtidal habitat to preserve subtidal habitat functions. Moreover, borrow ditch fills would result in improved slough channel habitat complexity/sinuosity, thereby improving aquatic habitat conditions, and may also improve physical processes by increasing sedimentation rates on site and/or reducing scour outboard of the site (by reducing the tidal prism). Therefore, the permanent conversion of a relatively small proportion of subtidal habitat to intertidal salt marsh habitat is considered **less than significant**.

Temporary Impacts on Water Quality in Wetlands and Aquatic Habitats during Construction (Less than Significant)

Project construction activities including grading, sheet pile installation, and placement of fill could result in reduced water quality through increased turbidity in the Elkhorn Slough system. Although turbidity is generally higher in tidal estuary systems compared to many riverine systems, a substantial increase in suspended sediment and turbidity may affect wildlife by interfering with visual foraging, or migratory behavior, and result in injury to gills of fish. Indirect effects could include increasing susceptibility to predation and reducing availability of food for some species. The sediment disturbance would be short-term and limited to work in marsh restoration, and the sediment plume would be expected to dissipate rapidly after disturbance. Because the water in the Elkhorn Slough system is naturally turbid, effects related to turbidity would likely be minor to fish occurring in the system. Leaking or spills of chemical contaminants or hazardous materials could be toxic to wildlife or the benthic community in the Elkhorn Slough system. However, turbidity and contaminant leaks/spills would be managed during Phase 1 restoration to substantially reduce the potential for sediment and contaminants to enter Elkhorn Slough. The project would incorporate standard BMPs to protect the estuary from turbidity and contaminant impacts during construction; a summary of BMPs to protect water quality is provided in the above discussion of *Temporary Impacts on Water Quality in Wetlands and Aquatic Habitats during Construction*, and in Section E.8, *Hydrology and Water Quality*. In Phase 1, temporary berms or sheet piles would be used to isolate the fill area during the construction period. If necessary, water pumped from the site to further dewater the construction area would be subject to standard BMPs (e.g., filtration via temporary sediment detention basins, filtration via a Baker tank) prior to discharge to protect the water quality of Elkhorn Slough. As for any earthmoving project, the turbidity generated during project implementation must be managed to comply with water quality guidelines. The water quality BMPs incorporated into the project would minimize the project’s potential to increase turbidity and contaminant discharge to Elkhorn Slough and would reduce potential water-quality related habitat impacts to a **less than significant** level.

Future Phases

Potential Effects on Intertidal Salt Marsh, Intertidal Mudflat, and Subtidal Habitat (Less than Significant)

Future phases of the project would result in temporary impacts on intertidal salt marsh, permanent impacts on intertidal mudflats, and both temporary and permanent impacts on subtidal habitat. **Table 7** provides the acreages of these impacts for future phases of the project. The restoration methods in future phases would be identical to those described for Phase 1, with the exception that future phases may be constructed in the wet (i.e., working during low-tide cycles, without temporarily diking and dewatering the site).

Construction in the wet would reduce the magnitude of temporary impacts on subtidal and tidal habitats by eliminating temporary fill placement associated with berm/sheet pile construction and by reducing temporary impacts on subtidal habitats associated with dewatering. Therefore, per the rationale provided above for Phase 1 impacts and the additional reduction in temporary impacts via possible construction in the wet, impacts on intertidal and subtidal habitat habitats in future phases are considered **less than significant**.

Potential Effects on Diked Salt/Brackish Marsh (Less than Significant)

The Seal Bend Restoration Area includes a 5.74-acre diked area comprised mostly of pickleweed-dominated salt marsh. A small, narrow fringe of diked brackish marsh is also present along the southern edge of the restoration area. The diked brackish marsh consists of species such as alkali bulrush (*Bolboschoenus maritimus*), cattail (*Typha latifolia*), and California bulrush (*Schoenoplectus californicus*). The small, fringe brackish marsh is too small to provide cover for many species that typically inhabit dense brackish marsh habitats. The diked marsh would be converted to fully tidal salt marsh (Table 7). The lack of tidal flushing in the diked condition can result in dramatic temporal variation in salinity, water depth, and water quality. Therefore, the primary productivity and species richness of vegetated diked marshes is typically lower than that in fully tidal salt marshes (Zedler et al. 1992). The loss of diked marsh would be compensated for by the overall increase in ecological functions and services associated with increased tidal salt marsh habitat and a decreased tidal prism in Elkhorn Slough. Therefore, conversion of diked salt/brackish marsh to intertidal salt marsh habitat is considered **less than significant**.

TABLE 7
WETLAND HABITAT IMPACTS AND RESTORATION ACREAGES—
FUTURE PHASES OF ELKHORN SLOUGH TIDAL MARSH RESTORATION PROJECT

Wetland Habitat Type	Impact Type	Impact Surface Area (acres)	Restored Habitat Surface Area (acres)	Net Gain/Loss Surface Area (+/- acres)
Intertidal salt marsh	Temporary	25.32	52.58	27.26
Diked salt/brackish marsh	Permanent (converted to intertidal salt marsh)	5.74	0.0	-5.74
Intertidal mudflat	Permanent (converted to intertidal salt marsh)	17.30	0.0	-17.30
Subtidal (slough channels)	Temporary	2.76	2.76	0
Subtidal (slough channels)	Permanent (converted to intertidal salt marsh)	4.10		-4.10
Willow thicket	Permanent (converted to intertidal salt marsh)	0.12	0.0	-0.12
Totals		**55.34**	**55.34**	**0.0**

d) **Native, Non-special-status Wildlife Species**

Phase 1

Potential Effects on Shorebirds(Less than Significant)

Mudflats in Elkhorn Slough are used by a wide variety of shorebirds, particularly during migration periods in the spring and fall, when there can be up to 20,000 individuals in the slough complex (Ramer et al. 1991). Western sandpipers (*Calidris mauri*) and least sandpipers (*Calidris minutilla*) are the most abundant shorebirds that use Elkhorn Slough (Harvey and Connors 2002). These and other shorebirds are observed using mudflats within the project site; the project site includes approximately 48.5 acres of mudflat that represents foraging habitat for shorebirds. During Phase 1 and future phases, mudflat habitat on the project site would be converted to intertidal salt marsh, thus resulting in a loss of foraging opportunity for shorebirds. Phase 1 would result in the conversion of 31.2 acres of mudflat, and 17.3 acres would be converted during future phases (Tables 6 and 7). Although mudflat habitat would be lost, the conversion would occur in phases, and the restored marsh areas would exhibit relatively low vegetation for approximately 1-3 years. Thus, conversion of mudflat to tidal marsh would occur gradually, allowing for shorebirds to distribute to other areas.

Within Elkhorn Slough, there are hundreds of acres of mudflat habitat available, due in part to the inundation of marsh habitats allowed by a higher tidal prism and reduction in sediment availability. Those habitats would remain available for shorebird foraging. Of the approximately 2,965 acres of tidal habitats within the system, more than 900 acres are mudflat or sparsely vegetated low marsh; most of these areas were former tidal marshes that have been converted to mudflats (Van Dyke and Wasson 2005). Thus, the loss of a small proportion (i.e., approximately 6%) of mudflat habitats in the system is not expected to affect the carrying capacity of shorebirds in the slough. Most importantly, the restoration would result in much higher productivity and quantity of marsh habitats than occur now, which would increase the export of organic matter to estuary mudflats beyond the project boundary. These marsh habitats would provide important resting areas for shorebirds during higher tides. The project would also likely result in water quality improvements outboard of the site, owing to a reduction in the tidal prism and therefore scour. Thus, the abundance of prey resources is expected to improve throughout the system, allowing for habitat quality, and subsequently the carrying capacity for shorebirds, to increase on existing and future mudflats in the Elkhorn Slough system. Therefore, the potential for loss of habitat to affect shorebirds is considered **less than significant** under CEQA; the project would be expected to result in improved habitat quality for shorebirds in the Elkhorn Slough system.

Potential Effects on Common Fish Species (Less than Significant)

Several "common" (i.e., non-special-status) fish species occur in various habitats in the project area. In subtidal and mudflat habitats, fish species such as surfperches (Family Embiotocidae), flatfishes (including California halibut [*Paralichthys californicus*]), bat rays (*Myliobatis californica*), clupeids (Family Clupeidae), and Pacific staghorn sculpin

(*Leptocottus armatus*) are likely to occur. Subtidal areas are also used by species such as plainfin midshipman (*Porichthys notatus*), leopard sharks (*Triakis semifasciata*), shovelnose guitarfish (*Rhinobatos productus*), and thornbacks (*Platyrhinodis triseriata*) (Yoklavich et al. 2002; Carlisle and Starr 2009). Pickleweed marsh habitats likely provide refuge and feeding habitat at high tides for species such as the threespine stickleback (*Gasterosteus aculeatus*), arrow goby (*Clevelandia ios*), juvenile starry flounder (*Platichthys stellatus*), longjaw mudsucker (*Atherinops affinis*), topsmelt (*Atherinops affinis*), and mullet (*Mugil cephalus*) (Woolfolk and Labadie 2012).

The project would result in a reduction in intertidal mudflat habitat of 31.2 acres during Phase 1 and 17.3 acres during future phases (Tables 6 and 7). The project would also result in a small loss of subtidal slough channels (3.4 acres between Phase 1 and future phases; Tables 6 and 7). The greater Elkhorn Slough area includes hundreds of acres of mudflats and intertidal sloughs, such that the loss of habitat would represent a small proportion of the available habitat. Also, habitat loss would occur in phases, with mudflats occurring in restored marsh areas for approximately 5 years after restoration, allowing a gradual shift in species distribution through the Elkhorn Slough system. Most importantly, the project would result in a large-scale restoration of tidal marsh habitat that is expected to be more robust than under current conditions, resulting in improved water quality and an increase in prey resources for fish species in the entire Elkhorn Slough system (including outside the project area). Thus, the restoration would offset or improve the overall habitat quality for fish in the system. Therefore, the loss of habitat for common fish species is considered **less than significant**; the project would be expected to result in improved conditions for fish in the Elkhorn Slough system.

Dewatering would occur during Phase 1 and potentially during future phases to facilitate restoration. Dewatering would occur at low tides when mudflats are exposed (and thus when no fish are present on mudflats or other dry areas) and when little water remains in tidal channels. Although some fish could be entrained during dewatering, few individuals would be expected to remain in the slough channels during low tide. The potential loss of a low number of individual fishes during dewatering represents a **less than significant impact** under CEQA because of the local and regional abundance of these species.

Lastly, leaks or spills of chemical contaminants or hazardous materials could be toxic to fish species or their prey. Impacts caused by leaks and spills would be avoided or minimized through implementation of BMPs incorporated into the project to protect wetland and aquatic habitats. Therefore, impacts on common fish assemblages are expected to be **less than significant** under CEQA.

Future Phases

Potential impacts on shorebirds and common fish species during future phases are addressed above, under Phase 1.

Potential Effects on Nesting Bird Species/Heron and Egret Rookery (Less than Significant)

A grove of eucalyptus and Monterey pine on the south side of the Seal Bend Restoration Area supports a rookery of great blue herons, great egrets, and double-crested cormorants. Although outside the project site, rookeries can be sensitive to human disturbance, particularly if new activities (i.e., during future phases) result in noise or other disturbances exceeding existing conditions during the breeding season. Disturbance to a rookery could cause adults to abandon their nests, resulting in the loss of eggs or chicks, or possibly mortality of eggs or chicks through predation. Disturbance can also cause eggs or chicks to be exposed if adults are temporarily flushed from their nests. Because there is an active dairy in the area, nesting birds at the colony are already subject to a baseline of human disturbance in the vicinity of the colony, the existing baseline (i.e., with normal dairy operations occurring) would be used to assess potential disturbance impacts to the colony (and to establish suitable disturbance-free buffers, if necessary). Although these species are not considered special-status species and are regionally common, the loss of a rookery, or even the partial loss of reproductive output at a rookery, would be considered potentially significant under CEQA. Implementation of **Mitigation Measures BIO-2a (Seasonal Avoidance)**, **BIO-2b (Pre-Construction Surveys)**, and **BIO-2c (Buffer Zones)** would reduce potential impacts to less than significant levels.

e) **Conflicts Pertaining to Local Policies or Ordinances**

Because the project site is located on State property, the project would have **no impact** with respect to conflicts with local policies or ordinances.

f) **Habitat Conservation Plans**

There are two Marine Protected Areas (MPA) in Elkhorn Slough. The first MPA is the Elkhorn Slough State Marine Conservation Area. This area includes the waters below mean high water (MHW) within Elkhorn Slough east of the Highway 1 Bridge and west of longitude 121° 46.40' W.

Title 14. Section 632 (a) (1) (C) State Marine Conservation Areas: In a state marine conservation area, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for commercial or recreational purposes, or a combination of commercial and recreational purposes except as specified in subsection 632(b), areas and special regulations for use. The department may issue scientific collecting permits pursuant to Section 650. The commission may authorize research, education, and recreational activities, and certain commercial and recreational harvest of marine resources, provided that these uses do not compromise protection of the species of interest, natural community, habitat, or geological features.

Title 14. Section 632 (b) (71) Elkhorn Slough State Marine Conservation Area:

(B) Take of all living marine resources is prohibited except:

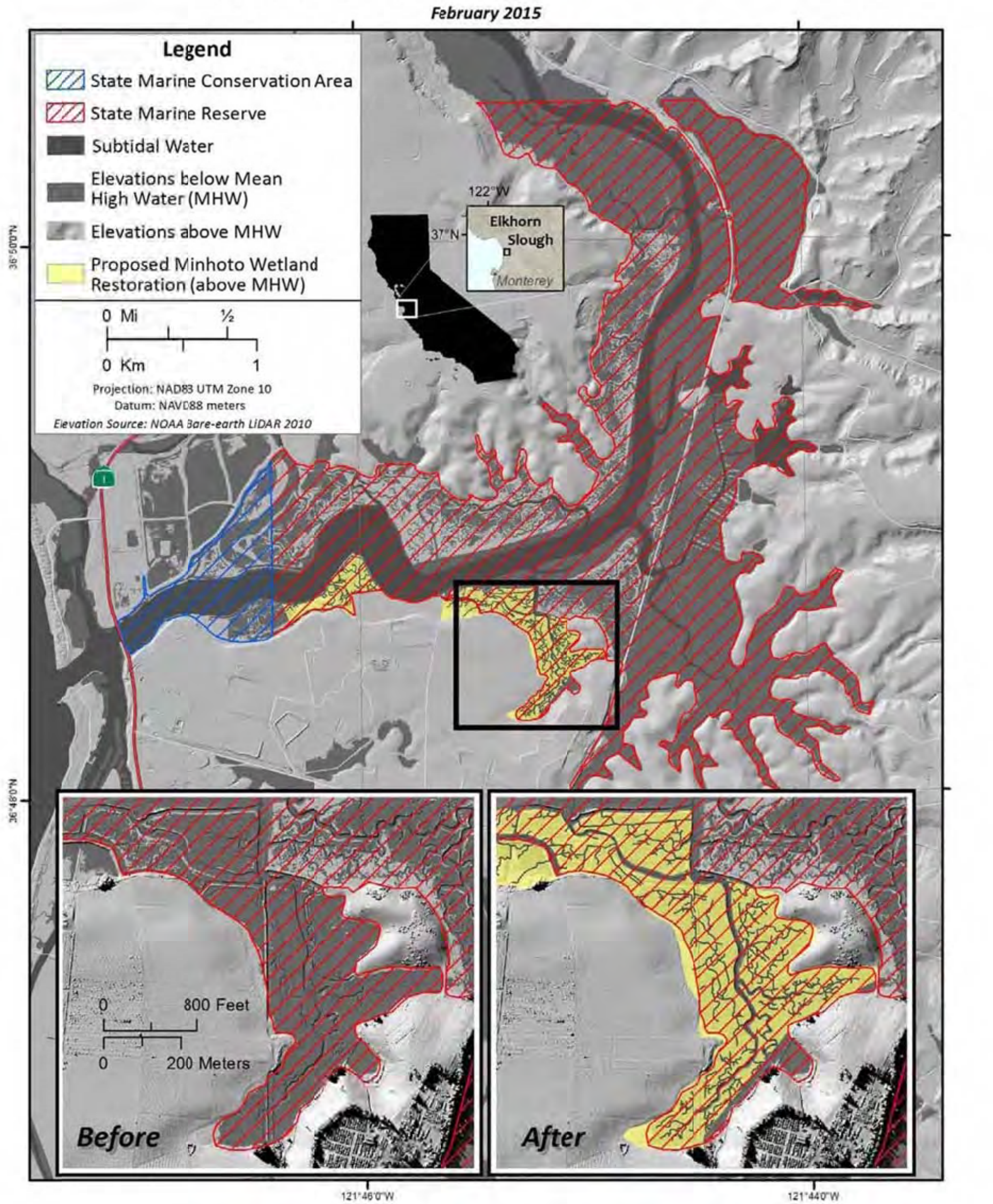
> 1. Only the following species may be taken recreationally: finfish by hook-and-line only and clams. Clams may only be taken on the north shore of the slough in the area adjacent to the Moss Landing State Wildlife Area [subsection 550(a)].

The second MPA is the Elkhorn Slough State Marine Reserve. This area includes the waters below MHW within Elkhorn Slough lying east of longitude 121° 46.40' W and south of latitude 36° 50.50' N. Most of the proposed project is currently within the Elkhorn Slough State Marine Reserve (Figure 8). The State Marine Reserve (SMR) designation generally prohibits damage or take of all marine resources (living, geologic, or cultural) including recreational and commercial take but does allow for restoration as provided for in Title 14 Section 632:

> Title 14. Section 632 (a) (1) (A) State Marine Reserves: In a state marine reserve, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource, except under a scientific collecting permit issued by the department pursuant to Section 650 or specific authorization from the commission for research, restoration, or monitoring purposes.
>
> Title 14. Section 632 (b) (70) (B) Take of all living marine resources is prohibited.

Consistent with Title 14 Section 632 the proposed project will restore and enhance tidal wetland, and subtidal channels within the SMR. Any take will be authorized and monitored through coordination with CDFW Marine Region.

Since tidal marsh restoration within the project area will occur through sediment addition it will raise the level of the ground to above MHW for all areas except the subtidal channels. The sediment addition will increase the elevation inside approximately 4.2 percent of the Elkhorn Slough SMR to above MHW. The area increased in elevation will be between the subtidal channels and will not change the boundary of the SMR and will increase the water quality within the subtidal channels. Due to the nature of the project (restoration of rare estuarine habitat) and the stochastic nature of the SMR boundary (MHW) the proposed project activities are not inconsistent with the provisions of the MLPA or Marine Managed Areas Improvement Act (MMAIA) of 2008 under Section 36700 to 36900 and Title 14 Section 632. For the reasons set forth above, the project would have a **less-than-significant** effect with respect to conflict with the provisions of an approved state habitat conservation plan.



Source: Elkhorn Slough National Estuarine Research Reserve, 2015

Figure 8
Marine Protected Areas in Elkhorn Slough

Cumulative Impacts on Biological Resources

The restoration of 147 acres of tidal salt marsh, salt marsh–upland ecotone habitat, and native grasslands would result in a net benefit to the Elkhorn Slough system. These restoration actions would create highly productive tidal marshes that export organic matter to tidal sloughs, channels, and mudflats, thereby increasing habitat quality of estuarine habitats and water quality throughout the entire Elkhorn Slough system. The benefits of the tidal marsh restoration on the project extend to other marshes in the Elkhorn Slough system, because a reduction in tidal prism (through raising of the marsh plain) would reduce erosion and allow for better marsh stability and resiliency to sea level rise. Further, many migratory species use Elkhorn Slough; restoration is thus expected to result in a vigorous tidal estuary that would benefit species that occur elsewhere on the California coast and in the Pacific Flyway. Most of the other foreseeable projects in the central coast of California that would affect tidal marsh habitat are tidal restoration projects, such as the South Bay Salt Pond Restoration project and the Suisun Marsh Restoration Project. These projects are expected to result in the restoration of thousands of acres of much higher-quality habitat than currently occurs, and thus would benefit many of the species that occur in Elkhorn Slough as well (**less than significant**).

Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
5. CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

a) CEQA Guidelines Section 15064.5 requires the lead agency to consider the effects of a project on historical resources. A historical resource is defined as any building, structure, site, or object listed in or determined to be eligible for listing in the California Register of Historical Resources (California Register), or determined by a lead agency to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California. The following discussion focuses on architectural and structural resources. Archaeological resources, including archaeological resources that are potentially historical resources according to Section 15064.5, are addressed in response to checklist question 5(b), below.

Setting

ESA staff conducted a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University on February 12, 2013 (File No. 12-0838). The purpose of the records search was to: (1) determine whether known cultural resources have previously been recorded in a ½-mile radius of the project area; (2) assess the likelihood for unrecorded cultural resources to be present based on historical references and the distribution of nearby resources; and (3) develop a context for the identification and preliminary evaluation of cultural resources. The review included the project area and a ½-mile radius. Previous surveys, studies, and site records were accessed. Records were also reviewed in the Historic Property Data File for Monterey County that contains information on sites of recognized historical significance, including those evaluated for listing in the National Register of Historic Places (National Register), the California Register, the California Inventory of Historical Resources, California Historical Landmarks, and California Points of Historical Interest.

No previously-recorded architectural resources, including any listed on federal, State, or local registers, have been identified within a ½-mile radius of the Phase 1 and future phases project areas. Historically, extensive tidal marsh occurred on the shores of Elkhorn Slough. Levees and berms were constructed at various times after 1872 in order to convert the tidal marshes into areas more suitable for agricultural use, economic production, and later, waterfowl hunting. By the 1930s and 1940s much of the salt marsh on the southern and eastern shores had been diked and drained. Decades later, these dikes began to fail, reintroducing tidal waters to the reclaimed lands. The structures are in varying states of preservation. Varying in length and width, these earthen-constructions are the primary cause of the tidal marsh loss that has occurred over the past 150 years. The series of structures in the Phase 1 and future phases project areas was given the temporary designation TWP-01 (Koenig, 2013 and 2014). TWP-01 includes only levees within the Phase 1 and future phases project areas; other levees in Elkhorn Slough have not been recorded as part of this project and have not been evaluated on a district-wide level for cultural significance.

Based on the California Register criteria, TWP-01 does not appear to be individually eligible for listing as a historical resource. The levees are associated with the control and management of Elkhorn Slough, its surrounding landscape, and natural resources. Constructed and maintained by the Empire Gun Club and early 20th century farmers, the structures altered water levels to provide more arable land and create ponds with accessible hunting opportunities. While these activities are representative of management practices that began in the early 20th century, the levees do not maintain physical integrity of design, materials, and workmanship, and do not represent a historic event (Criterion 1). TWP-01 also does not appear to be associated with the specific lives of persons significant in our past (Criterion 2). The levees do not embody distinctive characteristics of a type, period, or method of construction (Criterion 3); their design is of simple earthen construction, and they do not reflect architectural or distinguishing qualities that would make them eligible for Criterion 3. Nor are they likely to yield information important in history (Criterion 4).

Based on the above considerations and their lack of integrity due to past breaching events, it is recommended that TWP-01 is not eligible for listing in the California Register.

Phase 1

TWP-01 is not considered a historical resource for the purposes of CEQA and no further consideration of this resource is necessary. As no historical resources are in the Phase 1 project area, no mitigation is required and the project would have **no impact** on a historical resource.

Future Phases

As with the Phase 1 project, there are no historical resources are in the future phases of the project and no mitigation is required and the project would have **no impact** on a historical resource.

b) A significant impact would occur if the project could cause a substantial adverse change to an archaeological resource, defined as a historical resource in Section 15064.5 and as a unique archaeological resource in Section 21083.2, through physical demolition, destruction, relocation, or alteration of the resource.

Setting

The project area is within the traditional territory of the Ohlone people (Levy, 1978: 485–495). Collectively referred to by ethnographers as Costanoan, the Ohlone were distinct sociopolitical groups that spoke at least eight different languages of the same Penutian language group. The Ohlone occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. The primary sociopolitical unit was the tribelet, or village community, which was overseen by one or more chiefs. The project area is in the greater *Mutsun*-speaking tribal area, centered on the Pajaro River and the village of *Kalenta-ruk* (Milliken, 1995). After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement. Today, the Ohlone still have a strong presence in the Monterey Bay Area, and are highly interested in their historic and prehistoric past.

Phase 1

Results from the records search indicate that one archaeological resources study is on file at the NWIC within the records search radius for the Phase 1 project (Doane and Breschini, 2005). One archaeological site was identified during the investigation. Site CA-MNT-2432 was recorded as a prehistoric site covering a large area (16,000 square meters). During the 2005 recording, an exposed cut bank in a previously graded area was viewed that indicated site depth was approximately 1 meter below ground surface.

ESA archaeologists surveyed the Phase 1 project area, including the stockpile area and proposed area of excavation, on February 22, 2013 and September 18, 2014. The vicinity of CA-MNT-2432 was traversed on foot in very narrow (less than 5 meter wide) transects. Transects were widened to approximately 10-15 meters wide in the remaining project areas. Ground surface visibility throughout the survey area ranged from 10 to 90 percent, with animal burrows, agricultural furrows, and cuts providing adequate visibility to characterize the local soil and assess the presence of cultural materials. Dense vegetation necessitated occasional scraping of the ground surface every 5-10 meters to obtain a clear view of the underlying soils.

Surveyors identified CA-MNT-2432 at its previously recorded location. The site is located on an elevated knoll. Shell fragments were identified in a broader area; these may have washed downslope and been re-deposited.

Based on the California Register criteria for evaluation, CA-MNT-2432 appears to be eligible under Criterion 4 for its ability to likely yield information important in prehistory. The actual physical material of the site may answer important research themes and questions about human use and occupation along Elkhorn Slough. While a portion of the site has been severely impacted in the recent past by construction and general use of the area, other sections of the site, especially near the intersection of the north/south and east/west access roads, appear to remain intact and possess a considerable depth of stratigraphic layers (up to 1 meter deep) and site materials. This inland area site along undoubtedly one of the most important watercourses in the Monterey Bay area is likely to contain an assemblage of characteristics that possess a "configuration of artifacts, soil strata, structural remains, or other natural or cultural features" that may contribute data to the overall body of archaeological information that exists for this region (NPS, 1990:21). The site may also provide information regarding cultural chronology, trade and exchange, social complexity, settlement systems, subsistence patterns, as well as answer questions regarding faunal (animal) bone and plant remains.

CA-MNT-2432 also may be eligible under Criterion 1 for its association with events that have made a significant contribution to the broad patterns of prehistory. The site may represent an area of traditional use and occupation for the aboriginal inhabitants of the Elkhorn Slough area. Defined as a Traditional Cultural Property (TCP) in the federal nomenclature, a TCP is generally significant because of its association with the "cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King, 1998). According to National Register Bulletin 38 there are two integrity issues that should be considered in determining the eligibility of a TCP: (1) integrity of relationship and (2) integrity of condition. Assessing integrity of relationship includes developing "some understanding about how the group that holds the beliefs or carries out the practices is likely to view the property" (Parker and King, 1998). Places of importance to Native Americans can also be considered historical resources as "areas or places" determined to be significant in the "social" and "cultural annals of California" (CEQA Section 15064.5[a][3]).

Based on the above considerations, CA-MNT-2432 is eligible for listing in the California Register. CA-MNT-2432 is therefore considered a historical resource for the purposes of CEQA.

Richard Stradford, Archaeologist at the U.S. Army Corps of Engineers (USACE), reviewed the project impacts for Section 106 of the National Historic Preservation Act (Stradford, 2013). As noted by the USACE, the project design shows the access road traversing the extreme edge of the site boundaries of CA-MNT-2432. No grading or road improvements are proposed to accommodate the truck traffic to the Phase 1 restoration areas. The Phase 1 restoration areas would not be modified to receive sediment, and the area is expected to have similar surface conditions following removal of the sediment. The USACE therefore proposed a finding of No Adverse Affect to Historic Properties, with adoption of the following conditions to be reviewed by the State Historic Preservation Officer and interested Native Americans and tribes [36 CFR 800.5(b)]:

1) Project personnel working onsite would attend a mandatory pre-Project training led by a Secretary of the Interior-qualified archaeologist. The training would outline the general archaeological sensitivity of the area and the procedures to follow in the event an archaeological resource is unearthed or discoveries of human remains.

2) If any road improvements are needed at a later date, a lead archaeologist would monitor that work and assess the condition of any materials. The State site record would be updated with the resulting information.

3) Following completion of the temporary sediment stockpiling [Phase 1 restoration], the archaeologist would inspect site CA-MNT-2432 and the general vicinity to ensure that no Project-related site disturbance occurred during implementation. The State record would be updated [Stratford, 2013].

Impacts to CA-MNT-2432 would be a significant impact. However with incorporation of the USACE standards as **Mitigation Measure CUL-1**, impacts would be reduced to a less-than-significant level by ensuring that CA-MNT-2432 is avoided during project implementation and that the site is assessed following the Phase 1 restoration activities.

For the remaining locations in the Phase 1 project area, there is no indication of any additional known archaeological resources. On October 14, 2014 Albion Environmental, Inc. completed an Extended Phase I (Subsurface) Survey of the stockpile area to determine if intact subsurface cultural deposits are present requiring further evaluation and mitigation. The investigation included archaeologist excavating five mechanical trenches to observe the subsurface soil stratigraphy and determine a presence or absence of cultural materials. No archaeological resources were identified during the investigation (Farquhar, 2014).

Despite the negative subsurface survey results, the possibility of uncovering previously unknown archaeological resources cannot be entirely discounted. Impacts to previously undiscovered archaeological resources could be potentially significant. However with implementation of **Mitigation Measure CUL-2**, impacts would be reduced to a **less-than-significant** level by ensuring that work halt in the vicinity of the find and that the resource is assessed and appropriately treated.

Future Phases

Results from the records search indicate that one archaeological resource is within the records search radius for the future phases of the project. CA-MNT-232 (originally designated Hill #6 in 1929) is in a eucalyptus grove formerly occupied by the Vierra family. The site was re-identified in 1950 as a dark brown shell midden with four chert scrapers, one hammerstone, and one chopper noted during the survey.

ESA archaeologists surveyed the future phases project area on September 19, 2014. The vicinity nearest to CA-MNT-232 was traversed on foot in very narrow (less than 5 meter wide) transects. Transects were widened to approximately 10–15 meters wide in the remaining project areas. Ground surface visibility throughout the survey area ranged from 10 to 90 percent, with animal burrows, agricultural furrows, and cuts providing adequate visibility to characterize the local soil and assess the presence of cultural materials. Dense vegetation necessitated occasional scraping of the ground surface every 5–10 meters to obtain a clear view of the underlying soils.

CA-MNT-232 is not within the future phases project area or access routes. As no impacts to this resource are expected, no mitigation is required regarding this resource.

As with the Phase 1 project, for the remaining locations in the future phases project area, there is no indication of any additional known archaeological resources. However the possibility of uncovering previously unknown archaeological resources cannot be entirely discounted. Impacts to previously undiscovered archaeological resources could be potentially significant. However with implementation of **Mitigation Measure CUL-2**, impacts would be reduced to a **less-than-significant** level by ensuring that work halt in the vicinity of the find and that the resource is assessed and appropriately treated.

Mitigation Measure CUL-1 applies only to the Phase 1 project area.

Mitigation Measure CUL-1: U.S. Army Corps of Engineers Standards

The lead agency shall require the following standards during implementation of the Phase 1 restoration project:

1) Project personnel working onsite shall attend a mandatory pre-Project training led by a Secretary of the Interior-qualified archaeologist. The training would outline the general archaeological sensitivity of the area and the procedures to follow in the event an archaeological resource is unearthed or discoveries of human remains.

2) If any road improvements are needed at a later date, a lead archaeologist shall monitor that work and assess the condition of any materials. The State site record shall be updated with the resulting information.

3) Following completion of the Phase 1 restoration, the archaeologist shall inspect site CA-MNT-2432 and the general vicinity to ensure that no Project-related site disturbance occurred during implementation. The State record shall be updated.

Mitigation Measure CUL-2 applies to the Phase 1 and future phases project areas.

Mitigation Measure CUL-2: Inadvertent Discovery of Prehistoric Resources

If prehistoric or historic-period archaeological resources are encountered, all construction activities within 100 feet shall halt and the USACE shall be notified. A Secretary of the Interior-qualified archaeologist shall inspect the findings within 24 hours of discovery. If it is determined that the project could damage a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines), mitigation shall be implemented in accordance with Public Resources Code (PRC) Section 21083.2 and Section 15126.4 of the CEQA Guidelines, with a preference for preservation in place. Consistent with Section 15126.4(b)(3), preservation in place may be accomplished through planning construction to avoid the resource; incorporating the resource within open space; capping and covering the resource; or deeding the site into a permanent conservation easement. If avoidance is not feasible, a qualified archaeologist shall prepare and implement a detailed treatment plan in consultation with the USACE and the affiliated Native American tribe(s), if applicable. Treatment of unique archaeological resources shall follow the applicable requirements of PRC Section 21083.2. Treatment for most resources would consist of (but would not be not limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be impacted by the project. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and state repositories, libraries, and interested professionals.

c) A significant impact would occur if the project would destroy a unique paleontological resource or site, or a unique geologic feature. Paleontological resources are the fossilized evidence of past life found in the geologic record. Despite the tremendous volume of sedimentary rock deposits preserved worldwide, and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils—particularly vertebrate fossils—are considered to be nonrenewable resources. Because of their rarity, and the scientific information they can provide, fossils are highly significant records of ancient life.

Setting

Rock formations that are considered of paleontological sensitivity are those rock units that have yielded significant vertebrate or invertebrate fossil remains. This includes, but is not limited to, sedimentary rock units that contain significant paleontological resources anywhere within its geographic extent. The distribution and characteristics of soils within Elkhorn Slough are driven by the history of local parent material, transport of littoral sediment from the Pacific coast into Elkhorn Slough, transport of fluvial sediments into the Slough from the Pajaro and Salinas rivers, sedimentation from the Slough's local watershed, and the development of tidal marsh within the Slough. Local soils are primarily derived from heterogeneous sands of the Aromas Formation, which are composed of interbedded aeolian (wind-driven) sands, stream deposits (from the Pajaro and Salinas rivers as well as other tributaries), lake deposits, and nearshore marine sands (from littoral drift along the Pacific coast) (Caffrey et al., 2002b). These materials were deposited during the Pleistocene.

