

3.4 Biological Resources

This section evaluates the potential impacts related to biological resources during construction, invasive plant management, and maintenance of the Project. Construction activities include the earthwork involved in the estuarine restoration and infrastructure improvement portions of the Project. Invasive plant management activities include the removal of dense-flowered cordgrass (*Spartina densiflora*), European beachgrass (*Ammophila arenaria*), and dwarf eelgrass (*Zostera japonica*) using any one or a combination of the methods described in Section 2.5 (Proposed Invasive Plant Management). Maintenance activities include periodic repairs and improvements to the non-motorized boat put-in, trails, parking lots and road within the Project Area, and also include monitoring activities. For this section the study area includes the Project Area, McNulty Slough and associated levee systems, the first 500 feet (152 meters) of lower Hawk and Sevenmile sloughs, and the entirety of North Bay upstream of its confluence with the Eel River.

3.4.1 Setting

The Project Area consists of a gently sloping alluvial floodplain that drains east and south via McNulty Slough and North Bay to the Eel River estuary. The Eel River estuary is the fourth largest and one of the most significant estuaries along the California coast. The estuary includes a mosaic of tidal flats, sloughs, marshes, and seasonal wetlands that support resident and migratory birds, fish, mammals, amphibians, reptiles and invertebrate species, as well as a variety of saltmarsh, wetland and upland plants (CDFW 2019a, Schlosser and Eicher 2012; Grassetti et al. 2011). There are approximately 24 square miles (6,216 hectares) of delta lands, wetlands, and estuarine channels that receive runoff from the 3,700 square mile (958,296 hectares) Eel River Basin (CDFG 2010a).

Within the Eel River estuary, many remnant slough channels and streams that were historically interconnected have been disconnected through historical reclamation activities and ongoing agricultural land uses. Current conditions in the Project Area also reflect past land practices. Sometime between 1916 and 1948 to approximately 1986, the Project Area was diked, drained and primarily utilized for agricultural purposes. In 1986, CDFW acquired the currently tidal portion of the Project Area and subsequently subdivided it into five distinct Management Areas using earthen dikes. The five subdivided areas, defined as Areas A through E (see Figure 2-2, Project Area), were managed as shallow freshwater habitat for waterfowl and other native wildlife. In 1994, a levee breach occurred along McNulty Slough (east side of Area A) and caused tidal inundation of Area A. The breach, in combination with subsequent failures of other water control structures within Ocean Ranch and between Ocean Ranch, McNulty Slough and North Bay, resulted in decisions to discontinue management and maintenance of artificial freshwater wetland habitat and allowed most of the area to revert to saltmarsh or brackish marsh (Ducks Unlimited, Inc. 2015). Remnant levees exist between the Management Areas, reducing hydrologic connectivity and aquatic wildlife accessibility between the estuarine restoration area and McNulty Slough and North Bay.

Existing Habitat Conditions

This section contains an overview of the Project Area's existing habitat conditions. Subsequent sections contain more detailed information on the habitat types and sensitive natural resources, including aquatic resources, Sensitive Natural Communities, and special-status plant and wildlife species. Botanical species are referenced in accordance with the Jepson Flora Project (2020) naming convention (Jepson Herbarium 2020). All tidal elevations in this section are presented and analyzed in the North American Vertical Datum of 1988 (NAVD88).

The Project Area, with a total of 850 acres (344 hectares) is broken into two segments for the purpose of management: the estuarine restoration area (571 acres [231 hectares]) and the dunes restoration area (279 acres [113 hectares]). The estuarine restoration area is a wetland complex with tidal channels; mudflats; and salt, brackish and freshwater wetlands. The level of tidal exchange is severely restricted by the existing levee system, and existing channels are inadequate for sufficient tidal circulation. The dunes restoration area, located on a sand spit bordering the ocean, contains a system of coastal dunes and open sand. A small portion of the Project Area (6.3 acres [2.5 hectares]) is comprised of upland levees and access roads within the two restoration areas.

Aquatic resources represent 564.9 acres (228.5 hectares) of the Project Area (Pacific Coast Fish, Wildlife and Wetlands Restoration Association (Pacific Coast Restoration) 2018a). Aquatic resources are wetlands and deepwater habitats that are considered sensitive resources and subject to regulatory protection. Aquatic resources were found mostly in the estuarine restoration area (see Figure 3.4-1, Existing Aquatic Resources).

Eight special-status plant species were found at the Project Area (CDFW 2017, Pacific Coast Restoration 2018b). Three of these species were found in saltmarsh; four in coastal dunes; and one mostly in the transition zone between freshwater marsh and coastal dunes (see Figure 3.4-2, Rare Plant Mapping).

Eleven Sensitive Natural Communities were found at the Project Area (CDFW 2017, CDFW 2018, Pacific Coast Restoration 2018b). Sensitive Natural Communities are plant communities of limited distribution that are considered threatened to some degree. Two of the Sensitive Natural Communities found at the Project Area are associated with coastal salt and brackish marsh habitats; five with freshwater wetland habitats; three with coastal dune habitats; and one with northern coastal scrub habitats (see Figure 3.4-3, Sensitive Natural Communities).

The two most prevalent invasive plant species found at the Project Area are dense-flowered cordgrass and European beachgrass (see Figure 3.4-4, Invasive Plant Communities). Both species are listed by Cal-IPC (2019c) with a risk assessment rating of "high," signifying that they have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure, as well as high rates of dispersal and establishment. At the Project Area, coastal salt and brackish marshes are heavily infested by dense-flowered cordgrass, and coastal dune habitats are heavily infested by European beachgrass. Both of these invasive plant species form dense stands to the exclusion of other plant species, and both pose threats to Sensitive Natural Communities and special status plants at the Project Area.

In North Coast saltmarshes, dense-flowered cordgrass grows most robustly at low to middle tidal elevations, but it is actively encroaching on high elevation marshes as well (Pickart 2001, H. T. Harvey & Associates 2013). Dense-flowered cordgrass is an efficient colonizer of disturbed tidal areas, which necessitates careful control following restoration to prevent re-infestation. Once established, the dense tussocks and root system of the cordgrass limit colonization by other plant species.

European beachgrass impacts native dune plant species through direct competition and by altering sand movement dynamics. European beachgrass grows more densely than its native counterpart, sea lyme grass (*Leymus mollis*), trapping sand and thereby stabilizing dunes and hampering sand movement. This prevents new sand from reaching interior dunes and results in changes to the structure and ecology of dune ecosystems. The lack of sand mobilization to the back dunes impacts native dune mat species, many of which require areas of open sand to persist (Crossman et al. 2017, Pickart and Sawyer 1998).

Habitat Types

This section contains descriptions of the nine habitat types found at the Project Area, with information on where they are found and what types of sensitive resources they support.

Subtidal Channels

Tidal channels are channels that carry tidewater. Water depth in the channels fluctuates with the level of the tide. Subtidal channels are deep enough that they remain flooded even at low tide. Historically, tidal channels allowed unrestricted tidal exchange to much of the low-lying regions of the Project Area. Construction of the levee system restricted tidal exchange, but some of the historical channels remain. In addition, some channels (e.g., borrow ditches) were excavated as part of levee construction and other channels (e.g., drainage ditches) were excavated for agricultural practices. Following the main levee breach in 1994 and subsequent levee and tide gate failures, tidewater was re-introduced at a muted level. Remnant historical channels and ditches now convey tidewater into the interior of the Project Area and flood adjacent lands at high tide. The level of tidal exchange is muted overall and varies widely throughout the Project Area. It is greatest near the main breach to Area A and along the main historical subtidal channel that extends south from the breach site. A second smaller subtidal channel carries tidewater to the north from the breach site. Tidal exchange diminishes further from the breach and at higher elevations in the Project Area.

The conveyance of tidewater via subtidal channels has a major influence on the vegetation of adjacent lands; however, the only vegetation found within the channels themselves are eelgrass beds and macroalgae. Native eelgrass (*Zostera marina*) is considered a sensitive resource because so much of its habitat has been destroyed or is threatened. Eelgrass is an important food source for a number of aquatic organisms and wildlife and also functions as nursery grounds for several types of fish. Eelgrass is present outside of the Project Area within the subtidal channel of McNulty Slough, and may be present in the Project Area (Garwood 2018).

Intertidal Channels/Mudflat

Intertidal channels fill at high tide with an influx of tidewater and are exposed at low tide as tidewaters recede, draining the adjacent mudflats and marshes. Mudflats are large, flat areas that similarly are flooded at high tide and exposed at low tide. Area B, once managed as a freshwater pond, is now largely mudflat that is flooded at high tide and drains slowly at low tide through a culvert in the levee.

Intertidal channels and mudflats support macroalgae beds but are otherwise unvegetated. The channels provide habitat for a number of fish species and other aquatic organisms. Mudflats provide feeding grounds for shorebirds at low tide and are used by waterfowl when flooded at high tide.

Coastal Salt and Brackish Marshes

Coastal salt and brackish marshes form in sheltered areas that are influenced by tidewater exchange. The plants that grow there are adapted to both wet and saline conditions. In general, saltmarshes are found where seawater influence is highest, while brackish marshes are found where there is a mixture of seawater and freshwater influence. Inside the Project Area levees, the extent of salt and brackish marshes has steadily increased in response to muted tidal influence since re-introduction of tidal exchange through the 1994 levee breach. Coastal salt and brackish marshes are now the predominant marsh habitat type found in the Project Area, largely replacing the freshwater wetland complex once managed by CDFW.

Much of the saltmarsh in the Project Area is dominated by the invasive dense-flowered cordgrass. Additionally, two native saltmarsh plant communities are found at the Project Area, one dominated by pickleweed and the other by saltgrass (*Distichlis spicata*). Pickleweed mats are listed by CDFW (2020) as a Sensitive Natural Community. Pickleweed mats at the Project Area support three special status plants: Humboldt Bay owl's clover (*Castilleja ambigua* subsp. *humboldtiensis*), Point Reyes bird's beak (*Chloropyron maritimum* subsp. *palustre*), and Lyngbye's sedge (*Carex lyngbyei*). Patches of Lyngbye's sedge can be found in cordgrass marsh, but the other two sensitive plants do not grow in dense cordgrass. If left uncontrolled, continued expansion of cordgrass marsh at the Project Area poses an ongoing threat to the native saltmarsh communities and all three of the sensitive plants mentioned.

Brackish marshes at the Project Area are dominated by a mixture of saltmarsh bulrush (*Bolboschoenus maritimus* subsp. *paludosus*) and/or three-square bulrush (*Schoenoplectus pungens* var. *longispicatus*). Saltmarsh bulrush is listed by CDFW (2020) as a Sensitive Natural Community, and it is also threatened by dense-flowered cordgrass.

Fresh to Slightly Brackish Marshes

Freshwater marshes are predominantly influenced by freshwater sources such as creeks or other drainages, seeps and springs, or rainwater that ponds where drainage is poor. Freshwater marshes are found in the northern regions of the Project Area, where several drainages convey rainwater runoff from Table Bluff. These marshes are often slightly brackish at their interface with adjacent salt and brackish marshes. Prior to the 1994 levee breach, much of the Project Area was managed as a freshwater wetland complex. Since that time, freshwater marshes

have steadily declined as they have been replaced by salt and brackish marshes or by mudflats.

While less extensive than salt and brackish marshes, freshwater marsh plant communities found at the Project Area are more diverse. Marshes dominated by either slough sedge (*Carex obnupta*), salt rush (*Juncus lescurii*), water-parsley (*Oenanthe sarmentosa*), or Pacific silverweed (*Argentina egedii* subsp. *egedii*) are listed by CDFW (2020) as a Sensitive Natural Community. Two additional freshwater marsh plant communities found at the Project Area are those dominated by common cattail (*Typha latifolia*) or hardstem bulrush (*Schoenoplectus acutus*).

Fresh to slightly brackish marshes at the Project Area support one sensitive plant, seacoast angelica (*Angelica lucida*), especially in the transition zone between marsh and coastal dunes.

Freshwater Shrub Wetlands

Freshwater shrub wetlands are often associated with creeks and other drainages. A small amount of freshwater shrub wetlands dominated by coastal dune willow (*Salix hookeriana*) are found in the northern regions of the Project Area. Coastal dune willow thickets are listed by CDFW (2020) as a Sensitive Natural Community.

Freshwater Pond

There is one small freshwater pond located in the southwest region of the Project Area. It is a freshwater seep that was impounded on the inside of the perimeter levee by levee extensions. The pond does not appear to have any tidal influence. The water level in the pond does not fluctuate with the tidal cycle. Fresh to slightly brackish marsh vegetation grows on the edges of the pond.

Coastal Dunes

Coastal dunes form as onshore winds blow sand inland and the sand accumulates into hills or ridges. As sand accumulates, plants adapted to the sandy environment colonize, stabilizing the surface and promoting further dune formation. Coastal dunes are found just inland of the beach in the western region of the Project Area. While invasive European beachgrass dominates much of the dunes at the Project Area, two native plant communities are also found there, and both are listed by CDFW (2020) as Sensitive Natural Communities. The first is dominated by sea lyme grass. In natural systems, sea lyme grass colonizes the primary foredune (the dune ridge closest to the beach), but in the Project Area, sea lyme grass has been almost entirely outcompeted and replaced by European beachgrass.