Pleistocene Alluvium has a high paleontological potential because vertebrate fossils have been recovered from them in the past. A search of the paleontological locality database of the University of California, Museum of Paleontology was conducted to identify vertebrate fossil localities within Monterey County (UCMP, 2014). The records search did not identify existing fossil localities that directly intersect the project. However, the records search revealed several fossil localities in the broader region that were discovered within the same geologic unit, including one discovery nearby at Moss Landing.

Phase 1

Ground disturbance associated with the Phase 1 project would include primarily the deposition of fill materials and, therefore, would not affect depths at which paleontological resources could likely be encountered. While damage or destruction of unique paleontological resources for the project is unlikely, the possibility cannot be entirely dismissed. Thus, the potential impact to paleontological resources is considered potentially significant. Implementation of the following mitigation measure would reduce this potential impact by ensuring that if fossils are encountered, their significance is assessed by a qualified paleontologist, recorded, and salvaged if appropriate. With **Mitigation Measure CUL-3,** the impact would be reduced to a **less-than-significant** level.

Future Phases

As with the Phase 1 project, ground disturbance associated with the future phases of the project would include primarily the deposition of fill materials and, therefore, would not affect depths at which paleontological resources could likely be encountered. While damage or destruction of unique paleontological resources for the project is unlikely, the possibility cannot be entirely dismissed. Thus, the potential impact to paleontological resources is considered potentially significant. Implementation of the following mitigation measure would reduce this potential impact by ensuring that if fossils are encountered, their significance is assessed by a qualified paleontologist, recorded, and salvaged if appropriate. With **Mitigation Measure CUL-3,** the impact would be reduced to a **less-than-significant** level.

Mitigation Measure CUL-3 applies to the Phase 1 and future phases project areas.

Mitigation Measure CUL-3: Inadvertent Discovery of Paleontological Resources

If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, all ground disturbing activities within 100 feet of the find shall be halted until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate salvage measures in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996).

d) A significant impact would occur if the project would disturb any human remains, including those interred outside of formal cemeteries.

Setting

No human remains have been identified in association with CA-MNT-2432 or CA-MNT-232. While unlikely, the possibility exists that human remains could be buried within site boundaries or elsewhere in the project area.

Phase 1

While ground disturbance associated with the Phase 1 project would include primarily the deposition of fill materials, the inadvertent discovery of human remains during project implementation cannot be entirely discounted. Damage to human remains would be a potentially significant impact. Implementation of the following mitigation measure would reduce this potential impact by ensuring that if human remains are encountered and they are determined to be Native American in origin, the Native American Heritage Commission would be contacted and the remains would be treated appropriately. With **Mitigation Measure CUL-4,** the potential impact would be reduced to a **less-than-significant** level.

Future Phases

As with Phase 1, while ground disturbance associated with the future phases of the project would include primarily the deposition of fill materials, the inadvertent discovery of human remains during project implementation cannot be entirely discounted. Damage to human remains would be a potentially significant impact. Implementation of the following mitigation measure would reduce this potential impact by ensuring that if human remains are encountered and they are determined to be Native American in origin, the Native American Heritage Commission would be contacted and the remains would be treated appropriately. With **Mitigation Measure CUL-4,** the potential impact would be reduced to a **less-than-significant** level.

Mitigation Measure CUL-4 applies to the Phase 1 and future phases project areas.

Mitigation Measure CUL-4: Inadvertent Discovery of Human Remains

If human remains are encountered during ground disturbing activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission. The Native American Heritage Commission would then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who shall make recommendations for the treatment of any human remains.

Cumulative Cultural Resources Impacts

The geographic scope of potential cumulative impacts on historical resources, archaeological resources, paleontological resources, and human remains encompasses the project site and nearby vicinities. Cumulative projects identified in the vicinity that are assumed to cause some degree of disturbance during construction and thus contribute to a potential cumulative impact on cultural resources, include the Western Precooling Systems, the Sunset Farms, Inc., the Whistlestop Lagoon, the Deep Water Desal LLC, the Moss Landing Area Development Projects, the Triple M Ranch Wetland Restoration Project, the Moss Landing Sanctuary Scenic Trail, the Monterey Peninsula Water Supply Project, the Moss Landing - Crazy Horse Power Line Reconductoring Project, the Atkinson Lane Specific Plan, and the Manabe-Ow Specific Plan.

Background research suggests that there are no historical resources, archaeological resources, paleontological resources, or human remains in the direct project area. Mitigation Measure CUL-1 would ensure that one archaeological site in the vicinity of the project (CA-MNT-2432) is avoided during project implementation and that the archaeological site is assessed following Phase 1 restoration activities. The proposed project could have the potential to affect unknown archaeological resources, paleontological resources, or human remains should they be uncovered during ground disturbing activities. In combination with the other identified cumulative projects, the potential for a cumulative impact would be significant without mitigation. With implementation of protective measure **Mitigation Measure CUL-1**, as well as **Mitigation Measure CUL-2**, Inadvertent Discovery of Archaeological Resources, **Mitigation Measure CUL-3,** Inadvertent Discovery of Paleontological Resources, and **Mitigation Measure CUL-4**, Inadvertent Discovery of Human Remains, the proposed project's contribution to the potential cumulative impact would be **less than significant with mitigation**.

Geology, Soils, and Seismicity

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
6. GEOLOGY, SOILS, AND SEISMICITY — Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Discussion

a.i - iii) The Monterey Bay region is a geologically complex portion of the Coast Ranges geomorphic province in central coastal California, at the western edge of the North American Plate. Much of the Coast Ranges province is composed of marine sedimentary deposits, metamorphic rocks, and volcanic rocks.

The tectonics of this plate boundary region in the western part of California have played a major role in the geologic history of the area. Seismic activity in the region is dominated by the San Andreas Fault system, which includes the San Andreas Fault, as well as the Calaveras Fault and other, older (15,000 – 1.6 million years old) faults in the wider area of northern Monterey, southern Santa Cruz, southern Santa Clara, and western San Benito counties.

Phase 1 and Future Phases

Surface rupture occurs when movement along a fault breaks through the ground surface, and generally occurs along preexisting faults with relatively recent activity (i.e., within the last 11,000 years). The nearest active fault[1] to the project area is the San Andreas Fault, located approximately 10 miles northeast of the project area. No active faults are known to traverse the project area.

The California Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) prohibits the development of structures for human occupancy[2] across active fault traces[3]. Under the Alquist-Priolo Act, the California Geological Survey (CGS, formerly the California Division of Mines and Geology) must establish zones on either side of the active fault that delimit areas susceptible to surface fault rupture. These zones are referred to as fault rupture hazard zones and are shown on official maps published by the CGS. These zones vary in width, but average about one-quarter mile wide.

While it is possible that surface rupture could occur outside of these zones, the risk of occurrence is not substantial. The project site is not within or immediately adjacent to a mapped Alquist-Priolo Earthquake Fault Zone, and the project does not propose to build structures. Injury to workers from surface rupture is also highly unlikely due to the relatively short time of construction; therefore, the extent to which the project would expose people or structures to impacts involving rupture of a known earthquake fault is less than significant.

Seismic shaking can also trigger secondary ground-failures caused by liquefaction. Liquefaction is a phenomenon where saturated subsurface soils lose strength because of increased pore pressure and exhibit properties of a liquid rather than those of a solid. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, and fine-grained and occur close to the ground surface, usually at depths of less than 50 feet. Settlement can occur as a result of seismic ground shaking due to liquefaction of the subsurface soils.

In 1990 the California State Legislature passed the Seismic Hazards Mapping Act, requiring the State Geologist to delineate seismic hazard zones within which additional geologic and soil investigations are required prior to site development. The site

1 A fault is considered active if it has been evidenced to show displacement within the Holocene time period (the last 11,000 years).

2 A structure for human occupancy is one that is intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person hours per year (Hart, 1997).

3 The Alquist-Priolo Act designates zones that are most likely to experience fault rupture, although surface fault rupture is not necessarily restricted to those specifically zoned areas. The zones are defined by the California Geological Survey (CGS). For the purpose of delineating fault rupture zones, the CGS historically sought to also zone faults defined as potentially active, which are faults that have shown evidence of surface displacement during the Quaternary period (the last 1.6 million years). In late 1975, the State geologist made a policy decision to zone only those faults that had a relatively high potential for ground rupture, determining that a fault should be considered for zoning as active only if it was sufficiently active and "well defined." Sufficiently active is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches. Faults that are confined to pre-Quaternary rocks (more than 1.6 million years old) are considered inactive and incapable of generating an earthquake.

investigations evaluate the potential for liquefaction and landslides resulting from seismic shaking and identify mitigation to reduce the risk of these seismic hazards. The U.S. Geological Survey (USGS), the CGS, and the Southern California Earthquake Center formed the 2007 Working Group on California Earthquake Probabilities (WGCEP), which developed a model to forecast the probability of earthquake occurrence in California. Data from this work was used to create a probabilistic seismic hazard map of California, which maps the intensity of earthquake hazard throughout California. The intensity of an earthquake depends on the causative fault and the distance to the epicenter, the depth of the rupture below ground surface, the composition of underlying soils, and the duration of shaking. The project area is not within a seismic hazard zone, as mapped by the CGS, which indicates that the seismic hazard risk at the site is considered low by the CGS.

Neither Phase 1 nor future phases of the project would be susceptible to substantial adverse effects due to seismic groundshaking or liquefaction because no new structures are proposed as part of the project. The site is not expected to otherwise concentrate people in the project area once construction is complete. Workers at the site could be exposed to hazards associated with groundshaking; however, the risk of injury or death as a result of groundshaking or liquefaction at the project site would be highly unlikely due to the relatively short time of construction and therefore is considered to be less than significant.

a.iv) Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, triggered either by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience soil slumps, rapid debris flows, and deep-seated rotational slides. Slope stability can depend on many complex variables, including the geology, structure, and amount of groundwater, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Landslides can occur on slopes of 15 percent or less, but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges.

Without additional human disturbance, the risk of substantially adverse effects due to slope failure at the project site is low. The project site is relatively flat with gentle slopes and is not mapped by the CGS as being within a seismic hazard zone for earthquake-induced landslides. The County of Monterey has mapped the area as having low susceptibility to earthquake-induced landslides (Monterey County, 2007).

Phase 1

While the probability of slope failure is low at the site based on current conditions, initiation of Phase 1 of the project could result in conditions conducive to slope failure. Excavation in the upland area onsite, may destabilize adjacent areas and increase the risk of mass movement. Cuts into hillsides could remove material that is needed to support the upland materials, and staging area fills could slough, slump, or ravel if they result in over-steepened slopes. The buildings nearest to Phase 1 activities are located west of the northern portion of the buffer area. If excavation is not properly controlled, mass movement could affect these structures by reducing the ability of earth materials from supporting the structures. Sediment stockpiles could also slump if piled too steeply. The conditions for potential slope failure would only exist during Phase 1 construction, because after stockpiled material is transported onto the marsh, the upland area would be graded to a gentle slope that is unlikely to fail.

Adherence with sound grading practices (e.g., bracing or underpinning of excavated faces) in accordance with California Occupational Safety and Health Administration (OSHA) regulations, as required for all California construction projects, would generally ensure that construction activities would not create new areas of instability during excavation. This would adequately protect workers, construction equipment, and nearby buildings from effects of Phase 1 excavation.

The horticultural suitability rules for sediment to be stockpiled require that the sediments contain clay and silt. While Cal OSHA regulations do not contain rules defining the angles at which stockpiled material must be sloped in order to ensure worker safety, the regulations do contain required excavation slope angles determined by the soil type of material in the slope. To adequately protect workers and construction equipment from unexpected slope failure of the sediment stockpiles, inclusion of **Mitigation Measure GEO-1** is recommended. With the inclusion of Mitigation Measure GEO-1, the risk of loss, injury, or death resulting from mass movement associated with the project would be less than significant.

Future Phases

Future phases of the project would require the use of excavated soil from onsite or offsite locations, similar to Phase 1. However, sediment stockpiling would be avoided if feasible. For this analysis it is conservatively assumed that sediment stockpiling would be necessary for future Phases. Under this assumed scenario the potential impacts of future phases would be similar to those described above for Phase 1. Thus, with implementation of Mitigation Measure GEO-1, future phases of the restoration project would have a **less than significant impact** with respect to landslide risks.

Mitigation Measure GEO-1: Maximum Slope Angle of Stockpiled Sediment

Unless otherwise determined for the project by a geotechnical engineer, all sediment or soils stockpiled onsite shall be sloped at an angle not steeper than one and one half horizontal to one vertical.

b) Erosion is a natural process whereby soil and highly weathered rock materials are worn away and transported, most commonly by wind or water. Soil erosion can become problematic when human intervention causes rapid soil loss and the development of erosional features (such as incised channels, rills, and gullies) that undermine roads, buildings, or utilities. Vegetation clearing and earth moving reduces soil structure and cohesion, resulting in abnormally high rates of erosion, referred to as accelerated erosion. This typically occurs during construction activity involving grading and soil moving activities (i.e., presence of soil stockpiles, earthen berms, etc.) that loosen soils and make them more susceptible to wind and water erosion. Further, the operation of associated heavy machinery and vehicles over access roads, staging areas, and work areas can compact soils and decrease their capacity to absorb runoff, resulting in rills, gullies, and excessive sediment transport.

Phase 1

The project would expose soil to erosive forces during construction by stockpiling sediments, spreading earth materials on the surface of the marsh, and potentially excavating upland sediments onsite. Once the project is complete the upland area would be vegetated, stabilizing the upland portion of the project site. In addition, the project is designed to protect the marsh area from future erosion by raising marsh elevation to limit tidal scour and to encourage regrowth of native marsh vegetation. Thus the following discussion is only relevant to the period of construction of the project.

The project would stockpile sediment in approximately 10,000 square foot areas in two potential locations, shown on Figure 3. While sediments in this stockpile would be relatively exposed to erosive forces, sediment entrained by water traveling over the stockpiles would run to the marsh and, with the marsh sediment control measures in place (isolation of marsh areas from the tides; installation of hay fences, silt fences, straw wattles; placement of mats over marsh prior to traverse of the marsh areas by equipment), sediment would be deposited, which is the purpose of the project. Thus soil loss from the stockpiles is not considered an impact in this analysis.

Excavation and grading activities planned for the upland and buffer areas during construction would also increase exposure of soil or sediment to erosive forces. If erosion from these areas is not adequately controlled and gullies form, the gullies could propagate upslope and cut into the agricultural land to the west of the buffer area.

Any excavation that disturbs more than one acre would be subject to a National Pollutant Discharge Elimination System (NPDES) General Construction Permit and the required Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would contain soil stabilization and sediment control BMPs to limit the amount of sediment entrained in runoff from the excavation and stockpile areas, as described in more detail in Section E.8 *Hydrology and Water Quality*. Mitigation Measure AIR-1, described in Section E.3, *Air Quality*, includes provisions that would also minimize exposure of construction areas to wind erosion, such as covering inactive storage piles and prohibiting grading during periods of winds over 15 mph. Implementation of Mitigation Measures AIR-1 and GEO-1, above, in addition to the erosion control BMPs included in the SWPPP would limit erosion and loss of topsoil to **less than significant** levels.

Future Phases

Similar to Phase 1 of the project, construction activities would be conducted in accordance with the NPDES General Construction Permit and the erosion control BMPs contained within the SWPPP. Once future phases of the project are complete, the amount of sediment eroded from the marsh and from buffer areas around the marsh would be minimized by reducing tidal scour and establishing a permanent vegetated buffer around the marsh areas. The long-term result of future phases would thus reduce exposure of earth materials to erosion. Construction activities would also likely be similar to those evaluated in the Phase 1 discussion, above, although future phases of the project would avoid stockpiling sediment when feasible. Future phases of the project would be subject to the same sediment control requirements for the SWPPP and the fugitive dust control measures described in Mitigation Measure AIR-1, described above; impacts of future phases to soil and topsoil would thus be the same as those discussed above for Phase 1 of the project.

c) **Phase 1**

Phase 1 of the proposed project would include the placement of approximately 140,000 cubic yards of sediment over 47 acres of the project site. New loads, either from temporary stockpiling or final placement, would be placed on existing soils that could be unstable. The potential for seismic-related ground failure, including liquefaction, is discussed in response to checklist questions 6(a.i) through 6(a.iii), above. The potential landslide hazard for the project is discussed in response to checklist question 6(a.iv), above.

In addition to movement caused by earthquakes and slope instability, soils and surficial geologic deposits can become unstable or collapse due to subsurface dissolution or movement, subside as a result of fluid removal (e.g., due to activities such as groundwater pumping), or consolidate due to increased overburden weight. The types and engineering characteristics of materials present at and below the ground surface affect the occurrence of instability.

Soils of the project area include silty clay and marine terrace deposits (gravel, silt, sand, and clay) originally deposited in a tidal marine environment that have since been uplifted above sea level (ESF, 2014). Soil borings conducted in the Phase 1 project area and in surrounding locations in the slough generally encountered thick deposits of clay, clayey silt, clayey sand or sand topped by 1-2 feet of organic material or heavily organic clay.

According to the National Cooperative Soil Survey, the proposed marsh restoration areas are underlain by Alviso silty clay loam soil (NRCS, 2014). This soil is generally characterized as very poorly drained. The existing stockpile area is located on the moderately well-drained Santa Ynez fine sandy loam soils.

Sample borings taken in the project area and surrounding vicinity did not encounter conditions susceptible to collapse (subsurface cavities or caves, abandoned mine shafts, evaporite deposits, karst geology). No petroleum or natural gas withdrawals take place in the project area, nor are these activities proposed as part of the project (DOGGR, 2014). One groundwater well is located to the south of the project area. While this well is located near the project site, the relatively impermeable clays identified in the project site sample borings restrict groundwater flow (DWR, 2006), meaning that any water in the earth materials below the site would not be easily drained by pumping at the agricultural well to the south. Thus the likelihood that Phase 1 (and future phases) of the project would be affected by subsidence resulting from nearby groundwater withdrawals is very low. However, the softer clays and silts at the project site, found in the sample borings, may compact as a result of new sediment loading during project construction. The compaction of marsh areas is anticipated, and these areas would be overfilled to accommodate the expected amount of compaction in order to obtain the desired elevation of the marshland that would meet the project objectives.

Compaction may also occur in the stockpile areas; however, these additional stockpiles would at maximum cover two 0.25 acre areas during Phase 1, in addition to the 11-acre area which already contains sediment from the Pajaro Bench project (which, at maximum, was permitted to bear 200,000 cubic yards of sediment [Monterey County, 2013c]). There are no proposed structures or other improvements present on the stockpile areas and thus no resultant damage would occur should any compaction occur. Therefore, the potential impacts related to unstable soils would be **less than significant**.

Future Phases

Future phases of the project would occur in areas of generally similar surface geology and soils to the areas described in the above discussion of Phase 1. Sampling focused only on the Minhoto Marsh area determined that soils in the Minhoto Marsh area consist almost entirely of clay and silt. The Seal Bend restoration area boring contained all sand (ESF, 2014). Similar to Phase 1 activities, the earth materials present in areas slated for future phase restoration activities do not demonstrate characteristics associated with earth material collapse or subsidence due to fluid withdrawals. Future phases of the project may skip the stockpiling step and place material directly on the marsh, which may be overfilled similar to the process described for Phase 1 to accommodate the anticipated subsidence. Impacts of future phases on ground stability would be the same as those described for Phase 1. Thus, implementation of future phases would have a **less than significant impact** with respect to unstable soils.

d) **Phase 1 and Future Phases**

Expansive soils can damage overlying structures over time through different periods of wetting and drying. The clay present in expansive soils expands with the addition of water, and contracts as the soil dries. In general, the effects of expansive soils can damage foundations and aboveground structures, paved parking areas, and concrete slabs. The project does not propose to construct any structures that could be damaged by expansive soils. The risk posed to life or property at the site, should expansive soils be present, is thus very low, and any impacts from the low risk would be **less than significan**t.

e) **Phase 1 and Future Phases**

The project would not include the use of septic tanks or alternative wastewater systems. For this reason, the project would have **no impact** with respect to environmental or public health hazards associated with building septic tanks or alternative wastewater disposal systems in soils incapable or adequately supporting such systems.

Cumulative

Impacts on geology and soils are generally localized and do not result in regionally cumulative impacts. Geologic conditions can vary significantly over short distances creating entirely different effects elsewhere. Unless a project would alter the soils and rock underlying other adjacent projects or affect surrounding land due to landslides, impacts related to geologic, soils, and seismic hazards would be limited to the project site. The geographic scope of cumulative impacts related to geologic, soils, or seismic hazards therefore includes the project site and any projects immediately adjacent to it.

The Elkhorn Slough Sediment Stockpile project (ESSS) is the only cumulative project that overlaps geographically with the proposed project site. Erosion and land stability impacts of the ESSS would have been similar to those identified for the proposed project. However, the ESSS was also subject to the same types of regulations and mitigation measures, and has since been planted to stabilize and protect the stockpile from erosion. The stockpiled material would be used in the proposed project and would be subject to the regulations and mitigation measures identified above. Thus the proposed project would have a **less than significant** cumulative effect on geology and soils resources.

Hazards and Hazardous Materials

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
7. HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Discussion

a) The term “hazardous materials” refers to both hazardous substances and hazardous wastes. Under federal and state laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). The term “hazardous material” is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[4]

[4] California Health and Safety Code, Chapter 6.95, Section 25501(o).

Phase 1

Phase 1 of the project would involve the hauling of fill material to the site(s) by truck, stockpiling of fill material (unless feasible to place fill material directly on marsh), and the use of heavy earthmoving equipment and/or a conveyor system to transport material onto the marsh. Hazardous materials that would be used routinely during project construction include fuels, lubricants, and solvents needed for the fueling and maintenance of construction equipment.

Proposed sediment suitability criteria were developed for the project as described in Appendix 2 of the *Elkhorn Slough Tidal Marsh Restoration Project Restoration Plan* (ESA, 2014b). These criteria include sediment sampling and testing guidelines that were developed and discussed with the U.S. Environmental Protection Agency (EPA) and RWQCB. Final sediment chemistry screening levels would be stipulated in the permits required for sediment placement. These sediment screening criteria, once approved by the applicable permitting agencies, would ensure that concentrations of hazardous materials in fill material, if any, are below acceptable levels and would adequately protect human health and the environment from risks associated with transportation, storage, and deposition of the sediment on-site. As discussed in Section E.3, *Air Quality*, airborne dust resulting from the sediment hauling and placement activities would also be minimized through dust control measures, such as: watering of construction areas; covering of loose materials during sediment hauling; covering inactive storage piles; and maintaining at least 2 feet of freeboard in haul trucks.

Any hazardous materials needed for construction would be stored and used in accordance with the applicable regulations that specify hazardous materials storage and handling requirements, such as proper container types, spill containment, and usage methods for minimizing the potential for releases and harmful exposures. Additional protection of human health would be provided by OSHA regulations, which require that a project-specific health and safety plan be developed by the construction contractor prior to any construction activities. The health and safety plan would identify potential safety hazards in the construction area, including the storage and use of hazardous materials, and would identify standard safety precautions. The health and safety plan would also identify whom to contact in an emergency and the location of the nearest medical facility. Implementation of measures identified in the health and safety plan would adequately protect the safety and health of workers at the site.

Compliance with the requirements of a Storm Water General Permit for Construction Activities (also called a Construction General Permit), which requires the development and implementation of a SWPPP, would include BMPs designed to prevent pollutants from contacting stormwater and moving off-site into receiving waters (refer to Section E.8, *Hydrology and Water Quality*, for additional discussion). Examples of hazardous materials BMPs to protect surface and groundwater from possible sources of contamination include conducting routine inspections for leaks, placing drip pans underneath parked vehicles, training contractors in proper vehicle maintenance and spill cleanup activities, and maintaining inspection and compliance records.

As discussed, the project would utilize relatively minor quantities of hazardous materials. Hazardous materials storage and handling would be conducted in compliance with regulations protecting water quality and worker safety. Sediment transported to and stored at the site would be controlled for dust and screened according to criteria to be approved by the RWQCB and other environmental permitting agencies, ensuring the levels of chemicals in the sediment would not exceed those protective of human health and safety and the environment. For these reasons, the potential hazard to the public or the environment caused by routine transport, use, or disposal of hazardous materials would be **less than significant**.

Future Phases

Future phases would entail construction activities similar to those described for Phase 1. Impacts to human health and the environment associated with the routine transport, use, or disposal of hazardous materials would be the same in future phases as described for Phase 1, above. Accordingly, implementation of future phases would have a **less-than-significant** impact with respect to creation of a hazard because similar sediment screening requirements would be followed and compliance with OSHA regulations and the best management practices contained in the SWPPP would adequately minimize worker safety and spill risks.

b) **Phase 1**

While the project would not be expected to create a significant hazard to the public or the environment from the routine transport, use, or disposal of hazardous materials, accidental releases of relatively small quantities of hazardous materials could occur, which could degrade soil and downstream surface water and/or groundwater quality. Such impacts would be significant.

In addition to the BMPs anticipated in the SWPPP, to ensure timely spill identification and cleanup, implementation of **Mitigation Measure HAZ-1** is recommended. This measure would further reduce potential for public hazards by ensuring that, in the case of a spill, contaminated soils would be contained and disposed of in a manner that is protective of human and environmental health.

With the implementation of Mitigation Measure HAZ-1, potential impacts on human health and the environment would be **less than significant with mitigation**.

Future Phases

Future phases would entail construction activities similar to those described for Phase 1. Impacts to human health and the environment associated with the accidental release of hazardous materials would be the same in future phases as described for Phase 1, above. The impact would be **less than significant**.

Mitigation Measure HAZ-1: Spill Prevention and Cleanup

In the event of a release or spill of hazardous materials, the contractor shall immediately control the source of the leak and contain the spill. The construction contractor shall make all required hazardous materials release reporting notifications to the Monterey County Health Department and CDFW Elkhorn Office when a hazardous material spill occurs. Contaminated soils shall be excavated, tested and disposed of at an appropriate, licensed disposal facility.

c) The nearest school is located over 1.5 miles from the project site. Any accidental releases of hazardous material at the project site would not be expected to affect any schools at this distance. The project would have **no impact** with respect to this criterion.

d) The list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, commonly referred to as the Cortese List, contains information about sites in California where hazardous wastes or hazardous substances are not adequately contained or controlled or where hazardous substances cleanup is ongoing. Projects located at these sites could increase the risk of exposure of people or the environment to hazardous substances. The project site is not located on a Cortese List site. Thus, project implementation would have **no impact** with respect to this criterion.

e - f) There are no airports or private airstrips within two miles of the project site. The nearest airport is Watsonville Municipal Airport, located approximately 8 miles northwest of the project site (AirNav, 2014). The project site is not within the planning area shown in the Marina Municipal Airport Land Use Plan nor is it within the Airport Safety Compatibility Zones of the Watsonville General Plan. There would be no airport-related safety hazard impact on people residing or working in the project area as a result of the project.

g) The project site access routes are not listed as priority transportation routes in the Monterey County Catastrophic Earthquake Mass Transportation/Evacuation Plan, and the project site is over 8 miles from the nearest proposed pickup point listed in the Plan (OES 2010a; OES 2010b). The project site is not listed as a shelter location in the Plan. For these reasons, the project would have **no impact** on the implementation of emergency response or evacuation plans.

h) No structures would be built as part of the project, and the project site is approximately 3 miles from the nearest high or very high fire hazard severity zone (CALFIRE, 2007). The project would have **no impact** on the risk of loss, injury, or death involving wildfires.

Cumulative Impacts

The geographic scope of cumulative impacts associated with hazards and hazardous materials varies from site-specific for impacts associated with encountering hazardous materials present in soil and groundwater, to the broader community for impacts associated with a potential release of hazardous materials or with fire hazards, to several miles for aviation hazards. The Elkhorn Slough Sediment Stockpile project is the only project from the cumulative projects list that is within the geographic scope of hazards and hazardous materials impacts resulting from the proposed project. The Elkhorn Slough Sediment Stockpile project, completed in 2013, was required to comply with the same set of hazardous materials, OSHA, and stormwater regulations and mitigation measures as described above for the proposed project, and included measures for control of hazardous materials spills, which would reduce the potential for releases of hazardous materials to the environment (County of Monterey, 2013b). Accordingly, through compliance with these regulations and mitigation measures, project implementation would not be expected to contribute to a cumulatively considerable impact (**less than significant**).

Hydrology and Water Quality

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
8. HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

Discussion

a, f) The project is located adjacent to Elkhorn Slough, which is surrounded by farmlands and receives substantial agricultural run-off. Most of the Minhoto-Hester watershed is comprised of agricultural fields used for cattle grazing and the production of row crops. Most of the Seal Bend watershed consists of the Moon Glow Dairy operations and upland grasslands. Precipitation that falls within these watersheds drains from the uplands through ephemeral drainages into the marsh areas and eventually to Elkhorn Slough and Monterey Bay. Additionally, the project site receives saline tidal flows from Elkhorn Slough.

Water quality within the project site, and within Elkhorn Slough generally, changes in response to seasonal fluctuations in tides, watershed inputs, weather patterns, and other factors. Water quality within Elkhorn Slough is summarized in the Elkhorn Slough Existing Conditions Report (ESA et al. 2014) and discussed in detail in numerous reports (e.g., Caffrey et al. 2002a, Moffatt & Nichol 2008, PWA 2008, Hughes et al. 2011). Temperature, salinity, dissolved oxygen, and contaminants are reflective of the watershed inputs and seasonal factors stated above and are not expected to change in an adverse manner as a result of implementation of the project. Turbidity and nutrients are described below.

In Elkhorn Slough, turbidity appears to be primarily controlled by weather events and tidal action, though algae production may contribute to late-summer/early fall turbidity spikes. Large storms wash sediment-laden runoff into the slough from agricultural lands upstream, and high winds can resuspend settled sediments. Although Elkhorn Slough is listed as a CWA 303(d) impaired water body by the RWQCB for sedimentation/siltation (RWQCB, 2011), the reach of Elkhorn Slough in the vicinity of the project site is impaired by a lack of sediment which reduces the resilience of the marshes to sea level rise and also contributes to erosion of Elkhorn Slough and tidal marsh channels. Project implementation would increase long term marsh resilience and would improve water quality through reducing erosion and sedimentation within the Slough.

The primary inorganic nutrients of interest within Elkhorn Slough are nitrogen and phosphorus. Both are necessary for the growth of algae and other plants. However, in excessive quantities, they can negatively impact water quality and ecosystem health. The primary source of external nutrients to the Elkhorn Slough system is runoff from the system's watershed, especially from agricultural operations (e.g., fertilizers, manure); relatively smaller inputs include atmospheric deposition and bacterial fixation (Caffrey et al. 2002b). Nitrate levels are among the highest of California coastal estuaries.

Phase 1

The project is not expected to affect water temperature, salinity, or dissolved oxygen in any significant, foreseeable way. Conformance to protective sediment quality criteria for the placed fill material, discussed in detail in Section E.7, *Hazards and Hazardous Material*, would avoid the potential for significant water quality impacts associated with pesticides, heavy metals, and other potential contaminants. These criteria include sediment sampling guidelines that were developed with input from the U.S. Environmental Protection Agency (EPA) and the RWQCB. Final sediment chemistry screening thresholds would ensure that concentrations of hazardous materials in fill material, if any, are within acceptable limits and would adequately protect water quality from risks associated with placement of the sediment on-site. Therefore, the impact analysis presented below focuses on the potential for project implementation to cause an adverse and significant water quality impact as a result of sedimentation, erosion, turbidity, and nutrients. Potential impacts of sedimentation, erosion and turbidity on eelgrass are considered in Section E.4, *Biological Resources* and found to be less than significant with implementation of turbidity control measures incorporated as part of the project, conformance to existing regulations and permitting requirements, and the expected long-term benefits of the project in reducing ongoing erosion within Elkhorn Slough and the site.

Sedimentation, Erosion, and Turbidity

During Construction. For Phase 1, work areas on the marsh plain would be isolated from the tides by temporary water management structures (such as berms and sheet-piles) and dewatered to allow construction in non-tidal conditions. The isolated work areas would drain to Elkhorn Slough using a combination of gravity and pumps. Project construction would involve activities such as excavation of the Minhoto hillside, temporary stockpiling of material, placement of fill on the marsh plain, and sheet-pile installation. Activities that disturb the ground could leave soils exposed to rain or surface water runoff that may carry soils into Elkhorn Slough, increase turbidity levels in the slough, and have a potentially adverse impact on water quality and beneficial uses identified in the Central Coast Basin Plan. Transport of soil from the site could increase turbidity and deposition at eelgrass beds located downstream of the site, potentially harming this sensitive habitat. Sheet-pile installation could mobilize muds into the water column and increase turbidity. Hazardous materials associated with construction activities would likely involve standard construction related materials such as solvents, oil and grease, and petroleum hydrocarbons. If improperly handled during construction activities, these materials could degrade the quality of receiving waters (issues relating to accidental spills and appropriate handling are addressed in Section E.7, *Hazards and Hazardous Materials*).

Sediments mobilized by direct rainfall on newly-placed fill would likely settle out within the isolated work area, and not be released to Elkhorn Slough. Release of some sediments would be expected, as occurs under existing conditions with direct rainfall on the mudflats. Any temporary increases in turbidity in Elkhorn Slough are expected to be similar to the existing range of turbidity pulses, which regularly reach 100 Nephelometric Turbidity Units (ntu) surface turbidity at 0.5 m depth (ESA 2014). In the unlikely event of a breach of a water management berm, a pulse of sediment could be released from the site to Elkhorn Slough. Such a breach of a water management berm would be temporary, has a low probability of occurrence and would likely coincide with an extreme flood event when turbidity in Elkhorn Slough would already be high. Therefore, any turbidity pulse associated with such a breach would be unlikely to measurably contribute to a decrease in baseline water quality under extreme flood conditions. See response to checklist question 8(i) for a discussion of berm overtopping with respect to risk to human safety.

Each phase of the project would be subject to a General Construction Permit pursuant to the NPDES permit program under CWA Section 402(p), which requires appropriate BMPs to address erosion and sedimentation impacts. The nature of the project is such that the project applicant would apply for coverage under the State General Construction Permit to comply with federal NPDES regulations. As part of the Construction General Permit, the Applicant or their contractor would be required to prepare and implement a SWPPP and submit a notice of intent (NOI) to obtain coverage under the General Permit to the RWQCB prior to construction activities. The objectives of a SWPPP are to identify pollutant sources (such as sediment) that may affect the quality of stormwater discharge and to implement BMPs to reduce pollutants in stormwater. The SWPPP is a standard requirement, is based upon the approved final Project, would be prepared prior to Project implementation, and would specify appropriate BMPs that would be implemented during construction. Typical BMPs for erosion and stormwater control include measures such silt fences, straw wattles, and hay bales for on-land work and floating silt fences for in-water work, along with monitoring to ensure compliance. The standard BMPs also include practices for proper handling of chemicals such as avoiding fueling at the construction site and overtopping during fueling and installing containment pans. BMPs for the project would include using areas outside the 100-year flood zone for refueling, equipment maintenance, and emergency evacuation. Additionally, construction of the project would be required to comply with permit conditions under Section 401 of the CWA, requiring Water Quality Certification in accordance with the requirements of the RWQCB as well as conformance to Waste Discharge Requirements in accordance with the Porter-Cologne Water Quality Control Act.

Implementation of the water quality control measures incorporated as part of the project (see Section A, *Water Control and Turbidity Management*) and conformance to the permit requirements of the Construction General Stormwater Permit, Section 401 of the CWA, and Waste Discharge Requirements under the Porter-Cologne Water Quality Control Act would ensure water quality impacts associated with Project remain **less than significant**.

First few years after construction. Since one of the objectives of the project is to raise marsh plain elevations, the project would seek to minimize loss of soil after construction. Nonetheless, some newly-placed sediment would be re-suspended and transported off-site once the water management structures were removed/lowered and tides are re-introduced to the site. Re-suspension and transport of some soft surface sediment is typical of other newly restored sites such as the Napa Salt Marsh Restoration, Hamilton Wetland Restoration, and South Bay Salt Pond Restoration Project in San Francisco Bay. The resulting turbidity pulse would be temporary, within the natural range of existing turbidity fluctuations, and characteristic of such natural systems. Vegetation would be expected to begin colonizing the filled marsh plain immediately, with extensive cover within the first few years after construction, further reducing the potential for erosion and sedimentation over time. Therefore, short-term post-construction impacts relating to water quality are considered less than significant.

Long-term. Over the long-term, the project would decrease the potential for temporary spikes in turbidity caused by episodic re-suspension of sediments from the mudflats onsite. The project would result in conversion of mudflats to vegetated marsh, with the marsh vegetation stabilizing the surface soils. The project would also decrease turbidity caused by any ongoing channel erosion onsite and in Elkhorn Slough by decreasing the tidal prism and peak velocities, as described further in response to checklist question 8(c).

Nutrients. The terrestrial soils to be placed on the marsh plain are more limited in organic matter relative to natural marsh plain substrate. Organic matter plays an important role in marsh plant and invertebrate community productivity. Therefore, Phase 1 would include field manipulative experiments to test the effect of a marsh plain organic matter amendment on promoting tidal salt marsh vegetation establishment. The experiment would entail mixing an organic amendment (bio char or mulch) into the top 6 inches of the installed marsh plain soil to reach 15% soil organic matter (dry weight). This amendment would be applied to test plots covering a very small area (0.05 acres). Organic matter amendments could result in the export of some inorganic nitrogen (in the form of ammonium and nitrate) via ebbing tidal flows to the estuary beyond the project boundary. Elevated inorganic nitrogen loading to estuaries (e.g., from runoff of fertilizer nitrogen from surrounding agricultural lands) is suspected to cause the erosion/loss of tidal salt marsh via alterations in belowground plant root and microbial processes (Deegan et al. 2012). However, the amendment experiment would result in miniscule/insignificant export rates of inorganic nitrogen to the estuary because the test plots are small relative to the project site (~0.1%) and to the ~2300 acre estuary. Therefore, the expected, low export rate of inorganic nitrogen from the organic matter text plots is not expected to substantially increase inorganic nitrogen concentrations in Elkhorn Slough to levels that would exacerbate salt marsh loss. Consequently, organic matter amendments during Phase 1 would have no impact on estuary-wide water quality and marsh loss.

Future Phases

Sedimentation, Erosion, and Turbidity

The impacts of future phases on water quality would be similar in nature to those described for Phase 1 where construction is conducted under "dry" conditions through the use of temporary water management structures. Alternatively, construction for future phases may be conducted in the "wet," without water control structures. In The absence of water control structures, there would be twice-daily tidal inundation of the working area which could result in increased turbidity levels during placement of fill. Turbidity is generated when dry material is placed in ponded waters and as tides or rainfall runoff drain from newly-placed material. Tidal inundation of the project site would be gradual and predictable from tide charts or observed increases in Elkhorn Slough water levels.

For construction under "wet" conditions with tidal inundation of the working area, water quality control measures incorporated as part of the project would be applied, including specific turbidity management measures (see Section A, *Water Control and Turbidity Management*). Within the work area, the deeper tidal channels containing water would mostly be avoided when placing material, so only localized and temporary turbidity would be expected when dozers push material out onto the marsh. Sediment-control BMPs, such as hay bales, silt fences, or straw wattles would be used. No pumping would be required. Construction of the project under "wet" conditions would be required to comply with permit conditions under Section 401 of the CWA, requiring Water Quality Certification in accordance with the requirements of the RWQCB as well as conformance to Waste Discharge Requirements in accordance with the Porter-Cologne Water Quality Control Act.

Monitoring for turbidity and any other required water quality parameters would be conducted during construction downstream of the construction area or at the edge of Elkhorn Slough to document compliance with SWPPP requirements. Results of the monitoring would be used to adjust construction practices to improve soil retention, as possible. As in Phase 1, preparation, approval, and implementation of the SWPPP and compliance with NPDES permit regulations would reduce potential degradation of water quality associated with Project construction to a **less-than-significant** level.

Nutrients. Organic matter amendments could be applied across the full-scale restoration area in future phases, if the Phase 1 experiment yields positive results. Nonetheless, the majority of the organic matter amendment would not be expected to be mobilized by tidal action, since it would be mixed into the upper soil surface of the marsh plain and would adhere to the clay fraction of the soil. The restored marsh soil surface (and associated organic matter amendments) would not be expected to substantially erode because it would be relatively flat, at the upper elevation end of the tidal prism, and would be expected to become rapidly colonized by marsh vegetation. Moreover, the majority of the inorganic nitrogen released from the organic amendment to the soil/sediment pore water (i.e., mineralized as ammonium by the soil microbial community) would be expected to be assimilated by the marsh plant and soil microbial community (i.e., nitrification and denitrification). Therefore, organic matter amendments during future phases are judged to have a **less than significant impact** on estuary-wide water quality and marsh loss.

b) Groundwater in the project vicinity flows towards Elkhorn Slough and is only minimally affected by water surface elevations in the tidal areas of the site, which act as tailwater control on upstream groundwater elevations.

Phase 1

The project does not propose long-term groundwater extraction. Project construction would involve diking and pumping of the construction area to dry the sediment placement area. However, the dewatering would be temporary and unlikely to substantially affect local groundwater levels. The project does not propose the addition of permanent impervious surfaces. The project would not substantially affect the groundwater table as a result of groundwater extraction or through a reduction in groundwater recharge. For these reasons, implementation of Phase 1 would have a **less-than-significant** groundwater impact.

Future Phases

The impacts of future phases would be the same as those of Phase 1, with one minor exception. Recharge at M6 may increase or decrease seasonally, as a result of converting this area from ponded to tidally-influenced. Any changes in recharge at M6 would be minimal in extent, highly localized, and unlikely to substantially affect local groundwater levels. Accordingly, implementation of future phases would also have a **less-than-significant** groundwater impact.

c) The Elkhorn Slough main channel has been experiencing deepening and widening (Van Dyke and Wasson 2005). Hydraulic and geomorphic modeling indicates that high flow velocities during extreme tides, in particular the peak spring ebb tide, erode sediment within Elkhorn Slough (Philip Williams and Associates 2010). Tidal flow velocities are partially dependent on the magnitude of the tidal prism (the volume of water that flow through a given channel cross-section), with larger tidal prisms corresponding to faster flows and increased erosion.

Phase 1

The proposed Phase 1 would reduce the tidal prism within Elkhorn Slough by 69 ac-ft (ESNERR and ESF, 2014; Table 1). This reduction in tidal prism is anticipated to decrease flow velocities in Elkhorn Slough and reduce the average annual erosion rate within the project site and off-site in Elkhorn Slough (e.g., PWA 2010) by an unquantified amount. Therefore, implementation of Phase 1 would have a **less-than-significant** impact with respect to erosion; it would result in a net benefit in terms of an overall reduction in erosion rates. The potential for the project to temporarily increase erosion or siltation as a result of land disturbing activities related to the construction phase are discussed in responses to checklist questions 8(a) and 8(f), above.

Future Phases

The impacts of future phases would be similar in nature as those described for Phase 1 for impacts relating to erosion. Under proposed future phases, the tidal prism within Elkhorn Slough would be reduced by a further 67 ac-ft (ESNERR and ESF, 2014; Table 1), resulting in associated erosion reduction and a **less-than-significant** impact.

d) The project site currently drains from the upland areas through local depressions and swales to the tidal wetland areas. Restoration sub-area M6 is a brackish (11 ppt) seasonal pond which experiences seasonal wetting and drying through evaporation. M6 receives direct rainfall and may receive limited runoff from the adjacent Minhoto uplands.

FEMA (2009) maps part of the site within the 100-year flood plain. Mapped within the 100-year floodplain are the tidal wetlands and a narrow band of the adjacent hillside below the 100-year flood elevation of 8 feet NAVD. The 100-year floodplain has a 1% annual chance of flooding.

Phase 1

The Phase 1 project would not substantially alter long-term drainage patterns within the project area. There would be no substantial change in runoff flow rates nor would the project increase the potential for flooding. Implementation of the project would not substantially increase the impervious surface areas or increase the storm runoff generated at the project site. Construction-related structures such as berms and sheet-pile walls used for water management would temporarily re-direct flows, but not in a way that would result in an increased risk of flooding on- or off-site as compared to existing conditions. Should surface runoff collect upstream (landward) of the water management structures, excess water would drain to Elkhorn Slough through pumps, culverts, or dike overtopping. Therefore, there would be no increase in the rate or volume of surface runoff that could result in on- or off-site flooding; the impact would be **less than significant**.

Future Phases

The impacts of future phases would be similar to those describe for Phase 1, with one exception. Conversion of M6 from ponded to tidally-influenced would introduce tidally-driven water levels to the levee between M6 and the Moon Glow Dairy pond to the west. LiDAR elevation data available for the site (California State Coastal Conservancy 2009-2011) indicates that the levee around the dairy pond ranges in elevation from 9.3 to 11.9 ft NAVD along its crest. This is above the 100-year flood elevation of 8 ft NAVD, as calculated by FEMA (2009). The eastern part of the dairy pond levee, adjacent to M6, ranges in elevation from 9.5 to 10.9 ft NAVD. The levee along M6 is similar in elevation to other reaches of the dairy pond levee. In the unlikely event of overtopping from extreme high water, overtopping would occur first along the western edge of the dairy pond, where the levee is lowest. Water levels high enough to cause overtopping of the levee along M6 would also cause overtopping at many locations along the length of the dairy pond levee. The risk of flooding from restoring M6 to tidal marsh is considered low and would therefore be considered a **less-than-significant** impact.

e) The project lies within tidal waters and immediately adjacent to undeveloped uplands. The project would not create or contribute runoff that would enter any stormwater drainage systems. The potential for the project to provide additional sources of polluted runoff during construction and long-term are discussed in response to checklist question 8(a), above, and would result in a **less-than-significant** impact.

g) The project does not propose the construction of any housing or structures for human occupancy; therefore, there would be **no impact** to housing within a 100-year flood hazard area.

h) The restoration sub-areas (e.g., M1, M2, etc.) and a narrow fringe of immediately adjacent uplands are within the 100-year flood hazard zone as mapped by FEMA (2009). These areas have a 1% annual chance of flooding. The project would be limited to the restoration of wetlands and does not propose to construct any permanent structures. As discussed in response to checklist question 8(d), construction-related structures such as berms and sheet-pile walls used for water management would temporarily re-direct flows, but not in a way that would significantly increase flood risk or extent as compared to existing conditions. Therefore, project implementation would be unlikely to displace floodwaters, raise flood elevations, create new flooding impacts (e.g., by causing flooding of existing structures that previously would not have been inundated), and/or increase the severity or frequency of flooding relative to pre-Project conditions); the impact would be **less than significant.**

i) The project does not propose any change to the limited human use of the site and would not result in any permanent structures, nor is the project site exposed to risk of flooding from failure of a permanent dam or levee.

Phase 1

Failure of construction-related structures such as berms and sheet-pile walls used for temporary water management could expose construction staff to risk of flooding. In the unlikely event of a breach of the water management berm, water levels would rise gradually and water depths would be approximately one foot or less above the work areas (filled marsh plain) where people would be located. Therefore, flooding of the site as a result of the unlikely failure of a water management structure would not present a significant risk of injury or death to construction staff or loss of temporarily placed construction equipment.

Protections for human health and safety are provided for by OSHA regulations, which require that a project-specific health and safety plan be developed by the construction contractor prior to any construction activities. The health and safety plan would identify potential safety hazards in the construction area, including the risk of flooding, and would identify standard safety precautions. Implementation of measures identified in the health and safety plan would adequately protect the safety and health of workers at the site and would minimize such risks to a **less-than-significant** level.

Future Phases

The impacts of future phases would be the same as those of Phase 1, with the exception that construction for future phases may be conducted in the "wet," without water control structures. In the absence of water control structures, there is no risk of an unexpected breach. There would, however, be more frequent inundation of the working area. This inundation would be gradual and predictable from tide charts or observed increases in Elkhorn Slough water levels. Working surfaces would be temporarily constructed at elevations above water levels or construction equipment compatible with periodic inundation (e.g., marsh buggies) would be used. Thus, project implementation would have a **less-than-significant** impact with respect to dam or levee failure safety risks.

j) Part of the project site is located within a designated tsunami inundation area (CEMA, 2009). The Project would be limited to the restoration of wetlands and would not exacerbate any existing risks of tsunami, seiche, or mudflows. The project would add earth (mud) to elevate the marsh plain. However, the risk of mudflow is considered low because the fill area is essentially flat, the earth would compact over time, and marsh vegetation would stabilize the soils. Were a mudflow to occur, it would not pose a risk to people or structures. Therefore, project implementation would have a **less-than-significant** impact with respect to tsunami, seiche, or mudflow safety risks.

Cumulative Impacts

The cumulative analysis considers the relevant past, present, and probable future projects listed in Table 2 and Figure 7 with regards to the cumulative geographic area. The geographic area for the analysis of cumulative hydrology and water quality impacts is the local Seal Bend and Minhoto-Hester watershed and the adjacent section of Elkhorn Slough in the vicinity of the project.

Concurrent construction of the project and other projects in the cumulative geographic area could result in increased erosion of exposed soils during land disturbing activities and subsequent sedimentation, which could have a cumulative effect on the water quality of receiving waters. Also, any inadvertent release of fuels or other hazardous materials during concurrent construction of projects could affect the water quality in the receiving waters of Elkhorn Slough. As described in response to checklist questions 8(a) and 8(f), above, all waters encountered within the project site during construction (including construction dewatering and stormwater) would be required to obtain coverage under the Construction General Permit as well as be required to comply with permit conditions under Section 401 of the CWA (Water Quality Certification under the jurisdiction of the RWQCB). As part of the Construction General Permit, the applicant or its contractor would be required to prepare and implement a SWPPP and submit a completed notice of intent (NOI) form to the RWQCB prior to construction activities. Adherence to the requirements of the Construction General Permit would reduce potential cumulative impacts associated with stormwater runoff and water quality associated with construction of the Project.

Over the long-term, implementation of the project would not represent a substantial land use change within the watershed compared to current conditions at the site and in the surrounding area. The project would decrease the potential for temporary spikes in turbidity caused by episodic re-suspension of sediments from the mudflats onsite and would also decrease turbidity caused by any ongoing channel erosion onsite and in Elkhorn Slough by decreasing the tidal prism and peak velocities.

Given the measures taken to reduce and avoid hydrologic and water quality impacts related to construction of the project, the project would not be expected to make a considerable contribution toward any cumulative water quality or hydrology related impacts and there would be a **less than significant** cumulative impact associated with project implementation.

Land Use and Land Use Planning

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
9. LAND USE AND LAND USE PLANNING — Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐

Discussion

a) The project involves restoration of tidal salt marsh, upland ecotone, and native grasslands on lands and waters adjacent to Elkhorn Slough. Land uses in the vicinity of the project site include agriculture, commercial, industrial, and open space/habitat reserves. There are few homes in the project vicinity and the density of residential development is very low (minimum building site ranges from 1 to 40 acres). The restoration work would involve landform alterations on fallow agricultural land and tidal wetlands. The project does not propose the construction of any new facilities or structures. As a result, the project would be expected to have **no impact** with respect to physically dividing an established community.

b) The principal plans, policies, and regulations governing land use in the project vicinity include the California Coastal Act, the Monterey County Local Coastal Program (LCP; North County Land Use Plan and Coastal Implementation Plan), and Monterey County General Plan. The Monterey County LCP and General Plan policies apply to project areas above the mean high tide line. Coastal Act policies generally apply to project areas below the mean high tide line; however, in some cases could apply to the entire project area (e.g., consolidated development permit processed pursuant to Coastal Act Section 3060-1.3).

Coastal Act and Monterey County Local Coastal Program

Like the Coastal Act, the Monterey County LCP's policies and regulations generally provide for public access to and along the beach; protection of the scenic and visual qualities of the coast; prioritization of recreational, visitor-serving, and coastal-dependent land uses within the coastal zone; and maintenance and restoration of sensitive species habitats, including coastal wetlands and marine waters.

The project site is situated between Dolan Road and Elkhorn Slough, amidst ongoing agricultural and industrial operations. No public shoreline access exists across the project site and none would be affected by project construction. As discussed in Section E.14, *Recreation*, the main channel of Elkhorn Slough is a popular fishing, boating, and nature viewing destination. The project does not propose and would not be expected to result in any activities that would obstruct or otherwise inhibit use of the main slough channel or shoreline. Therefore, the project would not be expected to conflict with Coastal Act or LCP policies related to access or recreation. The projects implications for public access and recreational resources are discussed further in Section E.14, *Recreation*, and Section E.15, *Transportation*, respectively.

While the project site is not located within an area designated by the State or County as scenic or visually sensitive, lands adjacent to Elkhorn Slough are unique in their mostly undeveloped and agrarian aesthetic. The proposed restoration project would be in keeping with this aesthetic, as it would include no structures or other development that would obstruct views to or along the shoreline. Rather, the project would enhance the area's aesthetic appeal by increasing the area of vegetated marsh, ecotone, and grassland visible from the main channel. Therefore, the project would not be expected to conflict with Coastal Act or LCP policies related to scenic or visual resources. The projects implications for scenic and visual resources are discussed further in Section E.1, *Aesthetics*.

Located within a National Estuarine Research Reserve, the project is proposed for lands and waters that provide habitat for rare and sensitive species. The Coastal Act and Monterey County LCP limit the types of land uses that may be permitted within these areas. Land uses and activities that may be permissible within sensitive habitat and wetland areas generally include coastal- and resource-dependent uses, scientific research activities, and restoration and management programs for fish, wildlife or other physical resources. As described in the Project Description, the project is resource- and coastal-dependent, as it requires a site on the slough to be able to function at all; the project incorporates scientific study and experiment; and the main purpose of the project is to restore and enhance the slough's fish and wildlife habitat, as well as physical processes. For these reasons, the project would not be expected to conflict with Coastal Act or LCP policies regarding land use activities within or adjacent to sensitive habitats and wetlands. Additional discussion of the project's temporary effects on sensitive species and their habitats is provided in Section E.4, *Biological Resources* and Section E.8, *Hydrology and Water Quality*.

Monterey County General Plan

The Monterey County General Plan sets forth the comprehensive long-term land use policy for Monterey County. The General Plan consists of eight issue-oriented plan elements (e.g., Land Use, Circulation, Safety), as well as area or master plans for 14 regional planning areas (e.g., North County Land Use Plan, discussed above). Plan elements relevant to the project include: Conservation and Open Space; Safety; and Agriculture.

The Conservation and Open Space element provides for the long-term preservation and conservation of Monterey County open space lands and natural resources. Much like the Coastal Act and Monterey County LCP, described above, the Conservation and Open Space Element contains policies aimed at the protection of biological resources, water quality, marine resources, scenic resources, archaeological and paleontological resources, and air quality. As discussed above, the project would not be expected to conflict with policies related to the protection of, and over the long-term would be expected to result in the continued protection and/or enhancement of, biological resources, surface water and marine resources, scenic resources, and cultural resources.

With respect to Air Quality, the project's emissions would be limited to the construction phase, would be consistent with applicable Monterey Bay Unified Air Pollution Control District guidelines, and would not violate any air quality standard. Furthermore, the project would involve the conservation and enhancement of naturally vegetated areas, which would result in a long-term air quality benefit. The project's implications for air quality are addressed further in Section E.3, *Air Quality*. For the reasons set forth above, the project would not be expected to conflict with the General Plan's Conservation and Open Space Element.

The Monterey County General Plan's Safety Element identifies as a primary goal the maintenance of a healthy and quiet environment free from annoying and harmful sounds. As discussed in Section E.11, *Noise*, the project-related noise would be limited to the construction phase, consistent with County standards, and would not have a substantial adverse effect on nearby sensitive receptors. For these reasons, the project would not be expected to conflict with the General Plan's Safety Element.

The Monterey County General Plan's Agriculture Element sets forth policies designed to promote and facilitate the protection, conservation, and enhancement of agricultural lands and businesses. The proposed project would contour and restore to annual grassland an approximately 41-acre fallow portion of an approximately 200-acre agricultural parcel. Project implementation would create a native grassland buffer along the parcel's Minhoto Marsh shoreline, expanding the buffer between the windrows and Minhoto Marsh from the approximately 20-foot dirt road that existed when the area was actively farmed to a vegetated buffer of between 250 and 550 feet. While restoration of the parcel's edge would shift the use from agricultural to open space, it would not preclude future use of the site for farming or other agricultural uses, nor would it limit the use of adjacent portions of the property for continued crop production. In addition to farmland preservation, the Agriculture Element supports and promotes programs aimed at reducing soil erosion and protecting water quality – key objectives of the proposed restoration project. Therefore, on balance, the project would not be expected to conflict with the General Plan's Agriculture Element.

Due to the nature of the project – habitat restoration – and its limited duration and effects, as described in other sections of the document, the project is expected to be generally consistent with applicable land use plans, policies, and regulations. The project represents a continuation of ongoing efforts by Elkhorn Slough National Estuarine Research Reserve managers to restore and enhance degraded estuarine habitats and the physical processes that support and sustain those estuarine habitats. Due to its remote location and the types of agricultural and industrial land uses ongoing in the project vicinity, the restoration effort would not be expected to result in any substantial land use incompatibilities. Similarly, as no new facilities or structures are proposed, the project would not be expected to present any long-lasting disruptions to area land uses. For these reasons, the project would be expected to have a **less-than-significant** impact with respect to conflict with plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect.

c) In 2004, ESNERR initiated a planning effort, known as the Elkhorn Slough Tidal Wetland Project, to evaluate and develop restoration and management strategies to address marsh dieback and tidal erosion at Elkhorn Slough. In furtherance of this planning effort, the Elkhorn Slough Tidal Wetland Project Team produced the 2007 *Elkhorn Slough Tidal Wetland Strategic Plan*. The *Strategic Plan* builds upon prior planning efforts, management experience, and scientific studies to develop a framework to guide future estuarine restoration projects in Elkhorn Slough. Among the strategies identified to address marsh dieback and tidal erosion is the placement of thin layers of sediment onto eroding and degraded marsh plains with the objectives of reestablishing tidal wetlands vegetation, increasing marsh elevations, and minimizing tidal scour. The *Strategic Plan* identifies locations within Elkhorn Slough that are suffering from ongoing marsh loss and erosion of habitats. The proposed project site is highlighted as a former marsh area that has already lost vegetation and could also benefit from restoration efforts (ESTWPT 2007). As such, the proposed project is in keeping with and advances the goals and objectives of the *Elkhorn Slough Tidal Wetland Strategic Plan* and the broader efforts of the Elkhorn Slough Tidal Wetland Project. There are no habitat conservation plans that apply to the project area. The project would, therefore, have a **less-than-significant** impact with respect to conflict with an applicable habitat conservation plan or natural community conservation plan.

Cumulative Land Use Impacts

The geographic scope for potential cumulative land use impacts encompasses the Elkhorn Slough National Estuarine Research Reserve and Moss Landing Wildlife Area, and land uses along the banks of the Elkhorn Slough which generally include open space and agricultural uses.

As discussed in response to checklist question 9(b), construction of the project would have a less-than-significant effect with respect to conflicts with applicable land use plans, policies, and regulations. Similarly, the identified cumulative projects would also be required to comply with applicable land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, cumulative impacts related to compatibility with applicable land use plans, policies, or regulations would be less than significant.

As discussed in response to checklist question 9(b), the proposed project would not introduce new land uses and would not disrupt existing nearby land uses or preclude use of those lands for industrial, agricultural, or habitat conservation activities. With the exception of the Moss Landing Community Plan and Area Developments, and Deep

Water Desal Project, none of the Cumulative Projects identified in Table 2 involve new land uses that would be expected to disrupt existing nearby land uses or preclude use of those lands for industrial, agricultural, or habitat conservation activities.

The Moss Landing Community Plan would guide planning and development decisions within Moss Landing for the next 10 to 20 years. The Community Plan focuses mainly on activities within the Moss Landing Harbor area, but does extend to lands east of Highway 1. The Community Plan does not propose and would not authorize any development. Presently in draft form, the final Community Plan will be a chapter within the North County Land Use Plan (part of the Monterey County LCP, discussed above). The Community Plan policies are required to be consistent with the Coastal Act and the Monterey County LCP (Monterey County, 2014a). For these reasons, adoption of the Moss Landing Community Plan would not be expected to cause any substantial land use impacts that could combine with those of the proposed project.

Moss Landing Area Development Projects would involve master planning, new development, and redevelopment, mainly within the harbor/Moro Cojo Slough area of Moss Landing. The proposed developments would occur primarily within and amidst previously developed areas. The proposed development sites are located west of Highway 1, approximately one mile west of the project site (Monterey County 2014b). As a result, development of these projects would not be expected to have substantial adverse land use impacts that could combine with those of the proposed project.

The Deep Water Desal project is proposed for property zoned for Heavy Industrial (HI) land uses and would be located approximately 1,000 feet south of the nearest marsh area (also the project site) and more than 3,000 feet south of Elkhorn Slough's main channel. Given the property's existing zoning designation and the presence of other heavy industrial land uses in the area (e.g., Moss Landing Power Plant), desalination facility siting would not be inconsistent with the general pattern of development in the area. Desalination plant operation could disrupt nearby land uses through noise, emissions, or traffic. The proposed restoration project, however, would have no operational impacts on nearby land uses.

For the reasons described above, the effects of the proposed project, when combined with those of past, present, and reasonably foreseeable projects in the area, would not be expected to be cumulatively considerable. As a result, the project's contribution to cumulative land use impacts in the region would be **less than significant**.

Mineral Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
10. MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion

a, b) The project would use sediment readily available onsite and within the region for use in the restoration of the tidal marsh. No significant deposits of mineral resources are present in the project area (DOC, 1999). Additionally, the site does not contain any mineral resource recovery sites that have been delineated on a local plan. Therefore, project implementation would have **no impact** on a mineral resource recovery site.

Cumulative Mineral Resources Impacts

The geographic scope of cumulative impacts to mineral resources includes any other projects that would affect the same mineral resources as would be affected by the proposed project. However, since there are no mineral resources in the project area, the project would not contribute to any cumulative impact on mineral resources (**no impact**).

Noise

Issues (and Supporting Information Sources):		Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
11.	**NOISE — Would the project:**				
a)	Result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b)	Result in exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c)	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d)	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e)	For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	☐	☐	☐	☒
f)	For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion

a, b, d) Noise sensitive receptors typically include occupants of residences, schools, religious facilities, hospitals, and rest homes. Sensitive receptors in the vicinity of the project site are generally limited to homes. The closest noise-sensitive receptor to the project site is a single-family home located approximately 200 feet south-west from sub-area M6 and 1,900 feet west from sub-area M2. The second closest noise-sensitive receptor is a single-family home located 1,990 feet west of sub-area S2.

To describe noise environments and to assess impacts on noise–sensitive areas, a frequency weighting measure, which simulates human perception, is commonly used. It has been found that A-weighting of sound levels best reflects the human ear's reduced sensitivity to low frequencies, and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Table 8** identifies typical ranges of decibel levels for common sounds heard in the environment.

The assessment of the potential impacts of construction noise on sensitive noise receptors is based on a comparison of anticipated noise levels relative to the Monterey County Municipal Code (Section 10.60.030), which states that construction-related (short-term) noise should be managed to reduce impacts on adjacent land uses, and prohibits construction noise levels from exceeding 85 decibels (A-weighted) (dBA) at 50 feet. This

TABLE 8
TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet flyover at 1,000 feet	105	
Gas Lawnmower at 3 feet	95	
Diesel truck 50 feet at 50 mph	85	Food blender at 3 feet
Noise urban area, daytime	75	
Gas lawnmower at 100 feet	70	Garbage disposal at 3 feet
Commercial area	65	Normal speech at 3 feet
Heavy traffic at 300 feet	60	
	55	Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	35	
	30	Library
Quiet rural nighttime	25	Bedroom at night, concert hall (background)
	15	Broadcast/recording studio

SOURCE: Caltrans, 2009

prohibition does not apply to aircraft, or to machines, mechanisms, devices, or contrivances operated in excess of 2,500 feet from any occupied dwelling unit (Monterey County, 2009). This is because noise levels would typically dissipate below audible changes beyond that distance.

Phase 1

The closest noise-sensitive receptor to the proposed Phase 1 restoration site is a single-family home located approximately 1,900 feet west of sub-area M2. The three loudest pieces of construction equipment that would be used during Phase 1 construction include dozers (85 dBA at 50 feet), loaders (85 dBA at 50 feet), and backhoes (78 dBA at 50). Assuming an attenuation rate of 7.5 dBA per doubling of distance and that the three loudest types of off-road equipment would be running at the same time, the maximum noise level experienced at the single-family home would be below 50 dBA L_{max}. As a result, this noise-sensitive receptor would not be significantly impacted by construction noise. Similarly, no individual piece of construction equipment used during Phase 1 (e.g., dozers, backhoes, loaders, excavators) would generate noise in excess of the Monterey County Noise Control Ordinance’s 85 dBA limit at 50 feet.

Staging activities, including equipment mobilization, materials delivery, and construction worker vehicle traffic, would not cause a substantial increase in traffic noise at the nearest single family home. One of the haul routes passes within 80 feet of the single-family residence. Trucks and on-road vehicles would access the site from Dolan Road and then travel north along an unpaved haul route to the project’s construction staging areas. The peak noise levels at the single-family residence from passing trucks and commuting worker vehicles would be approximately 70 to 75 dBA at 50 feet during Phase 1 and future phases construction. As such, the project would not generate noise levels in excess of the Monterey County Noise Control Ordinance's 85 dBA limit at 50 feet. With the exception of workers commuting to the construction site, all construction traffic, including trucks and heavy equipment, would occur during the daytime. (5:00 a.m. to 6:00 p.m.), eliminating the potential for nighttime traffic noise.

The construction activities during Phase 1 and future phases may involve pile driving, which is typically associated with significant groundborne vibration. The nearest sensitive receptor (single-family residence) is within approximately 600 feet of restoration sub-areas (e.g., M4a or M6) where pile driving could occur. The vibration level at the single-family residence during such pile driving activities would be approximately 62.6 VdB. Other construction activities, such as upland buffer area grading near sub-area M2, would also generate groundborne vibration. The highest groundborne vibration level at the single-family residence, located 1,900 feet west of sub-area M2, during grading would be approximately 30.6 VdB. According to the Federal Transit Administration Guidance Manual for Transit Noise and Vibration Impact Assessment (FTA, 2006), the average human's perceptibility of vibration is about 65 VdB and human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Because the groundborne vibration at the nearest sing-family residence, during both on-site pile driving and grading, would be below the human perception threshold, there would be no substantial vibratory effects during Phase 1 or future phase construction.

In summary, noise and vibration levels associated with Phase 1 construction activities, including those resulting from pile driving, off-road equipment use, and construction traffic, would below the Monterey County Noise Control Ordinance's 85 dBA limit at 50 feet. Project implementation would not substantially disrupt occupants of the single-family residence. For these reasons, Phase 1 of the project would have a **less-than-significant** impact with respect to construction-period noise and vibration.

Future Phases

The noise-sensitive receptor nearest the future phases restoration sites is a single-family home located approximately 200 feet south-west of sub-area M6 (described above). The three loudest pieces of construction equipment that could be active during future phases include dozers (85 dBA at 50 feet), loaders (85 dBA at 50 feet), and backhoes (78 dBA at 50). Assuming an attenuation rate of 7.5 dBA per doubling of distance and that the three loudest types of off-road equipment would be running at the same time, the maximum noise level at the single-family home would be approximately 73 dBA L_{max}, which is below the Monterey County Noise Control Ordinance's 85 dBA at 50 feet construction noise limit. Additionally, as with Phase 1, no individual piece of construction equipment used during future phases (e.g., dozers, backhoes, loaders, excavators) would generate noise in excess of the Monterey County Noise Control Ordinance's 85 dBA limit at 50 feet.