The second Sensitive Natural Community found at the Project Area is known as dune mat. It is found in the foredune complex inland of the primary foredune and it is more extensive than sea lyme grass patches at the Project Area. Dune mat is composed mostly of a mix of mat-forming plants with variable and often sparse cover. Dune mat at the Project Area supports four special status plants: beach layia (*Layia carnosa*), dark-eyed gilia (*Gilia millefoliata*), short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*), and American glehnia (*Glehnia littoralis* subsp. *leiocarpa*). If left uncontrolled, continued expansion by European beachgrass at the Project Area poses an ongoing threat to the native dune communities and all four of the sensitive plants mentioned.

While dune mat is generally considered an upland plant community, it contains plants that are also tolerant of wet soils. One such plant, brewer's rush (*Juncus breweri*), is common along the eastern edge of dune habitat at the Project Area. Areas dominated by brewer's rush meet some regulatory definitions of wetland and are protected under those regulations.

Northern Coastal Scrub

Northern coastal scrub is an upland habitat characterized by various shrubs. Two northern coastal scrub plant communities are found at the Project Area, and neither are abundant. Coyote brush scrub (*Baccharis pilularis* subsp. *consanguinea*) is found primarily on the top and sides of levees throughout the Project Area. The second type is coastal brambles, dominated by a mixture of the native California blackberry (*Rubus ursinus*) and the invasive Himalayan blackberry (*Rubus armeniacus*). Coastal brambles are found on levees, often mixed with coyote brush scrub. Coastal brambles are also found growing along fencelines and in patches at the upper margins of marshes at the Project Area.

Plant communities dominated by native California blackberry are listed as sensitive by CDFW (2020). Scattered individuals of the sensitive plant seaside angelica can be found growing in northern coastal scrub habitat on the sides of levees at the Project Area.

Ruderal

Ruderal habitats are disturbed areas generally vegetated by non-native, sometimes invasive, plant species. Ruderal habitats are not extensive at the Project Area. They are found at the upper margins of marshes and along levees and access roads, mostly in the northern region of the Project Area. They are dominated by non-native grasses such as tall fescue (*Festuca arundinacea*), common velvet grass (*Holcus lanatus*), and sweet vernal grass (*Anthoxanthum odoratum*); and/or by wild radish (*Raphanus* spp.). Some of these weedy plants, referred to as facultative plants, are tolerant of both dry and wet soils. Areas dominated by facultative plants meet some regulatory definitions of wetland and are protected under those regulations.

Aquatic Resources

An investigation of aquatic resources potentially subject to federal and state regulation within the Project Area was conducted by Pacific Coast Fish, Wildlife and Wetlands Restoration Association in the spring and summer of 2018 (Pacific Coast Restoration 2018a). The entire Project Area was surveyed to determine the acreage and location of aquatic resources potentially subject to the following regulations:

- Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act as administered by the United States Army Corps of Engineers (USACE);
- The Porter-Cologne Water Quality Control Act and Section 401 of the CWA as administered by the North Coast Regional Water Quality Control Board (NCRWQCB); and

- The federal Coastal Zone Management Act and Sections 30233 and 30240 of the California Coastal Act (Coastal Act) as administered by the California Coastal Commission (CCC).

Aquatic resources found in the Project Area included wetlands and other waters of the U.S. and State. Wetlands were identified and mapped based on an assessment of three parameters: vegetation, soils, and hydrology. Pacific Coast Restoration (2018a) found 524.1 acres (212.1 hectares) of aquatic resources potentially under the jurisdiction of the USACE and the NCRWQCB, comprised of 350.3 acres (141.7 hectares) of three-parameter wetlands, and 173.8 acres [70.3 hectares] of other waters of the U.S./State. These aquatic resources plus an additional 40.8 acres [16.5 hectares] of one-parameter wetlands, totaling 564.9 acres (228.6 hectares), are all potentially under the jurisdiction of the CCC (Pacific Coast Restoration 2018a). See Figure 3.4-1 (Existing Aquatic Resources) for a visual representation of aquatic resources mapped within the Project Area, and Table 3.4-1 for a summary of aquatic resources in the Project Area.

Table 3.4-1 Aquatic Resources in the Project Area

Aquatic Resource Type	Acres
Three-parameter wetlands	350.3
Coastal salt and brackish marsh	306.5
Fresh to slightly brackish marsh	36.9
Freshwater shrub wetland	6.9
One-parameter wetlands	40.8
Brewer's rush dunes	33.4
Ruderal (facultative)	7.4
Other Waters of the U.S./State	173.8
Subtidal channel	11.7
Intertidal mudflat/channel	161.9
Freshwater pond	0.2
Total Aquatic Resources	564.9

Adapted from: Pacific Coast Restoration 2018a

Sensitive Natural Communities

Sensitive Natural Communities are plant communities that are of limited distribution statewide or within a county or region (see Section 3.4-2, Regulatory Framework, State, Sensitive Natural Communities). The distribution of these plant communities was mapped by Golec and Miller (CDFW 2017) and amended by Leppig (CDFW 2018) to include additional staging and access areas on the north side of the Ocean Ranch Unit that could be impacted by the Project. Table 3.4-2 and Figure 3.4-3 (Sensitive Natural Communities) list and depict, respectfully, the Sensitive Natural Communities mapped within the Project Area in 2017 and 2018.

Table 3.4-2 Sensitive Natural Communities in the Project Area

Scientific Name	Common Name	Associated Habitat Type	Global/State Rarity
<i>Abronia latifolia-Ambrosia chamissonis</i> Herbaceous Alliance	dune mat	Coastal dunes	G3/S3
<i>Argentina egedii</i> Herbaceous Alliance	Pacific silverweed marshes	Fresh to slightly brackish marsh	G4/S2
<i>Bolboschoenus maritimus</i> Herbaceous Alliance	salt marsh bulrush marshes	Brackish marsh	G4/S3
<i>Carex obnupta</i> Herbaceous Alliance	slough sedge swards	Fresh to slightly brackish marsh	G4/S3
<i>Carex pansa</i> Herbaceous Alliance	sand dune sedge swaths	Coastal dunes	G4?/S3?
<i>Juncus lescurii</i> Herbaceous Alliance	salt rush swales	Fresh to slightly brackish marsh	G3/S2?
<i>Leymus mollis</i> Herbaceous Alliance	sea lyme grass patches	Coastal dunes	G4/S2
<i>Oenanthe sarmentosa</i> Herbaceous Alliance	water parsley marshes	Fresh to slightly brackish marsh	G4/S2?
<i>Rubus ursinus</i> Shrubland Alliance	coastal brambles	Northern coastal scrub	G4/S3
<i>Salicornia pacifica</i> Herbaceous Alliance	pickleweed mats	Coastal salt marsh	G4/S3
<i>Salix hookeriana</i> Shrubland Alliance	coastal dune willow thickets	Freshwater shrub wetland	G4/S3

Information compiled from: CDFW 2017; CDFW 2018; Pacific Coast Restoration 2018b; CNPS 2019.

Key to status codes:

G1/S1: Critically Imperiled
G2/S2: Imperiled

G3/S3: Vulnerable

G4/S4: Apparently Secure

G5/S5: Secure

Special-Status Plant Species

Pacific Coast Restoration (2018b) performed an assessment of special-status plants at the Project Area. Queries of the California Natural Diversity Database (CNDDDB) (CDFW 2017) and the California Native Plant Society (CNPS 2018) yielded a list of 53 special-status plant species that were previously documented in the vicinity of the Project Area. Of this total, 23 species grow in habitat types, soil types or elevations not found in the Project Area, and the remaining 30 species were considered to have some potential for occurring at the Project Area. Sixteen of the 30 had CNDDDB records (some historical only) within a 5-mile radius of the Project Area. For details on the results of this assessment, refer to Pacific Coast Restoration (2018b).

Pacific Coast Restoration (2018b) also conducted a comprehensive floristic survey of the Project Area between April 26 and July 28, 2018. Eight special-status plant species were found (Table 3.4-3, Figure 3.4-2), all previously documented at the Project Area by either Golec and Miller (CDFW 2017) or USFWS (2018).

A description of the listing status, habitat characteristics, and known location within the Project Area for these eight species is provided below. In addition, information on two unobserved but State and Federally listed plant species with low potential of occurring at the Project Area - Menzies' wallflower (*Erysimum menziesii*) and western lily (*Lilium occidentale*) - are provided below. Information is also presented on eelgrass meadows, which were documented in McNulty Slough in the study area by Garwood (2018).

Table 3.4-3. Special-status Plants Present in the Project Area

Special-status Plants			Occupied Habitat (Acres)
Scientific Name	Common Name	Annual/Peren	
<i>Angelica lucida</i>	seacoast angelica	Perennial	14.93
<i>Carex lyngbyei</i>	Lyngbye's sedge	Perennial	0.74
<i>Castilleja ambigua</i> subsp. <i>humboldtiensis</i>	Humboldt Bay owl's clover	Annual	1.38
<i>Chloropyron maritimum</i> subsp. <i>palustre</i>	Point Reyes bird's-beak	Annual	1.18
<i>Gilia millefoliata</i>	dark-eyed gilia	Annual	22.86
<i>Glehnia littoralis</i> subsp. <i>leiocarpa</i>	American glehnia	Perennial	0.02
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i>	short-leaved evax	Annual	26.61
<i>Layia carnosa</i>	beach layia	Annual	34.00

Adapted from: Pacific Coast Restoration (2018b)

Seacoast angelica (*Angelica lucida*) CRPR 4.2. Present.

Seacoast angelica has no state or federal listing status and has a California Rare Plant Rank (CRPR) of 4.2 due to its limited distribution in California; its status should be monitored according to CNPS (2019). It is a perennial species, found in coastal bluff scrub, coastal dunes, coastal scrub, marshes and swamps at elevations between 0 and 490 feet (0 to 149 meters). Large stands of seacoast angelica were found in the transition zone between freshwater marsh and coastal dune habitats in Area A (northwestern region) and Area E. Seacoast angelica was also found growing on the sides of levees in northern coastal scrub (Figure 3.4-2) (Pacific Coast Restoration 2018b). This species was also documented sparsely along McNulty Slough in Area C.

Lyngbye's Sedge (*Carex lyngbyei*) CRPR 2B.2. Present.

Lyngbye's sedge has no state or federal listing status and a CRPR 2B.2 ranking, as it is found only in coastal wetlands along the intertidal/upland interfaces from Marin to Del Norte Counties. This rhizomatous herb requires intact coastal brackish reaches of estuaries, where it can form dense mono-specific stands, and is often the first colonizer of open mudflats. Small amounts of Lyngbye's sedge were found in coastal salt marsh, mostly in Area A and bordering McNulty Slough, including a few small, dense patches growing on the edges of dense-flowered cordgrass marsh (Pacific Coast Restoration 2018b) (Figure 3.4-2).

Humboldt Bay owl's-clover (*Castilleja ambigua* subsp. *humboldtiensis*) CRPR 1B.2. Present.

Humboldt Bay owl's-clover has no state or federal listing status and has a CRPR 1B.2 ranking, as it occurs in very limited areas along the northern California coast in salt marsh habitats (CNPS 2019). It is an annual hemiparasitic herb that forms root connections with host plants from which it derives some of its resources. Humboldt Bay owl's-clover often occurs in large groups (over 100 individuals) due to the seeds being carried and deposited to a specific location by the tide. Within the Project Area, this species was observed at the upper margins of coastal saltmarsh habitat, mostly in the southern portion of Area A bordering McNulty Slough (Pacific Coast Restoration 2018b) (Figure 3.4-2).

Point Reyes bird's-beak (*Chloropyron maritimum* subsp. *palustre*) CRPR 1B.2. Present.

Point Reyes bird's-beak has no state or federal listing status and has a CRPR 1B.2 ranking, as it occurs in very limited areas along the northern California coast in saltmarsh habitats (CNPS 2019). It is an annual hemiparasitic herb that forms root connections with host plants from which it derives some of its resources. Within the Project Area, this species was observed at the upper margins of coastal saltmarsh habitat, mostly in the southern portion of Area A bordering McNulty Slough (Pacific Coast Restoration 2018b) (Figure 3.4-2).

Dark-eyed gilia (*Gilia millefoliata*) CRPR 1B.2. Present.

Dark-eyed gilia has no state or federal listing status and is ranked 1B.2 on the CRPR list, as its distribution in California is largely limited to coastal strand and stabilized dune habitats. Within the Project Area, this annual herb is found in the dune restoration area, and specifically within the dune mat plant community. Dark-eyed

gilia was found in areas with open sand, and also tolerated areas with moderate vegetation cover (Pacific Coast Restoration 2018b) (Figure 3.4-2).

American glehnia (*Glehnia littoralis* subsp. *leiocarpa*) CRPR 4.2. Present.

American glehnia has no state or federal listing status and has a CRPR 4.2 ranking as its of limited distribution in California; its status should be monitored according to CNPS (2019). This species is a perennial herb and can be found in coastal dunes (CNPS 2019). Within the Project Area, this species was found growing in a few dune mat plant community locations in the northern portion of Area A and Area E (Pacific Coast Restoration 2018b) (Figure 3.4-2).

Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*) CRPR 1B.2. Present.