Similar to Phase 1, construction activities associated with future phases would not result in a substantial increase in noise at the closest noise-sensitive receptor due to off-road construction equipment or construction traffic. The highest groundborne vibration level at the nearest residential home, located 200 feet south-west of sub area M6, during grading would be approximately 59.9 VdB, which is just below the FTA's human perception threshold. Additionally, there would be no pile driving equipment or other activities that are typically associated with significant groundborne vibration would be associated with the project's future phases construction. For the reasons set forth in the discussion of Phase 1 construction activities, above, implementation of the project's future phases would not generate substantial groundborne vibration.

In summary, noise and vibration levels associated with future phases construction activities, including those resulting from off-road equipment use and construction traffic, would below the Monterey County Noise Control Ordinance's 85 dBA limit at 50 feet. Project implementation would not substantially disrupt occupants of the single-family residence. For these reasons, future phases of the project would have a **less-than-significant** impact with respect to construction-period noise and vibration.

c) The restoration of the Elkhorn Slough, after either Phase 1 or future phases, would not alter the existing operations. No permanent increase in ambient noise would result from the proposed project. **No Impact** would occur.

e, f) The project area is not located within two miles of a public airport or private airstrip, or in an area with an airport land use plan. Furthermore, project activities would not expose people residing or working in the project area to excessive noise levels. **No impact** would occur.

Cumulative Noise Impacts

For cumulative construction-related noise impacts, the geographic scope of analysis encompasses the sensitive residential receptors in the vicinity of the project site and along access roads. These sensitive receptors are located approximately 200 feet south-west of sub-area M6 and 1,990 feet west of sub-area S2. The haul roads providing access to the various staging areas near the project sites would be accessed from Dolan Road.

As discussed in response to checklist questions 12(a), (b), and (d), above, potential project-related construction- and operations-related noise and vibration impacts were determined to be less than significant. There are several cumulative projects that have construction schedules that could overlap with the proposed project's construction schedule. These projects include Moss Landing Community Plan, Moss Landing area Development Projects, Deep Water Desal, Elkhorn Road and Dolan Road Resurfacing Projects, and Triple M. Ranch Wetland Restoration Project. However, since none of these projects lies in close proximity to the project site, cumulative noise increases resulting from simultaneous construction activities would not be expected. As a result, the project contribution to cumulative construction-related noise increases would not be cumulatively considerable and would represent a **less-than-significant** impact.

Population and Housing

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
12. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

a - c) The project would restore 147 acres of vegetated tidal salt marsh, upland ecotone, and native grasslands in Elkhorn Slough estuary. Construction of either homes or infrastructure is not proposed as part of the project.

Phase 1

During construction (lasting approximately 11 months), contractors would be employed at the site. These contracted jobs would not result in long-term employment or population growth and, therefore, would not affect the demand for housing nor the availability of housing in the local area or region. The 147 acres to be restored currently encompass an undeveloped area consisting of wetlands, mudflats, and marsh areas; therefore, the project would not displace or demolish existing housing or displace substantial numbers of people. While there is one residential home and farming operations nearby, these would not be displaced by the implementation of the project.

Future Phases

The population and housing impacts of future phases of project construction would be the same as those described for Phase 1, above. Construction scheduling for future phases has not been completed but is not likely to encourage contractors to relocate. While some maintenance would be necessary in the years following restoration to control weeds in the marsh, the amount of maintenance work would not cause a substantial increase in demand for long-term employees in the local area or region who would then require housing.

No impact to population and housing would occur as a result of the project.

Cumulative Population and Housing Impacts

If the proposed project contemporaneously induced population growth or displaced housing units or people in the same area(s) as other projects, then the combined impacts could cumulatively affect population and housing resources. However, the proposed project would not induce population growth or displace housing or people and therefore would not contribute to a cumulative impact on population and housing resources (**no impact**).

Public Services

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
13. PUBLIC SERVICES — Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Discussion

a.i - v) **Phase I**

Impacts associated with the provision of government facilities or services can occur when a project increases demand for these facilities or services, usually through increasing the number of people in the same jurisdiction as the project, resulting in the need for additional or expanded facilities, the construction of which could cause significant environmental impacts. The project would restore 147 acres of vegetated tidal salt marsh, upland ecotone, and native grasslands in Elkhorn Slough estuary, and would not construct housing or other facilities that would draw more people to the region surrounding the project area over the long term. Thus, no additional demand would result from the project once construction is complete. Construction activities associated with the restoration, occurring over 11 months and requiring approximately 6 full-time workers and 3 part-time workers, would not be expected to create additional demands for fire, police, school, or park facilities, and thus would not result in the need for new government facilities. No governmental facilities are proposed as part of the project, and the project would not physically alter existing governmental facilities. The project would not induce population growth, and would not otherwise affect the ability of existing public facilities to achieve performance objectives. There would be **no impact** on the provision of the listed public services as a result of the project.

Future Phases

The public services impacts of future phases of project construction would be the same as those described for Phase 1, above, resulting in **no impact**.

Cumulative Public Services Impacts

The geographic scope of cumulative impacts to public services includes any other projects that would affect the same public services as would be affected by the proposed project. However, the proposed project would not include or result in the need for additional public facilities, and thus the project would not contribute to any cumulative impact on these services (**no impact**).

Recreation

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
14. RECREATION — Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a - b) Physical deterioration of parks or recreation facilities could occur if a project results in population growth that increases use of recreational facilities leading to deterioration of those facilities, or if a project displaces use of recreation uses such that use of other recreation facilities increases substantially and results in deterioration of those facilities.

Recreational resources in the region surrounding the project include ESNERR, Moss Landing Wildlife Area, and Kirby Park. Public entrances to these recreational areas are not located in the vicinity of the project area. While there may be temporary disturbance of some access routes due to overlap with truck haul routes, there are multiple public access routes such that no access point would be overused and thus would not result in physical deterioration of those areas. The Elkhorn Slough system includes public trails, but there are no public trails in the vicinity of the project (ESF, 2014). There would be no direct effect on trails resulting from the project, nor would the project displace trail use resulting in deterioration of other trail facilities. Elkhorn Slough is used by kayakers and boaters; however, the project would not affect watercraft recreation access because the project area is off limits to watercraft (ESF, 2011). Temporary construction impacts related to noise and visual resources would not impact recreationists due to the distance of recreational uses from the site and would not be substantially disruptive as those uses are consistent with existing ongoing agricultural activities on adjacent lands. Further, the project would not result in any loss of recreational water areas. Overall, the project would not displace recreational activities to other existing recreation facilities, resulting in deterioration of those other facilities. In addition, the project would not induce population growth and thus not increase the number of people using these recreational areas, requiring the construction of new facilities or the expansion of existing facilities. No recreational facilities are proposed as part of the project. For the reasons set forth above, the project would have **No Impact** on recreational resources.

Cumulative Recreation Impacts

The geographic scope of cumulative impacts to recreation facilities would include all projects that may affect access to or use of the same recreational facilities that would be affected by the proposed project. The proposed project would not affect any recreational facilities; thus the project would not contribute to any cumulative impact on recreation (**no impact**).

Transportation and Traffic

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
15. TRANSPORTATION AND TRAFFIC — Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☒	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☒	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
e) Result in inadequate emergency access?	☐	☒	☐	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

This section describes transportation facilities and traffic along travel routes that would be used by the project and in the vicinity of the project site. The impact analysis presents the criteria used to evaluate the significance of potential impacts on transportation facilities and traffic as a consequence of implementing the proposed project, the methods used in evaluating these impacts, and the results of the impact assessment.

Environmental Setting

The project site is situated 90 miles south of San Francisco and 20 miles north of Monterey (see Figure 1). Regional access to the site is provided by State Route 1 (SR 1), State Route 156 (SR 156), and State Route 183 (SR 183).

SR 1 is an undivided conventional state highway that extends north/south along the California coast. In the area closest to the project site, this highway has two travel lanes and paved shoulders. According to the most-recent data published by Caltrans, the average daily traffic volume on SR 1 in the vicinity of the project site is approximately 37,000 vehicles, with up to approximately 4,050 vehicles during the peak traffic hour (Caltrans, 2014).

SR 156 and SR 183 are both undivided east-west state highways that connect SR 1 with U.S. 101. The average daily traffic is 30,000 vehicles (3,200 peak hour) and 13,300 vehicles per day (1,350 peak hour) respectively (Caltrans, 2014).

Local access to the project site is provided by Dolan Road and Via Tanques Road in the unincorporated area of Monterey County known as Elkhorn, between Moss Landing and Castroville. Dolan Road is a two-lane rural roadway with paved shoulders. Via Tanques Road primarily serves agriculturally-related traffic, and has no painted centerline and gravel shoulders, which corresponds to low existing traffic volumes.

Airports

There are no airports in the vicinity of the project site. The nearest public airport is the Watsonville Municipal Airport is located approximately 10 miles north of the project site. Other airports include the Marina Municipal Airport, which is located approximately 12 miles south of the project site and Salinas Municipal Airport which is approximately 15 miles southeast of the site.

Public Transportation Services

Public transportation in the project site vicinity is provided by the Monterey-Salinas Transit (MST), which offers fixed-route and weekday dial-a-ride public transportation service. MST serves a 280 square-mile area of Monterey County and Southern Santa Cruz County (MTS, 2014). However, this service does not operate on roads that directly access the project site. The closest point of operation is approximately four miles west of the project site on SR 1.

Non-Motorized Transportation

There are no dedicated pedestrian or bicycle facilities in the immediate vicinity of the project site or along the surrounding roadways or highways, and SR 1 in the project area. Bike lanes are planned for in the Transportation Agency for Monterey County's Bicycle and Pedestrian Master Plan (TAMC, 2011). Improvements to the Monterey Bay Sanctuary Trail are planned for some sections of SR 1.

Approach to Analysis

The proposed project is a restoration project that would occur in two phases over approximately 11 months for each phase. For the purpose of this analysis, a worst-case scenario is presented; representing the heaviest range of associated traffic.

Roadway operating conditions are judged with respect to LOS, which is a qualitative measurement of operational characteristics of traffic flow on a roadway, based on traffic volumes and road type. LOS is defined by six grades (from A to F), with LOS A representing the best (freely-flowing) traffic conditions, and LOS F representing the worst (substantially-congested) traffic conditions. **Table 9** provides the LOS characteristics for roadways.

TABLE 9
LEVEL OF SERVICE DESCRIPTIONS

Level of Service (LOS)	Traffic Flow Characteristics
A	Free-flow operations, Little, if any, delays.
B	Reasonably free-flow operations; ability to maneuver within the traffic stream is only slightly restricted. Minimal delays.
C	Travel speeds are at or near free-flow, but the ability to maneuver within the traffic stream is noticeably restricted. Acceptable delays.
D	Travel speeds begin to decline with increasing flows. The ability to maneuver within the traffic stream is more-noticeably limited, and minor incidents can be expected to create queuing. Queues dissipate rapidly, without excessive delays.
E	Operation is at or near capacity, and therefore is volatile because there are virtually no useable gaps in the traffic stream. Maneuverability is extremely limited. Any disruption to the traffic stream, such as vehicles entering from ramps or side streets, can cause disruptions. Substantial delays.
F	Breakdown in traffic flow, with queues forming behind major breakdown points, such as traffic incidents or recurring points of congestion. Delay may block upstream intersections.

SOURCE: Transportation Research Board, Highway Capacity Manual, 2000.

Roadway conditions were analyzed based on peak-hour traffic, volume-to-capacity (v/c) ratio, and LOS. The evaluation of traffic impacts from implementation of the project was undertaken by assessing trip generation (workers and trucks) for both the construction and operational phases of the project against existing traffic conditions.

Truck traffic associated with the project would be spread out over the day, and the level of peak hour trips generated by the project would be generally low. Although the project is temporary in nature, project related traffic (workers and trucks) was added to State Routes to assess the project’s contribution to peak hour traffic.

The amount of traffic generated by the proposed project during the peak hour was estimated by adding the average daily number of workforce and haul trucks that would be present on any given construction day. Trips are assumed to be made by two types of vehicles: trucks and light duty vehicles. For the purposes of this analysis, trucks are considered semi-trucks or haul trucks that would be used to haul equipment or sediment to the storage areas. Aside from haul trucks, other construction equipment would include heavy earthmoving equipment, such as dozers, backhoes, loaders, and excavators to transport dry material out onto the marsh. A conveyor system could also be used to transport material from a stockpile out to the marsh, in lieu of dozers. A mobile radial stacker at the end of the conveyor belt would be rotated to spread the material.

Light duty vehicles would include, but may not be limited to, cargo vans, pickup trucks, sport utilities vehicles, minivans, and sedans. Light duty vehicles would be used for activities such as inspection, crew transport, and minor hauling of materials.

Hauling Scenario

Trucks would transport fill material from upland sources to the site. Table 1 in Section A, *Project Description,* presents the estimated number of truck trips that the project could potentially generate for hauling sediment from off-site locations. This analysis conservatively assumes all sediment required for the project would be sourced off site. Because sediment source locations are still unknown, the round-trip travel distance and the rate of delivery remains unknown. This analysis assumes the sediment would be sourced from locations within 50 miles from the project site, although it is expected that actual sites of the sediment would be closer. It is also assumed that sediment delivery would include up to 150 one-way haul truck trips per day during the peak delivery day.

Using a 16 cubic yard haul truck, the proposed project would generate approximately 5,588 one way trips (or 11,176 round trips) during Phase 1 of the project. Future phases would generate approximately 8,530 one-way trips (or 17,060 round trips). For a worst case scenario that assumes an overlap in project phases, under a 13-hour work day, the proposed project could generate approximately 25 one way trips (or 50 round-trips) per hour, or one truck every one to two minutes. For the purpose of this analysis, the passenger car equivalent (PCE) of a 16 cubic yard haul truck is 2.5 passenger cars.

Haul trucks would access their ultimate dump sites via temporary truck routes close to the edge of the restoration sites. Haul roads would be approximately 30-feet wide to allow for two-way traffic. The roads would be narrower if a one-way circular path can be defined. The optimum scenario would consist of a truck haul ingress route directly to the working/stockpile area, and a separate truck egress route directly back to Dolan Road. Haul routes are shown in Figure 3 of the Project Description.

Construction Workforce

As presented in Section A, *Project Description*, the construction workforce during Phase 1 would include approximately six full-time workers and approximately three part-time workers plus occasional engineer visits and supplies delivery. The future phases would require the same workforce but with one additional full-time laborer. The estimated average crew size of 10 is not anticipated to exceed 15 round trips (30 one-way trips) from construction workers traveling to and from each work site on an average day, or six during the peak hour.

Construction Trip Distribution

It is not known at this time what would be the specific destination(s) or originating location(s) for delivery of imported fill and other materials to the work sites. However, a number of restoration materials sources are located in the surrounding areas. Construction worker trips are assumed to originate from the urban areas in the project region and nearby communities.

Based on the existing roadway network serving the project area, it is assumed project trucks and construction workers traveling to and from the project site would primarily use a combination of highways (e.g., SR 1), county roads, and designated truck routes in the project vicinity to reach other local points and/or regional locations.

Construction Schedule

It is anticipated that Phase 1 construction would begin in October 2015 and last approximately 11 months (if continuous) and may be implemented over two construction seasons. Construction of future phases would begin at the completion of Phase 1 and last approximately 11 months (if continuous) and may be implemented over several construction seasons. It is assumed that some work associated with future phases (e.g., delivery and stockpile of sediment from off-site sources) could begin prior to completion of Phase 1. The construction period assumes that the construction contractors would work between the hours of 5:00 a.m. to 6:00 p.m., Monday through Friday.

Discussion

a) The trip generation for the proposed project is based on the number of workers commuting to the site on a daily basis, as well as deliveries such as sediment, and haul away of materials and equipment. For purposes of this analysis, and to ensure that potential impacts are not underestimated, although carpooling would be encouraged, construction workers are assumed to commute in their own vehicle (i.e., no carpooling) and to arrive in the a.m. peak hour and leave during the p.m. peak hour each weekday. Heavy equipment would not be hauled to or from the project site daily, but rather would be hauled in at the beginning of construction and hauled out upon completion of construction. Sediment truck-trips would occur throughout the day, but are assumed to occur mostly outside the peak commute hours. All other non-peak-hour activities (such as fuel deliveries) may occur sporadically and periodically throughout the construction duration, but they are not considered typical occurrences. The vehicle trip generation for each construction phase is shown in Table 1 of the Project Description.

Based on the anticipated construction schedule, workforce, truck deliveries, and equipment the restoration work associated with the project would generate an average of up to approximately 650 one-way truck trips per day, and up to approximately 30 one-way worker trips per day.

For purposes of determining the peak-hour LOS of SR 1, a capacity of 3,200 vehicles in both directions is assumed. The peak-hour volume along SR 1 in the project vicinity is approximately 4,050 vehicles, which is oversaturated and the LOS is F. The segment of SR 1 in the project vicinity is the most heavily traveled two-lane convention highway in Caltrans District 5 (Caltrans, 2009). The addition of peak-hour construction vehicles (i.e., up to approximately 126 PCE and 6 construction worker trips) would increase peak hour vehicles on SR 1. Traffic associated with the project would be temporary and spread out throughout the work day; however, construction traffic would occur on a highly congested highway. SR 156 has 3,200 peak hour vehicles and SR 183 1,350 peak hour vehicles, respectively (Caltrans, 2014). Like SR 1, the addition of project related construction traffic on these two-lane convention highways would be temporary and spread throughout the work day. SR 156 is over oversaturated and SR 183 has a v/c ratio of 0.42, LOS B. Although construction traffic is temporary by nature, implementation of **Mitigation Measure TRANS-1** would reduce traffic impacts on SR 1 and SR 156 to a less-than-significant level.

Further, the additional truck traffic resulting from the proposed project would temporarily disrupt existing transportation and circulation patterns in the project vicinity. Impacts would include direct disruption of traffic flows and street operations, as truck traffic in general can increase delay or reduce capacity, especially during the peak traffic periods. The impacts during peak traffic periods would be significant because they would result in either roadway or intersection levels of service that would be unacceptable (i.e., worse than LOS D). The decrease in traffic volumes outside the peak periods typically is sufficient to allow the additional truck traffic without significant delays. Delays also would be experienced by drivers during off peak hours, but because of the lower volume, fewer people would be affected by the delays during those periods. With the implementation of Mitigation Measure TRANS-1, potential traffic impacts would be reduced to a **less-than-significant** level.

Mitigation Measure TRANS-1: Prior to the issuance of construction or building permits, the project sponsor and/or its construction contractor shall:

- Prepare and submit a Construction Traffic Control Plan to Monterey County Public Works and Planning departments and the California Department of Transportation District 5 office for review. The Construction Traffic Control Plan must be prepared in accordance with both the California Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook and must include, but not be limited to, the following issues:
  - Timing of deliveries of heavy equipment and building materials;
  - Directing construction traffic with a flagger;
  - Placing temporary signing, lighting, and traffic control devices if required, including, but not limited to, appropriate signage along access routes to indicate the presence of heavy vehicles and construction traffic;
  - Ensuring access for emergency vehicles to the project sites;
  - Maintaining access to adjacent properties;
  - Specifying both construction-related vehicle travel and oversize load haul routes, minimizing construction traffic during the a.m. and p.m. peak hour, distributing construction traffic flow across alternative routes to access the project sites, and avoiding residential neighborhoods to the maximum extent feasible.
- Obtain all necessary permits for the work within the road right of way or use of oversized/overweight vehicles that would utilize county-maintained roads, which may require California Highway Patrol or a pilot car escort. Copies of the approved traffic plan and issued permits shall be submitted to the Monterey County Public Works and Planning departments.
- Coordinate with the Monterey County Public Works department to ensure the importation of sediment to be used in the restoration project is substantially completed prior to the County's repaving of Dolan Road. If sediment importation cannot be substantially completed prior to repaving of Dolan Road, CDFW/ESF shall undertake the following measures:

- Enter into a secured agreement with Monterey County to ensure that any county roads that are demonstrably damaged by project-related activities are promptly repaired and, if necessary, paved, slurry-sealed, or reconstructed as per requirements of the state and/or Monterey County.
- Submit documentation that identifies the public roads to be used during construction. The project operator shall be responsible for repairing any damage to non-county maintained roads that may result from construction activities. The project operator shall submit a preconstruction video log and inspection report regarding roadway conditions for roads used during construction to the Monterey County Public Works and Planning departments.
- Subsequent to completion of construction, submit a post-construction video log and inspection report to the County. This information shall be submitted in DVD format. The County, in consultation with the project operator's engineer, shall determine the extent of remediation required, if any.

b) As discussed above in response to checklist question 15(a), the proposed project would result in a temporary increase in traffic as materials are hauled to the site, but this increase would not adversely affect the existing capacity of area roadways over the long term. Traffic capacity along segments of SR 1 and SR 156 in the project vicinity are oversaturated. Mitigation Measure TRANS-1 requires the operator to minimize project-related traffic during the peak hour, thereby reducing traffic impacts on the roadway system. Impacts related to this criterion would be **less than significant with mitigation**.

c) The nearest public airport to the project site is the Watsonville Municipal Airport, which is located approximately 10 miles to the north of the project site. The proposed project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks, resulting in **no impact**.

d) The proposed project would require the delivery of heavy construction equipment and large quantities of sediment to the project site. Construction-related vehicle loads must comply with permit-related and other requirements of the California Vehicle Code and California Streets and Highway Code. California Highway Patrol escorts may be required at the discretion of Caltrans and Monterey County, and would be detailed in respective load permits. Due to the rural nature of the area roads, construction vehicles and haul trucks would not be expected to incur hazards traveling to and from the project site. Furthermore, the proposed project would not include a design feature or utilize vehicles with incompatible uses that would create a hazard on the roadways surrounding the project site.

The use of haul trucks to transport sediment to the project site could affect road conditions on the designated haul routes by increasing the rate of road wear. The degree to which this impact would occur depends on the design (pavement type and thickness) and existing condition of the road. Major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project's impacts are expected to be negligible on those roads. Rural roadways, such as Dolan Road, are generally not built with a pavement thickness that would withstand substantial truck traffic volumes. Mitigation Measure TRANS-1 would ensure that the project is implemented in coordination with Monterey County Public Works Department and that any damage caused by project-related traffic is repaired to County of Monterey engineering standards.

The proposed project would not change the configuration (alignment) of area roadways, and would not introduce types of vehicles that are not already traveling on area roads. However, additional truck traffic would increase the risk of accidents. Project-generated trucks on project area roadways would interact with other vehicles. Potential conflicts also could occur between construction traffic and bicyclists and pedestrians.

Implementation of Mitigation Measures TRANS-1 would require the contractor to prepare a traffic control plan in accordance with professional engineering standards prior to commencement, including compliance with roadside safety protocols, so as to reduce the risk of accident. Thus, implementation of Mitigation Measures TRANS-1 would ensure temporary increases in the potential for accidents would be mitigated to a less-than-significant level. Impacts related to this criterion would be **less than significant with mitigation**.

e) The project site is located in a rural area and a limited number of access roads would be affected by truck traffic during the restoration project. The project would not alter roadway configurations. As such, the proposed project would not alter emergency access in the public right-of-way. Additionally, as part of the project, internal access roadways improvements would occur to allow materials to be brought to the site. Therefore, the project would allow for adequate emergency access.

As described in response to checklist question 15(a), increased project-related traffic would not cause a significant increase in congestion and would not significantly affect the existing capacity on area roads, with implementation of Mitigation Measure TRANS-1. Furthermore, the proposed project would not require closures of public roads, which could inhibit access by emergency vehicles. During restoration, heavy construction-related vehicles could interfere with emergency response to the site or emergency evacuation procedures in the event of an emergency (e.g., slowing vehicles traveling behind the truck). However, given that there are no retail businesses, limited residences, and no emergency response stations in the immediate vicinity of the project site, it is not considered likely that heavy construction-related traffic would result in inadequate emergency access. Impacts related to this criterion would be **less than significant with mitigation**.

f) Monterey County's General Plan includes policies regarding access and safety standards of roadway facilities, bike facilities, and public transit. There are no dedicated pedestrian or bicycle facilities in the immediate vicinity of the project site. Bike lanes are planned for in the Transportation Agency for Monterey County's Bicycle and Pedestrian Master Plan (TAMC, 2011). Improvements to the Monterey Bay Sanctuary Trail are planned for some sections of SR 1.

The proposed project would not conflict with the General Plan policies, the Bicycle and Pedestrian Master Plan, or transit services, because there is no public transportation service or dedicated pedestrian or bicycle facilities on roads that provide direct access the project site. The closest such facilities are located on SR 1, and the project would not introduce types of vehicles that are not already traveling on area roads or introduce a barrier to pedestrians, bicyclist, and transit use on this facility. Therefore, the project would not conflict with adopted policies, plans, or programs supporting alternative transportation. Therefore, the project would have a **less-than-significant** impact on alternative modes of transportation.

Cumulative Transportation and Traffic Impacts

The geographic scope for potential cumulative impacts related to transportation and circulation encompasses the State highways in the project vicinity (i.e., SR 1, SR 156, and SR 183) and local roads. As described above in response to checklist question 15(a), construction of the proposed project would result in a temporary increase in vehicle trips on the State highways, Dolan Road, and Via Tanques Road. Construction activities associated with the project would be expected to occur in two phases, starting in October 2015 and lasting approximately 11 months for each phase, possibly over multiple construction seasons for each phase.

Of the cumulative projects listed in Table 2, only those that would use SR 1, SR 156, and Dolan Road, and that have overlapping construction schedules could contribute to cumulative traffic impacts on these roadways; these projects include: Deep Water Desal (beyond 2017), Moss Landing Community Plan (through 2045), Moss Landing Harbor District / USACE maintenance dredging (ongoing every 2-4 years), Monterey Peninsula Water Supply Project (2016-2018), and Elkhorn Road and Dolan Road resurfacing (starting in 2017).

As discussed in response to checklist question 15(a), construction of the proposed project would contribute haul trucks to roadways that are operating at saturated levels, specifically, SR 1 and SR 156. Implementation of Mitigation Measure TRANS-1 would reduce the project’s impact to traffic volumes, as it would encourage truck traffic to occur outside the peak commute periods. After construction activities associated with the project are completed, there would be only periodic project-related visits to the site for maintenance and monitoring. As such, the project would not substantially affect cumulative traffic volumes on SR 1 or SR 156. However, the temporary increase in truck traffic from the proposed project and other construction projects in the vicinity could cause a cumulative impact. Implementation of Mitigation Measure TRANS-1 would reduce the project’s cumulative impact level to **less-than-significant**.

Utilities and Service Systems

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
17. UTILITIES AND SERVICE SYSTEMS — Would the project:				
a) Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion

a - c) The project would not generate any wastewater. As a result, it would not exceed any wastewater treatment requirements, require construction of new wastewater treatment or storm water drainage facilities, or result in the expansion of existing facilities. **No impact** would occur.

d) Project construction would not require expanded water entitlements because the project would not need additional water during construction. Expanded entitlements are not required once construction is complete, as no additional water would be needed at the site upon project completion. The project would have **no impact** to existing water entitlements and resources.

e) The proposed project would not increase demand associated with wastewater treatment because it would not generate any wastewater. **No impact** would occur.

f - g) Construction of the project would have limited solid waste disposal needs because it would not require the demolition of existing facilities or the disposal of substantial quantities of excavated soil. Small amounts of solid waste may be generated by workers or equipment during construction, which would require recycling or disposal, as applicable, in accordance with state and local solid waste regulations. Materials could be hauled by the construction contractor to transfer stations or disposal sites south of the project area, such as Monterey Peninsula Landfill (remaining capacity of over 48 million cubic yards) or Salinas Disposal, Transfer and Recycling (500 tons/day maximum throughput) (CalRecycle, 2014). The project would be required to comply with applicable federal, state, and local statutes and regulations related to solid waste. The impact of solid waste generated by the project would therefore be **less than significant**.

Cumulative Utilities and Services Impacts

The geographic scope of potential cumulative utilities and service systems impacts consists of the project site and immediate vicinity, the service areas of the regional utility providers, and landfills in the project region.

As described above, the project would not generate wastewater or require the construction of new water facilities or new water entitlements; therefore, it would not contribute to any cumulative environmental impact in this regard. The remaining permitted capacity of the nearest landfill that accepts municipal waste is over 49 million cubic yards. Other cumulative projects would contribute an unknown quantity of solid waste to the region's sanitary landfills which, collectively, have approximately 51 million cubic yards of remaining capacity (CalRecycle, 2014). The proposed project, in combination with the other cumulative projects identified in Figure 7, could result in a cumulative impact on landfill capacity. However, given the available landfill capacity, the proposed project's incremental contribution would not be cumulatively considerable (**less than significant**).

Mandatory Findings of Significance

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
17. MANDATORY FINDINGS OF SIGNIFICANCE — Would the project:				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Discussion

a) The discussion in Section E, Evaluation of Environmental Impacts, identifies potentially significant impacts on the environment related to air quality, biological resources, cultural resources, hazardous materials, geology, and transportation. However, mitigation measures have been provided to address these potentially significant project-level impacts. Implementation of the mitigation measures would reduce the impacts to a less-than-significant level.

As discussed in Section E.4, *Biological Resources*, project impacts on special-status wildlife (e.g., marine mammals, special-status fish and special-status birds) would be reduced with implementation of **BIO-1a (Seasonal Avoidance)**, **BIO-1b (Education Program),** and **BIO-1c (Biological Monitoring)**. In summary, impacts related to reducing the number or restricting the range of a rare or endangered plant or animal would be **less than significant with mitigation**.

As discussed in Section E.5, *Cultural Resources*, construction activities associated with the proposed project could result in potential impacts on unknown archaeological resources paleontological resources, and human remains. These impacts would be less than significant with implementation of **CUL-1 (U.S. Army Corps of Engineers Standards for archaeological work)**, **CUL-2 (Inadvertent Discovery of Prehistoric Resources)**, **CUL-3 (Inadvertent Discovery of Paleontological Resources)**, and **CUL-4 (Inadvertent Discovery of Human Remains**). Therefore, impacts related to elimination of important examples of California history or prehistory would be **less than significant with mitigation**.

b) Section 15130 of the State CEQA Guidelines requires a reasonable analysis of the significant cumulative impacts of a proposed project. *Cumulative impact* refers to "two or more individual effects that, when considered together, are considerable or able to compound or increase other environmental impacts." The individual effects may be changes resulting from a single project or an increase in the number of environmental impacts. The cumulative impact is the change in the environment that results when the incremental impact of the project is added to closely-related past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects that take place over a period of time (CEQA Guidelines Section 15355 (a)(b)).

For the purposes of this initial study, the geographic context for the proposed project's cumulative impact assessment is generally the Elkhorn Slough area, although an expanded geographic context was considered for some topics. Recently approved and reasonably foreseeable projects and planning efforts in the vicinity of the project site are presented in Table 2.

This initial study determined that the proposed project would have no impact or is not applicable for the following issues: mineral resources, population and housing, and public services. Therefore, the proposed project would not contribute to cumulative impacts related to these issue areas.

The assessment of potential cumulative impacts for the remaining environmental issue areas is provided in the relevant subsections of Section E, Evaluation of Environmental Impacts. However, for the reasons described in Sections E.1 through E.16, with implementation of mitigation measures to address the potential for significant project-level impacts, the proposed project's contribution to all cumulative impacts on the environment would not be cumulatively considerable (**less than significant with mitigation**).

c) Discussion in Section E, Evaluation of Environmental Impacts, identifies potentially significant impacts related to air quality, cultural resources, hazardous materials, geology and soils, and transportation. Of these, impacts related to air quality, hazardous materials, and transportation could adversely affect human beings. Mitigation measures have been provided in this initial study to reduce these potentially significant project-level impacts to a less-than-significant level. No project-level significant impacts were identified for the following environmental issue areas: aesthetics; agricultural and forest resources; land use; mineral resources; noise; hydrology and water quality, population and housing; public services; recreation; utilities and service systems. Therefore, with implementation of the mitigation measures specified in Sections E.1 through E.16, the proposed project would not result in substantial adverse effects, direct or indirect, on human beings (**less than significant with mitigation**).

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Appendix A

Construction Methods and Equipment

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MEMORANDUM

To: Michelle Orr, ESA

From: Dilip Trivedi, Megan Bordelon, Jack Fink

Date: June 10, 2013 (revised April 11, 2014)

Subject: Draft Construction Methods
Elkhorn Slough – Phase 1 Marsh Restoration Project
M&N Job No. 7962

Construction Methods for Dry Import Fill Material

The following is a description of the methods in which material may be delivered and placed on the Minhoto-Hester's Marsh and Seal Bend. The selected contractor may use a combination of the construction methods described to achieve the project goals.

Material Delivery
Material may be delivered to the restoration sites by trucks or rail, as described in detail in the following section. If delivered by trucks, material could be stockpiled in the vicinity of the restoration site, or placed directly on the marsh for spreading. If delivered by rail, material would have to be trucked or conveyed from an unloading area near the rail tracks to a stockpile near or on the marsh, requiring an additional handling step compared to delivery via trucks.

Trucks
The most common type of transportation for fill material from upland sources is by truck (Figure 1, Photo A). Trucking is the conventional transport mode for the upland construction industry. Costs for trucking are lowest when the number of times the material is handled is minimized, so this discussion emphasizes "single- or double-handling" of material since the needed quantity of sediment addition is relatively high for this project. Material is typically loaded into trucks capable of carrying from 10 cubic yards for a standard rear-dump truck, 14 cubic yards for a twin-trailer belly dump truck, to 20 cubic yards for a "super 10" rear dump truck (the longest bed of any on-road single-trailer truck used for transporting earthen material) and a twin-trailer rear dump truck arrangement. The total number of truck trips to deliver 100,000 cubic yards of material is between 5,000 to 10,000 round trips, depending on the size of the truck. This level of trucking would need to be evaluated for impacts to traffic, infrastructure, the environment and public safety.

Generally, the considerations most important for sediment addition at a site are direct access by trucks and earthmoving equipment and available working/staging area. Trucks need to be able to gain access to their ultimate dump site(s), so it will be necessary to provide temporary truck routes as close to the edge of the wetland as possible to minimize re-handling of the sediment (and associated costs).

Temporary haul roads should be approximately 30 feet wide to allow traffic in two directions, unless a one-way circular path can be defined. A working/stockpile area should be positioned near where sediment will be placed in the wetland. This working/stockpile area should be one that supports a piece of equipment such as a dozer that can push the sediment out onto the marsh. Working/stockpile areas should be approximately 10,000 square feet (one-quarter acre) in area to support the operation.

At Elkhorn Slough, the optimum scenario would consist of a truck haul ingress route directly to the working/stockpile area, and a separate truck egress route directly back to Dolan Road. The working/stockpile area should be large enough that trucks can offload in it, and a dozer can then push the material placed by the trucks into a large stockpile. Ideally, the working/stockpile area would encompass the shoreline along the proposed wetland to enable progressive placement as needed within the wetlands.

The proposed stockpile location for Phase 1 work (M1, M2, M3, and possibly H1) is just west of the Minhoto Marsh on farmland. The ideal stockpile or drop-off location for H1 (and potentially M1c) would be just east of H1, where trucks would access the hillside by driving Via Tanques Road through the adjacent car “Pick-N-Pull”. If H1 is restored in Phase 2, material could be placed directly on the marsh from the east hillside, eliminating a need for stockpiling. For Seal Bend, if the material must be stockpiled prior to placement on the marsh, a stockpile location is not identifiable immediately adjacent to the marsh. Trucks could stockpile material in the fields located approximately 2000 feet south from the Seal Bend, however the material would have to be re-handled and either trucked again to the marsh at the time of placement, or a conveyor system would have to be installed to transport the material. In either case, costs will increase with re-handling material.

Rail Car Belly or Side Dump with Conveyor Belt System

A Union Pacific Railroad (UPRR) track runs just east of Hester’s Marsh, where rail cars could offload from an existing track siding. If the existing track siding is in usable condition, the appropriate land permissions would have to be obtained and the train scheduling would not have to conflict with current track uses. If any of these issues render the sliding unusable, a new costly track siding would have to be constructed.

Rail transport of sediment along the UPRR line could deliver large quantities of sediment to the site, assuming there is a suitable location for the material to be loaded onto the rail cars at the source site. Rail cars that haul aggregate are equipped with either doors that open under the bottom of the car, or the cars tip and allow material to be emptied from the car (Figure 1, Photo B & C). A system of conveyance would have to be installed to move the material from either under the rail car or from next to the tracks to the desired stockpile or placement site (Figure 1, Photo D). A similar system was used for delivery of 75,000 cubic yards of sand to Seal Beach in southern California in 1997/98 that worked successfully to nourish that site. In that particular case however, the tracks were owned by the restoring agency, which made modifications to the tracks possible.

Just east of Hester’s Marsh, side dump rail cars would be the most cost-efficient means of transferring the material off the cars. Dozers or loaders would move piled material away from the dump location. The loaders could transport the material down the hill for stockpiling on or near Hester’s Marsh with multiple trips, or via a conveyor system. Hester's Marsh and M1c are the preferred sites to receive material delivered by rail cars because of their nearby location. The other restoration areas (Seal Bend and Minhoto M1-M6, excluding M1c) are not easily accessible by rail car or would require trucking to another stockpile area away from the rail dump site. The material would have to be triple-handled, which would be very costly.

Permission of the UPRR is required for this operation, including a rail right-of-way which can be time-consuming to obtain. Material costs for delivery depend on rail costs and can exceed costs for trucking. Sediment delivery costs by rail for the Seal Beach project were approximately 20% higher than the costs would have been to deliver the material by truck. Some of the cost increase was due to their installation of a conveyor system from the rail car drop site to an earthwork stockpile, as well as trucking the material first to a yard and loading it on to trains. For these reasons it may not be economical to utilize nearby material sources for the Elkhorn Slough Restoration Project. The advantage of rail for the Seal Bend Project was the large quantity delivered over a short time and the lack of impact to traffic, air quality, and public safety from rail compared to trucking.

Material Placement

Once the material is stockpiled onsite, it may be transported from the stockpile to the marsh by means of earthmoving equipment or a conveyor system in conjunction with earthmoving equipment. The feasibility and associated assumptions of dry material placement methods are described below. All dry material placement methods will require dust control measures.

The stability of the marsh soils and their bearing capacity to support equipment will influence the method of material placement. The historical uses of the restoration areas provide input into the level of consolidation of the existing sediment. As described in the existing conditions report, portions of Seal Bend and Minhoto-Hester's restoration areas were converted to pasture for cattle, which indicates those areas will be better consolidated than those areas intentionally flooded and used for waterfowl hunting.

<u>Earthmoving Equipment (Dozers, Loaders, etc.)</u>

Heavy earthmoving equipment such as dozers, backhoes, loaders, and excavators may be used to transport dry material out onto the marsh. All heavy equipment traveling out on the marsh would have to be low ground pressure (to prevent sinking in the mud) and haul roads or timber mats would be temporarily placed in specific paths on the marsh where needed to additionally spread the weight of the equipment (Figure 2, Photo A).

Dozers would push material from the stockpile out to the marsh, creating a raised working surface in which they can operate at desired fill elevation, approximately 1.5 – 2 feet above the current marsh. With this method, the equipment could be operated nearly all the time since the design elevation is at the MHHW level (which occurs for less than 5% of the time in a month). Loaders could supplement moving the stockpiled material closer to the marsh as work progresses.

The most cost effective method of earthmoving is to fill an entire surface to a designated elevation, with straight paths throughout the fill footprint to push the material. Desired tidal channels can be re-dug with an excavator or backhoe. For Elkhorn Slough, existing tidal channels are an important design component. For earthmoving equipment, tidal channels present a challenge to navigating the marsh. The low ground pressure dozers will not be able to reliably cross the lower channels, especially if it violates rental contracts of the equipment. Marsh buggies are capable of working in those conditions, however they're commonly found along the Gulf Coast and the cost for mobilization would be cost-prohibitive for this project. They are not discussed further for that reason.

Working around the channels and extending the trip paths from the stockpile to the fill locations will increase the time, and therefore cost, of restoring the marsh. To limit trip distances onto the marsh, channel crossings would be constructed in numerous locations, comprised of 2 to 3 culvert pipes covered with material to allow continued water flow in the marsh. The crossings would be approximately 30 feet in width for two-way traffic of dozers. The crossing would be removed with an excavator or backhoe when the area requiring access is filled.

The types and numbers of earthmoving equipment that are available to the contractor will influence the phasing plan to push material out over the marsh, as well as locations of channel crossings. If the construction and removal of the channel crossings are undesirable from an ecological perspective, they could be limited by a minimum distance between each (such as 200 feet). There will be a cost efficiency balance between constructing numerous channel crossings that will require removal, and trip distances. It's very unlikely the main (100 foot) channel separating Minhoto and Hester's Marshes would be crossed by dozers; the preferable method would be to stockpile material near Hester's Marsh and push material from there, otherwise material will have to be transported around the southern portion of the marsh.

Dry sands, silts, and clays may be moved with earthmoving equipment. Compaction of the fill is not recommended, as it is known to stifle vegetation growth. Maintaining the water flow throughout the marsh during construction will enhance seed deposition and vegetation growth. Silt fencing and other turbidity barriers will be placed at key reaches along the channels and marsh to limit turbidity out of the placement area.

Relative to the other dry and wet material placement methods described below, using earthmoving equipment is less costly than any wet placement method, and in the same price range as using a conveyor belt in conjunction with earthmoving equipment (described in the next section). The approach of tidal channel preservation and channel crossings will influence the cost.

<u>Conveyor System with Earthmoving Equipment</u>

A conveyor system may be used to transport material from a stockpile out to the marsh, in lieu of dozers pushing the material the full distance. A loader would continuously load the conveyor system with material near the stockpile, and a dozer at the marsh drop off location would spread the material to prevent build up and delay the material movement (Figure 2, Photo C & D). The dozer in the marsh would utilize low-ground pressure tires, while the loader near the stockpile could be typical equipment operating on sturdy ground.

A conveyor system may be very helpful in transporting material to hard-to-reach marsh areas surrounded by tidal channels that are to be preserved. Channel crossings could be constructed to get dozers to the confined area, and then conveyors could deposit the material efficiently. Installing conveyors is possibility for this project, as they are easily installed and comparable in cost to other equipment rentals. Timber matting could be temporarily placed on the marsh to provide a stable footing for the conveyors. A mobile radial stacker at the end of the conveyor belt could be rotated and spread the material 180 degrees (Figure 2, Photo B), increasing the placement efficiency.

With a conveyor system, less dozer traffic will be crossing the marsh. Channels won't potentially have to be filled as often with channel crossings. The material placement options via dozer or conveyor system can support different tidal preservation approaches.

All dry sediment types may be transported with a conveyor belt system. Because the material will be moved into place by dozers in the marsh, the turbidity generated by placement is expected to be the same as placement with dozers. The conveyor system will limit trips across the marsh to the placement locations. Overall, the turbidity generated using a conveyor system versus dozers to transport material to the marsh is not likely to be significantly different.

Vegetation establishment via the tides is similar to the earthmoving equipment method of placement, as well as the turbidity controls (silt fencing).

Proposed Placement Equipment by Restoration Sub-Site

Table 1 below summarizes the proposed earthmoving equipment to move and place the material in the restoration sites. (These assumptions were used to generate the Alternative's Cost Estimate prepared by Moffatt & Nichol dated 05/29/2013). Figure 3 depicts the conveyor locations and stockpile assumptions.

Sub-Site Name	Material Movement Equipment	Material Placement Equipment	Assumptions
H1	2 conveyors (600 ft, 400 ft) 1 loader	2 dozers	Material transported from stockpile or borrow area adjacent to Minhoto Marsh
M1a	-	2 dozers	Material pushed onto M1a from adjacent upland stockpile or borrow area
M1b	-	2 dozers	Material pushed onto M1b from adjacent upland stockpile or borrow area
M1c	1 conveyor (300 ft) 1 loader	2 dozers	Material conveyed from stockpile adjacent to Minhoto Marsh to M1c or borrow area

Sub-Site Name	Material Movement Equipment	Material Placement Equipment	Assumptions
M2	-	2 dozers	Material pushed onto M2 from adjacent upland stockpile or borrow area
M3	1 conveyor (300 ft) 1 loader	2 dozers	Material conveyed from stockpile adjacent to Minhoto Marsh to M3 or borrow area
M4a	-	2 dozers	Material deposited directly on M4a (no stockpile assumed)
M4b	-	2 dozers	Material deposited directly on M4b (no stockpile assumed)
M5	1 conveyor (350 ft) 1 loader	2 dozers	Material deposited on upland area adjacent to Minhoto Marsh, then conveyed to M5 (a small transfer location near conveyor loading area assumed)
M6	-	2 dozers	Levees around M6 are suitable for truck traffic to place material around the perimeter for spreading (no stockpile assumed)
S1	For all S1 - S4 sites: 1 conveyor (2000 ft) 1 loader For S4 only: 1 additional conveyor (800 ft)	2 dozers	Stockpile in fields 2000 ft south of restoration sites
S2		2 dozers	
S3		2 dozers	
S4		2 dozers	

Preservation of Tidal Channels

Tidal channel preservation while filling a marsh is challenging. Installing best management practices (BMPs) or avoiding the channels while filling are two possible methods to preserve channels. Tidal channels may be re-dug after material is placed.

The following discussion assumes borrow channels will be filled. Artificial borrow ditches are typically deeper than surrounding marsh channels, becoming a source of high water velocities and should be filled where possible to restore a natural tidal exchange across the marsh.

<u>BMPs with Setbacks</u>

BMPs, such as hay bales or silt fences, may be staked into the ground along channels to prevent the approximately 2 feet deep fill from entering the channels during dry material placement. In all dry placement methods, dozers would push material up to the BMPs to achieve the desired elevation. The BMPs will be installed with an appropriate setback from the channel (possibly 5 feet), such that material will not fall into the channel as BMPs are removed at the completion of an area.

This tidal channel preservation method will create longer, flatter channel side-slopes than most likely seen in a natural marsh system. As mentioned previously, channel crossings with culverts would be constructed to allow for equipment to maneuver the marsh, and still allow for water movement. BMPs and channel crossings would be removed at project completion.

Avoidance of Channels

If tidal channels are avoided all-together during the spreading of dry material, a larger setback (possibly 10-15 feet) from the channel edge would have to be acceptable (compared to the BMP sediment barrier option). Longer, flatter slopes will border all the channels, and material placement efficiency would be sacrificed as dozers would have longer routes (around channels) to placement areas (as compared to not preserving the channels). Channel crossings with culverts would still be required to maneuver around the marsh; however they would be removed at the completion of the project.

Turbidity Control and Containment

Turbidity is generated when dry material is placed in the ponded tidal zone and as tides inundate newly-placed material. Because the deeper tidal channels containing water will mostly be avoided when placing material, only limited turbidity is expected when dozers push material out onto the marsh. As in any earthmoving project, the turbidity generated during the project must comply with water quality guidelines.

Turbidity may be controlled with typical BMPs such as silt fencing, hay bales, and straw waddles (Figure 6, Photo A, B & C). These BMPs are an effective tool in slowing sheet flow and catching solids prior to water leaving the site. A less common method of turbidity control is full containment of a site, such as installing sheet piles or levees across long distances to block tidal flows between the worksite and nearby water body. This method would create a drier working surface and allow for quick fill placement, however it would come at a high cost and the turbidity reduction benefits are expected to be minimal, if any. Further discussion of working in a contained and uncontained site is described below.

Working in a Tidal Environment (no containment)

During placement of material into the restoration areas, channels in the active placement area will be isolated by small berms or silt fencing to limit sediment transport into Elkhorn Slough without limiting water movement on the marsh. The marsh would be placed in sections within the small berms or silt fencing. When fill is placed in channels to create crossings for equipment, culverts will be installed to allow for continued water migration into and out of the marsh. Standing water, causing unstable working conditions, is not desired.

When the dozers push the material out in front of them, creating a raised path at the design elevation (MHHW), they would be creating a surface they can work on during most tides. High water levels during working hours could decrease the work efficiency but it is expected to be for a short, predictable time.

Working in the dry (with containment)

To work in the dry, sheet piles, berms or levees would have to be constructed to block tidal flow into the restoration site. The turbidity generated from construction activities would not likely be different than placing the material during open tidal interaction. The cost to installing sheet piles or levees would be significant.

Blocking tidal interaction on the marsh could raise fish entrapment issues, and more significantly would eliminate the water as a seed source. Vegetation establishment would proceed much slower without tidal inundation of the new fill material.

Because the fill material should not be compacted (to avoid stifling vegetation growth), the fill material will erode a small amount initially once the tides are allowed to enter the newly raised marsh area. The initial erosion is not expected to be significantly better or worse than if the contractor were placing material on the marsh while it was open to tides, although the cost would be significantly more to try to keep the water out of the marsh while working. Pumps, requiring diesel generators for power, would be required to pump the water that infiltrates into the working area back to the slough. This pumping will also very likely require a discharge permit.

Wet Material Delivery and Placement

Wet material delivery to the restoration sites could come from two projects in Moss Landing: the Army Corps of Engineers (Corps) federal channel dredging and the Moss Landing Harbor District dredging. The Corps dredges the federal navigation channel in Moss Landing Harbor every three years and disposes the material on the beach or in a designated aquatic disposal site (SF-12). An estimated 13,500 cubic yards of sandy material and 31,500 cubic yards of silty material is dredged each event (Corps 2007). The Corps uses either a clamshell or a hydraulic cutterhead (typ. 12”) dredge.

The Moss Landing Harbor District dredges the harbor’s berthing and docking facilities where sands, silts, and clays accumulate. The Harbor District also uses a 12” hydraulic cutterhead dredge, which creates a hydraulic slurry (~20% solids and ~80% water) to transport material through a pipeline to the designated placement site. Silts and clays can be conveyed farther distances hydraulically in smaller pipelines than sand, and silts/clays are also preferred for marsh fill.

The Minhoto-Hester’s Marsh is approximately 15,000 feet upriver from the harbor, which is feasible for a small hydraulic dredge pushing silts and clays. A booster pump located along the pipeline could provide additional power to convey the slurry to the destination site. Dredging at the harbor is restricted to designated environmental work windows during the year, so the restoration work would be subject to the dredging project’s schedule.

Other sources of wet material are unlikely to be feasible because the means of getting the material to the site is limited by the shallow depth of Elkhorn Slough. Barges/scows or hopper dredges have deeper drafts than the approximate 10-foot deep slough near Minhoto Marsh. Slough water would be mixed with the material in the barges/scows to create a slurry for pumping to the restoration sites (Dean III 2003). A significant amount of water would also have to be discharged back into the Slough, requiring discharge permits.

In preparation of receiving a sediment slurry mix, water containment infrastructure must be in place at the restoration areas. Levee and berm building requires upland sources of material for creation of the initial berms (or creation of borrow ditches). Depending on the existing levees conditions, they could provide initial foundation for the construction of the levees. Soil erosion control measures would be installed on perimeter containment levees to prevent discharge of sediment to surface waters. The sediment slurry mix would be discharged into the containment cells, filling the lower channels first (Figure 4, Photo A & B). Tidal channel preservation with wet placement would not be possible.

Containment cells would be connected with adjustable discharge weirs, leading from one to the next to slowly decant the water off the top of the slurry. Decant water would be discharged back into Elkhorn Slough via discharge pumps (if not possible to flow by gravity). Significant space would be required to allow adequate detention time for solids to settle. The discharged waters would be monitored for compliance with the waste discharge requirements defined in a RWQCB site-specific permit. The turbidity generated within the restoration site areas during wet material placement would be much more compared to during dry material placement.

If the sediment was mostly sand, it would settle quickly and collect near the discharge pipe and have to be continuously moved away from the pipe discharge by excavators or dozers (Figure 4, Photo C). If the sediment was mostly silt, it will flow out away from the end of the pipe. The pipe would be dragged or pushed along the levees with dozers to fill different areas of the containment cells. If the existing or constructed levees are in poor condition and cannot resist the weight of a dozer, the pipeline would have to be brought up the main channel at high tide to reach the inner Minhoto and Hester's Marsh areas. The sediment would have to remain covered with water to minimize consolidation. Significant efforts would be undertaken to meet water quality guidelines, including designing an acceptable detention time for sufficient solids setting.

Once the desired elevation was obtained, water control structures would be removed and the levees would be excavated down to grade. The tidal channels could be re-dug.

Rainbow placement of wet material is a method to distribute sediment farther from the end of the pipe and commonly used in beach fill construction projects. Rainbow placement is not recommended in this case because it is relatively limited in distance, causes higher turbidity than typical wet slurry placement, has reduced control, and would not preserve tidal channels (Figure 4, Photo D).

Some projects create a slurry mixture from dry, stockpiled material by digging a pit or renting a dump box and mixing water and sediment into the pit (Figure 5, Photo A & B). The slurry is pumped out with a slurry pump to the desired location (with containment berms in-place). This method allows for small pipelines to be used (6-8" as opposed to 12" or larger with dredges) which are much easier to move, however the smaller pipe results in slower production rates and placement time could double. A pit or dump box is in the same cost range of placing material with trucks or a conveyor belt, excluding the initial levee construction. As with any hydraulic placement of material, all tidal channels will be filled in and could later be excavated.

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<u>Figures</u>

Figure 1. Dry Material Delivery Methods
Figure 2. Dry Material Placement Methods
Figure 3. Dry Material Movement Routes
Figure 4. Wet Material Delivery and Placement Methods
Figure 5. Wet Material Delivery and Placement Methods Continued
Figure 6. Turbidity Control Measures

Photo A. Dump Truck

Photo B. Loader filling a bottom dump rail car

Photo C. Rail car belly dump

Photo D. Rail car belly dump location with conveyor belt

Figure 1. Dry Material Delivery Methods

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Elkhorn Slough
Tidal Marsh Restoration

Photo A. Low ground pressure bulldozer
www.nature.org/

Photo B. Mobile Radial Stacker

Photo C. Typical conveyor
M&N Study Report for Occidental de Colombia 2012

Photo D. Typical Conveyor Loading Hopper
M&N Study Report for Occidental de Colombia 2012

Figure 2. Dry Material Placement Methods

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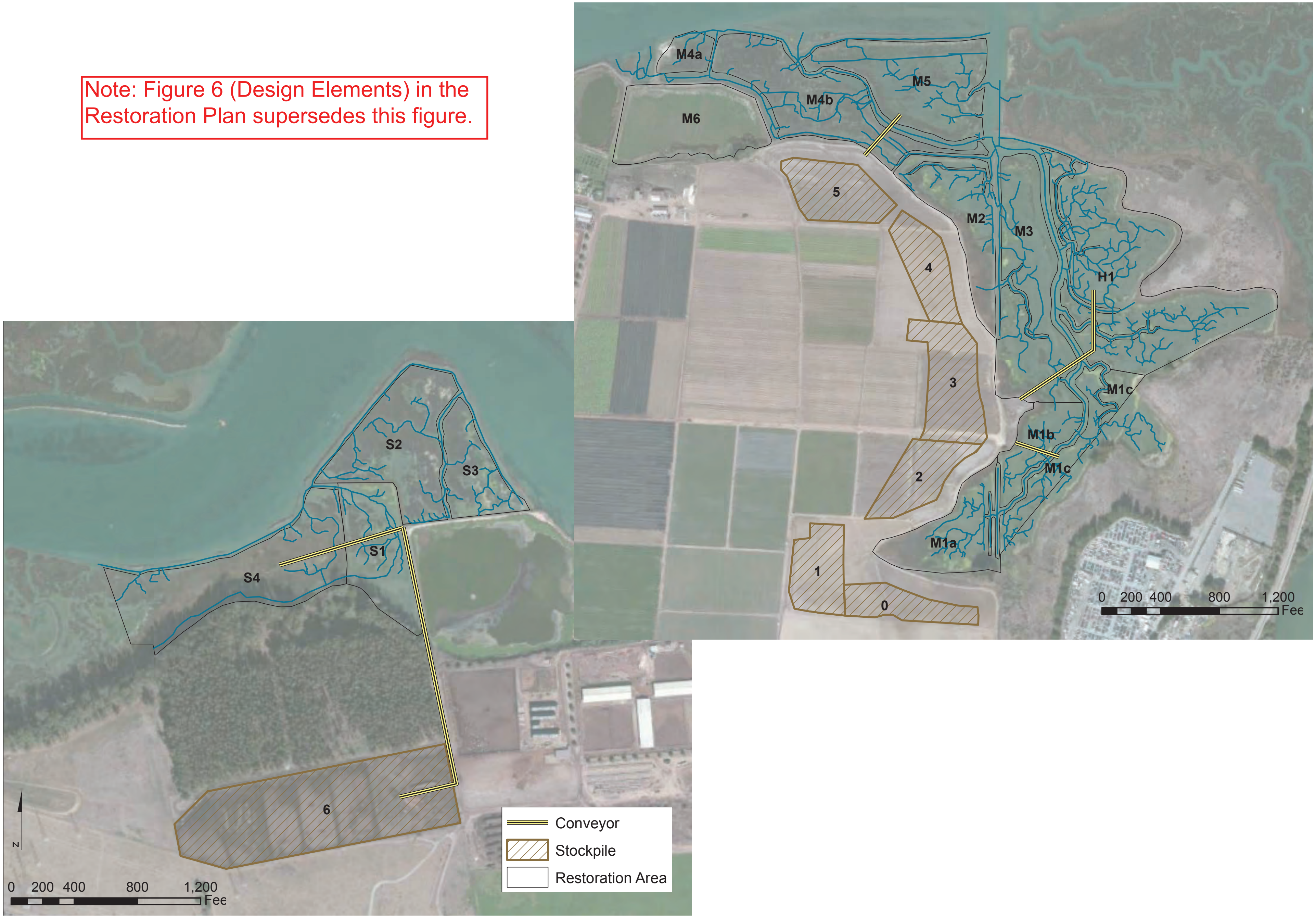
Note: Figure 6 (Design Elements) in the Restoration Plan supersedes this figure.



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Elkhorn Slough
Tidal Marsh Restoration

Figure 3. Dry Material Movement Routes

Photo A. Bulldozer clearing pipe discharge
http://baynature.org/

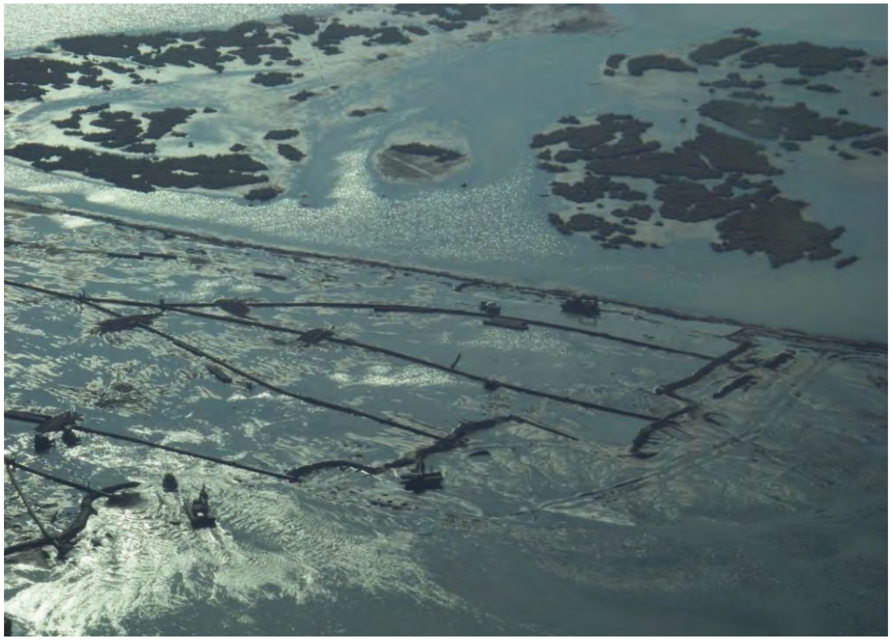

Photo B. Hydraulic placement

Photo C. Excavator clearing pipe discharge

Photo D. Rainbow Placement

Figure 4. Wet Material Delivery and Placement Methods

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Elkhorn Slough
Tidal Marsh Restoration

Photo A. Pit for slurry mixing (dry to wet material) and slurry pump

Photo B. Dump box for slurry mixing (dry to wet material) and slurry pump

Figure 5. Wet Material Delivery and Placement Methods Cont.

MOFFATT & NICHOL

WALNUT CREEK, CALIFORNIA

Elkhorn Slough
Tidal Marsh Restoration

Photo A. Turbidity control with containment fencing

Photo B. Turbidity control with containment fencing
www.terraerosion.com

Photo C. Silt Fencing around a channel
http://farm9.staticflickr.com/8219/8360429939_a0b9ec90cb_s.jpg

Figure 6. Turbidity Control Measures

MOFFATT & NICHOL
WALNUT CREEK, CALIFORNIA

Elkhorn Slough
Tidal Marsh Restoration

Appendix B
Air Quality Calculations

APPENDIX B

AIR QUALITY CALCULATIONS

Appendix B Contents:

CalEEMod Phase 1 Summer Daily Emissions Report - 1 page
CalEEMod Future Phase Summer Daily Emissions Report - 1 page
CalEEMod Combined Annual Emissions Report - 1 page

CalEEMod Phase 1 Overall Construction Summery Emissions Summary (Maximum Daily Emissions)

<u>Phase Assumptions:</u>

Construction Start date: October 2015
Duration: 11 months
Work schedule: 5 days/week
Equipment: Dozers, Loaders, backhoes and dump trucks

<u>Unmitigated Construction</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.5350	69.3666	51.4643	0.0740	131.4326	3.4179	134.8504	13.0891	3.1757	16.2648	0.0000	7,622.6590	7,622.6590	1.9592	0.0000	7,663.8028
2016	5.9647	62.7752	50.2703	0.0739	41.0204	3.0970	44.1173	4.0868	2.8770	6.9637	0.0000	7,544.9114	7,544.9114	1.9476	0.0000	7,585.8117
Total	**12.4997**	**132.1418**	**101.7346**	**0.1478**	**172.4529**	**6.5148**	**178.9678**	**17.1759**	**6.0526**	**23.2285**	**0.0000**	**15,167.5704**	**15,167.5704**	**3.9069**	**0.0000**	**15,249.6145**

<u>Mitigated Construction</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.5350	69.3666	51.4643	0.0740	40.7010	3.4179	44.1189	4.0470	3.1757	7.2227	0.0000	7,622.6590	7,622.6590	1.9592	0.0000	7,663.8028
2016	5.9647	62.7752	50.2703	0.0739	12.7070	3.0970	15.8039	1.2651	2.8770	4.1421	0.0000	7,544.9114	7,544.9114	1.9476	0.0000	7,585.8117
Total	**12.4997**	**132.1418**	**101.7346**	**0.1478**	**53.4080**	**6.5148**	**59.9228**	**5.3121**	**6.0526**	**11.3648**	**0.0000**	**15,167.5704**	**15,167.5704**	**3.9069**	**0.0000**	**15,249.6145**

CalEEMod Future Phase Overall Construction Summery Emissions Summary (Maximum Daily Emissions)

Phase Assumptions:

Construction Start date: August 2016
Duration: 11 months
Work schedule: 5 days/week
Equipment: Dozers, Loaders, backhoes and dump trucks

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	3.6452	33.1683	33.2971	0.0414	52.0251	1.5384	53.5635	5.1841	1.4431	6.6271	0.0000	4,162.3938	4,162.3938	0.8799	0.0000	4,180.8718
2017	3.8718	35.9686	36.3353	0.0530	151.5200	1.6725	152.2243	15.0892	1.5881	15.7372	0.0000	5,210.9753	5,210.9753	0.9369	0.0000	5,230.6499
Total	**7.5169**	**69.1369**	**69.6324**	**0.0944**	**203.5451**	**3.2109**	**205.7878**	**20.2733**	**3.0312**	**22.3643**	**0.0000**	**9,373.3691**	**9,373.3691**	**1.8168**	**0.0000**	**9,411.5217**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	3.6452	33.1683	33.2971	0.0414	16.1185	1.5384	17.6569	1.6057	1.4431	3.0488	0.0000	4,162.3938	4,162.3938	0.8799	0.0000	4,180.8718
2017	3.8718	35.9686	36.3353	0.0530	46.9207	1.6725	47.6250	4.6651	1.5881	5.3131	0.0000	5,210.9753	5,210.9753	0.9369	0.0000	5,230.6499
Total	**7.5169**	**69.1369**	**69.6324**	**0.0944**	**63.0392**	**3.2109**	**65.2819**	**6.2708**	**3.0312**	**8.3618**	**0.0000**	**9,373.3691**	**9,373.3691**	**1.8168**	**0.0000**	**9,411.5217**

CalEEMod Overall Construction Summery Emissions Summary during both Phase 1 and Future Phase (Maximum Daily Emissions)

Construction Start date: October 2015
Duration: 22 months
Work schedule: 5 days/week
Equipment: Dozers, Loaders, conveyors, backhoes and dump trucks

<u>Unmitigated Construction</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1431	1.3691	1.2213	1.5200e-003	1.6423	0.0655	1.7079	0.1636	0.0613	0.2249	0.0000	140.5431	140.5431	0.0319	0.0000	141.2138
2016	0.3926	3.8418	3.6035	4.5600e-003	3.4841	0.1858	3.6699	0.3472	0.1727	0.5199	0.0000	420.8969	420.8969	0.1053	0.0000	423.1072
2017	0.1858	1.7361	1.8527	2.4500e-003	1.8693	0.0821	1.9515	0.1863	0.0773	0.2636	0.0000	220.3114	220.3114	0.0462	0.0000	221.2821
Total	**0.7216**	**6.9470**	**6.6776**	**8.5300e-003**	**6.9957**	**0.3335**	**7.3292**	**0.6971**	**0.3113**	**1.0084**	**0.0000**	**781.7514**	**781.7514**	**0.1834**	**0.0000**	**785.6031**

<u>Mitigated Construction</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1431	1.3691	1.2213	1.5200e-003	0.5088	0.0655	0.5743	0.0507	0.0613	0.1120	0.0000	140.5429	140.5429	0.0319	0.0000	141.2136
2016	0.3926	3.8418	3.6035	4.5600e-003	1.0795	0.1858	1.2653	0.1076	0.1727	0.2803	0.0000	420.8964	420.8964	0.1053	0.0000	423.1067
2017	0.1858	1.7361	1.8527	2.4500e-003	0.5792	0.0821	0.6613	0.0577	0.0773	0.1350	0.0000	220.3111	220.3111	0.0462	0.0000	221.2819
Total	**0.7216**	**6.9470**	**6.6775**	**8.5300e-003**	**2.1674**	**0.3335**	**2.5009**	**0.2159**	**0.3113**	**0.5272**	**0.0000**	**781.7505**	**781.7505**	**0.1834**	**0.0000**	**785.6022**

Appendix C

Elkhorn Slough Habitat Assessment

APPENDIX C

Elkhorn Slough Tidal Marsh Restoration Project

Existing Biological Resource Conditions

Prepared by:

H. T. Harvey & Associates

Prepared for:

ESA PWA

December 2014

Project # 2757-03

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Introduction

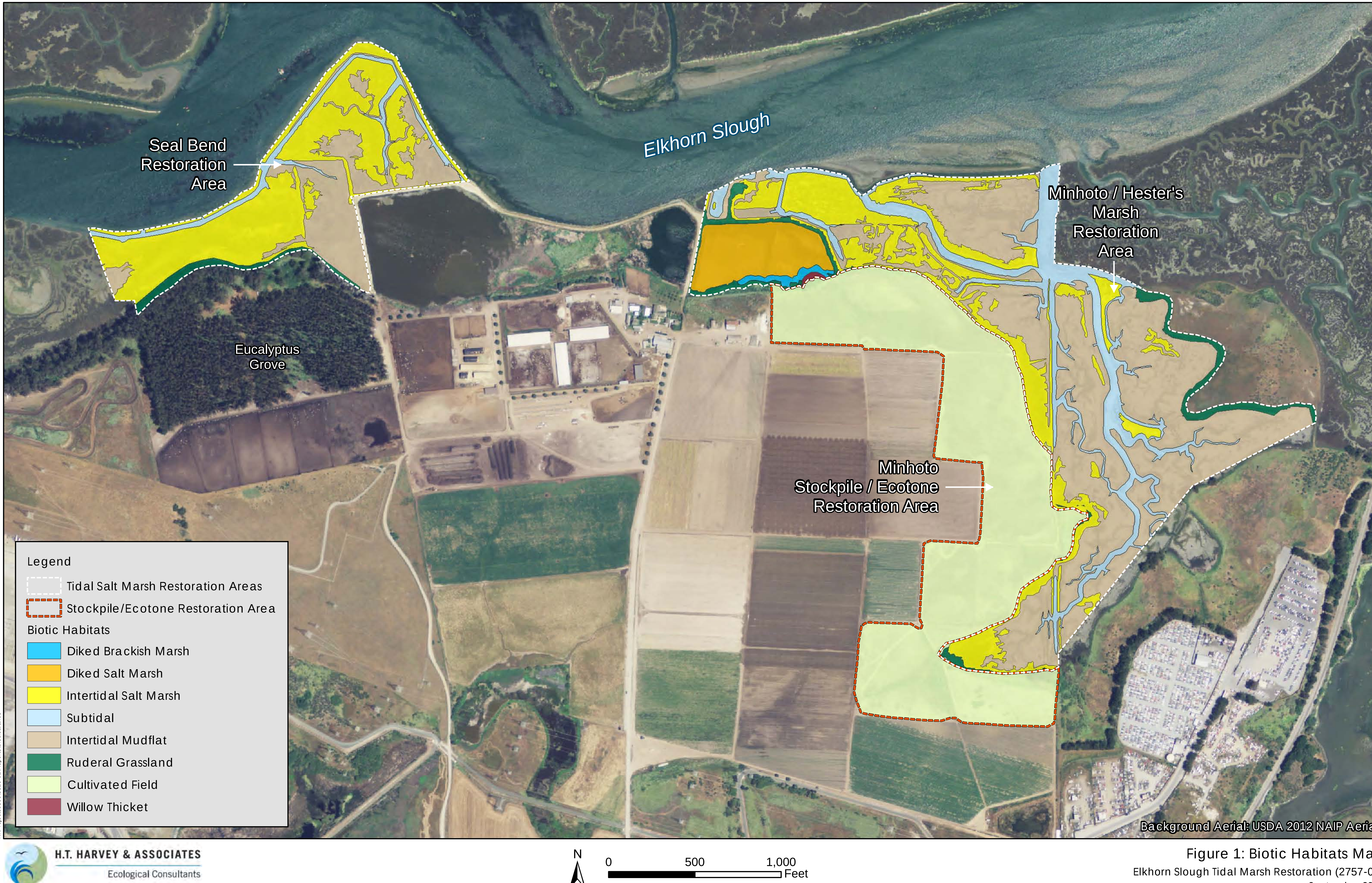
This Appendix describes the biological communities and special-status species found on or adjacent to the project site, as well as those whose needs must be considered during the restoration design process. H.T. Harvey and Associates' methods for assessing these communities are described below.