Short-leaved evax has no State or Federal listing status and has a CRPR 1B.2 ranking, as its distribution in California is largely limited to coastal strand, northern coastal scrub and dune habitats (CNPS 2019). Within the Project Area, this species is present in coastal dune habitat in the southern and central dune restoration area. Short-leaved evax was found in areas with moderate vegetation cover, and it also showed a tolerance for some degree of compaction, as it was found in portions of vehicle access routes (though not in active tire tracks with high levels of sand disturbance) (Pacific Coast Restoration 2018b) (Figure 3.4-2).

Beach layia (*Layia carnosa*) FE; SE; CRPR 1B.1. Present.

Beach layia is a State and Federally listed endangered species and a CRPR 1B.1 ranking documented from approximately 20 occurrences in eight dune systems between Freshwater Lagoon in Humboldt County and Vandenberg Air Force Based in Santa Barbara County (USFWS 2017a). The largest extant occurrences are currently known from dunes in Humboldt County (CNPS 2019). Beach layia is a succulent-like, annual herb ranging from a single stem to many branched individual stems up to six inches tall and 16 inches in breadth, in part depending on substrate moisture. Populations tend to be patchy and subject to large annual fluctuations in size due to shifts in wind erosion patterns, remobilization, factors affecting dune stabilization, and moisture. The wind dispersed seeds often establish in sparsely vegetated areas (i.e., dune mat). It does not grow in areas where there is high cover of native or non-native plants; therefore, encroachment by non-native species, particularly those that stabilize dunes and form dense stands (e.g., European beachgrass) pose threats to the species (USFWS 2011). Within the Project Area, beach layia was observed in dune mat within the proposed dune restoration area. There were two large, disjunct concentrations of beach layia in the Project Area: one in the north, and the other on the southern part of the sand spit (USFWS 2018, Pacific Coast Restoration 2018b) (Figure 3.4-2). In 2017, CDFW assisted the USFWS with beach layia data collection and occurrence data and estimated that 4.7 million beach layia occurred within suitable habitat in the Project Area (USFWS 2018).

Menzies' wallflower (*Erysimum menziesii*) FE; SE; CRPR 1B.1. Low Potential.

Menzies' wallflower, which has not been documented in the Project Area, is a State and Federally listed endangered species and has a CRPR 1B.1 ranking documented from approximately 16 occurrences scattered across dune systems, including the

foredune complex and low-lying deflation plane (Pickart and Sawyer 1998) on sand spits bordering Humboldt Bay in Humboldt County, Ten Mile River in Mendocino County, and the Marina Dunes (Monterey Bay) and Monterey Peninsula in Monterey County (USFWS 2017b). Survival of the species is threatened by several factors including: a white rust disease in the Humboldt Bay area, the encroachment of non-native plant species, deer predation, and recreational impacts (USFWS 2008). A small population of Menzies' wallflower occurs at the north end of the south spit of Humboldt Bay, which is actively managed by USFWS, the Bureau of Land Management (BLM) and the Wiyot Tribe (M. van Hattem, pers. comm. 2019).

Western lily (*Lilium occidentale*) FE; SE; CRPR 1B.1. Low potential.

Western lily is a State and Federally listed endangered species and has a CRPR 1B.1 ranking. It has been documented from within four miles (6.4 kilometers) of the coast, from Coos County, Oregon to Loleta, California. This species is not known to the Project Area; however, a population of western lily exists approximately 0.25 mile (0.4 kilometer) (at its closest point) from the Project Area at the Sitka spruce dominated Table Bluff Ecological Reserve owned and managed by CDFW (CDFW 2014). The western lily grows at the edges of bogs and in forest openings along the margins of ephemeral ponds and small channels (USFWS 2017c). It is a wetland adapted plant and is often found within freshwater bogs, fens, coastal scrub and coastal prairie, and along the ecotone of different vegetation types. It occurs in a coastal cool season Mediterranean-type climate, where summers are dry and windy and winters are wet and relatively warm. This species occurs in one of two soil conditions: mineral soils that possess an impermeable layer that serves to maintain moisture late into the growing season, or organic marsh soils in which a fluctuating water table temporarily inundates the bulbs, but which drops below the level of the bulbs by mid to late spring (USFWS 2009).

Eelgrass (*Zostera marina*) Habitat protected by Federal and State regulation; Present

Eelgrass is a highly productive species and is considered a “foundation” or habitat forming species as it is a primary and secondary producer, substrate for epiphytes and epifauna, and a sediment stabilizer and nutrient cycling facilitator (NMFS 2014a). Under the National Marine Fisheries Service’s (NMFS) “no net loss” wetlands policy, eelgrass is protected for its habitat and habitat values. Eelgrass provides ecological services for a variety of fish, bird, and invertebrate species, including species that have important cultural, commercial, and recreational values to the region. In northern California the eelgrass low growth season occurs between October and April, and the high growth season begins in April where eelgrass gradually forms localized stands during summer months (NMFS 2014a). In the Eel River estuary, eelgrass occurs in saline to brackish portions of the estuary, including the documented population in McNulty Slough (Garwood 2018) (Figure 3.4-3). According to Garwood (2018), a total of 20.43 acres (8.27 hectares) of eelgrass were documented during the June 29, 2018 survey of McNulty Slough, with all observed eelgrass occurring within a 0.85 mile (1.4 kilometers) section adjacent to the southern portion of the Project Area. The 2018 survey did not include waters inside the Ocean Ranch Unit breach. Dwarf eelgrass, which has previously been observed in the upper reaches of McNulty Slough, was not observed during the 2018 survey.

Wildlife Resources

A wide diversity of wildlife species utilize the study area, including birds, amphibians, reptiles, and mammals. Wildlife distribution across the study area varies seasonally and is based on vegetation types, water depths, and water salinities. A variety of habitat types such as coastal salt and brackish marsh, intertidal channel/mudflat/freshwater to brackish marsh, freshwater ponds, dunes, and northern coastal scrub provide habitat for a significant number and variety of avian species. In general, shorebirds are found in the brackish to saline waters in the outer marsh and dunes where an abundance of invertebrates can be found. Waterfowl and heron/egrets are generally observed foraging in aquatic portions of the study area. Passerines can be found in wetland and shrub habitat across the study area and the ephemeral wetlands at the Project Area likely provide foraging habitat for many insectivorous passerine species.

The study area has a high diversity of avian species throughout the year, with a total of 204 species documented in the Project vicinity (eBird 2019, CDFW 2019a). Of the total, approximately four special-status avian species are known or have a high potential to nest in the Project Area due to the presence of suitable habitat including: American Bittern (*Botaurus lentiginosus*), Western Snowy Plover (*Charadrius nivosus nivosus*), Northern Harrier (*Circus hudsonius*), and Bryant's Savannah Sparrow (*Passerculus sandwichensis alaudinus*). The federally protected Western Snowy Plover is known both to nest and winter on the wave slope, high beach and terminus of the spit within the dune restoration area (Colwell 2019).

Northern Red-legged Frog (*Rana aurora*) breed in limited freshwater habitats within the study area and utilize upland habitat for non-breeding habitat. There are numerous records of this species from the Project vicinity (CDFW 2019a, iNaturalist 2019). In 2010, CDFW surveyed suitable breeding habitat within the Ocean Ranch Unit and observed sixty egg masses restricted to the northern portion of Area E and to a lesser extent Area C (CDFG 2010b). Personal observation by Ken Mierzwa (GHD) provides confirmation for species presence immediately southeast of the Project Area (K. Mierzwa pers. comm. 2018). In addition, there is potential aquatic habitat for Western Pond Turtle in the northern portion of Area E where freshwater occurs; however, these turtles are ectothermic (cold blooded) and therefore thermally challenged for basking requirements due to close proximity to the coast. CDFW has observed a single sub-adult Western Pond Turtle (J. Olson pers. comm. 2018) north of Area E within the dunes, but the population is likely small for the aforementioned reasons. Regional populations of Western Pond Turtle, generally located north of San Francisco Bay, are considered the Northwestern Pond Turtle (*Emys marmorata marmorata*) (California Herps 2019) and are hereafter referred to as such in this Draft EIR.

Special-status bat species may also occur in the Project Area, as the study area provides a wide variety of foraging habitats that likely support diverse insect prey. Although no occurrence data on bats is available for the Project Area, nearby BatAMP records from Lanphere Dunes (which is forested) show that Townsend's and Hoary Bat are present there (Weller 2015). The Project Area is not forested, rather it contains shrubs and saltmarsh vegetation, but may support the possibility of special-status bats foraging onsite.

Several reports document the importance of the Eel River estuary (Puckett 1977), including McNulty Slough and the Project Area, for salmonids and other marine species. Water quality and fish surveys (seining and minnow trapping) conducted in McNulty Slough and the Project Area between February and October 2007 did not find salmonids, although water quality conditions were suitable to support juvenile rearing and outmigration in the Project Area (Wallace and Gilroy 2008). Surveys of McNulty Slough, North Bay and Hawk Slough conducted between January 2008 and June 2009 found 28 fish species including juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) and Coho Salmon (*O. kisutch*); juvenile and adult Steelhead Trout (*O. mykiss*); and Longfin Smelt (*Spirinchus thaleichthys*) (Scheiff et al. 2013). The anadromous salmonids and Longfin Smelt were captured in McNulty Slough. In 2018, fish surveys were conducted by CDFW in the Project Area using beach seines, a channel net and minnow traps (Ray 2018a); 12 fish species were found including a juvenile Chinook Salmon, which was the first record of a juvenile salmonid in the study area outside of McNulty Slough. The most numerically dominant species identified in 2018 were Topsmelt (*Atherinops affinis*), Pacific Staghorn Sculpin (*Leptocottus armatus*), and Shiner Perch (*Cymatogaster aggregata*); Threespine Stickleback (*Gasterosteus aculeatus*), Prickly Sculpin (*Cottus asper*), Northern Anchovy (*Engraulis mordax*), Surf Smelt (*Hypomesus pretiosus*), Starry Flounder (*Platichthys stellatus*), English Sole (*Parophrys vetulus*), Sacramento Pikeminnow (*Ptychocheilus grandis*), and Saddleback Gunnel (*Pholis ornata*) were also present (Ray 2018a). Invertebrates found during the 2018 survey included Crangon Shrimp (*Crangon spp.*), Yellow Shore Crab (*Hemigrapsus oregonensis*), and Dungeness Crab (*Metacarcinus magister*) (Ray 2018a).

The 2018 fish surveys did not find Tidewater Goby (*Eucyclogobius newberryi*) in the Project Area, which was likely due to the sampling equipment used (CDFW 2018a). Sampling was terminated after three hours because tidal flow velocity decreased significantly making the channel net inefficient and dangerous for fish (Ray 2018a). Two other surveys to determine presence/absence of Tidewater Goby were conducted in 2012 (Scheiff and Gilroy 2013) and 2017 (Ray 2018b). The 2012 survey yielded a total of 85 Tidewater Goby at 13 of the 31 sampled sites, and the 2017 survey yielded 24 Tidewater Goby at seven of the 31 sampled sites (Scheiff and Gilroy 2013, Ray 2018b). Most of the sites where Tidewater Goby were present were located in the northern portion of Areas A and E, which represents the most important areas of habitat for the species within the Project Area (Ray 2018b).

Marine mammal species documented within McNulty Slough include Pacific Harbor Seal (*Phoca vitulina richardii*) and California Sea Lion (*Zalophus californianus*) (M. van Hattem pers. comm. 2019). Additional marine mammals expected to utilize deep ocean habitat west of the Project Area include: Blue Whale (*Balaenoptera musculus*), Gray Whale (*Eschrichtius robustus*), Humpback Whale (*Megaptera novaeangliae*) and Orca Whale (*Orcinus orca*).

Special-Status Wildlife Species

Table 3.4-4 summarizes the special-status wildlife species and their potential to occur in the study area based on review of the CNDDDB, USFWS species list, and personal communication with CDFW staff. Of these, 34 special-status wildlife species have been determined to have a moderate to high potential to occur in the

study area based on habitat requirements, species range, and known occurrences proximate to the study area (including observation in the study area during preliminary surveys). A detailed account of these 34 species, including a description of their habitat and known distribution, is provided in Appendix B. For the remaining species, the study area either lacks potentially suitable habitat or may contain potential habitat, but the habitat is minimal to the extent that the occurrence of special-status species is unlikely.