1.1 Methods

H. T. Harvey & Associates' plant, wildlife, and fish ecologists Annie Eicher, Scott Demers, Ron Duke, and Neil Kalson assessed biotic conditions for the project site via a review of existing information, supplemented with a reconnaissance-level survey of the project site conducted on 18 January 2013. Specifically, the information review and reconnaissance survey was conducted to 1) characterize existing aquatic, wetland, and terrestrial habitats; 2) identify sensitive habitats including coastal salt marsh habitat; and 3) assess the site for its potential to support special-status plant and animal species and their habitats. In accordance with our scope, species-specific surveys were not conducted. A wetland jurisdictional delineation for permitting will be conducted in the future. Our plant ecologist prepared a map of the existing biotic habitats within the project site in Geographic Information System (GIS) format, based on existing GIS mapping (H. T. Harvey and Associates 2008, NERRS 2009), review of National Wetlands Inventory mapping, aerial imagery (NAIP 2009, World Imagery-dated 8 May 2010, Google Earth Imagery dated 5 May 2012), and site reconnaissance. Per our scope, the habitat map is approximate and sufficient for CEQA documentation; the map is based principally upon the existing GIS mapping and interpretation of recent aerial imagery with limited ground-truthing.

The boundary of H. T. Harvey & Associates' site description and associated biotic habitat map was defined by the project site boundary provided by ESA PWA in a GIS shapefile on 17 January 2013 (with subsequent amendments per consultation with ESA PWA staff). The site boundary included 2 proposed tidal marsh restoration areas and an upland soil stockpile area. The Minhoto/Hester's Marsh restoration area is 75.6 acres (ac) and the Seal Bend restoration area is 28.6 ac. The 43-ac stockpile/ecotone restoration area is located on the Minhoto parcel adjacent to the restoration area and currently consists of cultivated agricultural fields (Figure 1). The project will restore the marsh-ward portion of the stockpile area to tidal marsh, marsh-upland ecotone habitat, and grassland. Figure 1 refers to this as the stockpile/ecotone restoration area.

Additionally, we included eelgrass beds at Seal Bend in our mapping and site description; eelgrass beds with greater than approximately 30% cover were mapped using Google Earth imagery (dated 5/5/2012). Although located well outside the project boundaries, we intend to assess the possible indirect impacts of the project on this sensitive resource in the forthcoming impact assessment as part of the project's Initial Study. Also outside the project boundary is a grove of eucalyptus (*Eucalyptus* spp.) and Monterey pine (*Pinus radiata*) on the south side of the Seal Bend Restoration Area (Figure 1) that provides habitat for sensitive wildlife species. Therefore, this habitat is discussed below.



N:\Projects3300\3326-01\Reports\Bioclearance

H.T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1: Biotic Habitats Map
Elkhorn Slough Tidal Marsh Restoration (2757-03)
September 2014

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The California Natural Diversity Database (CNDDB 2013) and the California Native Plant Society's (CNPS) *Online Inventory of Rare and Endangered Plants* (2013) were queried for information on the local distribution of special-status species. Additional information was obtained from technical publications, the California Consortium of Herbaria (2013), *The Jepson Manual, Second Edition* (Baldwin et al. 2012), and personal communication with individuals, including Elkhorn Slough National Estuarine Research Reserve (ESNERR) staff, who have expertise on local habitats and special-status species. Soils mapping data from the *Web Soil Survey* prepared by the National Cooperative Soil Survey, Natural Resources Conservation Service (NCSS-NRCS 2013) was used to identify any soils on-site with the capacity to support special-status plants with specific edaphic requirements.

1.2 Biotic Habitats

The following section provides a description of the biotic habitats found within the project site and their functions and values. Habitat types were developed using a combination of described habitats and vegetation alliances as per Holland (1986), Sawyer et al. (2009), and (Kutcher 2008). The habitat types are based upon hydrology, land use, and vegetation, and are consistent with those previously described for Elkhorn Slough (Zimmerman and Caffrey 2002, Elkhorn Slough Tidal Wetland Project Team [ESTWPT] 2007). Habitats are considered sensitive if they support vegetation alliances listed as sensitive on the California Department of Fish and Wildlife's (CDFW; then California Department of Fish and Game) List of Vegetation Alliances and Associations (2010).

The six biotic habitats found within the project site are: subtidal, intertidal mudflat, intertidal salt marsh, diked salt marsh, diked brackish marsh/willow thicket, and cultivated field/ruderal grassland. The distribution of habitats within the project site is shown in Figure 1, and their approximate acreages are summarized in Table 1. Habitats at the project site are described in more detail below.

Table 1

Biotic Habitat	**Area (ac) at Project Site**
Subtidal	13.02
Intertidal Mudflat	48.47
Intertidal Salt Marsh	32.47
Diked Salt Marsh	5.25
Diked Brackish Marsh/Willow Thicket	0.61
Cultivated Field/Ruderal Grassland	47.17
Total	**146.99**

1.2.1 Subtidal/Aquatic

Subtidal channels occupy 13.0 ac within the Seal Bend and Minhoto/Hester's Marsh restoration areas. These channels connect to the main channel of Elkhorn Slough and provide tidal exchange to intertidal mudflats and intertidal salt marsh at the site. Subtidal channel habitats occur below the elevation of the low tidemark or Mean Lower Low Water (MLLW) where the substrate is continuously submerged. Tidal creeks form networks that serve an important function of water conveyance and drainage onto and off of mudflat and marsh surfaces as well as the transfer of sediment and nutrients between marshes and the main estuarine channel (ESTWPT 2007).

Elkhorn Slough channel habitats have substrates largely composed of material such as organic matter, mud, sand, and gravel. The fine-grained materials are often cohesive, as a result of unconsolidated material eroding away over several decades. Channel depth averages about 9.8 ft (ESTWPT 2007). As discussed above, salinity in the main channel just west of Seal Bend was recorded as ranging from 5-10 parts per thousand (ppt) in the rainy season to 32-35 ppt in the summer (ESTWPT 2007). Water temperatures range from 10 to 22 °C, with an average temperature of approximately 13.5 °C (MBARI LOBO data).

As discussed in-depth in Section 3.2.5, recent water quality assessments indicate that channels in the estuary overall are moderately eutrophic, indicating excessive nutrient enrichment (Johnson 2010, Hughes et al. 2011). Elkhorn Slough is surrounded by intensely cultivated/chemically fertilized farmlands and the estuary receives substantial agricultural run-off from the Salinas Valley. Nitrate concentrations in the estuary often exceed values found in the nutrient-rich waters of Monterey Bay by nearly 20-fold (Johnson 2010). Dissolved oxygen concentrations fluctuate much more widely in Elkhorn Slough than in most other estuaries, likely attributable to the high rates of primary productivity induced by external inputs of nitrogen. Degraded water quality is strongly affecting environmental conditions for organisms dwelling in subtidal habitats in Elkhorn Slough (Wasson et al. 2012).

Many of the slough channels onsite have a natural, sinuous form, however there are also numerous linear human-constructed channels as well (e.g., borrow ditches). The constructed channels reduce slough channel topographic complexity relative to the natural marsh condition and thereby likely reduce plant and animal community diversity. The restoration plan considers measures to restore natural slough channel form and reduce the surface area and drainage influence of the constructed channels.

1.2.1.1 Vegetation

The subtidal areas within the Seal Bend and Minhoto/Hester's Marsh restoration areas contain little vegetation. Subtidal macroalgal species within the Elkhorn Slough system include *Ulva lactuca, U. expansa,* and *U. lobata.* Floating macroalgal mats occur in the water column, dominated primarily by *U. intestinalis*, but also include *Rhizoclonium riparium* and *Chaetomorpha* sp. High concentrations of nutrients may contribute to increased macroalgal abundance and higher phytoplankton densities in the water column (Hughes et al. 2010). These species are also likely to occur in the project area.

Eelgrass (*Zostera marina*) is the dominant seagrass species in Elkhorn Slough system. It grows in shallow, protected waters, rooted in unconsolidated sediments. Dense eelgrass beds occur in only a few areas along the lower main channel, with the largest bed located near Seal Bend (Palacios 2010), but no eelgrass beds occur in the project site. Eelgrass abundance and distribution has changed within Elkhorn Slough; there is currently a shoal in the Seal Bend region where eelgrass has colonized (Hammerstrom and Grant 2012). This main eelgrass bed is located on the north side of the channel approximately 375 ft north of the northern extent of the Seal Bend restoration site (Figure 1) and thus is well outside the project area. On the south side of the channel, a smaller patch occurs within about 100 ft from the Seal Bend Restoration site. In monitoring conducted since 2000 in Elkhorn Slough, significant inter-annual variability in the vegetation density of the beds has been evident (Palacios 2010, Hammerstrom and Grant 2012).

1.2.1.2 Wildlife

The subtidal channels in Elkhorn Slough are used by a variety of bird species that are able to forage from the air (e.g., terns) or under water (e.g., diving ducks, cormorants) and those that can swim. The abundance of most species varies seasonally, with the highest numbers occurring in fall through spring (Harvey and Connors 2002). Generally, species that are associated with oceanic habitats, such as pelagic cormorants (*Phalacrocorax pelagicus*) and Brandt's cormorants (*Phalacrocorax penicillatus*), can be found near the mouth of the slough whereas others, including many diving and dabbling duck species, are found more inland in shallower, calmer waters of the slough system. The species associated with inland/shallower waters are more likely to occur in the project areas than those associated with more oceanic/deeper waters.

Bird species that forage aerially by plunging into the water in search of fish include terns such as the Forster's tern (*Sterna forsteri*) and Caspian tern (*Sterna caspia*), as well as the California least tern (*Sterna antillarum browni*), a federally and State endangered species that occasionally visits Elkhorn Slough during migration. California brown pelican (*Pelecanus occidentalis*) also can be observed diving for fish in Elkhorn Slough and roosting on the water, as well as on adjacent slough banks. Brown pelicans occur in the slough after post-breeding dispersal from southerly breeding sites such as West Anacapa Island and Santa Barbara Island; after breeding they form communal roost sites. Seasonally, American white pelicans (*Pelecanus erythrorhynchos*), which forage for fish by swimming rather than diving like brown pelicans, occur in the slough as well. Common loons (*Gavia immer*), as well as the less common Pacific loon (*Gavia pacifica*) and red-throated loon (*Gavia stellata*) also dive for fish in subtidal channels of Elkhorn Slough. Cormorants, including double-crested cormorants (*Phalacrocorax auritus*), pelagic cormorants, and Brandt's cormorants, as well as red-breasted mergansers (*Mergus serrator*), a diving duck, will use subtidal channels in Elkhorn Slough to forage on fish. Other diving ducks such as greater scaup (*Aythya marila*), lesser scaup (*Aythya affinis*), ruddy ducks (*Anas clypeata*), buffleheads (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), surf scoters (*Melanitta perspicillata*), and white-winged scoters (*Melanitta deglandi*) dive for bivalves, crustaceans, and other invertebrates in subtidal areas of the slough complex. Gulls also roost and forage on the channels of Elkhorn Slough. Western gulls (*Larus occidentalis*) are common residents in the Elkhorn Slough area, and glaucous-winged gulls (*Larus glaucescens*), California gulls (*Larus californicus*), ring-billed gulls (*Larus delawarensis*), and Bonaparte's gulls (*Chroicocephalus philadelphia*) forage opportunistically by following other species and finding scraps of food or by finding prey in shallow water or near the surface. Dabbling ducks such as the gadwall (*Anas strepera*), cinnamon teal (*Anas cyanoptera*), northern shoveler (*Anas clypeata*), and mallard (*Anas platyrhynchos*) use the smaller, shallower channels in Elkhorn Slough to forage and roost. As described above, dabbling ducks and are more likely to occur on the project site than diving ducks and piscivorous birds described above.

The southern sea otter (*Phoca vitulina richardsi*) and harbor seal (*Phoca vitulina richardsi*) are two marine mammals that use subtidal channels in Elkhorn Slough and could occasionally occur in the project area. Sea otters, numbering approximately 100 individuals, rest and pup in Elkhorn Slough; however, they also forage on snails, mussels, and crabs (McCarthy 2010a). They typically use the lower and middle portions of the slough, although they also occur in mid-estuary habitats, in places like Parsons Slough, and they could occasionally use channels on the site. They rest and groom while floating on their backs either individually or in "rafts", particularly in areas with eelgrass. Harbor seals are year-round residents in Elkhorn Slough and they number in the hundreds (McCarthy 2010b). They generally occur in the main channel, either individually or in small groups, and their numbers are highest from May through August when they are pupping and molting (Harvey and Connors 2002). Harbor seals use the slough complex primarily for staging, resting, and pupping, with most foraging occurring in Monterey Bay, but they occasionally forage in the slough on small fish (Harvey and Connors 2002). In addition to using the channels of the slough system, harbor seals use mudflats and marshes for haul-out sites (Harvey and Connors 2002; McCarthy 2010b). Harbor seals occasionally haul out onto the project site.

1.2.1.3 Benthic Invertebrates

Subtidal benthic invertebrate community species dominance differs in the lower and upper slough (Wasson et al. 2002). In the lower slough, soft substrates provide habitat supporting abundant populations of burrowing species such as larger clam species (e.g., *Tresus nuttallii*), fat innkeeper worms (*Urechis caupo*), and polychaetes (Wasson et al. 2002). Epifauna including moon snails (*Polinices lewisii*), sea hares (e.g., *Aplysia californica*), and rock crabs (*Cancer antennarius*) are also abundant in the lower slough (Wasson et al. 2002). Farther up in the slough the substrate becomes softer and finer, with dominant species in subtidal habitats near the project site including the rough piddock (*Zirfaea pilsbryi*), tube-dwelling anenomes (*Pachycerianthus fimbriatus*), polychaetes, and moon snails (Wasson et al. 2002). These species are more likely to occur on the project site than those associated with habitats towards the mouth of the slough. In nearby subtidal channels of Parsons Slough, benthic infauna included polychaetes (e.g., *Exogone lourei*), crustacea (e.g., *Leptochelia dubia*, *Monocorophium* sp.), mollusks (e.g., *Nutricola tantilla*), and oligochaetes (e.g., *Tubificoides* sp.) (Oliver et al. 2009).

1.2.1.4 Fish

In subtidal habitats, the fish species most likely to occur are some of the same species found in intertidal mudflat habitats (see below section) such as surfperches (Family Embiotocidae), flatfishes (including California halibut [*Paralichthys californicus*]), bat rays (*Myliobatis californica*), clupeids (Family Clupeidae), and Pacific staghorn sculpin (*Leptocottus armatus*). Subtidal habitats are also utilized by species such as plainfin midshipman (*Porichthys notatus*), as well as several larger elasmobranchs such as leopard sharks (*Triakis semifasciata*), shovelnose guitarfish (*Rhinobatos productus*), and thornbacks (*Platyrhinodis triseriata*) (Yoklavich et al. 2002, Carlisle and Starr 2009). These species have the potential to occur in the general Elkhorn Slough system and the larger, deeper channels on the project site.

1.2.2 Intertidal Mudflat/Aquatic

Intertidal mudflats channels occupy 48.5 ac at the project site, and are more extensive within the Minhoto-Hester's area then the Seal Bend area. Mudflats occur between channel and marsh habitats, typically between the elevations of MLLW and Mean High Water (MHW). Mudflats are generally inundated during high tide and exposed during low tide. Mudflats serve an important function in estuarine chemical cycles (ESTWPT 2007).

1.2.2.1 Vegetation

Much of the mudflats at the project site are generally devoid of vegetation. The Intertidal Mudflat mapping unit contains inclusions of small patches of salt marsh vegetation (i.e., pickleweed); however, overall cover by vascular plant species is less than 30% (Figure 2). Mudflat at relatively higher elevations support macroalgae. Peak months of macroalgal productivity are in the summer, when blooms can completely cover intertidal mudflats in Elkhorn Slough. Dense macroalgal blooms are an indicator of high nutrient loading and eutrophication, which can facilitate microbial decomposition, cause hypoxic and anoxic conditions, and lead to an overall loss in biodiversity. Eutrophication may also play an important role in driving marsh loss mechanisms at Elkhorn Slough. Macroalgal species documented on intertidal mudflats in Elkhorn Slough include *U. lactuca, U. intestinalis, R. riparium, Chaetomorpha sp.,* and *Gracilariopsis andersonii* (Hughes et al. 2010) and these may also occur on mudflats in the project site.

1.2.2.2 Wildlife

Mudflats in Elkhorn Slough are used by a wide variety of shorebirds, particularly during migration periods in the spring and fall when there can be up to 20,000 individuals in the slough complex (Ramer et al. 1991). The shorebirds that occur in the Elkhorn Slough system also occur on the mudflats of the project site. Mudflats are used primarily for foraging and shorebirds generally roost (resting and preening) when they are not foraging. Many mudflat specialists roost on the upper flats after initially foraging on the receding tide, then fly to alternate habitats to roost as the mudflats flood. Shorebirds are very flexible and opportunistic in their diets, with considerable dietary overlap among species and foraging guilds (Skagen and Oman 1996). They often take prey in accordance with availability, concentrating where prey is most dense (Goss-Custard 1970; Goss-Custard 1977; Goss-Custard 1979). These birds often concentrate at the edge of the receding tideline, where worms, crustaceans, and bivalves occur close to the surface. Thus, the hydrologic regimes and ecosystem processes that maintain abundant invertebrate populations are more important than the specific invertebrate taxa available. Near the waterline, shorebird microhabitat use typically depends on each species' leg length, as well as the size and shape of their bills. For example, the very shortest-billed semipalmated plovers (*Charadrius semipalmatus*) and black-bellied plovers (*Pluvialis squatarola*) feed on recently exposed mud, small sandpipers such as western sandpiper (*Calidris mauri*) and least sandpipers (*Calidris minutilla*) forage on recently uncovered mud and shallow water, mid-sized birds such as dunlin (*Calidris alpina*), long-billed dowitchers (*Limnodromus scolopaceus*), and short-billed dowitchers (*Limnodromus griseus*) forage in slightly deeper water, and larger shorebirds such as willets (*Tringa semipalmatus*), long-billed curlews (*Numenius americanus*), and marbled godwits (*Limosa fedoa*) are able to probe in deeper water.

Of the species that use Elkhorn Slough mudflats, western and least sandpipers are the most abundant in the Elkhorn Slough system (Harvey and Connors 2002) and are likely the most abundant on the project site. As mentioned above, these shorebirds are migratory and they forage in estuaries like Elkhorn Slough and breed in other regions; however, black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), western snowy plover (*Charadrius alexandrinus nivosus*), and killdeer (*Charadrius vociferus*) are shorebirds that are residents in the area. Of these species the American avocet is a common forager on mudflats, using a variety of foraging techniques with their recurved bills to forage for prey in soft substrates. Killdeer as well as the federally threatened western snowy plover, which breeds on nearby beaches and former salt ponds, may occur on Elkhorn Slough mudflats periodically.

In addition to shorebirds, wading birds such as great egrets, great blue herons, and snowy egrets (*Egretta thula*) will forage on the edge of mudflats for small fish in the shallow intertidal waters year-round and those species can be observed on the project site. Harbor seals frequently use mudflats in Elkhorn Slough for haul-out sites and have the potential to haul out on mudflats on the project site.

1.2.2.3 Benthic Invertebrates

Benthic invertebrate infauna and epifauna vary with distance from the mouth of Elkhorn Slough, with coarse beach sand near the mouth and finer clays and silts towards the head of the system (Wasson et al. 2002). Intertidal benthic infauna diversity is greatest near the mouth and decreases toward the head of the slough, with bivalves and ghost shrimp (*Callianassa californiensis*) being more abundant in the lower slough, and more non-native infaunal invertebrates occurring in the upper slough (Wasson et al. 2002). The species more common in the upper slough are more likely to occur on the project site than those commonly occurring towards the mouth of the slough. Intertidal benthic epifauna species also vary with distance from the mouth. Large, mobile benthic intertidal epifauna species (e.g., moon snails (*Polinices lewisii*), sea hares (e.g., *Aplysia californica*), sea stars, *Cancer* crabs) tend to occur closer to the mouth (and thus are unlikely to occur on the project site), whereas other species (e.g., grapsid shore crabs) occur only in the upper slough or throughout the slough (Wasson et al. 2002). *Ulva* mats that are found on higher tidal flats can harbor dense populations of amphipods (Wasson et al. 2002).

In nearby Parsons Slough and the project site (sometimes called Pick-n-Pull marsh) invertebrate species diversity was high and reflective of the species composition expected in a “well-flushed” system (Oliver et al. 2009). In Parsons Slough, dominance and diversity changed seasonally. In the summer crustaceans accounted for 35% of the individuals, polychaetes for 33% and oligochaetes for 24%; whereas in spring crustaceans were 46%, mollusks were 26%, polychaetes were 17%, and oligochaetes were 14% of the individuals.

1.2.2.4 Fish

Fish species richness and species composition declines with distance up the Elkhorn Slough system (Yoklavich et al. 2002). Because the lower slough is strongly influenced by coastal processes, the species composition reflects coastal marine fish species, but the upper slough becomes more euryhaline (i.e., wide range of salinities) and species composition changes. The project site is located in the mid to lower

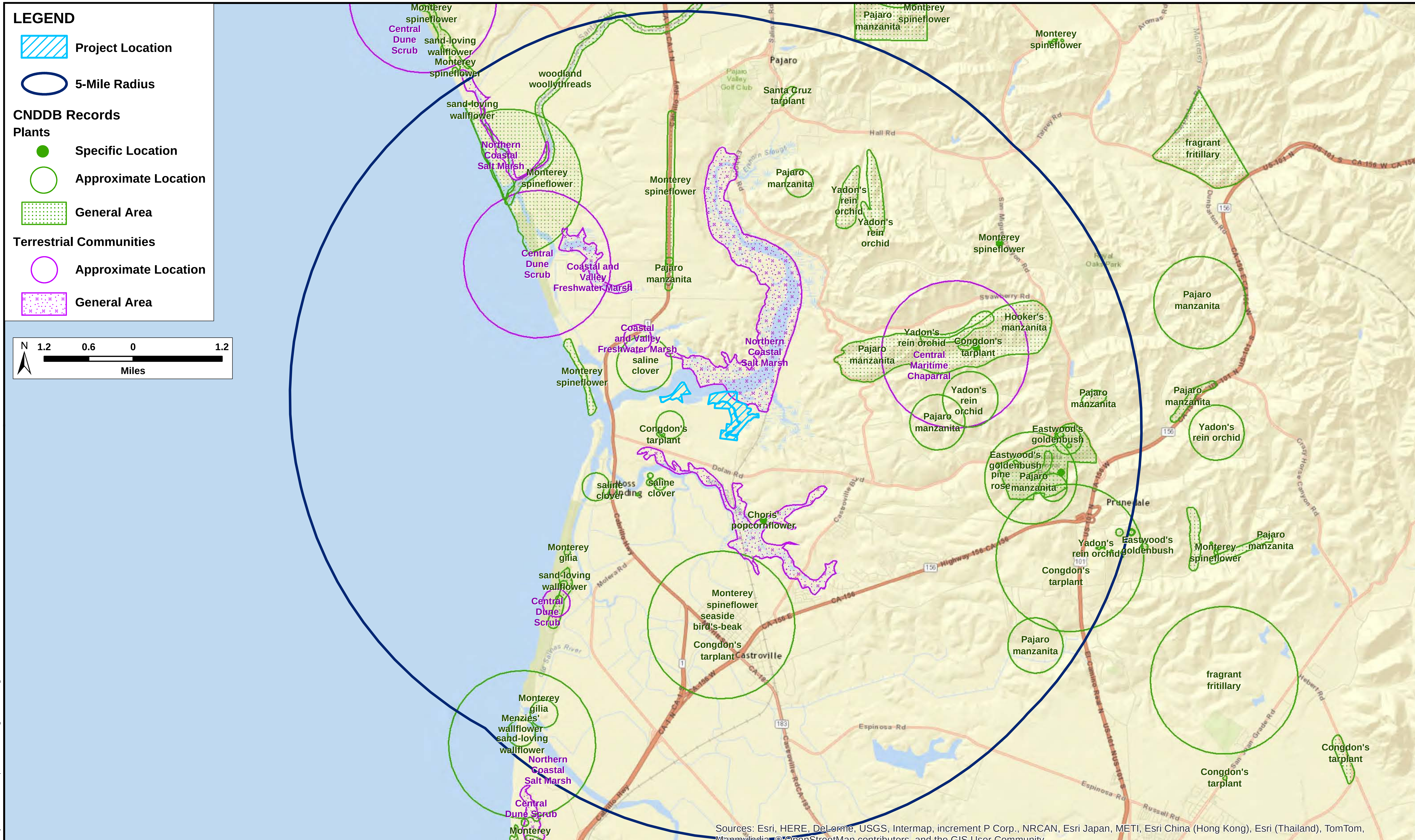

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Figure 2: CNDDB Plant Records
Elkhorn Slough Tidal Marsh Restoration (2757-03)
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slough and is well flushed by the tides. Based on surveys conducted in similar habitats, fish species likely to occur in intertidal mudflat habitats in the project area include arrow goby (*Clevelandia ios*), longjaw mudsucker (*Gillichthys mirabilis*), and topsmelt (*Atherinops affinis*), as well as surfperches, flatfishes, bat rays, Pacific staghorn sculpin, northern anchovy (*Engraulis mordax*), and juvenile Pacific herring (*Clupea pallasii*) (Woolfolk and Labadie 2012, Ritter et al. 2008, Yoklavich et al. 2002). During H. T. Harvey & Associates' site reconnaissance, a number of potential bat ray feeding pits were observed on a mudflat in the southern portion of the Minhoto restoration area.

1.2.3 Intertidal Salt Marsh

Approximately 32.5-ac of intertidal salt marsh occur at the project restoration sites. Marsh is more extensive in the Seal Bend restoration area compared to the Minhoto/Hester's Marsh restoration area. Intertidal salt marsh habitat occurs within and adjacent to the project site from approximately +4 ft NAVD88 (~1 ft below MHW) to approximately +7 ft NAVD 88 (~1.3 ft above Mean Higher High Water (MHHW). Intertidal salt marshes in Elkhorn Slough are highly saline. Cover by vascular plant vegetation is greater than 30%.

Tidal marshes have been shown to improve nutrient filtration, which provides a health benefit to the estuary's aquatic life forms and to humans by reducing eutrophication and the transmittal of pathogens. Additionally, the unique sediment conditions of tidal salt marshes allow them to store disproportionate quantities of soil carbon and help them to remove nitrogen from the hydrosphere. Intertidal marshes in Elkhorn Slough provide habitat for dozens of native plant species, and are used by invertebrates, fish, reptiles, birds and mammals for resting, feeding, breeding and refuge (Woolfolk and Labadie 2012).

1.2.3.1 Vegetation

Intertidal salt marsh at the project site occur on the Alviso soil series, characterized as a gray, neutral, silty clay loam typically associated with marshes (NCSS-NRCS 2013). Total vegetation cover ranges from 30-100%. The vegetation is dominated by a single native species, perennial pickleweed (*Salicornia pacifica*), as is characteristic of low elevation intertidal salt marshes in the region. Both the percent cover and the height of pickleweed are generally lower at lower elevations of the project site where the marsh transitions to mudflat. The diversity of the native plant community increases at slightly higher elevations, as on remnant interior berms, and at the upper marsh edge where a few other native species are found occurring with pickleweed; these include saltgrass (*Distichlis spicata*) marsh jaumea (*Jaumea carnosa*), alkali heath (*Frankenia salina*), and coast gumplant (*Grindelia stricta*). Tidal salt marsh vegetation provides organic matter inputs to the detrital food chain both within the vegetated marsh plain and in the adjacent intertidal mudflat and subtidal habitats of Elkhorn Slough via microbial decomposition and tidal transport of organic matter produced by tidal marsh vegetation. Pacific cordgrass (*Spartina foliosa*), which is a dominant species in low elevation marshes in the San Francisco Bay region, is absent from Elkhorn Slough (Caffrey et al. 2002).

Ecotones are transition zones of especially high species richness, where different plant communities overlap. The tidal salt marsh-upland ecotone is characterized by a mixture of high marsh and upland plant species. In a study of salt marsh-upland ecotones in Elkhorn Slough, Wasson and Woolfolk (2011) found that available habitat for ecotone plant species is extremely limited and highly invaded by non-native species. In most locations within the project site, the upland directly abuts the marsh, with very little or no tidal marsh-upland ecotone. For example, at its upper margin, the intertidal salt marsh at the Minhoto parcel is bordered by a cultivated field and/or ruderal grassland habitat.

1.2.3.2 Wildlife

Shorebirds that forage on mudflats during lower tides will use tidal marshes in Elkhorn Slough for roosting and some foraging during high tides. Also, waders, like great egrets, snowy egrets, and great blue herons will use tidal marshes for foraging and roosting. These waders, along with larger shorebirds like long-billed curlews, marbled godwits, and willets will forage in small tidal channels and shallow marsh plain depressions for crabs, small fish, worms, and other invertebrates. Greater yellowlegs (*Tringa melanoleuca*), the less common lesser yellowlegs (*Tringa flavipes*), black-necked stilts, and American avocets will forage in a variety of habitats including salt marshes in Elkhorn Slough. Gulls, particularly smaller gulls like ring-billed gulls, Bonaparte's gulls, and California gulls will forage in tidal channels and depressions, and these species will roost in salt marshes as well. Raptors, including northern harriers (*Circus cyaneus*), white-tailed kites (*Elanus leucurus*), and red-tailed hawks also forage in tidal marshes and adjacent areas for small mammals, such as the California vole (*Microtus californicus*) and the Salinas harvest mouse (*Reithrodontomys megalotis longicaudus*) (this species is not a special-status species). Northern harriers nest in marshes in the area but are unlikely to nest on the project site itself due a lack of dense vegetation that is suitable for nesting. White-tailed kites and red-tailed hawks may nest in trees in adjacent upland areas. Otters often haul out on salt marsh at the Yampah marsh and may also haul out on tidal marsh in the project site as well.

1.2.3.3 Benthic Invertebrates

California salt marshes can support dense populations of oligochaetes and polychaete worms, while the lower elevation marsh surfaces can be dominated by gastropods, amphipods, isopods, and crabs, but adjacent tidal creeks are generally more species-rich (Woolfolk and Labadie 2012) and these invertebrates are expected to occur in the Elkhorn Slough system as well. Burrows of the lined shore crab (*Pachygrapsus crassipes*) in Elkhorn Slough indicate their presence in lower marshes (Woolfolk and Labadie 2012). In high marshes, invertebrates also include terrestrial insects and spiders (Woolfolk and Labadie 2012).

1.2.3.4 Fish

Fish can only utilize tidal salt marshes when they are inundated at high tides. Fish known to use tidal salt marsh as habitat in northern California include the threespine stickleback, arrow gobies, and juvenile starry flounder (Goals Project 2000). Based on West and Zedler's work (2000), it is reasonable to assume that long-jawed mudsuckers, topsmelt, and mullet use in local marshes at high tide, as well. Gobies may use pickleweed beds bordering tidal creeks and inland sloughs as spawning habitat (Yoklavich et al. 2002).

1.2.4 Diked Salt Marsh

A diked salt marsh occurs at the northwest side of the Minhoto/Hester's Marsh restoration area. Historically, this was intertidal salt marsh, diked in the 1930s (Van Dyke and Wasson 2005). The diked salt marsh is approximately 5.3 ac.