Table 3.4-4 Potential for Special-status Wildlife Species to Occur within the Study Area

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
MAMMALS			
Pallid Bat <i>Antrozous pallidus</i>	SSC, S3, WBWG High Priority	Habitats include chaparral, coastal scrub, desert wash, Great Basin grassland, Great Basin scrub, Mojave Desert scrub, riparian woodland, Sonoran Desert scrub, upper montane coniferous forest, and valley & foothill grassland. The species prefers deserts, grasslands, shrublands, woodlands, and forests. They are most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. They are very sensitive to disturbance of roosting sites.	Low Potential. The Project Area does not provide xeric habitat preferred by this species. The closest record of this species from the Project vicinity is from a specimen collected in Ferndale in 1924 (CDFW 2019a).
Townsend's Big-eared Bat <i>Corynorhinus townsendii</i>	SSC, S2, WBWG High Priority	Habitats include broadleaved upland forest, chaparral, chenopod scrub, Great Basin grassland, Great Basin scrub, Joshua tree woodland, Lower montane coniferous forest, meadow & seep, Mojavean desert scrub, riparian forest, riparian woodland, Sonoran desert scrub, Sonoran thorn woodland, upper montane coniferous forest, valley & foothill grassland. The species is found in a wide variety of habitats throughout California, although it is most common in mesic sites. They roost in the open, hanging from walls and ceilings. Roosting sites are limiting. This species is extremely sensitive to human disturbance.	Moderate Potential. No records of the species from the immediate area. Closest known record is from 2015 at Lanphere Dunes (Weller 2015), although recent surveys detected possible presence near the Salt River. Species roosts in a variety of structures includes hollow trees, buildings (barns), and lava tubes, and winters in caves. No roosting habitat exists within the Project Area. Foraging habitat for the species could be present in the Project Area.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Hoary Bat <i>Lasiurus cinereus</i>	S4, WBWG Medium Priority	Habitats include broadleaved upland forest, cismontane woodland, lower montane coniferous forest, and North Coast coniferous forest. The species prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. In addition, they roost in dense foliage of medium to large trees, feed primarily on moths, and require water.	Moderate Potential. No records of the species from the immediate area. Closest known record is from 2015 at Lanphere Dunes (Weller 2015). No roosting habitat exists within the Project Area, however this species may roost in trees within the Project vicinity. Foraging habitat for the species could be present in the Project Area.
Humboldt Mountain Beaver <i>Aplodontia rufa humboldtiana</i>	SNR	Habitats include coastal scrub, redwood (<i>Sequoia sempervirens</i>), and riparian forest. The species inhabits the coast Range in southwestern Del Norte County and northwestern Humboldt County. Preferred microhabitat includes a variety of coastal habitats, including coastal scrub and riparian forests, typically with open canopy and thickly vegetated understory.	Low Potential. Although there are historical records of this species from the county and suitable coastal scrub habitat is present, there are no recent records of this species from the Project Area (Steele 1989, CDFW 2019a). Table Bluff north of the Project Area contains suitable habitat and would be unaffected by the Project. Occurrence within Project Area unlikely but not impossible.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Sonoma Tree Vole <i>Arborimus pomoe</i>	SSC, S3	Habitats include North Coast coniferous forest, old growth, and redwood. The species inhabits the North Coast fog belt from the Oregon border to Sonoma County and is found most-commonly in Douglas-fir (<i>Pseudotsuga menziesii</i>), redwood & montane hardwood-conifer forests. The species feeds almost exclusively on Douglas-fir needles but will occasionally feed on needles of grand fir, hemlock or spruce.	Low Potential. There are no records of this species within the Project Area (CDFW 2019a). There are no coniferous trees in the Project Area, however some coniferous trees exist on adjacent properties. The Project Area does not contain suitable habitat for this species.
North American Porcupine <i>Erethizon dorsatum</i>	S3	Habitats include broadleaved upland forest, cismontane woodland, closed-cone coniferous forest, lower montane coniferous forest, North Coast coniferous forest, and upper montane coniferous forest. The species prefers forested habitats in the Sierra Nevada, Cascade, and Coast ranges, with scattered observations from forested areas in the Transverse Ranges. They utilize a wide variety of coniferous and mixed woodland habitat.	Low Potential. No suitable large patches of riparian forest/coniferous forest or woodland habitat are present in the Project Area. Known to occur to the south within the Eel River Estuary Preserve.
Fisher - West Coast Distinct Population Segment (DPS) <i>Pekania pennanti</i>	ST, SSC, S2S3	Habitats include North Coast coniferous forest, old growth, and riparian forest. The species prefers intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Microhabitat includes cavities, snags, logs and rocky areas for cover and denning. The species needs large areas of mature, dense forest.	Low Potential. No records are known from the Project Area (CDFW 2019a). No suitable old growth coniferous forest habitat (for foraging and denning) is present on or directly adjacent to the Project Area.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Pacific Harbor Seal <i>Phoca vitulina richardii</i>	MMPA Protection	This species is found all along the California coast. They favor near-shore coastal waters and are often seen on rocky islands, sandy beaches, mudflats, bays and estuaries (Marine Mammal Center 2019).	High Potential. Known to Occur in Study Area. This species has been observed within McNulty Slough adjacent to the Project Area (M. van Hattem pers. comm. 2019). Suitable habitat for this species is also available along the beach within the dune restoration area.
California Sea Lion <i>Zalophus californianus</i>	MMPA Protection	This species is found all along the California coast. They inhabit rocky and sandy beaches of coastal islands and mainland shorelines, and may frequent sandbars, sheltered coves, tide pools, and structures such as piers, jetties and buoy (Marine Mammal Center 2019).	High Potential. Known to Occur Study Area. This species has been observed within McNulty Slough adjacent to the Project Area (M. van Hattem pers. Comm. 2019). Suitable habitat for this species is also available along the beach within the dune restoration area.
BIRDS			
Sharp-shinned Hawk <i>Accipiter striatus</i>	CWL, S4	Habitat includes cismontane woodland, lower montane coniferous forest, riparian forest, and riparian woodland. The species inhabits ponderosa pine (<i>Pinus ponderosa</i>), black oak (<i>Quercus kelloggii</i>), riparian deciduous, mixed conifer, and Jeffrey pine (<i>Pinus jeffreyi</i>) habitats. Prefers riparian areas. Microhabitat preferences include north-facing slopes with plucking perches. Nests are usually within 275 feet (84 meters) of water.	Low Potential. Fly-over or Foraging Only. There is no suitable extensive forested habitat (for breeding or foraging) on or directly adjacent to the Project Area. The study area may provide foraging habitat for the species.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Tricolored Blackbird <i>Agelaius tricolor</i>	BCC, ST, SSC, S1S2	Habitat includes freshwater marsh, swamp, and wetlands. This is a highly colonial species, most numerous in the Central Valley and Sierra foothills. Largely endemic to California. The species requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	Low Potential. Foraging and Nesting. The closest known records of this species to the Project Area are from the Loleta Bottoms. Suitable nesting habitat associated with brackish and freshwater marsh vegetation in the Project Area. Based on available habitat (saltwater marsh/tidal slough), the species is unlikely to occur in the Project Area (eBird 2019).
Grasshopper Sparrow <i>Ammodramus savannarum</i>	SSC, S3	The species inhabits dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. The species favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.	Low Potential. Foraging and Nesting. The closest known record of this species to the Project Area is from Table Bluff Road near Copenhagen Road (adjacent to grassland). Suitable nesting habitat associated with dry, upland areas of grassy vegetation in the Project Area. Based on available habitat, the species is unlikely to occur in the Project Area but cannot be completely ruled out (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Great Egret <i>Ardea alba</i>	S4	Habitat includes brackish marsh, estuary, freshwater marsh, marsh & swamp, riparian forest, and wetlands. The species nest colonially in large trees. Rookery sites are located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	High Potential. Foraging Only. Known to Occur in Study Area. There are numerous records of this species from the Project Area and requisite foraging habitat is present in the Project Area. Historical rookeries were present on an island in the nearby Eel River Delta (eBird 2019), and an existing rookery exists on the south end of Humboldt Bay (M. van Hattem pers. comm. 2019).
Great Blue Heron <i>Ardea herodias</i>	S4	Habitat includes brackish marsh, estuary, freshwater, marsh, marsh & swamp, riparian forest, and wetlands. Species is a colonial nester in tall trees, cliffsides, and sequestered spots on marshes. Rookery sites are in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, and wet meadows.	High Potential. Foraging Only. Known to Occur in Study Area. There are numerous records of this species from the Project Area. Historical rookeries were present on an island in the nearby Eel River Delta (eBird 2019).
Short-eared Owl <i>Asio flammeus</i>	SSC, S3	Habitats include Great Basin grassland, marsh & swamp, meadow & seep, valley & foothill grassland, and wetlands. This species is found in swamp lands, both fresh and salt, lowland meadows, and irrigated alfalfa fields. Tule (<i>Schoenoplectus acutus</i>) patches/tall grass are needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	High Potential. Foraging Only During Winter. Known to Occur in Study Area. The species is seasonally present in the Project Area during the winter (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Western Burrowing Owl <i>Athene cunicularia</i>	BCC, SCC, S3	Habitat includes coastal prairie, coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, and valley & foothill grassland. The species prefers open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. The species is a subterranean nester, dependent upon dens created by burrowing mammals, most notably the California Ground Squirrel (<i>Otospermophilus beecheyi</i>).	High Potential. Foraging Only During Winter. Species is known to winter in the Project vicinity and suitable habitat is present within the upland ruderal habitat and in the dunes in the Project Area (eBird 2019).
Canvasback <i>Aythya valisineria</i>	S2	Habitat includes Great Basin flowing waters, Great Basin standing waters, and wetlands. The species breeds in fresh, emergent wetlands bordering open water in northeastern California. They require emergent vegetation near suitable shallow-water foraging areas for nesting.	High Potential. Foraging Only. Known to Occur in Study Area. Species was observed in the Project Area during the winter of 1993 and wintering birds occur seasonally in the Project vicinity (eBird 2019). Suitable nesting habitat associated with emergent wetland vegetation in the Project Area.
American Bittern <i>Botaurus lentiginosus</i>	S3S4	Habitats include brackish marsh, freshwater marsh, and saltmarsh. The species favors freshwater and slightly brackish marshes and coastal saltmarshes. Microhabitat preferences include dense reed beds.	High Potential. Foraging and Nesting. Species has been known to occur in the Project vicinity (eBird 2019). Suitable nesting habitat associated with emergent wetland vegetation in less saline portions of the Project Area.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Marbled Murrelet <i>Brachyramphus marmoratus</i>	FT, SE, S1	Habitats include lower montane coniferous forest, old growth, and redwood. The species feeds near-shore and nests inland along the coast from Eureka to the Oregon border and from Half Moon Bay to Santa Cruz. They nest in old-growth redwood-dominated forests, up to 60 miles (96.5 kilometers) inland, often in Douglas-fir trees.	Low Potential. Fly-over Only. No suitable old growth coniferous forest habitat (for nesting) is present on or directly adjacent to the Project Area. However, the species likely flies over the Project Area on the way to foraging habitat (Humboldt Bay/the Pacific Ocean) (CDFW 2019a).
Black Brant <i>Branta bernicla</i>	SSC, S2	Habitat includes estuary, marine bay, and mud shore/flats. They require well-protected, shallow marine waters with intertidal eelgrass beds, primarily within bays and estuaries. At high tide they need sheltered open water or protected beaches for loafing. Their primary food is eelgrass. Distribution is closely tied to abundance of eelgrass. Brant often feed close to mudflats, sandbars or spits used as gritting sites.	High Potential. Foraging Only. Known to Occur in Study Area. Brant are known to occur during the winter and spring migration within the Project Area and seasonal presence is possible (eBird 2019).
Vaux's Swift <i>Chaetura vauxi</i>	SSC, S2S3	Habitats include lower montane coniferous forest, North Coast coniferous forest, mature forest, and redwood. The species prefers redwood, Douglas-fir, and other coniferous forests. They nest in large hollow trees and snags and often nest in flocks. They forage over most terrains and habitats but show a preference for foraging over rivers and lakes.	Moderate Potential. Foraging Only. There are numerous records of this species from the Project vicinity (eBird 2019). Foraging habitat is likely present in the Project Area. The presence of nests/colonies onsite is unknown but unlikely as there are no large trees or human made structures onsite.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Western Snowy Plover <i>Charadrius nivosus nivosus</i>	FT, BCC, SSC, S2S3	Habitat includes Great Basin standing waters, sandy shores, and wetlands. The species inhabits sandy beaches, and salt pond levees and shores of large alkali lakes. Plovers require sandy, gravelly or friable soils for nesting, and are often found in sparsely vegetated beaches in areas of ample sand.	High Potential. Foraging and Nesting. Known to Occur in Study Area. Western Snowy Plovers are known to use beaches in the Project Area year-round (nesting and wintering populations). Numerous nests have been documented within the dune restoration area on the upper waveslope, with most nesting attempts focused on the sparsely vegetated spit near the mouth of the Eel River in recent years (Colwell 2019, eBird 2019). The Project Area also includes designated critical habitat for this species (See Figure 3.4-5).
Northern Harrier <i>Circus hudsonius</i>	SSC, S3	Habitat includes coastal scrub, Great Basin grassland, marsh and swamp, riparian scrub, valley and foothill grassland, and wetlands. Species inhabits coastal salt & freshwater marsh. They nest and forage in grasslands, from saltgrass in desert sink to mountain cienagas (alkaline, wetland system unique to the southwest). The species nests on the ground in shrubby vegetation, usually at marsh edge; nests are built of a large mound of sticks in wet areas.	High Potential. Foraging and Nesting. Known to Occur in Study Area. There are records of this species from the Project Area year-round. Requisite foraging and nesting habitat (the shrubby edges of wet areas) is present at the Project Area (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Western Yellow-billed Cuckoo <i>Coccyzus americanus occidentalis</i>	FT, BCC, SE, S1	The species is a riparian forest nester, along the broad, lower flood-bottoms of larger river systems. They nest in dense riparian habitat of willow (<i>Salix spp.</i>), often mixed with black cottonwoods (<i>Populus balsamifera</i>), with an understory of blackberry (<i>Rubus spp.</i>), nettles (<i>Urtica dioica</i>), or California wild grape (<i>Vitis californica</i>).	Low Potential. Foraging and Nesting. Although suitable riparian habitat may be present for the species adjacent to the Project Area, there are no records of this species from the Project vicinity and the riparian habitat is considered marginal. The closest known recent records are from Cock Robin Island in the Eel River Wildlife Area and along the Salt River (CDFW 2019a, eBird 2019). Species presence is highly unlikely.
Olive-sided Flycatcher <i>Contopus cooperi</i>	BCC, SSC, S4	Habitats include lower montane coniferous forest, redwood, and upper montane coniferous forest. Nesting habitats are mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir (<i>Abies magnifica</i>), and lodgepole pine (<i>Pinus contorta</i>). The species is most numerous in montane conifer forests where tall trees overlook canyons, meadows, lakes or other open terrain.	High Potential. Foraging Only. Known to Occur in Study Area. Species is known to occur in the Project Area in low numbers (eBird 2019). The site may serve as foraging habitat for the species; breeding habitat unlikely as there are no trees in the Project Area.
Yellow Rail <i>Coturnicops noveboracensis</i>	BCC, SCC, S1S2	Habitats include freshwater marshes, meadows, and seeps. The species is a summer resident in the eastern Sierra Nevada in Mono County. Preferred microhabitat is freshwater marshlands.	No Potential. The only known record of this species from the North Coast (rare incidental) was from a domestic cat captured individual near the Blue Ox in Eureka (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Snowy Egret <i>Egretta thula</i>	S4	Habitat includes marsh and swamp, meadow and seep, riparian forest, riparian woodland, and wetlands. The species is a colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites are situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	High Potential. Foraging Only. Known to Occur in Study Area. Species is known to occur in the Project Area year-round. The closest known rookery is at Hookton Slough.
White-tailed Kite <i>Elanus leucurus</i>	CFP, S3S4	Habitat includes cismontane woodland, marsh and swamp riparian woodland, valley and foothill grassland, and wetlands. The species inhabits rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Microhabitat requirements include open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	High Potential. Foraging Only. Marsh or grassland areas exist in the Project Area that serve as foraging or nesting habitat (no trees occur onsite). Species common in the Project vicinity and likely to occur year-round in the Project Area (eBird 2019).
Little Willow Flycatcher <i>Empidonax traillii brewsteri</i>	BCC, SE, S1S2	Habitats include meadow, seeps, and riparian woodland. The species prefers mountain meadows and riparian habitats in the Sierra Nevada and Cascades. They nest near the edges of vegetation clumps and near streams.	High Potential. Fall Migration Only. Species is known to occur in the Ferndale Bottoms along the Salt River. This species is known to migrate south in early August to early October, and have very low numbers of adults along the riparian zones in coastal northern California (Rousseau and Ralph 2012). Coastal dune willow thicket shrubland alliance is present in the Project Area (Area E) which may provide suitable habitat for the species during migration.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Merlin <i>Falco columbarius</i>	CWL, S3S4	Habitat includes estuary, Great Basin grassland, and valley & foothill grassland. The species prefers the seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands and deserts, farms and ranches. Clumps of trees or windbreaks are required for roosting in open country.	High Potential. Foraging Only During Winter. Species is a common winter visitor to the Project vicinity and may forage within the Project Area (eBird 2019).
Prairie Falcon <i>Falco mexicanus</i>	BCC, CWL, S4	Habitats include Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran Desert scrub, and valley and foothill grassland. The species favors dry, open terrain, either level or hilly. Breeding sites are located on cliffs. The species forages far afield, even to marshlands and ocean shores.	Low Potential. Fly-over or Foraging Only. Species is an uncommon winter visitor to the Project vicinity and may forage within the Project Area (eBird 2019).
American Peregrine Falcon <i>Falco peregrinus anatum</i>	BCC, CFP, S3S4	The species is found near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; or on human-made structures. Nests consist of a scrape or a depression or ledge in an open site.	High Potential. Foraging Only. Known to Occur in Study Area. Species has been observed in Project Area (M. van Hattem pers. comm. 2019) and is a common visitor to the Project vicinity (year-round presence, although greater numbers in the winter) (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Bald Eagle <i>Haliaeetus leucocephalus</i>	BCC, SE, CFP, S3	Habitat includes lower montane coniferous forest. The species inhabits ocean shore, lake margins, and rivers for both nesting and wintering. Most nests are within one mile (1.6 kilometers) of water. The species nests in large, or dominant live trees with open branches, especially ponderosa pine. Can roost communally in winter.	High Potential. Foraging Only. Known to Occur in Study Area. There are records of this species from the Project Area including individuals likely foraging nearshore along the coast (eBird 2019). In addition, coniferous forest habitat on Table Bluff could serve as nesting habitat for the species.
Long-billed Curlew <i>Numenius americanus</i>	BCC, CWL, S2	Habitats include Great Basin grassland, meadow, and seeps. The species breeds in upland shortgrass prairies and wet meadows in northeastern California. Habitats on gravelly soils and gently rolling terrain are favored over others.	High Potential. Foraging Only. Known to Occur in Study Area. Numerous records of this species exist from the Project Area (particularly during fall migration) (eBird 2019). Seasonal presence is possible
Black-crowned Night Heron <i>Nycticorax nycticorax</i>	S4	Habitats include marsh and swamp, riparian forest, riparian woodland, and wetlands. The species is a colonial nester, usually in trees, occasionally in tule patches. Rookery sites are located adjacent to foraging areas: lake margins, mud-bordered bays, marshy spots.	High Potential for Foraging and Moderate Potential for Nesting. Known to Occur in Study Area. There are numerous records of this species from the Project Area. Requisite foraging habitat is present, and nesting habitat (utilizing tule patches) may be present in the Project Area. No trees or rookeries exist within the Project Area. Historical rookeries were present on an island in the nearby Eel River Delta (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Osprey <i>Pandion haliaetus</i>	CWL, S4	Habitats include ocean shore, bays, freshwater lakes, and larger streams. Large nests are built in tree-tops within 15 miles (24 hectares) of foraging habitat.	High Potential. Fly-over or Foraging Only. Known to Occur in Study Area. There are records of this species from the Project Area including individuals likely foraging nearshore along the coast (eBird 2019). In addition, patches of coniferous forest adjacent to the Project Area could serve as nesting habitat for this species.
Bryant's Savannah Sparrow <i>Passerculus sandwichensis alaudinus</i>	SSC, S2S3	Habitats include low tidally influenced habitats, adjacent ruderal areas, moist grasslands within and just above the fog belt, and, infrequently, drier grasslands (Fitton 2008). This species occurs year-round in coastal California and was observed to prefer ungrazed versus grazed sites for foraging and nesting near Humboldt Bay (Kwasny 2000 in Fitton 2008).	High Potential. Foraging and Nesting. Known to Occur in Study Area. Bryant's Savannah Sparrow is a resident breeder within the Project Area (M. van Hattem, pers. comm. 2019). The species (Savannah Sparrow) has been documented numerous times throughout the Project Area (eBird 2020). Suitable nesting habitat in tidal areas (associated with clumps of grass or pickleweed).
California Brown Pelican <i>Pelecanus occidentalis californicus</i>	CFP, S3	The species is a colonial nester on coastal islands just outside the surf line. They nest on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators. The species roosts communally.	Low Potential, Winter Foraging. Fly-over Only. This species is occasionally observed in nearshore waters off the north and south spits (primarily during the winter) (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Double-crested Cormorant <i>Phalacrocorax auritus</i>	CWL, S4	The species is a colonial nester on coastal cliffs, offshore islands, and along lake margins in the interior of the State. They nest along the coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	High Potential. Likely Foraging, Possibly Nesting. The Project Area contains suitable foraging and marginal nesting habitat. Species may also fly over the Project Area to access additional foraging habitat (Pacific Ocean).
Purple Martin <i>Progne subis</i>	SSC, S3	Habitats include broadleaved upland forest and lower montane coniferous forest. The species prefers woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, and Monterey pine (<i>Pinus radiata</i>). The species primarily nests in old woodpecker cavities; also in human-made structures. Nests are often located in tall, isolated trees/snags.	High Potential. Foraging Only. Known to Occur in Study Area. There are several occurrences of this species from the Project Area and the species may forage onsite. Nesting substrate is limited, as there are no trees or human-made structures within the Project Area.
California Ridgway's Rail <i>Rallus obsoletus obsoletus</i>	FE, SE, CFP, S1	Habitats include brackish marsh, marsh & swamp, saltmarsh, and wetland. The species inhabits salt water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. They are associated with abundant growths of pickleweed, but feed on invertebrates from mud-bottomed sloughs away from cover.	No Potential. The last Ridgway's Rail breeding population documented in Humboldt County was in 1932 at the mouth of the Mad River (CDFW 2019a). No records of the species have been documented since then. The species was extirpated from this area most likely as the result of tidal marsh habitat loss.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Bank Swallow <i>Riparia riparia</i>	ST, S2	Habitats include riparian scrub and riparian woodland. The species is a colonial nester. Nests primarily in riparian and other lowland habitats west of the desert. They require vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, and/or the ocean bluffs to dig nest tunnels and burrows.	Moderate Potential. Foraging Only. There are no available muddy banks/cliffs present for nesting habitat in the Project Area, however this species is known to nest in the lower Eel River outside of the Project Area (M. van Hattem, pers. comm. 2019). There are also species records from the Project vicinity and the species may forage in the Project Area (eBird 2019).
Rufous Hummingbird <i>Selasphorus rufus</i>	BCC, S1S2	Habitats include North Coast coniferous forest and old growth. The species breeds in the northwest coastal area from the Oregon border to southern Sonoma County. They nest in berry tangles, shrubs, and conifers. Favors habitats rich in nectar-producing flowers.	High Potential. Foraging Only. Known to Occur in Study Area. There are records of this species from the Project Area and suitable foraging habitat may be present onsite (eBird 2019).
Yellow Warbler <i>Setophaga petechia</i>	BCC, SSC, S3S4	Habitats include riparian forest, riparian scrub, and riparian woodland. The species prefers riparian plant associations in close proximity to water. The species also nests in montane shrub habitat in open conifer forests in the Cascades and Sierra Nevada. The species commonly nests and forages in willow shrubs and thickets, and in other riparian plants including black cottonwood, sycamore (<i>Platanus spp.</i>), ash (<i>Fraxinus spp.</i>), and red alder (<i>Alnus rubra</i>).	High Potential. Foraging and Nesting. Known to Occur in Study Area. There are several occurrences of this species from the Project Area, and suitable nesting habitat may be present onsite in the coastal dune willow thicket shrubland alliance (eBird 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Northern Spotted Owl <i>Strix occidentalis caurina</i>	FT, ST, S2S3	Habitat includes North Coast coniferous forest, old growth redwood. The species inhabits old-growth forests or mixed stands of old growth and mature trees. They are occasionally found in younger forests within patches of big trees. Preferred microhabitat includes a high, multistory canopy dominated by big trees, many trees with cavities or broken tops, downed wood, and space under canopy.	No Potential. No suitable old growth coniferous forest habitat (for foraging or nesting) is present on or directly adjacent to the Project Area.
FISH			
Green Sturgeon - Northern DPS <i>Acipenser medirostris</i>	SSC, S1S2, AFS-VU	These are the most marine species of sturgeon; they feed in coastal marine and estuarine environments and adults return to selected large rivers to spawn. Ocean abundance increases northward of Point Conception. The Northern DPS is known to spawn in the Rogue and Klamath Rivers at temperatures between 8-14°C. Recent research indicates that a spawning run still occurs in the Eel River basin that appears to be of Northern DPS decent (Stillwater Sciences and Wiyot Tribe 2017). The Southern DPS, which was Federally-listed as threatened in 2006 (NMFS 2006), only spawns in the Sacramento River; however, listed Southern DPS green sturgeon may enter the Eel River estuary to feed (Lindley et al. 2011). Prefers spawning substrate of large cobble but can range from clean sand to bedrock.	Moderate Potential. Repeated observations of small numbers of adult and juvenile green sturgeon in the Eel River since 2002 suggest spawning may have resumed there after decades of spawning absence (Higgins 2013, CDFW 2015, Stillwater Sciences and Wiyot Tribe 2017). This species may utilize McNulty Slough.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Pacific Lamprey <i>Entosphenus tridentatus</i>	SSC, S4, AFS-VU	Anadromous species that is distributed along the west coast of North America from central Baja California to the Bering Sea off Alaska, as well as off the coast of Japan. Widely distributed throughout the Eel River Basin, although population numbers have declined substantially (Stillwater Sciences 2010). Microhabitat preferences include streams with swift-current gravel-bottomed areas for spawning with water temps between 12-18° C (Stillwater Sciences and Wiyot Tribe 2016). Ammocoetes need soft sand or mud.	Moderate Potential. No spawning habitat (freshwater gravel bottomed streams or riffle habitat) occur within the Project Area. However, juvenile and adult lamprey may exist within the tidal channels. This species has been documented migrating into the Eel River in the winter and spring, and it is hypothesized that an alternative migration in the summer and early fall may also be taking place (Stillwater Sciences and Wiyot Tribe 2016). Juvenile outmigration to the ocean typically occurs in the winter and spring during high flow events (CDFW 2015).
Tidewater Goby <i>Eucyclogobius newberryi</i>	FE, SSC, S3, AFS- EN	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the lower Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels (CDFW 2019a). The species is typically found in water less than one meter deep and salinities of less than 12 parts per thousand (USFWS 2005).	High Potential. Known to Occur in Study Area. This species has been documented within shallow low-velocity brackish water habitat in the Project Area (Scheiff and Gilroy 2013, Ray 2018b). Designated critical habitat for Tidewater Goby is located in a slough channel approximately 0.5 mile (0.8 kilometer) east of the Project Area and within the Eel River estuary.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Coastal Cutthroat Trout <i>Oncorhynchus clarkii clarkii</i>	SSC, S3, AFS-VU	Small, low gradient, coastal streams and estuarine habitats including lagoons (CDFW 2015) from the Eel River to the Oregon border (CDFW 2019a). Need shaded streams with optimal water temperatures less than 18° C, small gravel for spawning and deep pools for holding in summer (CDFW 2015, CDFW 2019a).	High Potential. This species has been documented in the Eel River estuary as well as lower Eel River tributaries such as the Salt River (CDFW 2015, CDFW 2019a). It is presumed present in the Project Area.
Coho Salmon - Southern Oregon / Northern California Coast Evolutionarily Significant Unit (ESU) <i>Oncorhynchus kisutch</i>	FT, ST, S2 AFS-TH	Anadromous fish, spending the first portion of its life cycle in small coastal streams and estuaries before outmigrating to the ocean. After approximately 6 to 18 months in the ocean, the species returns to its natal stream to spawn (CalTrout 2019). Coho Salmon in northern California are typically associated with low gradient reaches of tributary streams to larger river systems (CDFW 2019b) and spawn in coastal rivers and creeks typically at age three (CalTrout 2019).	High Potential. Known to Occur in Study Area. This species has been documented in tidal portions of the Project Area, and records of this species exist from the adjacent McNulty Slough (Cannata and Hassler 1995, Scheiff et al. 2013). Young of the year Coho Salmon are not expected to utilize habitat in the Project Area in late spring and summer because salinities are too high and water temperatures are not suitable (they are greater than 17°C) (Wallace and Gilroy 2008). Critical habitat for Coho Salmon is designated in McNulty Slough.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Steelhead Trout- Northern California DPS <i>Oncorhynchus mykiss</i>	FT, S2S3, AFS-TH	Anadromous fish, spending most of its life cycle in the ocean, but spawning in coastal rivers and creeks. The federal designation refers to populations occurring below impassable barriers in coastal basins from Redwood Creek to, and including, the Gualala River. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	High Potential. Known to Occur in Study Area. The species is present in tidal portions of the Project Area, and records of this species exist from the adjacent McNulty Slough (Cannata and Hassler 1995, Scheiff et al. 2013). Water quality conditions within McNulty Slough appear to be acceptable for outmigrating Steelhead Trout (Wallace and Gilroy 2008). Critical habitat for Steelhead Trout is designated in the Eel River estuary.
Chinook Salmon - California Coastal ESU <i>Oncorhynchus tshawytscha</i>	FT, S1, AFS-TH	Anadromous fish, spending most of its life cycle in the ocean, but spawning in coastal rivers and creeks. Juveniles resulting from the fall adult run outmigrate in the spring. The Coastal Chinook Salmon ESU includes naturally spawned populations from rivers and streams south of the Klamath River (exclusive) to the Russian River (inclusive) (CDFW 2019a).	High Potential. Known to Occur in Study Area. This species has been documented in the Project Area (Ray 2018b) and is expected to be present during spring outmigration (March through June) and likely until September. Water quality conditions within McNulty Slough appear to be acceptable for outmigrating juvenile Chinook Salmon (Wallace and Gilroy 2008). Critical habitat for this species is designated in McNulty Slough.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Longfin Smelt <i>Spirinchus thaleichthys</i>	ST, S1	Euryhaline (able to adapt to a wide range of salinities), nektonic (part of an aggregate of swimming aquatic organisms), and anadromous. Occupies nearshore waters, estuaries, and lower portions of freshwater streams (Garwood 2018). Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15-30 parts per thousand (ppt). Known to spawn in both the Eel River and in tributaries to Humboldt Bay.	High Potential. The species has been documented in McNulty Slough (Scheiff et. al. 2013).
Eulachon – Southern DPS <i>Thaleichthys pacificus</i>	FT, S3	Found in Klamath River, Mad River, Redwood Creek and in small numbers in Smith River and Humboldt Bay tributaries. Spawn in lower reaches of coastal rivers w/ moderate water velocities and bottom of pea-sized gravel, sand and woody debris.	Low Potential. Undetected from recent nearby samples. Potentially suitable habitat is present.
REPTILES			
Green Sea Turtle <i>Chelonia mydas</i>	FT	Habitat includes marine and bay areas. The species is completely herbivorous; needs adequate supply of seagrasses and algae.	Low Potential. No marine habitat is present in the Project Area (although there is ocean-fronting beach) and there are no known records of this species from the beaches in the Project Area (CDFW 2019a, iNaturalist 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Northwestern Pond Turtle <i>Emys marmorata marmorata</i>	SSC, S3	This species is found throughout California in streams, wetlands, ponds and lakes below 6000 feet (1,829 meters). The species needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 kilometers from water for egg-laying.	Moderate Potential. There is one recent (2017) record of this species from the Project vicinity. Limited freshwater habitat occurs in the northern portion of Area E in the Project Area (CDFW 2019a). If present, likely limited to the freshwater habitats around northern end of Area E.
Olive Ridley Sea Turtle <i>Lepidochelys olivacea</i>	FT	Preferred nesting areas occur along continental margins and rarely, on oceanic islands. In the eastern Pacific, the largest nesting concentrations occur in southern Mexico and northern Costa Rica (NMFS and USFWS 1998). This species is believed to migrate between breeding grounds in the north and feeding grounds to the south, in the eastern Pacific (NMFS and USFWS 1998). This species is primarily vegetarian but does eat benthic prey such as crustaceans (NMFS and USFWS 1998).	Low Potential. No marine habitat is present in the Project Area (although there is ocean-fronting beach) and there are no known records of this species from the beaches in the Project Area (CDFW 2019a, iNaturalist 2019).
AMPHIBIANS			
Coastal Tailed Frog <i>Ascaphus truei</i>	SSC	Habitat includes aquatic, Klamath/North Coast flowing waters, lower montane coniferous forest, North Coast coniferous forest, redwood, and riparian forest. The species occurs in montane hardwood-conifer, redwood, Douglas-fir & ponderosa pine habitats. The species is restricted to perennial montane streams. Tadpoles require water below 15° C.	No Potential. Requisite habitat for this species is not present in or directly adjacent to the Project Area, and there are no known records of this species from the Project Area (CDFW 2019a, iNaturalist 2019).