1.2.4.1 Vegetation

The diked marsh is enclosed by an intact levee that does not have a water control structure. The area ponds water much of the time (Woolfolk, personal communication 2013). Like the intertidal salt marsh on-site, this area is mapped as having the Alviso soil series, characterized as a gray, neutral, silty clay loam typically associated with marshes (NCSS-NRCS 2013). Presumably the soils have a residually high salinity, as most of area is dominated by a dense cover of perennial pickleweed, except where dissected by ditches, which held standing water when observed during low tide at the time of field reconnaissance. There is a fringe of brackish plants along the upper edge that is mapped and described separately as diked brackish marsh habitat.

1.2.4.2 Wildlife

The diked salt marsh provides fewer foraging opportunities for birds compared to the subtidal channels, mudflats, and tidal marshes, due to a paucity of benthic invertebrates and fishes compared to those habitats. However, shorebirds may roost in the diked marsh during high tides when intertidal areas are flooded. Also waders, such as egrets and herons, and certain shorebirds, such as greater yellowlegs and black-necked stilts may forage in this habitat. Raptors, including white-tailed kites, northern harriers, and red-tailed hawks may forage for small mammals, including the California vole, in this habitat as well.

1.2.4.3 Benthic Invertebrates

The most likely benthic invertebrates in the diked salt marsh are chironomid fly larvae, and possibly oligochaete worms (*Paranais* sp.) and water boatman, a typical species assemblage for areas in Elkhorn slough with very restricted tidal input (Oliver et al. 2009). The brackish water snail, *Tryonia imitator*, tends to occur in very restricted wetland habitats that do not dry out; however, one was found in a more flushed wetland in Parsons Slough (Oliver et al. 2009). It is unlikely that the brackish water snail is in the project site.

1.2.4.4 Fish

Because there is no connection between Elkhorn Slough and the diked salt marsh, no estuarine fish are anticipated to be present. However, it is possible that mosquitofish (*Gambusia affinis*) could have been introduced into the area via agricultural drainage.

1.2.5 Diked Brackish Marsh/Willow Thicket

Approximately 0.6 ac of brackish marsh occurs in conjunction with the diked salt marsh.

1.2.5.1 Vegetation

At the upper edge of the diked salt marsh, where the levee walls are not steep and drainage pipe outflows from the adjacent agricultural field provide freshwater flow, there is a fringe of brackish/freshwater plant species. This includes a clump of willows (*Salix* sp.), cattail (*Typha* sp.), bulrush (*Schoenoplectus californicus* and *Schoenoplectus* sp.), and also an invasive plant species, pampas grass (*Cortaderia sp.*). The habitat is narrow and not well-developed.

1.2.5.2 Wildlife

The small, fringe brackish marsh/willow thicket is likely too small to provide cover for many species that typically inhabit dense riparian or brackish marsh habitats. However, the willows may be used for nesting birds such asthe American robin (*Turdus migratorius*), Anna's hummingbird (*Calypte anna*), western scrub jay (*Aphelocoma californica*), or California towhee (*Melozone crissalis*). Green herons (*Butorides virescens*) may also roost in the willows, and possibly may nest there as well. The cattails and bulrush may provide habitat to red-winged blackbirds (*Agelaius phoeniceus*), marsh wrens (*Cistothorus palustris*), common yellowthroats (*Geothlypis trichas*), and other species that commonly nest in freshwater marsh habitats. Terrestrial mammals like raccoons (*Procyon lotor*) and gray fox (*Urocyon cinereoargenteus*) may take cover and forage in this habitat as well. Although no amphibians were observed during sampling of this marsh (Bland 2014), California red-legged frogs (*Rana aurora draytonii*) may occur in this marsh.

1.2.5.3 Benthic Invertebrates

The most likely benthic invertebrates in the coastal brackish marsh/willow thicket are chironomid fly larvae, and possibly oligochaete worms and water boatman, a typical species assemblage for areas in Elkhorn slough with very restricted tidal input (Oliver et al. 2009). The brackish water snail tends to occur in habitats that do not dry out, with restricted flows/tidal flushing; however, one was found in a more flushed wetland in Parsons Slough (Oliver et al. 2009); it is unlikely that the brackish water snail is in the project site.

1.2.5.4 Fish

Because there is no connection between Elkhorn Slough and the diked brackish marsh, no estuarine fish are anticipated to be present. However, it is possible that mosquitofish could have been introduced into the area via agricultural drainage.

1.2.6 Formerly Cultivated Field/Ruderal Grassland

Nearly the entire Minhoto stockpile/ecotone restoration area is comprised of a formerly cultivated field, with a narrow margin of ruderal grassland occurring intermittently between the field and adjacent marshlands. Soils are described as fine sandy loam; moderately deep soils that formed in material weathered from soft sandstone (NCSS-NRCS 2013). In addition to the stockpile site, the levee surrounding the diked salt marsh is vegetated by ruderal grassland interspersed with occasional coyote brush.

1.2.6.1 Vegetation

The cultivated field was under continuous agricultural production between the 1930s and 2009, at which time ESNERR acquired the property. The site has been disked and seeded annually with sterile annual barley (*Hordeum vulgare*) as a weed abatement and erosion protection measure (Woolfolk personal communication 2013). It is currently being used as a soil stockpile area for material that will be used to create marsh and ecotone habitats.

In a few areas there is a narrow fringe of ruderal grassland species including poison hemlock (*Conium maculatum*), annual grasses, and mallow (*Malva* sp.), as commonly occurs adjacent to agricultural lands in the Elkhorn Slough watershed (Wasson and Woolfolk 2011, Woolfolk, personal communication 2013). Within this ruderal grassland margin, the native shrub coyote brush (*Baccharis pilularis*) occurs at the north end of the stockpile site and a single small live oak tree (*Quercus agrifolia*) occurs at the south end.

1.2.6.2 Wildlife

The annual barley in the stockpile/ecotone restoration area has relatively low habitat value for wildlife species. The field is likely used for foraging by blackbirds, sparrows, finches and other birds that forage on seeds in open habitats. Western meadowlarks (*Sturnella neglecta*) and savannah sparrows (*Passerculus sandwichensis*) may nest in the barley if allowed to grow to sufficient height such that it provides cover and nesting substrate. Northern harriers are unlikely to nest in this habitat compared to other sites with taller, denser vegetation that would provide nesting cover. Canada geese (*Branta canadensis*) likely use the field for roosting and foraging. Because the field has been tilled regularly, small mammals are likely present in low numbers, and thus raptors are less likely to forage over the site compared to nearby marsh and untilled upland areas, although they may forage there occasionally. California ground squirrel (*Otospermophilus beecheyi*) burrows are present in the field and they may be preyed on by gray foxes or other predators. Western burrowing owls (*Athene cunicularia hypugaea*) are uncommon in the Elkhorn Slough area but they could potentially forage in the stockpile site and use ground squirrel burrows for refuge, and an individual has been observed in field during the non-breeding season. The field margins where coyote brush occurs could be used by white-crowned sparrows (*Zonotrichia leucophrys*) and other bird species that inhabit brushy areas. There are no freshwater habitats on the project site, however California red-legged frogs and California tiger salamanders (*Ambystoma californiense*) have been observed in a seasonal swale approximately 0.5 mi to the west of this site (Bland 2014) and they could occur in other freshwater habitats in adjacent areas. These species could occasionally disperse across the upland portion of the site. Tiger salamanders are known to seek refuge in California ground squirrel burrows and because ground squirrels have occupied this habitat since tilling has ceased, the possibility that tiger salamanders occur in burrows cannot be discounted. This possibility was likely reduced historically by active ground squirrel control, disking and planting.

1.2.7 Eucalyptus Grove

A grove of eucalyptus and Monterey pine on the south side and adjacent to the Seal Bend Restoration Area provides habitat for several sensitive wildlife species, therefore, we provide a brief summary of the characteristics of this habitat here although it is located just outside of the project boundary (Figure 1). This grove supports a rookery of great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), and cormorants. The eucalyptus trees also provide wintering roost sites for monarch butterflies (*Danaus plexippus*) and nest sites for raptors, such as red-tailed hawks (*Buteo jamaicensis*). Although not within the project boundary, this grove supports sensitive wildlife species that may be subject to noise and other disturbance associated with restoration activities in the Seal Bend Restoration Area, and indirect impacts to this area will be considered in the impact assessment for this next phase of the project.

1.3 Special-status Plant and Animal Species

For purposes of this assessment, "special-status species" include plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (FESA) or the California Endangered Species Act (CESA); animals listed as "fully protected" under the California Fish and Wildlife Code (Section 3511); animals designated as "Species of Special Concern" by the CDFW; and plants ranked as rare or endangered by the CNPS. An overview of special-status species regulations is provided in Appendix 1.

The potential for the site to support special-status plant and wildlife species is discussed below. In addition to site reconnaissance surveys, background information was gathered to determine the potential for special-status species to occur on the project site. The information reviewed included the following:

- The California Natural Diversity Database (CNDDB 2013)
- The CNPS's Online Inventory of Rare and Endangered Vascular Plants of California (2013)
- The Jepson Manual (Baldwin et al. 2012)
- Changes in a California Estuary: A profile of Elkhorn Slough (Caffrey et al. 2002)
- Numerous reports in the Elkhorn Slough Technical Report Series (found at: http://www.elkhornslough.org/research/bibliography_tr.htm)
- Environmental documentation associated with the nearby Parson Slough Project, including the Final Initial Study and Mitigated Negative Declaration for the Parsons Slough Project (Vinnedge Environmental Consulting 2010)
- Personal communication with individuals, including ESNERR staff, having expertise on local habitats and special-status species

1.3.1 Special-status Plant Species and Sensitive Habitats

The following section describes special-status plant species and sensitive habitats onsite.

1.3.1.1 Special-status Plant Species

The search area defined for CNDDB (2013) and CNPS (2013) queries included the 7.5-ft topographical quadrangles in which the project site is located (Moss Landing and Prunedale), plus 5 adjacent quadrangles containing similar habitats as found on the project site (Soquel, Watsonville West, Watsonville East, Salinas, and Marina). With one additional species added from ESNERR (2006), the resulting list included 93 special-status plants occurring in the region that were evaluated for their potential to occur at the project site. Special-status plant species occurring within a 5-mi radius of the site are shown in Figure 2 (CNDDB 2013).

Many of the special-status plants that occur in the project region are associated with habitat types or soil types that did not occur on the project site historically or no longer occur on the project site due to the extensive land disturbance associated with agricultural use and hydrologic alterations at the site. Habitat types that are absent from the project site include but are not limited to: chaparral, and cismontane woodland or other forested habitat. Absent soil types include serpentine soils, gypsum, shale, and sandy dune soils. Additionally, some plant species only occur at higher elevations than the project site and/or have highly endemic ranges centered in specific areas that do not include the project site. The cultivated field/ruderal grassland at the Minhoto stockpile/ecotone restoration site is considered too disturbed/degraded to support rare plants. The few upland areas of the project site that are not cultivated annually are vegetated by tall weedy species such as poison hemlock or mustard; this tall overstory inhibits growth of the lower-statured native species (Woolfolk, personal communication 2013). The densely vegetated, ruderal grassland with coyote brush that occurs along the perimeter levee of the diked marsh is also not expected to be suitable habitat for any of the species considered. The conclusion of this assessment is that none of the 93 special-status plant species considered for occurrence within the project site are likely to occur there, as indicated in Appendix 1.

1.3.1.2 Sensitive Habitats

Tidal Wetlands. Several sensitive habitat types are present either on-site or near the site. The *Salicornia pacifica* alliance is listed as a sensitive natural community by California Department of Fish and Game (2010), with a global/state conservation status rank of G4 S3 (apparently secure globally, vulnerable at state level). While CNDDB has adopted the MCV alliance-based classification for natural communities; element occurrence reports continue to include Holland (1986) natural community nomenclature. The CNDDB Element Occurrence Report generated for this project assessment includes the occurrence of Northern Coastal Salt Marsh at Elkhorn Slough as a significant occurrence of this sensitive habitat type, with a rank of G3 S3.2 (vulnerable at global and state levels) (CNDDB 2013, Figure 2). Elkhorn Slough supports one of the largest tracts of salt marsh in California outside of San Francisco Bay, and the pickleweed-dominated marshes that characterize the estuary are recognized as having significant ecological value (Woolfolk and Labadie 2012). Salt marsh habitat occurring at the project site in its current state has a lower functional capacity and lower biodiversity than other salt marshes in the estuary that have never been diked. Moreover, wetlands are considered environmentally sensitive habitat areas (ESHA) under the California Coastal Act.

Eelgrass. Eelgrass beds are considered essential fish habitat under the Magnuson-Stevens Act and environmentally sensitive habitat areas under the California Coastal Act. Seagrass meadows are one of the most productive habitats in the world. Seagrass meadows enhance biodiversity, providing nursery and feeding areas for many species of fish, shellfish, birds, and mammals. Seagrasses act as ecosystem engineers by reducing flow velocities, filtering sediment out of the water column and preventing sediment resuspension, attenuating waves, and buffering the nearshore environment from the effects of storms (Van der Heide et al. 2011). Seagrass meadows cycle nutrients, serving as sinks for organic carbon and also exporting organic carbon to adjacent ecosystems (Mateo et al. 2006). Seagrass meadows worldwide are threatened by shoreline development, erosion, eutrophication, and global climate change. In Elkhorn Slough near Seal Bend, most eelgrass occurs just slightly below MLLW, while at a nearby downstream site called Vierra, eelgrass grows to depths of 3.3 to 6.5 ft below MLLW, with the difference likely attributable to both light availability and erosion processes. Active erosion of sediment on the channel-ward edges of the main eelgrass bed at Seal Bend causes a sharp-drop off at the edge of the bed in about 3 ft below MLLW, which leaves exposed rhizomes extending out into the water column where the sediment has eroded out from under the root-rhizome matrix. This steep bathymetry appears to be a limiting factor to eelgrass expansion further into the channel (Hammerstrom and Grant 2012).

1.3.2 Special-status Animal Species

On 18 February 2013, H. T. Harvey & Associates wildlife ecologists Ron Duke, Scott Demers, and fish ecologist Neil Kalson conducted a reconnaissance-level field survey for special-status animal species and their habitat associates on the project site. The survey method involved hiking the survey area, focusing on areas that may provide habitat for special-status species.

Prior to the site visit, the CNDDB was queried for special-status wildlife species occurring within the USGS 7.5 minute Moss Landing Quadrangle in which the project is located and within the adjacent quadrangles surrounding the project site: Soquel, Watsonville West, Watsonville East, Prunedale, Salinas, and Marina Quadrangles (CNDDB 2013). Special-status animal species occurring within a 5-mi radius of the project site are shown in Figure 3 (CNDDB 2013). In addition, we reviewed the results of previous surveys and biological studies conducted by numerous researchers and environmental planners, including the Final Initial Study and Mitigated Negative Declaration for the Parsons Slough Project (Vinnedge Environmental Consulting 2010), reports in the Elkhorn Slough Technical Report Series (found at: http://www.elkhornslough.org/research/ bibliography_tr.htm), and other reports related to the Elkhorn Slough area. The legal status and likelihood of occurrence of these species is presented in Table 2.

The following is a list of the special-status animal species, judged to be absent because the site is outside of the known range, for which habitat at the site is not suitable, or recent records are lacking in the site vicinity. The list includes Ohlone tiger beetle (*Cicindela ohlone*), Smith's blue butterfly (*Euphilotes enoptes smithi*), Zayante band-winged grasshopper (*Trimerotropis infantilis*), black legless lizard (*Anniella pulchra pulchra*), coast horned lizard (*Phrynosoma blainvillii*), silvery legless lizard (*Anniella pulchra nigra*), western pond turtle (*Clemmys marmorata*), bank swallow (*Riparia riparia*), California black rail (*Laterallus jamaicensis coturniculus*), California Ridgway's rail (*Rallus obsoletus obsoletus*) (formerly California clapper rail [*Rallus longirostris obsoletus*]), American badger (*Taxidea taxus*), and Monterey ornate shrew (*Sorex ornatus salarius*).

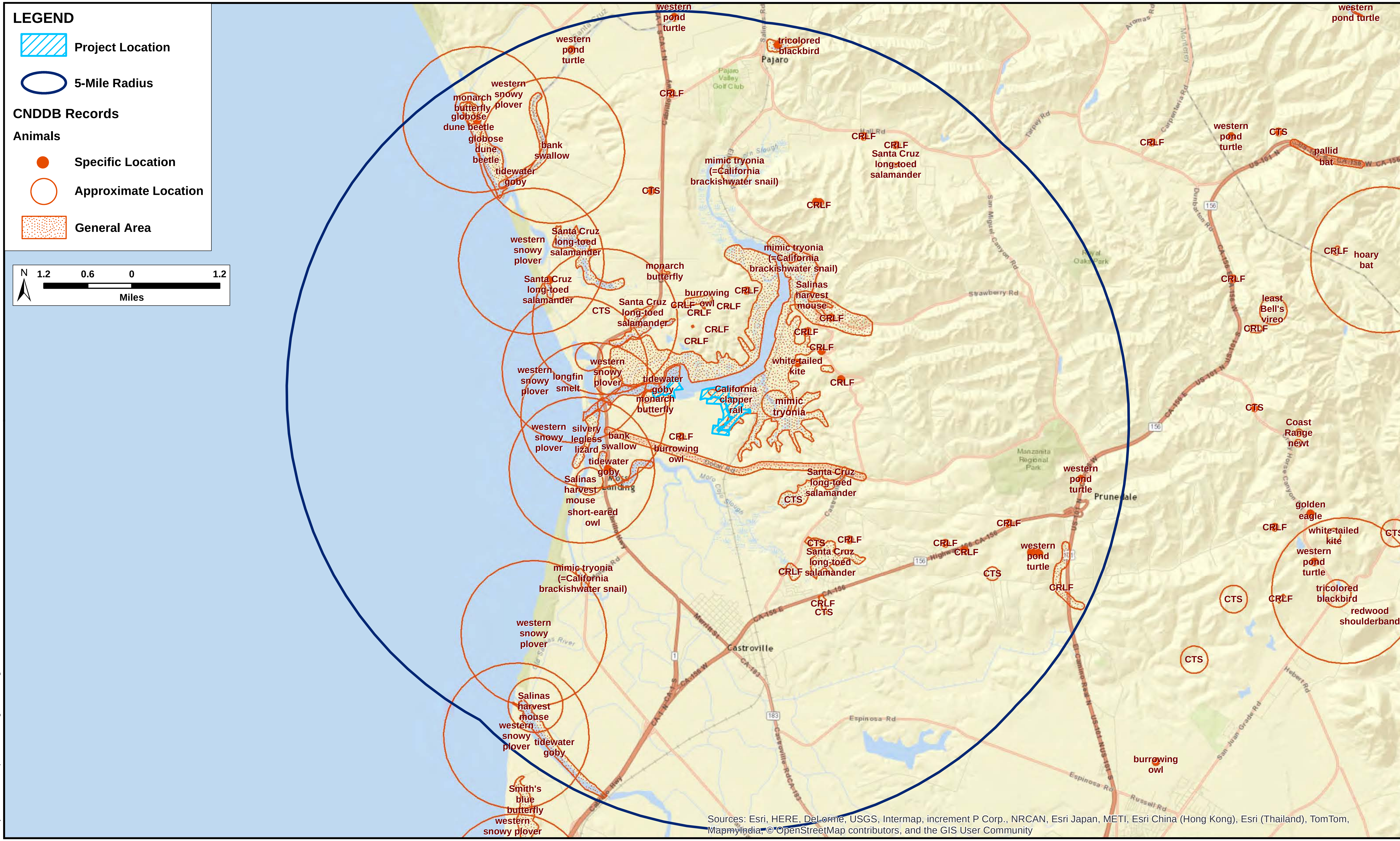

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Figure 3: CNDDB Animal Records
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Table 2. Special-status Animal Species, Their Status, and Potential Occurrence at the Project Site

Name	Status*	Habitat	Potential For Occurrence On Site
Federal or State Threatened or Endangered Species			
Ohlone Tiger Beetle (*Cicindela ohlone*)	FE	Coastal prairie grasslands with poorly drained clay soils.	Absent: No suitable grasslands with clay soils present in the project site or adjacent areas.
Smith's Blue Butterfly (*Euphilotes enoptes smithi*)	FE	Coastal dune and sage scrub habitats.	Absent: No suitable dune or coastal scrub habitats with larval or adult foodplants present.
Zayante Band-winged Grasshopper (*Trimerotropis infantilis*)	FE	Open ponderosa pine forests in the "Zayante Sandhills" region of Santa Cruz County.	Absent: No suitable ponderosa pine habitat with sandy soils present in the project site or adjacent areas.
California Red-legged Frog (*Rana aurora draytonii*)	FT, CSSC	Streams, freshwater pools, and ponds with overhanging vegetation.	Unlikely: No suitable freshwater habitats occur within the project site. The species has been observed in a seasonal swale approximately 0.5 mi west of the site and may occur in other freshwater habitats in the vicinity. Low probability that individuals could disperse onto upland stockpile area.
California Tiger Salamander *(Ambystoma californiense)*	FT, ST, CSSC	Breeds in vernal or temporary pools in annual grasslands, or open stages of woodlands. Uses small mammal burrows for refugia during dry season.	Possible: No suitable freshwater habitats occur within the project site. The species has been observed in a seasonal swale approximately 0.5 mi west of the site and may occur in other freshwater habitats in the vicinity. Low probability that individuals could disperse onto upland stockpile area and use ground squirrel burrows as refugia.
Santa Cruz Long-toed Salamander *(Ambystoma macrodactylum croceum)*	FE, SE, SP	Temporary pools in coastal oak woodlands, chaparral and other habitats. Uses small mammal burrows and leaf litter in upland habitats during dry season.	Unlikely: No suitable freshwater pools on site or moist upland ground cover. Dispersal onto upland areas is unlikely due to distance (≥1.5 mi) and intervening unsuitable habitat (salt marsh/mud flat and development) between the project site and nearest breeding habitat.

Name	Status*	Habitat	Potential For Occurrence On Site
Chinook Salmon – Sacramento River Winter-run ESU (*Oncorhynchus tshawytscha*)	FE, SE	Cool streams with suitable spawning habitat and conditions allowing migration, as well as estuarine and marine habitats.	Unlikely: Salmonids occur in coastal waters of the Monterey Bay region but are unlikely to stray into Elkhorn Slough. Numerous surveys have not detected this species in the project vicinity (M. Fountain pers. comm).
Chinook Salmon – Central Valley Spring-run ESU (*Oncorhynchus tshawytscha*)	FT, ST	Cool streams with suitable spawning habitat and conditions allowing migration, as well as estuarine and marine habitats.	Unlikely: Salmonids occur in coastal waters of the Monterey Bay region but are unlikely to stray into Elkhorn Slough. Numerous surveys have not detected this species in the project vicinity (M. Fountain pers. comm).
Coho Salmon - Central California Coast ESU (*Oncorhynchus kisutsch*)	FE, SE	Cool streams with suitable spawning habitat and conditions allowing migration, as well as estuarine and marine habitats.	Unlikely: Salmonids occur in coastal waters in the Monterey Bay region but are unlikely to stray into Elkhorn Slough. Numerous surveys have not detected this species in the project vicinity.
North American Green Sturgeon – Southern DPS (*Acipenser medirostris*)	FT, CSSC	Spawn in freshwater tributaries of the Sacramento River and river systems farther north, forage in riverine, estuarine, and marine habitats.	Unlikely: Green sturgeon have never been observed in Elkhorn Slough (M. Fountain pers. comm.) and are unlikely to occur even as an occasional forager.
Steelhead – Central California Coast DPS (*Oncorhynchus mykiss*)	FT	Cool streams with suitable spawning habitat and conditions allowing migration, as well as estuarine and marine habitats.	Unlikely: Salmonids occur in coastal waters in the Monterey Bay region but are unlikely to stray into Elkhorn Slough even as an occasional forager.
Steelhead – South Central California Coast DPS (*Oncorhynchus mykiss*)	FT, CSSC	Cool streams with suitable spawning habitat and conditions allowing migration, as well as estuarine and marine habitats.	Unlikely: South Central California Coast steelhead occur in Gabilan Creek (Bougton et al. 2006), which is connected to Moss Landing Harbor via Tembladero Slough and the Old Salinas River Channel. However, this species is unlikely to stray into Elkhorn Slough even as an occasional forager.

Name	Status*	Habitat	Potential For Occurrence On Site
Tidewater Goby (*Eucyclogobius newberryi*)	FE, CSSC	Shallow coastal bar-built lagoons and lower estuaries with minimal tidal flushing but high oxygen levels.	Unlikely: Tidewater gobies are known to occur in Moro Cojo Slough to the south and Struve Pond to the north of Elkhorn Slough, but are not known to occur in Elkhorn Slough due to high tidal flows. However, this species may occasionally disperse into Elkhorn Slough and the smaller channels in the project site in search of suitable habitat
Bald eagle (*Haliaeetus leucocephalus*)	DL, SE, SP, BEGEPA	Occurs mainly along seacoasts, rivers and lakes; nests in tall trees or in cliffs. Feeds mostly on fish.	Possible: Occasional forager in aquatic habits within and adjacent to the project site. No suitable breeding habitat on the project site.
Bank Swallow (*Riparia riparia*)	ST	Nests in colonies on vertical banks or bluffs in alluvial soils adjacent to streams, rivers, lakes, and coastlines.	Absent: No suitable bank or bluff habitats occur within the project site or adjacent areas.
California Black Rail (*Laterallus jamaicensis coturniculus*)	ST, SP	Breeds in fresh, brackish, and tidal salt marsh in coastal California including San Francisco Bay-Delta Estuary, as well as northwestern Baja California, lower Imperial Valley and Colorado River, and Sierra Nevada foothills.	Absent: Not known to breed in the Elkhorn Slough area likely due to a lack of suitable marsh habitat with dense vegetation and shallow water.
California Ridgway's Rail *(Rallus obsoletus obsoletus)*	FE, SE, SP	Salt and brackish marsh habitat usually dominated by pickleweed and cordgrass.	Absent: Extirpated from Elkhorn Slough. Currently restricted to San Francisco Bay estuary.
California Least Tern (*Sterna antillarum browni*)	FE, SE, SP	Nests along the coast on bare or sparsely vegetated flat substrates.	Possible: Occasional forager in aquatic habitats within the project site during migration. No breeding habitat on site.
Western Snowy Plover (*Charadrius nivosus nivosus*)	FT, CSSC	Nests on sandy beaches and salt pan habitats.	Possible: No salt pan or sandy beach habitat occurs on the project site. Nests in the former salt pond complex to the north and on coastal beaches to the west. May occasionally forage in intertidal areas in the project site.

Name	Status*	Habitat	Potential For Occurrence On Site
Southern Sea Otter (*Enhydra lutris nereis*)	FT, MMPA, SP	Inhabits nearshore waters along the California coastline from San Mateo County to Santa Barbara County. Uses both rocky and soft bottom areas for foraging on a variety of marine invertebrates.	Possible: Southern sea otters occur regularly in Elkhorn Slough for foraging, resting, socializing, and pupping. Foraging, rafting, and pupping locations are generally down-slough near Seal Bend, in areas with full tidal exchange (Maldini et al. 2010). Sea otters may occasionally traverse some of the deeper channels on the project site. They haul-out on pickleweed areas adjacent to the slough.
California Species of Special Concern			
Black Legless Lizard (*Anniella pulchra pulchra*)	CSSC	Sandy dunes and habitats with moist sandy soils dominated by bush lupine and mock heather.	Absent: No suitable sandy habitats occur within the project site or adjacent areas.
Coast Horned Lizard (*Phrynosoma blainvillii*)	CSSC	Sandy washes and other open habitats with bushes for cover and loose soils with abundant insects for prey.	Absent: No suitable habitats with sandy or loose soils occur within the project site or adjacent areas.
Silvery Legless Lizard (*Anniella pulchra nigra*)	CSSC	Chaparral and other habitats with sparse vegetation and sandy or loose loamy soils.	Absent: No suitable sandy habitat occurs within the project site or adjacent areas.
Western Pond Turtle *(Clemmys marmorata*)	CSSC	Permanent or nearly permanent fresh or brackish water in a variety of habitats.	Absent: No suitable permanent or nearly permanent fresh or brackish water occurs on the project site. The aquatic habitat on site consists of tidal salt water. Not expected to disperse across the site.
Chinook Salmon – Fall-run Central Valley ESU (*Oncorhynchus tshawytscha*)	CSSC	Cool rivers and large streams that reach the ocean and that have shallow, partly shaded pools, riffles, and runs.	Unlikely: Salmonids occur in coastal waters in the Monterey Bay region but are unlikely to stray into Elkhorn Slough. Numerous surveys have not detected this species in the project vicinity (M. Fountain pers. comm).

Name	Status*	Habitat	Potential For Occurrence On Site
Loggerhead Shrike (*Lanius ludovicianus*)	CSSC	Nests in dense shrubs and trees, forages in grasslands, marshes, and ruderal habitats.	Possible: Occasional forager in tidal marshes and upland habitats within project site and adjacent upland areas, particularly during the non-breeding season. Could potentially breed in adjacent areas with suitable nesting trees and shrubs, but not likely to breed in the vicinity.
Northern Harrier *(Circus cyaneus)*	CSSC	Nests and forages in marshes, grasslands, and ruderal habitats.	Present: Occasional forager in tidal marshes in the project site and adjacent upland areas and likely breeds in Elkhorn Slough. Unlikely to breed in the low-elevation tidal marshes within the project site, the annual barley crop, or other low-quality upland habitats in the stockpile area.
Short-eared Owl (*Asio flammeus*)	CSSC	Nests on ground in tall emergent vegetation or grasses, forages over a variety of open habitats.	Possible: Occasional forager in tidal marshes within project site and adjacent upland areas. Unlikely to breed in the low-elevation tidal marshes within the project site, and not likely to breed in the annual barley crop or other low-quality upland habitats in the stockpile area.
Tricolored Blackbird *(Agelaius tricolor)*	CSSC	Breeds near freshwater in dense emergent vegetation.	Possible: No suitable freshwater habitat on the site but non-breeding individuals occur in freshwater habitats on an adjacent property, and the species may occasionally occur on the site.
Western Burrowing Owl *(Athene cunicularia hypugaea)*	CSSC	Flat grasslands and ruderal habitats with low vegetation and suitable burrows.	Present: Occasional forager in tidal marshes within the project site and adjacent upland areas. California ground squirrel burrows used for breeding and roosting were observed in the stockpile area and a burrowing owl has been seen near a burrow for a few weeks in the winter.
American Badger (*Taxidea taxus*)	CSSC	Grasslands, savannahs, deserts and other open habitats with friable soils for excavating dens and abundant prey, including fossorial mammals.	Absent: No suitable open areas with friable soils occur on the project site or adjacent areas.

Name	Status*	Habitat	Potential For Occurrence On Site
Monterey Ornate Shrew (*Sorex ornatus salarius*)	CSSC	Moist riparian woodland habitats with dense vegetation, duff, or downed logs.	Absent: Suitable densely vegetated habitats do not occur on site.
Pallid Bat (*Antrozous pallidus*)	CSSC	Forages over many habitats; roosts in buildings, rocky outcrops and rocky crevices in mines and caves.	Unlikely: May occasionally forage over the project site. No suitable roosting habitat on the project site or in adjacent areas.
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	CSSC	Forages in a variety of habitats; roosts in caves and artificial structures.	Unlikely: May occasionally forage over the project site. No suitable roosting habitat on the project site; may roost on artificial structures in the project vicinity, including bridges.
Western Red Bat (*Lasiurus blossevillii*)	CSSC	Migratory species that typically breeds in old growth riverine habitats such as areas in the Central Valley. Solitary and roosts in the foliage of deciduous trees in riparian areas and sometimes orchards.	Unlikely: May occur as an occasional forager over the project site, but unlikely to roost on or adjacent to the site due to the absence of suitable roost sites.
State Protected Species			
American Peregrine Falcon *(Falco peregrinus anatum)*	DL, SP	Forages in many habitats; nests on cliffs and similar human-made structures.	Possible: Occasional forager (on other birds) in the project site, primarily during migration and winter. Does not currently breed in the project site.
California Brown Pelican *(Pelecanus occidentalis californicus)*	DL, SP	Occurs in nearshore marine habitats and coastal bays. Nests on islands in Mexico and southern California.	Present: Known to roost in Elkhorn Slough; no breeding habitat on site. May occasionally use remnant dikes to roost within the project site.
Golden Eagle (*Aquila chrysaetos*)	SP, BEGEPA	Grasslands, deserts, and other open habitats with abundance of suitable prey species.	Unlikely: May occur as an occasional forager over marshes, the stockpile area, and adjacent upland areas. No suitable breeding habitat occurs in the project site.
White-tailed Kite *(Elanus leucurus)*	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats.	Possible: No suitable nesting habitat on the project site. May occasionally forage in marsh habitats on the project site or in adjacent upland habitats.

Name	Status*	Habitat	Potential For Occurrence On Site
Species Protected by the Marine Mammal Protection Act			
Harbor Seal (*Phoca vitulina richardsi*)	MMPA	Coastal waters, river mouths, estuaries, and lagoons along the Pacific Coast, typically in areas with sheltered areas that can provide haul-out areas.	<u>Present</u>: Harbor seals inhabit Elkhorn Slough year-round. Harbor seals may periodically forge near the mouth of the slough, but they typically forage offshore. There are numerous haul-out sites in the Elkhorn Slough area, including Seal Bend, Seal Point (across from Seal Bend), near the entrance to Parsons Slough, and within Parsons Slough and in tidal creeks within the Parsons Slough complex (McCarthy 2010b). The species also has the potential to haul out in the project area.