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Northern Red-legged Frog <i>Rana aurora</i>	SSC, S3	Habitat includes Klamath/North Coast flowing waters, riparian forest, and riparian woodland. The species inhabits humid forests, woodlands, grasslands, and streamsides in northwestern California, usually near dense riparian cover. The species is generally near permanent water, but can be found far from water, in damp woods and meadows, during the non-breeding season.	High Potential. Known to Occur in Study Area. Requisite habitat (coastal wetlands and riparian habitat,) for this species is present in the northern extent of Areas C and E within the Project Area. There are numerous records of this species from the Project Area (CDFW 2019a, iNaturalist 2019).
Foothill Yellow-legged Frog <i>Rana boylii</i>	SSC, S3S4	Habitat includes aquatic, chaparral, cismontane woodland, coastal scrub, Klamath/North Coast streams, lower montane coniferous forest, meadow & seep, riparian forest, and riparian woodland. The species prefers partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats and needs at least some cobble-sized substrate for egg-laying. Also, this species needs at least 15 weeks to reach metamorphosis.	Low Potential. Requisite habitat for this species is not present on or directly adjacent to the Project Area, and there are no known records of this species from the Project Area (CDFW 2019a, iNaturalist 2019).
INVERTEBRATES			
California Floater <i>Anodonta californiensis</i>	S2	This species inhabits freshwater lakes and slow-moving streams and rivers, and generally occurs in shallow water.	No Potential. No freshwater aquatic/riverine habitat occurs within the Project Area. Freshwater pond in Area A is very small (0.2 acre) and contains some tidal influence via seepage.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Obscure Bumble Bee <i>Bombus caliginosus</i>	S1S2	This species inhabits coastal areas from Santa Barbara county north to Washington state. Associated food plants include <i>Baccharis spp.</i> , <i>Cirsium spp.</i> , <i>Lupinus spp.</i> , <i>Lotus spp.</i> , <i>Grindelia spp.</i> and <i>Phacelia spp.</i>	Moderate Potential. The Project Area falls within the species current range (Hatfield et al. 2014). CNDB data, shows the four closest detections to the Project Area of this species were all 40-60 years ago. These include one within five miles of the Project Area, two within 6-10 miles from the Project Area, and one detection 11-15 miles from the Project Area.
Western Bumble Bee <i>Bombus occidentalis</i>	SC,S1	Once common and widespread, species has declined precipitously from central California to southern British Columbia, perhaps from disease.	Low Potential. Although the Project Area falls within the species pre-2002 range (according to ICUN Redlist), the range has contracted significantly in the last decade and now only includes the intermountain west and cascade regions of the U.S. (Hatfield et al. 2015). CNDB data, shows the three closest detections to the Project Area of this species include one detection within five miles, but over 80 years old, and two occurrences within 6-10 miles that are 40-60 years old.

Species	Status ¹	Habitat Requirements ²	Potential to Occur On-site
Sandy Beach Tiger Beetle <i>Cicindela hirticollis gravida</i>	S2	The species inhabits coastal dunes adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. Microhabitat preferences include clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	No Potential. Last historical record of this species from Humboldt County was in the early 1900s (CDFW 2019a). This species is believed to have been extirpated from the area with known extant populations only in Marin, San Luis Obispo, Ventura, Santa Barbara, and San Diego counties in California (NatureServe 2019).
Western Pearlshell <i>Margaritifera falcata</i>	S1S2	The species inhabits freshwater streams usually associated with velocity breaks (e.g., bedrock or large wood).	No Potential. No riverine habitat occurs within the Project Area.

Key to status codes:

FE = Federal Endangered

FT = Federal Threatened

FC = Federal Candidate

FD = Federal Delisted

PT = Proposed Threatened

BCC = USFWS Birds of Conservation Concern

SE = State Endangered

SC = State Candidate

SD = State Delisted

SNR= State Not Ranked

ST = State Threatened

MMPA Protection = Marine Mammal Protection Act Protection

SR = State Rare

SSC = CDFW Species of Special Concern

CFP = CDFW Fully Protected Animal

CWL = CDFW Watch List

BCC = USFWS Birds of Conservation Concern

1A = CRPR List 1A: Plants presumed extinct in California

1B = CRPR List 1B: Plants rare, threatened or endangered in California and elsewhere

2 = CRPR List 2: Plants rare, threatened, or endangered in California, but more common elsewhere

3 = CRPR List 3: Plants about which more information is needed (a review list)

4 = CRPR List 4: Plants of limited distribution (a watch list)

WBWG = Western Bat Working Group

WBWG = Western Bat Working Group (independent group composed of agencies, organizations and individuals interested in bat research, management and conservation).

- WBWG High Priority: represents species considered highest priority for funding, planning, and conservation actions. These species are imperiled or at high risk of imperilment.
- WBWG Medium Priority: indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats (including lack of meaningful information).
- WBWG Low Priority: indicates that most of the existing data support stable populations of the species, and that the potential for major changes in status in the near future is considered unlikely.

AFS = American Fisheries Society; EN = Endangered, TH = Threatened, VU = Vulnerable

SR = State Rare

SSC = CDFW Species of Special Concern

CFP = CDFW Fully Protected Animal

CWL = CDFW Watch List

CDFW Special Animal List State Ranking:

S1: Critically Imperiled

S2: Imperiled

S3: Vulnerable

S4: Apparently Secure

S5: Secure

Potential to Occur:

No Potential Habitat on and adjacent to the Project Area is clearly unsuitable for the species requirements (e.g., cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Low Potential Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the Project Area is unsuitable or of very poor quality. The species is not likely to be found in the Project Area.

Moderate Potential Some of the habitat components meeting the species requirements are present, and/or some of the habitat on or adjacent to the Project Area is suitable. The species has a moderate probability of being found in the Project Area.

High Potential All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the Project Area is highly suitable for one or more components of their life cycle. The species has a high probability of being found in the Project Area, or has been observed in the Project Area

Table compiled from CDFW California Natural Diversity Database (CNDDB), U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Species List, and the National Marine Fisheries Service (NMFS) West Coast Fisheries Database Electronic Inventory searches of the Cannibal Island, Ferndale, Fortuna, Eureka, and Field's Landing USGS 7.5 Minute Quadrangles (CDFW 2019a, CNPS 2019, NMFS 2019, USFWS 2019). Potential to occur is determined based on habitat availability and nearest known documented records as well as limited site specific information including annual Christmas bird counts, USFWS/Snowy Plover counts, eBird and iNaturalist citizen science databases, CDFG frog survey 2010, CDFW fish sampling data (2006-2009, 2012, 2017, 2018), and incidental observations made during site visits by GHD and HTH (Colwell 2019, eBird 2019, iNaturalist 2019).

3.4.2 Regulatory Framework

Many sensitive biological resources in California, including species, habitats, and aquatic resources, are protected and/or regulated by federal, state, and local laws and policies. Those applicable to the Project are summarized below.

Federal Regulations

Clean Water Act, Section 404

The CWA (1977, as amended) establishes the basic structure for regulating discharges of pollutants into Waters of the U.S. It gives the U.S. Environmental Protection Agency (EPA) the authority to implement pollution control programs, including setting wastewater standards for industry and water quality standards for contaminants in surface waters. The CWA makes it unlawful for any person to discharge any pollutant from a point source into Waters of the U.S., without a permit under its provisions.

Proposed discharges of dredged or fill material into Waters of the U.S. require USACE authorization under Section 404 of the CWA [33 U.S.C. 1344]. Regulations implementing CWA Section 404 define “Waters of the U.S.” to include intrastate waters (such as, lakes, rivers, streams, wetlands, and natural ponds) that the use, degradation, or destruction could affect interstate or foreign commerce. Wetlands are defined for regulatory purposes as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 Code of Federal Regulations [CFR] 328.3; 40 CFR 230.3). Projects are reviewed by USACE under standard (i.e., individual) or general (i.e., nationwide, programmatic, or regional) permits. The type of permit process used to consider a project is determined by the USACE and based on project parameters.

Clean Water Act, Section 401

In California, the State Water Resources Control Board (SWRCB) and nine RWQCBs review projects for compliance with state and federal water quality standards under Section 401 of the CWA. In Humboldt County, the NCRWQCB is responsible for certifying that a federally permitted project meets state water quality objectives (§401 CWA, and Title 23 California Code of Regulations [CCR] 3830, et seq.) before the permit is issued.

Executive Order 11990

Executive Order 11990 (1977) requires all federal agencies managing federal lands, sponsoring federal projects, or funding state or local projects to assess the effects of their actions on wetlands. The agencies are required to follow avoidance, mitigation, and preservation procedures, where practicable. The Presidential Wetland Policy of 1993 and subsequent reaffirmation of the policy in 1995 supports protection and restoration of wetlands, while advocating for increased fairness of federal regulatory programs.

Executive Order 13112, Invasive Species

Executive Order 13112 was issued in 1999 to enhance federal coordination and response to the complex and accelerating problem of invasive species. It provides policy direction to promote coordinated efforts of federal, state, and local agencies in monitoring, detecting, preventing, evaluating, managing, and controlling the spread of invasive species and increasing the effectiveness of scientific research and public outreach affecting the spread and impacts of invasive species.

Federal Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.) establishes a national policy that all federal departments and agencies provide for the conservation of threatened and endangered species and their habitats. The Secretary of the Interior and the Secretary of Commerce are designated in the ESA as responsible for: (1) maintaining a list of species likely to become endangered within the foreseeable future throughout all or a significant portion of its range (threatened) and that are currently in danger of extinction throughout all or a significant portion of its range (endangered); (2) carrying out programs for the conservation of these species; and (3) rendering opinions regarding the impact of proposed federal actions on listed species. The ESA also outlines what constitutes unlawful taking, importation, sale, and possession of listed species and specifies civil and criminal penalties for unlawful activities.

Pursuant to the requirements of the ESA, an agency reviewing a project within its jurisdiction must determine whether any Federally listed or proposed species may be present in the project region, and whether the proposed project would result in “take” of such species. The ESA prohibits “take” of threatened and endangered fish or wildlife species except under certain circumstances and only with authorization from USFWS or NMFS through a permit process. “Take” under the ESA includes activities such as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” USFWS regulations define harm to include “significant habitat modification or degradation.” On June 29, 1995, a U.S. Supreme Court ruling further defined harm to include habitat modification “...where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.” Of note, Federally-listed plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land.

In addition, an agency reviewing a project is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the ESA or result in the destruction or adverse modification of critical habitat for such species (16 USC 1536[3][4]). Critical Habitat is defined by the ESA as a specific geographic area containing features essential for the conservation of an endangered or threatened species. Critical habitat should be evaluated if designated for Federally listed species that may be present in the project vicinity and/or potentially impacted by the project.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) (16 U.S.C. 1362) of 1972 prohibits the “taking” of marine mammals and restricts the import, export, or sale of marine

mammals. Take under the MMPA is defined as “the act of hunting, killing, capture, and/or harassment of any marine mammal; or, the attempt at such.” Harassment includes disruption of behavioral patterns. Implementation of the MMPA is divided between USFWS (sea otters [*Enhydra lutris*], walruses [*Odobenus rosmarus*], polar bears [*Ursus maritimus*], manatees [*Trichechus manatus*], and dugongs [*Dugong dugon*]) and NMFS (pinnipeds including seals and sea lions and cetaceans including dolphins and whales). Incidental Harassment Authorizations (IHA) or Letters of Authorization (LOA) may be issued for certain activities which can result in small amounts of take incidental to another lawful activity.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) was passed in 1972 and established a national policy and national program for the management, beneficial use, protection, and development of land and water resources of the nation’s coastal zones. The voluntary national program was meant to encourage coastal states to develop and implement coastal zone management plans. The Coastal Act (further described below) is the foundation of the California Costal Management Program which is California’s coastal zone management plan. The CZMA requires that federal actions and development requiring federal permits or funding affecting land or water areas or resources within the coastal zone are consistent with the provisions of the act and approved coastal zone management plans. In California, outside of San Francisco Bay, the California Coastal Management Program is implemented and enforced by the CCC.

Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) was passed in 1976 and provides the federal government with the authority to manage fisheries in the U.S. Exclusive Economic Zone (EEZ) (from state waters which end 3 nautical miles offshore to a distance of 200 nautical miles). In addition, the MSA mandates inter-agency cooperation in achieving protection, conservation, and enhancement of Essential Fish Habitat (EFH). The MSA defines EFH as "Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity, and may include migratory routes, open waters, wetlands, estuarine habitats, artificial reefs, shipwrecks, mangroves, mussel beds, and coral reefs." For the purpose of interpreting the definition of EFH: 'Waters' include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle" (50 CFR 600.10). EFH designations serve to highlight the importance of habitat conservation for sustainable fisheries and sustaining valuable fish populations. EFH relates directly to the physical fish habitat and indirectly to factors that contribute to degradation of this habitat. Important components of EFH include adequate water quality, temperature, food source, water depth, and cover/vegetation.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) as amended established federal responsibilities for the protection of nearly all species of birds, their eggs, and nests. A migratory bird is defined as any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. The MBTA prohibits the take, possession, buying, selling, purchasing, or bartering of any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Only exotic species such as Rock Pigeons (*Columba livia*), House Sparrows (*Passer domesticus*), and European Starlings (*Sturnus vulgaris*) are exempt from protection.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) was originally enacted in 1940 in order to protect the national emblem of the United States, the Bald Eagle. At that time, the Bald Eagle was experiencing significant population pressures from hunting, egg collection, and habitat loss (Buehler 2000). This act was expanded in 1962 to include protections for the Golden Eagle (*Aquila chrysaetos*), which was also experiencing precipitous population declines due to habitat loss, hunting, and electrocution from power lines (Kochert et al. 2002).

The current federal statute as amended (16 U.S.C. 668-668d) includes criminal penalties for anyone, including individuals, associations, partnerships, and corporations who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner any bald eagle commonly known as the American eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof” without a permit (16 U.S.C. § 668a).

A BGEPA take permit may be required if a proposed activity is near an active or inactive eagle nest, roosting site, or foraging site. This is particularly true if the project is near breeding habitat (as opposed to wintering habitat or migratory stop-over sites). The act applies to all activities that may impact eagles, including projects without a federal nexus. If there is a possibility that the project could “non-purposely take” eagles (unavoidable take associated with, but not the purpose of an activity) the USFWS may issue a programmatic take permit. In this case, the permit would be subject to conditions or mitigation measures to minimize impacts. Post-construction monitoring and annual reports may also be required (50 CFR 22.26).

State Regulations

California Environmental Quality Act

Rare or endangered plant or wildlife species are defined in the CEQA Guidelines Section 15380. Endangered means that survival and reproduction in the wild are in immediate jeopardy. Rare means that a species is either presently threatened with extinction or that it is likely to become endangered within the foreseeable future. A species of animal or plant shall be presumed to be rare or endangered if it is listed in 14 California Administrative Code (CAC) 670.2 or 670.5, or 50 CFR 17.11 or 17.12 pursuant to the ESA as threatened or endangered.

California Coastal Act

The Coastal Act (California Public Resources Code [PRC] Sections 30000 et seq) was enacted by the State Legislature in 1976 to provide long-term protection of California's 1,100-mile (1,770 kilometers) coastline for the benefit of current and future generations. Coastal Act policies constitute the standards used by the CCC in its coastal development permit decisions and for the review of local coastal programs (LCPs) prepared by local governments and submitted to the CCC for approval. These policies are also used by the CCC to review federal activities that affect the coastal zone (see Coastal Zone Management Act above). Among other things, the policies require:

- Protection and expansion of public access to the shoreline;
- Protection, enhancement and restoration of environmentally sensitive habitats;
- Protection of productive agricultural lands, commercial fisheries and archaeological resources; and
- Protection of the scenic beauty of coastal landscapes and seascapes;

The Coastal Act defines an “environmentally sensitive habitat area” (ESHA) as an “area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments” (Section 30107.5). Three important elements define an ESHA:

1. A geographic area can be designated ESHA because of the presence of individual species of plants or animals or because of the presence of a particular habitat;
2. In order for an area to be designated as ESHA, the species or habitat must be either rare or it must be especially valuable; and,
3. The area must be easily disturbed or degraded by human activities.

Section 30240 states in part that:

- a) ESHA shall be protected against significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.
- b) Development in areas adjacent to ESHA and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas and shall be compatible with the continuance of those habitat and recreation areas.

While there is not a specific list of habitats considered to be ESHA for the state or county, the CCC through the Coastal Act and counties or municipalities through LCPs are the jurisdictional agencies that exert authority in identifying and protecting ESHA during project review and permitting. The CCC generally considers CDFW-designated Sensitive Natural Communities to be ESHAs. Thus the Sensitive Natural Communities discussed in Impact BIO-2 would also likely be considered ESHA under the Coastal Act.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter Cologne) was passed in 1969 and assigns overall authority for water rights and water quality protection to the SWRCB and directs the nine RWQCBs to develop and enforce water quality standards within their boundaries. Through Porter-Cologne, the RWQCBs are responsible for regulating any activity, including waste discharges, that would, or that have the potential to, impair the beneficial uses of water bodies.

The SWRCB utilizes WDRs to regulate activities that may affect waters of the state or that may discharge water in a diffuse matter. As described above, any federally sponsored or permitted activity that may result in a discharge to a water body must be certified under CWA Section 401 that the proposed activity would comply with state water quality standards. In practice, a CWA Section 401 Water Quality Certification incorporates a “General Waste Discharge Requirement for Dredge and Fill Discharges”, so a project-specific WDR is not typically required. A WDR is, however, required when a CWA Section 401 Water Quality Certification is not, or if the project is particularly complex.

In the Project Area, the NCRWQCB regulates construction in Waters of the U.S. and Waters of the State, including activities in wetlands, under both the CWA and Porter Cologne (California Water Code, Division 7).

Executive Order W-59-93, State Wetland Conservation Policy

The California Wetlands Conservation Policy (Executive Order W-59-93) establishes a primary objective to “ensure no overall net loss...of wetlands acreage and values in California.” The RWQCBs implement this policy and the Basin Plan Wetland Fill Policy, both of which require mitigation for wetland impacts.

California Endangered Species Act

The California Endangered Species Act (CESA) includes provisions for the protection and management of species listed by the State of California as endangered, threatened, or designated as candidates for such listing (California Fish and Game Code (FGC) Sections 2050 through 2085). The CESA generally parallels the main provisions of the ESA and is administered by CDFW, which maintains a list of state threatened and endangered species as well as candidate species. The CESA requires consultation “to ensure that any action authorized by a state lead agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of the species” (Section 2053). California plants and animals declared to be endangered or threatened are listed in 14 CCR 670.2 and 14 CCR 670.5, respectively. The state prohibits the incidental take of species listed pursuant to CESA or candidate species unless that take is permitted by CDFW. Under CESA, “take” is defined as to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” It does not include protection of habitat, unless alteration or removal of habitat would result in direct “take” (as defined above) of an individual animal.

California Fish and Game Code

CDFW is responsible for conserving, protecting, and managing California’s fish, wildlife, and native plant resources. To meet this responsibility, FGC Section 1602

et. seq. requires an entity to notify CDFW of any proposed activity that would substantially alter the bed, bank, or channel of a lake or stream, would substantially divert or obstruct the flow of water, or that would use material from the streambed. A Lake or Streambed Alteration Agreement (LSAA) would include avoidance and minimization measures necessary to protect those resources. CDFW would issue an LSAA for the proposed Project prior to implementing stream alteration work.

Species of Special Concern

The CDFW maintains a list of Species of Special Concern. A Species of Special Concern is a species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:

- is extirpated from the state or, in the case of birds, is extirpated in its primary season or breeding role;
- is listed as Federally-, but not State-, threatened or endangered; meets the state definition of threatened or endangered but has not formally been listed;
- is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status; or
- has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for state threatened or endangered status.