Special-status Species Code Designations

FE =	Federally listed Endangered
FT =	Federally listed Threatened
SE =	State listed Endangered
DL =	Delisted
CSSC =	California Species of Special Concern
SP =	State Protected Species
BEGEPA =	Bald Eagle Golden Eagle Protection Act
MMPA =	Marine Mammal Protection Act

Definitions Regarding Potential Occurrence

Present:	Observed on or very close proximity to the project site
Likely:	Reasonably certain to occur on the site
Possible:	Conditions suitable for occurrence, at least as occasional visitor
Unlikely:	Conditions marginal for occurrence
Absent:	Conditions unsuitable for occurrence

Several special-status species may occur on the site rarely, or only as occasional foragers or dispersants, but are not expected to breed on the site, and would not likely be affected by project implementation. These species include the central California coast steelhead DPS (*Oncorhynchus mykiss*), Central Valley spring-run ESU (*Oncorhynchus tshawytscha*), Central Valley fall-run Chinook salmon ESU (*Oncorhynchus tshawytscha*), central California coast coho salmon ESU (*Oncorhynchus kisutsch*), Sacramento River winter-run Chinook salmon ESU (*Oncorhynchus tshawytscha*), south central California coast steelhead DPS (*Oncorhynchus mykiss*), California red-legged frog, California tiger salamander, Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), California least tern (*Sterna antillarum browni*), golden eagle (*Aquila chrysaetos*), tri-colored blackbird (*Agelaius tricolor*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western red bat (*Lasiurus blossevillii*).

Expanded discussions are provided below for the special-status animal species that could breed on the site or for which the resource agencies have expressed particular concern in the general vicinity of the site.

Tidewater Goby (*Eucyclogobius newberryi*); Federal Listing Status-Endangered; State Listing Status-None. The species was federally listed as endangered in 1994 (USFWS 1994). Critical habitat was designated in 2000, revised in 2008 (USFWS 2008), and further revised in 2013 (USFWS 2013). The current range of the species extends from Tillas Slough near the Oregon border to Cockleburr Canyon in San Diego County. This species inhabits coastal lagoons, estuaries, and marshes during all its life stages and is rarely found in marine environments, except during breaching or storm events when individuals are flushed out to sea (USFWS 1994). This species usually selects areas within upper estuaries within the freshwater and saltwater interface but can range short distances into freshwater (USFWS 2005). Tidewater gobies are typically found in shallow (<3 ft) water and prefer sandy substrates for breeding but can be found on rocky or soft substrates as well (USFWS 2005). Tidewater gobies feed on small animals, including mysid shrimp, amphipods, and aquatic insects (Moyle 2002). This species is typically an annual species although some individuals may live longer than a year (Moyle 2002). Reproduction occurs year-round, with peaks in spawning occurring in late spring and late summer (Swenson 1999, USFWS 2005). Female gobies can lay 6 to 12 clutches per year; male gobies guard the eggs that are attached to sand grains within burrows (Swenson 1999). Tidewater gobies formerly inhabited 134 locations but have been extirpated at 23 of those sites, and between 55 and 70 of the locations have become degraded or are small enough that the long-term inhabitance of this species is uncertain (USFWS 2005).

In the Elkhorn Slough area, tidewater gobies occur in Bennett Slough, which is considered critical habitat for the species (USFWS 2013), to the north of Elkhorn Slough. They are also known to occur in the Moro Cojo Slough system to the south of Elkhorn Slough. Tidewater gobies are likely absent from the Elkhorn Slough system due to high tidal flows, but could occur in the system as occasional dispersants.

North American Green Sturgeon Southern Distinct Population Segment (*Acipenser medirostris*); Federal Listing Status- Threatened; State Listing Status- Species of Special Concern. There are two distinct population segments (DPSs) of the North American green sturgeon, the Northern and Southern

DPS. They are distinguished only by their spawning locations; otherwise they are identical and their ranges overlap (Adams et al. 2002; USFWS 2006; USFWS 2009). The Northern DPS breeds north of the Eel River and is not listed as threatened or endangered, and the Southern DPS breeds only in the Sacramento River and was federally listed as threatened in 2006 (USFWS 2006). Threats to green sturgeon include loss of spawning habitat, degradation of water quality, fisheries harvest, and poaching. Green sturgeon is a long-lived (up to 70 years), anadromous fish species that occurs along the Eastern Pacific Coast from the Bering Sea south to Ensenada, Mexico. They spend most of their lives in coastal marine waters, coastal bays, and estuaries along the Pacific coast, and Monterey Bay provides habitat for adults and sub-adults (Huff et al. 2012). Juveniles inhabit bays and estuaries for 1 to 4 years before traveling to the ocean. They spend about 15 years at sea before returning to spawn in their natal freshwater habitat, and spawn every 2 to 4 years thereafter (Moyle 2002). They spend summers in coastal waters up to 360 ft deep along California, Oregon, and Washington, migrate north in the fall to as far as southeast Alaska, and then return in the spring (Erickson and Hightower 2007; Lindley et al. 2008). They occur on the bottom, although they can forage throughout the water column, feeding on benthic invertebrates and small fishes.

Green sturgeon have not been documented within Elkhorn Slough (Brown 2002), and although unlikely, the species could enter the Elkhorn Slough system to forage.

California Brown Pelican (*Pelecanus occidentalis*); Federal Listing Status- Delisted; State Listing Status- State Protected Species. Pelican populations were decimated by the effects of DDT, and while the species began to recover after the chemical was banned in 1972, the California population remained threatened by other environmental contaminants, habitat loss, and human disturbance, to which they are extremely sensitive (Jacques et al. 1996, Shields 2002). The species was listed as endangered both under FESA and CESA until 2009 when the California brown pelican population was determined to have sufficiently recovered to be delisted by both the federal (74 FR 59443) and state agencies (Fish and Game Commission 2009). The California brown pelican ranges from the San Francisco bay area to Baja California. Established breeding colonies occur on West Anacapa Island, Santa Barbara Island, and at the Salton Sea; communal winter roosts occur throughout the range (Shields 2002). Pelicans are highly gregarious in all seasons, forming large communal winter roosts from which they range up to 47 mi to forage (Shields 2002). Preferred winter roost sites are comprised of estuaries, sand bars, spits, or beaches that are close to aquatic foraging grounds, allow the birds to dry off after foraging, and offer shelter from predators and the elements (Jacques et al. 1996, Shields 2002). Sites that are completely or almost completely surround by water are required for night roosts, to maximize protection from predators (Jacques et al. 1996). Pelicans forage in relatively warm brackish and ocean waters where fish are close enough to the surface to be captured by plunge-diving birds (Shields 2002).

Brown pelicans use Elkhorn Slough for roosting in open water habitats and on steep banks of the lower portions of the slough during post-breeding (i.e., July – August). This species may occasionally roost in the project site in aquatic habitats.

Western Snowy Plover (*Charadrius nivosus nivosus*); Federal Listing Status- Threatened; State Listing Status- Species of Special Concern. The Pacific Coast population of the snowy plover (i.e., "western snowy plover") was federally listed as a threatened species in 1993 (58 FR 12864) because of a decline in the breeding population, loss of breeding habitat, and increased depredation by non-native predators. The listed western snowy plover was recognized at the time as *Charadrius alexandrinus nivosus*, which was considered a subspecies of the Eurasian Kentish plover (*Charadrius alexandrinus*). In 2009, the American Ornithologist's Union (AOU) received, and later accepted, a proposal to change the scientific name of the snowy plover that occurs in the Americas to *Charadrius nivosus,* with 3 subspecies including *C. nivosus nivosus* (occurring in the United States and parts of Mexico), *C. nivosus tenuirosrtis* (occurring in Cuba, Puerto Rico, the Caribbean, and Yucatan Peninsual), and *C. nivous occidentalis* (occurring in South America). The USFWS accepted the AOU change in taxonomic nomenclature and now recognizes the western snowy plover as *C. nivosus nivosus* (USFWS 2012). The snowy plover is a small pale shorebird that nests on beaches and salt pans in western North America. Snowy plovers nest on barren to sparsely vegetated beaches, salt flats, dredge spoils, levees, river bars, and salt evaporation ponds (Page et al. 1995). The western snowy plover nests along the Pacific Coast from Damon Point, Washington to Bahia Magdalena, Baja California, Mexico (USFWS 2007). Snowy plovers that nest at inland areas are not considered part of the Pacific coast population, although interior-nesting plovers will winter along the Pacific coasts. Snowy plovers consume flies, beetles, crabs, polychaete worms, amphipods, sand hoppers, moths, grasshoppers, small crustaceans, mollusks, and plant seeds (Page et al. 1995). They forage by pursuing their prey on foot, picking from the surface or probing in sand and loose soils, and will charge dense aggregations of flies, snapping their bill at those flushed (Purdue 1976, Page et al. 1995). Window surveys along the Pacific Coast indicate that the numbers of breeding snowy plovers have ranged from a low of 976 in 2000 to a high of 1,904 in 2004; in 2006 1,723 plovers were counted along the Pacific Coast (USFWS 2007).

Western snowy plovers nest on the sandy beaches near Moss Landing Harbor and in the former salt pond on the north side of the slough. Western snowy plovers are not expected to breed on the project site due to a lack of suitable sandy or salt pan areas but they may occur as an occasional forager on tidal flats.

Southern Sea Otter (*Enhydra lutris nereis*) Federal Listing Status- Threatened and Protected by Marine Mammal Protection Act; State Listing Status- Protected Species. The species was federally listed as threatened in 1977 (USFWS 1977). It also is designated as a fully protected species by California. No critical habitat has been designated for the species. The northern California coast historically was home to large numbers of southern sea otters, but they were nearly extirpated from the region by fur hunters in the 1700s and 1800s. A small population of approximately 50 individuals was discovered along the Big Sur coast; the species was subsequently protected and the population has gradually increased, although a lack of genetic diversity is a concern for the species' recovery. The current population size is estimated at 2,800 individuals (Carretta et al. 2009). The range of the southern sea otter currently extends from just south of San Francisco Bay to just south of Point Conception, Santa Barbara County (Carretta et al. 2009). A small translocated population remains near San Nicholas Island off southern California. Sea otters forage on sea urchin and abalone in rocky areas and burrowing infauna like the Pismo clam and butter clam is soft sediment areas (McCarthy 2010a). Sea otters use estuaries for resting, pupping, and foraging, where they rest and groom while floating on their backs either individually or in rafts. They often congregate in areas where they can anchor to eelgrass or other materials.

Sea otters frequently use Elkhorn Slough and the population in this area has reached 100 individuals after being extirpated in the early 1900's and returning in the 1980's (McCarthy 2010a). Sea otters rest and pup in Elkhorn Slough but also forage on snails, mussels, and crabs (McCarthy 2010a). Within the slough, otters are typically located in areas of full tidal exchange and tend to be located in the lower and middle portions of the slough, although they occur upstream in subtidal mudflats and tidal channels in Parsons Channel. Otters have been observed hauled out in pickleweed vegetation in the Parsons Slough area (Vinnedge Environmental Consulting 2010) and may use pickleweed marshes in the project site on occasion. Individuals at Moss Landing Harbor, at the mouth of Elkhorn Slough, are comprised mainly of males (ranging from juvenile to adult), whereas otters occupying the slough itself tend to consist of juvenile, sub-adult, adult females, some with pups, and small numbers of reproductive/territorial males (K. Mayers pers. comm., as cited in McCarthy 2010a). Sea otters are also known to occur in Yampah Marsh and Parsons Slough adjacent to the Minhoto/Hester's Marsh restoration area (Eby and Scoles 2010).

Harbor Seal (*Phoca vitulina richardsi*); Federal Listing Status- Protected by Marine Mammal Protection Act; State Listing Status- None. Harbor seals are widely distributed throughout the northern Atlantic and Pacific Oceans along coastal waters, river mouths, and bays (Burns 2008; Lowry et al. 2008). Despite the species' continuous distribution, there is significant genetic variation throughout the range, and they are divided into five subspecies, with two occurring in the Pacific Ocean (O'Corry-Crowe et al. 2003; Westlake and O'Corry-Crowe 2002). Aside from occasional dispersing individuals, harbor seals within the Monterey Bay area are part of the California stock. In northern California, pupping peaks in June and lasts about 2 weeks; pups are weaned in 4 weeks (Burns 2008). A seasonal molt occurs in June and July, after pupping. Mating occurs in the water after weaning. The larger males defend territories near female haul-outs and return to these sites in successive years. Harbor seals consume a variety of prey, but small fishes predominate in the diet (Tallman and Sullivan 2004). Foraging occurs in a variety of habitats, from streams to bays to the open ocean, and harbor seals can dive to depths of almost 500 m (Eguchi and Harvey 2005). The primary predators of harbor seals are killer whales (Ford et al. 1998) and great white sharks (Anderson et al., 2008). The harbor seal population in California grew rapidly following the passage of the Marine Mammal Protection Act in 1972; however, growth has slowed and the population has remained relatively constant since 1990 (Carretta et al. 2009; Lowry et al. 2008). The estimated minimum population size in California waters is 31,600 seals, and it is unknown if an optimal sustainable population has been attained is unknown (Carretta et al. 2009).

Harbor seals, numbering in the hundreds, are year-round residents in Elkhorn Slough**.** They occur individually or in small groups in the main channel and often haul-out on channel banks and mudflats, especially at Seal Bend (Harvey and Connors 2002). The slough is mainly used for staging, resting, and pupping, with most foraging occurring in Monterey Bay, but they occasionally forage in the slough (McCarthy 2010b). Foraging in the slough is mostly on small fish (Harvey and Connors 2002). Elkhorn Slough began to be used for breeding in 1989 after the human access to haul-out sites near Seal Bend was limited, and pupping now occurs up-slough on various mudflats including in Rubis Creek and

Parsons Slough (Harvey and Connors 2002; McCarthy 2010b). Haul-out sites have varied in the slough, with Seal Bend being the most frequented historically, and other sites being used as well, including mudflat use at Rubis Creek, the entrance to Parsons Slough, and tidal creeks within the Parsons Slough complex (McCarthy 2010b; Eby and Scoles 2010); they also can haul-out in the project site as well.

California Red-legged Frog (*Rana draytonii*); Federal Listing Status- Threatened; State Listing Status- Species of Special Concern. The historic distribution of the California red-legged frog extended from the city of Redding in the Central Valley and Point Reyes National Seashore along the coast, south to Baja California, Mexico. The species' current distribution includes isolated locations in the Sierra Nevada and the San Francisco Bay area, and along the central coast (USFWS and CDFG 2003). The California red-legged frog was listed as threatened in June 1996 (USFWS and CDFW 2003) based largely on a significant range reduction and continued threats to surviving populations (Miller 1994). Critical habitat was designated in April 2006 (USFWS and CDFW 2003), and revised critical habitat has been proposed (USFWS and CDFW 2003).

The California red-legged frog inhabits perennial freshwater pools, streams, and ponds throughout the Central California Coast Range and isolated portions of the western slope of the Sierra Nevada (Fellers 2005). Its preferred breeding habitat consists of deep perennial pools with emergent vegetation for attaching egg clusters (Fellers 2005), as well as shallow benches to act as nurseries for juveniles (Jennings and Hayes 1994). Non-breeding frogs may be found adjacent to streams and ponds in grasslands and woodlands, and may travel up to 2 mi from their breeding locations across a variety of upland habitats (Bulger and Scott 2003, Fellers and Kleeman 2007). Typically, however, red-legged frog dispersal distances are much shorter, and the USFWS (2010) considered 1 mi a more typical dispersal distance for the species in its critical habitat designation.

No suitable freshwater habitats for California red-legged frogs occur on the site. The species is known to occur in a seasonal swale approximately 0.5 mi to the west of the stockpile area and they may occur in freshwater habitats in other areas in the vicinity of the project. There is a low probability that individuals could disperse from this location onto upland portions of the site.

California Tiger Salamander (*Ambystoma californiense*); Federal Listing Status- Threatened (Central Population); State Listing Status:- State Threatened. The California tiger salamander's preferred breeding habitat consists of temporary (minimum of 3–4 months), ponded environments (e.g., vernal pool, ephemeral pool, or human-made ponds) surrounded by uplands that support small mammal burrows. California tiger salamanders will also utilize permanent ponds provided aquatic, vertebrate predators are not present. Such ponds provide breeding and larval habitat, while burrows of small mammals such as California ground squirrels and valley pocket gophers in upland habitats provide refugia for juvenile and adult salamanders during the dry season.

The range of the California tiger salamander is restricted to the Central Valley and the South Coast Range of California from Butte County south to Santa Barbara County. Tiger salamanders have disappeared from a significant portion of their range due to habitat loss from agriculture and urbanization and the introduction of non-native aquatic predators. The California tiger salamander was listed as threatened in August 2004 (USFWS and CDFG 2003) and critical habitat was designated in August 2005 (USFWS and CDFG 2003). The California tiger salamander is considered a covered species by the working draft HCP/NCCP.

According to the Final Rule for listing the central population of the California tiger salamander as threatened under the federal Endangered Species Act (USFWS 2004), "Adult California tiger salamander have been observed up to 2,092 m (1.3 mi) from breeding ponds (S. Sweet, University of California, Santa Barbara, in litt. 1998), which may be vernal pools, stock ponds, or other seasonal or perennial water bodies." Most studies of upland habitat use by California tiger salamanders suggest that most individuals do not travel far from breeding ponds. Trenham and Shaffer (2005) estimated that 50, 90, and 95 percent of adult California tiger salamanders were within 492, 1608, and 2034 ft of their study pond, respectively, and that 95 percent of juvenile California tiger salamanders were within 2067 ft of the pond, with 85 percent concentrated between 656 and 1969 ft, but none were found at 2625 ft. Trenham et al. (2001) observed a high probability of adult California tiger salamanders dispersing between pools up to 2198 ft apart but did not observe dispersal events longer than 2297 ft. However, Austin and Shaffer (1992) reported dispersal distances by California tiger salamanders of at least 1.0 mi, and Orloff (2007) reported longer-distance dispersal by a few individuals in a population in Pittsburgh, Contra Costa County. Orloff's results suggested that some individuals may travel up to 1.3 mi or more from aquatic breeding habitat to upland aestivation habitat. A more recent study of two pools in Solano County, CA suggested that approximately 50% of CTS adults and sub-adults are found within 562 meters (1844 ft.) from a breeding pond and approximately 95% within 1867 meters (6125 ft.) (Searcy and Shaffer 2011). Collectively, these studies suggest that dispersal distances may vary among populations and/or sites; that California tiger salamander abundance likely decreases with increasing distance from a breeding pond; and that a few individuals may disperse 1 mi or more from breeding areas.

No suitable freshwater habitats for California tiger salamanders occur on the site. The species is known to occur in a seasonal swale approximately 0.5 mi to the west of the stockpile area and they may occur in freshwater habitats in other areas in the vicinity of the project. There is a low probability that individuals could disperse from this location onto upland portions of the site.

Santa Cruz Long-toed Salamander (*Ambystoma macrodactylum croceum*); Federal listing status- Endangered; State listing status- Endangered. The USFWS listed the Santa Cruz long-toed salamander as endangered on March 11, 1967. Populations are known from six localities in Santa Cruz and Monterey Counties: Valencia-Seascape, Larkins Valley, Ellicott-Buena Vista, Pleasant Valley-Corralitos, McClusky Slough and Moro Cojo Slough. This species is one of the smallest members of the "mole" salamanders, or Ambystomidae, measuring about 2.5 inches from snout to vent.

These salamanders spend most of their life underground, often in small mammal burrows. They have yellowish-orange (or faded to dull tan or olive) markings on the body and tail that contrast with the gray to jet-black color of their dorsal surface (Ruth 1988). The markings are highly cryptic when viewed against dead willow or coast live oak leaves. This species may occur in situations where water has been impounded in freshwater pond-like habitat where suitable breeding could occur (e.g., vernal pools, stock ponds) and where small mammal burrows (aestivation habitat) and moist vegetated habitats occur nearby.

No suitable freshwater habitats for Santa Cruz long-toed salamanders occur on the site. The nearest known location is from the Lower Cattail Pond approximately 1.5 mi to the northeast of the project site. Individuals from this location are unlikely to disperse onto the project site due to intervening unsuitable habitats, including saline tidal habitats and developed areas.

1.3.3 Special-status Bird Species

Raptors. The tidal marsh and upland portions of the project site represent potentially suitable habitat for several special-status raptor species, including the northern harrier (*Circus cyaneus*), short-eared owl (*Asio flammeus*), western burrowing owl (*Athene cunicularia hypugaea*), and white-tailed kite (*Elanus caeruleus*). The northern harrier nests in marshes and grasslands, usually those with tall vegetation and moisture sufficient to inhibit accessibility of nest sites to predators. This species forages, primarily on small mammals and birds, in a variety of open grassland, ruderal, and agricultural habitats. Northern harriers may nest in the project site, although the tidal marshes are likely too low in elevation and too sparsely vegetated to support nesting by this species, and they are unlikely to nest in the upland stockpile area due to insufficient vegetation density; however they are likely to forage on the site at least occasionally.

Short-eared owls occur in open habitats such as grasslands, wet meadows, and marshes. They require tules or other tall grasses for nesting or daytime refuge. They may occur in the project site as an occasional forager but are unlikely to breed in Elkhorn Slough.

Western burrowing owls prefer annual and perennial grasslands, typically with sparse or nonexistent tree or shrub canopies. In California, burrowing owls are found in close association with California ground squirrels; owls use the burrows of ground squirrels for shelter and nesting. Burrowing owls occur infrequently in Elkhorn Slough and are unlikely to use the project site for breeding. However, there are small numbers of California ground squirrel burrows around the edges of the stockpile area and a non-breeding burrowing owl has been observed in that location.

White-tailed kites can be found in association with the herbaceous and open stages of a variety of habitat types, including open grasslands, meadows, emergent wetlands, and agricultural lands. Nests are constructed in dense stands located adjacent to foraging areas. Stick nests are often built near the top of a dense willow, oak, or other tree stands. White-tailed kites are not expected to nest on the project site due to a lack of nesting habitat although they may nest in the vicinity and forage on the site on occasion.

Nesting Migratory Birds. In addition to the species described above, all native non-game birds are protected under the federal Migratory Bird Treaty Act (MBTA). This protection prohibits direct take of birds and the destruction of nests or eggs. A variety of common birds, such as western meadowlarks (*Sturnella neglecta*) and savannah sparrows (*Passerculus sandwichensis*) could potentially nest within the project area, particularly in upland areas within and adjacent to the stockpile area. Although take of these relatively common species would not be considered a significant impact under the CEQA, it would be in violation of federal and state laws. Appendix 2 provides an overview of the MBTA.

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Personal Communication

Woolfolk, A., Stewardship Coordinator for the Elkhorn Slough National Estuarine Research Reserve and H. T. Harvey & Associates' Biologist Annie Eicher on 8 February 2013.

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Appendix 1. Special-Status Plant Species Considered but Rejected for Occurrence at the Elkhorn Slough Tidal Marsh Restoration Project Site

Scientific Name	**Common Name**	**Lack of Serpentine Soils**	**Suitable Habitat Type Not Present**	**Microhabitat Features Not Present**	**Other Edaphic Requirements**	**Outside the Elevation Range**	**Highly Endemic Range**
Acanthomintha lanceolata	Santa Clara thorn-mint	X	X		X		
Acanthomintha obovata ssp. cordata	heart-leaved thorn-mint				X	X	
Acanthomintha obovata ssp. obovata	San Benito thorn-mint	X			X	X	
Agrostis lacuna-vernalis	vernal pool bent grass		X		X		X
Allium hickmanii	Hickman's onion			X			
Amsinckia douglasiana	Douglas' fiddleneck				X		
Antirrhinum ovatum	oval-leaved snapdragon				X	X	
Arabis blepharophylla	coast rockcress				X		
Arctostaphylos andersonii	Anderson's manzanita		X				
Arctostaphylos hookeri ssp. hookeri	Hooker's manzanita		X				
Arctostaphylos hooveri	Hoover's manzanita		X			X	
Arctostaphylos montereyensis	Toro manzanita		X				X
Arctostaphylos obispoensis	Bishop manzanita	X	X		X		
Arctostaphylos pajaroensis	Pajaro manzanita		X				
Arctostaphylos pumila	sandmat manzanita		X				
Arctostaphylos regismontana	Kings Mountain manzanita		X		X	X	
Aspidotis carlotta-halliae	Carlotta Hall's lace fern	X	X				
Astragalus macrodon	Salinas milk-vetch	X			X	X	

Scientific Name	Common Name	Lack of Serpentine Soils	Suitable Habitat Type Not Present	Microhabitat Features Not Present	Other Edaphic Requirements	Outside the Elevation Range	Highly Endemic Range
Astragalus nuttallii var. nuttallii	ocean bluff milk-vetch		X				
Astragalus tener var. tener	alkali milk-vetch				X		
Atriplex coronata var. coronata	crownscale				X		
Benitoa occidentalis	western lessingia	X			X	X	
Calandrinia breweri	Brewer's calandrinia			X			
Calochortus uniflorus	large-flowered mariposa lily			X			
Calystegia collina ssp. venusta	South Coast Range morning-glory	X				X	
Castilleja ambigua ssp. insalutata				X		X	
Castilleja latifolia	Monterey Coast paintbrush		X				
Ceanothus rigidus	Monterey ceanothus		X				
Centromadia parryi ssp. congdonii	Congdon's tarplant			X	X		
Chorizanthe douglasii	Douglas' spineflower		X		X		
Chorizanthe palmeri	Palmer's spineflower	X					
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower		X				
Chorizanthe pungens var. pungens	Monterey spineflower				X		
Chorizanthe robusta var. robusta	robust spineflower		X		X		
Chorizanthe ventricosa	potbellied spineflower	X					
Clarkia breweri	Brewer's clarkia	X	X			X	
Clarkia lewisii	Lewis' clarkia		X				
Clinopodium mimuloides	monkey-flower savory		X			X	

Scientific Name	Common Name	Lack of Serpentine Soils	Suitable Habitat Type Not Present	Microhabitat Features Not Present	Other Edaphic Requirements	Outside the Elevation Range	Highly Endemic Range
Cordylanthus rigidus ssp. littoralis	seaside bird's-beak		X				X
Corethrogyne leucophylla	branching beach aster		X				
Cryptantha rattanii	Rattan's cryptantha		X			X	
Delphinium hutchinsoniae	Hutchinson's larkspur			X			
Eriastrum virgatum	virgate eriastrum		X				
Ericameria fasciculata	Eastwood's goldenbush		X				
Eriogonum argillosum	clay buckwheat	X	X				
Eriogonum elegans	elegant wild buckwheat				X	X	
Eriogonum heermannii var. occidentale	western Heermann's buckwheat		X			X	
Eriogonum nudum var. indictum	protruding buckwheat	X	X				
Eriogonum umbellatum var. bahiiforme	bay buckwheat	X	X		X	X	
Eriophyllum jepsonii	Jepson's woolly sunflower	X	X			X	
Erysimum ammophilum	sand-loving wallflower		X				
Erysimum menziesii	Menzies' wallflower		X				X
Erysimum menziesii ssp. yadonii	Yadon's wallflower		X				X
Eschscholzia hypecoides	San Benito poppy	X				X	
Fritillaria agrestis	stinkbells	X			X		
Fritillaria liliacea	fragrant fritillary	X		X			
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	X	X		X		

Scientific Name	Common Name	Lack of Serpentine Soils	Suitable Habitat Type Not Present	Microhabitat Features Not Present	Other Edaphic Requirements	Outside the Elevation Range	Highly Endemic Range
Galium cliftonsmithii	Santa Barbara bedstraw		X			X	
Gilia tenuiflora ssp. amplifaucalis	trumpet-throated gilia					X	
Gilia tenuiflora ssp. arenaria	Monterey gilia		X		X		
Grindelia hirsutula var. maritima	San Francisco gumplant	X			X		
Hesperevax caulescens	hogwallow starfish		X				
Hoita strobilina	Loma Prieta hoita	X	X				
Holocarpha macradenia	Santa Cruz tarplant			X		X	X
Horkelia cuneata var. sericea	Kellogg's horkelia		X				
Horkelia yadonii	Santa Lucia horkelia		X		X	X	
Hosackia gracilis (formerly *Lotus formosissimus)*	harlequin lotus			X			
Iris longipetala	coast iris			X			
Lasthenia conjugens	Contra Costa goldfields			X			
Lasthenia ferrisiae	Ferris' goldfields		X				
Lasthenia leptalea	Salinas Valley goldfields			X			
Legenere limosa	legenere		X				
Leptosiphon grandiflorus	large-flowered leptosiphon			X			
Lessingia tenuis	spring lessingia		X			X	
Lomatium parvifolium	small-leaved lomatium	X	X				
Lupinus cervinus	Santa Lucia lupine		X			X	
Lupinus tidestromii	Tidestrom's lupine		X				

Scientific Name	Common Name	Lack of Serpentine Soils	Suitable Habitat Type Not Present	Microhabitat Features Not Present	Other Edaphic Requirements	Outside the Elevation Range	Highly Endemic Range
Malacothamnus jonesii	Jones' bush-mallow		X				
Malacothamnus niveus	San Luis Obispo County bush-mallow		X			X	
Malacothrix phaeocarpa	dusky-fruited malacothrix		X				
Micropus amphibolus	Mt. Diablo cottonweed				X		
Monolopia gracilens	woodland woolythreads	X					
Pedicularis dudleyi	Dudley's lousewort			X			
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue		X			X	
Pentachaeta bellidiflora	white-rayed pentachaeta	X					
Perideridia gairdneri ssp. gairdneri	Gairdner’s Yampah			X			
Pinus radiata	Monterey pine		X				
Piperia yadonii	Yadon's rein orchid		X				
Plagiobothrys chorisianus var. chorisianus	Choris' popcorn-flower						
Plagiobothrys diffusus	San Francisco popcorn-flower			X			X
Rosa pinetorum	pine rose		X				
Trifolium buckwestiorum	Santa Cruz clover		X		X		
Trifolium hydrophilum	saline clover			X			

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Appendix 2. Regulatory Overview

Special-status Species Regulations Overview

Federal and state endangered species legislation gives several plant and animal species known to occur in the vicinity of the site special status. In addition, state resource agencies and professional organizations, whose lists are recognized by agencies when reviewing environmental documents, have identified as sensitive some species occurring in the vicinity of the site. Such species are referred to collectively as "species of special-status" and include: plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (FESA) or the California Endangered Species Act (CESA), animals listed as "fully protected" under the California Fish and Game Code, animals designated as "Species of Special Concern" by the CDFW, and plants listed as rare or endangered by the CNPS in the *Inventory of Rare and Endangered Plants of California* (2013).

Federal Endangered Species Act provisions protect federally listed threatened and endangered species and their habitats from unlawful take. "Take" under FESA includes activities such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct." The U.S. Fish & Wildlife Service's (USFWS) regulations define harm to mean "an act which actually kills or injures wildlife." Such an act "may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 CFR § 17.3). Activities that may result in "take" of individuals are regulated by the USFWS. The USFWS produced an updated list of candidate species September 19, 1997 (USFWS 1997; 50 CFR Part 17). Candidate species are not afforded any legal protection under FESA; however, candidate species typically receive special attention from federal and state agencies during the environmental review process.

Provisions of CESA protect state-listed threatened and endangered species. CDFW regulates activities that may result in "take" of individuals (i.e., "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code. The CDFW, however, has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification . . . " Additionally, the California Fish and Game Code contains lists of vertebrate species designated as "fully protected" (California Fish & Game Code §§ 3511 [birds], 4700 [mammals], 5050 [reptiles and amphibians], 5515 [fish]). Such species may not be taken or possessed without a permit.

The CDFW has also produced 3 lists (amphibians and reptiles, birds, and mammals) of "species of special concern" that serve as "watch lists." Species on these lists either are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review.

Plants listed as rare or endangered by the CNPS (2013), but which have no designated status under state endangered species legislation, are defined as follows:

- List 1A.   Plants considered by the CNPS to be extinct in California.

- List 1B. Plants rare, threatened, or endangered in California and elsewhere.
- List 2. Plants rare, threatened, or endangered in California, but more numerous elsewhere.
- List 3. Plants about which we need more information - A review list.
- List 4. Plants of limited distribution - A watch list.

The Migratory Bird Treaty Act Overview

The Federal Migratory Bird Treaty Act (MBTA; 16 U.S.C., §703, Supp. I, 1989) prohibits killing, possessing, trading, or other forms of take of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. "Take" is defined as the pursuing, hunting, shooting, capturing, collecting, or killing of birds, their nests, egg or young (16 U.S.C. §703 and §715n). This act encompasses whole birds, parts of birds, and bird nests and eggs. The MBTA does not protect non-native species.

California State Fish and Game Code

Native migratory birds are also protected by the State of California. California Fish and Game Code §3503 emulates the MBTA and protects native birds' nests and eggs from all forms of take. The Fish and Game Code goes further than the MBTA in protecting eggs and young, in that disturbance that causes nest abandonment resulting in the loss of eggs or young may be considered take by the CDFW. Nesting raptors (birds of prey) are specifically protected under California Fish and Game Code §3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." To avoid take, the CDFW typically recommends buffers between active nests and new human activities that were not present at the onset of nesting. During the breeding season, the CDFW typically recommends a minimum buffer of 50-100 ft around active nests of non-raptors and a minimum buffer of 300 ft around active nests of raptors.

U.S. Army Corps of Engineers Jurisdiction

Areas meeting the regulatory definition of "Waters of the U.S." (jurisdictional waters) are subject to the jurisdiction of the USACE under provisions of Section 404 of the Clean Water Act (1972) and Section 10 of the Rivers and Harbors Act (1899). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the U.S.," tributaries of waters otherwise defined as "Waters of the U.S.," the territorial seas, and wetlands (termed Special Aquatic Sites) adjacent to "Waters of the U.S." (33 CFR, Part 328, Section 328.3). Wetlands on non-agricultural lands are identified using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).). In addition, the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation*

Manual: Arid West Region (Regional Supplement; USACE 2006) was followed to document site conditions relative to hydrophytic vegetation, hydric soils and wetland hydrology. The Regional Supplement is designed to be used with the current version of the Corps Manual; where differences in the 2 documents occur; the Regional Supplement takes precedence over the Corps 1987 Manual.

Construction activities within jurisdictional waters are regulated by the USACE. The placement of fill into such waters must comply with permit requirements of the USACE. No USACE permit will be effective in the absence of state water quality certification pursuant to Section 401 of the Clean Water Act. The State Water Resources Control Board is the state agency (together with the Regional Water Quality Control Boards) charged with implementing water quality certification in California.