Species of Special Concern, are species that are declining in California, and if current population and habitat trends continue could warrant listing pursuant to CESA or the ESA. Species of Special Concern receive consideration under CEQA.

Native Plant Protection Act

The CDFW administers the California Native Plant Protection Act (CNPPA) (FGC Sections 1900–1913). The CNPPA allows the California Fish and Game Commission to designate rare and endangered plant species and to notify landowners of the presence of such species. Section 1907 of the FGC allows the Commission to regulate the “taking, possession, propagation, transportation, exportation, importation, or sale of any endangered or rare native plants.” Section 1908 further directs that “[n]o person shall import into this state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the Commission determines to be an endangered native plant or rare native plant.”

Sensitive Natural Communities

The Manual of California Vegetation Online, describes California vegetation types, also known as “natural communities,” and categorizes them into a hierarchical structure of alliances and associations. CDFW’s CNDB evaluates the rarity and threats to these natural communities and ranks them into set categories, known as a state ranking. Alliances and associations with a CNDB State (“S”) ranking of S1 through S3 are defined as Sensitive Natural Communities and impacts to them should be assessed during CEQA project review. State ranking includes the following:

- S1 = Critically Imperiled – Critically imperiled in the state because of extreme rarity (often five or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
- S2 = Imperiled – Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
- S3 = Vulnerable – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- S4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 = Secure – Common, widespread, and abundant in the state.

Eelgrass Mitigation Policy

Eelgrass habitat is protected under a variety of state and federal laws because of the important biological, physical, and economic values it provides. To avoid further loss of existing eelgrass habitat, the West Coast NOAA's Region of NMFS released the California Eelgrass Mitigation Policy and Implementing Guidelines (NMFS 2014a) to provide guidance on eelgrass mitigation efforts. It is an expansion of an earlier policy from southern California implemented in 1991, which led to 2011 recommendations for an integrated eelgrass monitoring and assessment program for the southern California coast.

California Invasive Plant Council

The California Invasive Plant Council (Cal-IPC) keeps an inventory categorizing plants that threaten California's natural areas. The inventory includes invasive plants that currently cause environmental damage or economic harm in California as well as a "Watch List" of plants that are a high risk of becoming invasive in the future. The inventory represents the best available knowledge of invasive plant experts in California. Categorization is based on an assessment of ecological impacts, conducted with transparent science-based criteria and expert review. The inventory has no regulatory authority, rather is intended to be utilized as a management resource. The categorization or ratings of Cal-IPC plants are in accordance with the following:

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically. European beachgrass and dense-flowered cordgrass are Cal-IPC rated as High.
- **Moderate** – These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.
- **Alert** – An Alert is listed on species with High or Moderate impacts that have limited distribution in California but may have the potential to spread much further.
- **Watch** – These species have been assessed as posing a high risk of becoming invasive in the future in California

Public Trust Lands

The State Lands Commission (SLC) has jurisdiction and management authority over all public trust lands, including ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the common law Public Trust Doctrine which requires they be managed for the benefit of the public consistent with the provisions of Public trust (e.g., commerce, navigation, fisheries, recreation). Review by the SLC and issuance of a new, or amendment of an existing surface lease may be required for a project under SLC jurisdiction.

Regional and Local

Lands within the Project Area are owned by CDFW or are under the jurisdiction of the SLC, and therefore will not require a Conditional Use Permit from Humboldt County nor adherence to the Humboldt County General Plan or the Local Coastal Program Eel River Area Plan. Potential impacts within each resource category extending beyond the Project Area boundary, such as potential impacts to the biological resources within portions of lower Hawk and Sevenmile sloughs, and the entirety of North Bay are analyzed utilizing local regulatory documents such as the Humboldt County General Plan and the Local Coastal Program Eel River Area Plan. Therefore local and regional regulatory policies are discussed below.

Humboldt County General Plan

The following policies from the Humboldt County General Plan are applicable to the portions of the study area located outside of the Project Area with regard to biological resources (Humboldt County 2017):

BR-P1. Compatible Land Uses

Area containing sensitive habitats shall be planned and zoned for uses compatible with the long-term sustainability of the habitat. Discretionary land uses and building activity in proximity to sensitive habitats shall be conditioned or otherwise permitted to prevent significant degradation of sensitive habitat, to the extent feasible, consistent with CDFW guidelines or recovery strategies.

BR-P2. Critical Habitat

Discretionary projects which use federal permits or federal funds on private lands that have the potential to impact critical habitat shall be conditioned to

avoid significant habitat modification or destruction consistent with federally adopted Habitat Recovery Plans or interim recovery strategies.

BR-P4. Development within Stream Channels

Development within stream channels shall be permitted when there is no lesser environmentally damaging feasible alternative, and where the best feasible mitigation measures have been provided to minimize adverse environmental effects. Development shall be limited to essential, non-disruptive projects as listed in Standard BR-S6 - Development within Stream Channels.

BR-P5. Streamside Management Areas

To protect sensitive fish and wildlife habitats and to minimize erosion, runoff, and interference with surface water flows, the County shall maintain Streamside Management Areas, along streams including intermittent streams that exhibit in-channel wetland characteristics and off-channel riparian vegetation.

BR-P6. Development within Streamside Management Areas

Development within Streamside Management Areas shall only be permitted where mitigation measures (Standards BR-S8 - Required Mitigation Measures, BR-S9 - Erosion Control, and BR-S10 - Development Standards for Wetlands) have been provided to minimize any adverse environmental effects, and shall be limited to uses as described in Standard BR-S7 - Development within Streamside Management Areas.

BR-P7. Wetland Identification

The presence of wetlands in the vicinity of a proposed project shall be determined during the review process for discretionary projects and for ministerial building and grading permit applications, when the proposed building development activity involves new construction or expansion of existing structures or grading activities. Wetland delineation by a qualified professional shall be required when wetland characterization and limits cannot be easily inventoried and identified by site inspection.

BR-P8. Wetlands Banking

The County supports the development of a wetlands banking system that minimizes potential conversion of prime agriculture lands to wetlands.

BR-P9. Oak Woodlands

Oak woodlands shall be conserved through the review and conditioning of discretionary projects to minimize avoidable impacts to functional capacity and aesthetics, consistent with state law.

BR-P10. Invasive Plant Species

The County shall cooperate with public and private efforts to manage and control noxious and exotic invasive plant species. The County shall recommend measures to minimize the introduction of noxious and exotic invasive plant species in landscaping, grading and major vegetation clearing activities.

BR-P11. Biological Resource Maps

Biological resource maps shall be consulted during the ministerial and discretionary permit review process in order to identify habitat concerns and to guide mitigation for discretionary projects that will reduce biological resource impacts to below levels of significance, consistent with CEQA.

BR-P12. Agency Review

The County shall request the CDFW, as well as other appropriate trustee agencies and organizations, to review plans for development within Sensitive Habitat, including Streamside Management Areas. The County shall request NOAA Fisheries or USFWS to review plans for development within critical habitat if the project includes federal permits or federal funding. Recommended mitigation measures to reduce impacts below levels of significance shall be considered during project approval, consistent with CEQA.

BR-P13. Landmark Trees

Establish a program to identify and protect landmark trees, including trees that exhibit notable characteristics in terms of their size, age, rarity, shape or location.

Eel River Area Local Coastal Plan

Sections of the Eel River Area Plan that pertain to protection of biological resources include:

Section 30240, which states that environmentally sensitive habitat areas shall be protected from a significant disruption in habitat values. This section is further described above in State Regulations, California Coastal Act.

Section 30233 which discusses allowable uses of fill in coastal wetlands. Although no wetlands will be converted to uplands as a result of the Project, restoration is one of the allowable uses for placing fill in coastal wetlands.

3.4.3 Evaluation Criteria and Significance Thresholds

The Project would cause a significant impact related to biological resources, as defined by the CEQA Guidelines (Appendix G), if it would:

- 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 CDFW, USFWS or NMFS;
- Have a substantial adverse effect on any riparian habitat or other Sensitive Natural Community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- 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;

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Areas of No Project Impact

As explained below, the Project would not result in impacts related to one of the significance criteria identified in Appendix G of the current CEQA Guidelines.

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. The study area is not located within the boundaries of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. As such, the Project would not conflict with the provisions of any of these plans. No impact would occur and the evaluation criterion is not discussed further in this Draft EIR.

3.4.4 Methodology

Potential impacts to biological resources from the Project are evaluated to determine compliance with applicable federal, state, and local permitting and design requirements. Although some invasive plant management activities may occur during construction, it is considered in this section independent of construction activities. Potential impacts related to special-status plants, animals, aquatic resources (wetlands and other Waters of the U.S. and State), and Sensitive Natural Communities are evaluated by assessing their location relative to ground disturbing activities. The evaluation also considers potential impacts to or changes in habitat type or extent after the Project is implemented, especially for sensitive habitats.

3.4.5 Impacts and Mitigation Measures

Impact BIO-1: *Would the Project have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS or NMFS?*

The Project has been designed to avoid and minimize impacts to listed and sensitive species to the extent possible through design considerations (e.g., the seasonal timing of construction work to avoid disturbing nesting birds, locating the parking area in a disturbed ruderal location). None-the-less, construction, invasive plant management and maintenance of the Project could directly and indirectly impact populations of special-status wildlife and plant species and their habitats that occur in the study area.

Fish and Other Aquatic Species

A key goal of the Project is to restore and expand the area of tidal influence and enhance habitat for native fish, invertebrates, wildlife and plant species. Increased

tidal exchange and enhancement of existing tidal channels in the Project Area is anticipated to provide a significant improvement to fish and other aquatic species' habitat as compared to existing conditions.

There is no critical habitat for Tidewater Goby in the Project Area, although critical habitat exists for this species within the Eel River estuary, adjacent to and approximately 900 feet (274 meters) east of the study area. Critical habitat for Chinook Salmon (California Coastal DPS) and Coho Salmon (Southern Oregon/Northern California ESU) exists within McNulty Slough. There is no critical habitat within the study area for Longfin Smelt, Green Sturgeon, Eulachon or Steelhead Trout. State-listed Longfin Smelt, such as those recently documented in newly restored Riverside Ranch, are present nearby (Kramer 2016). Pacific Lamprey, a California species of special concern, is known to migrate into the Eel River throughout the year (Stillwater Sciences 2010).

Construction, Dewatering and Relocation Activities

Impacts to special-status fish species, including Tidewater Goby, juvenile salmonids, Green Sturgeon, Longfin Smelt, Eulachon and Pacific Lamprey, could occur during various construction activities, including all work that requires excavation or fill in tidally influenced portions of the Project Area. Although salmonids and other estuarine or anadromous fishes are believed to be in low numbers in the Project Area where most work would occur, some individual animals almost certainly occur in tidal areas where fill or excavation is proposed and could be affected by construction activities. For example, installing cofferdams and pumping water could isolate and/or entrain fish. Hydraulic dredging could also entrain fish. In the short term, construction activities including dredging, fill, and levee breaching or lowering would result in disturbance to soils that could affect turbidity and suspended sediment, which in turn could degrade water quality and impair fish mobility.

Dewatering is proposed, as feasible, for Areas B, C, D and E in order to isolate work areas as much as possible. Fish currently have access to Areas A, B, C and D via the existing channel network (see Figure 3.9-4 in Section 3.9 Hydrology and Water Quality), therefore dewatering Areas B, C and D may adversely affect fish. Potential adverse impacts from dewatering include stranding or entrainment into pumps, mortality due to dewatering equipment, debris, or relocation.

Area A would be constructed during low tide, and would not be dewatered. Therefore equipment would be within the marsh and levee areas and would excavate within channels that contain water and aquatic species. Potential adverse impacts from construction within Area A include: crushing, injury and stranding of fish and other aquatic species, all of which can lead to mortality. These potential impacts would be significant. Mitigation Measure BIO-1a (below) would be implemented to reduce potential adverse impacts to these species from dewatering and construction activities, in addition to other potential stressors.

Finally, internal and external levee breaching would alter hydrologic functions (e.g., salinity, flow, velocity) which could create an environment intolerable for some life stages of Tidewater Goby. However, in the long-term, the Project would result in a net gain in suitable Tidewater Goby habitat, and an increase in available higher quality habitat by including backwaters and slow moving low salinity habitat. Recent

experience on the nearby Riverside Ranch/Salt River Ecosystem Restoration Project documented a rapid increase in Tidewater Goby abundance and use of newly available habitat in the first years after tidal habitat restoration (Kramer 2016). Tidewater Goby are expected to increase in abundance within the Project Area after estuarine restoration activities are complete.

Invasive Plant Management

Invasive plant management activities would occur within the dunes and estuarine restoration areas. Treatment activities of European beachgrass in the dunes would have no impact on aquatic species because aquatic habitat does not exist in that portion of the Project Area. Treatment of dense-flowered cordgrass in the estuarine restoration area would likely occur concurrent with, or just after, construction activities, and would occur thereafter as needed and as funding allows. Equipment operating in the marsh to remove dense-flowered cordgrass would pose similar potential adverse impacts to aquatic species as described above for construction activities. The use of land-based treatments for invasive plant management (top mowing, grinding, tilling, prescribed burning) may result in loose soil which may deliver sediment to the water column. Potential impacts from in-water and land based invasive plant management treatments would be reduced with implementation of Mitigation Measure BIO-1a (below). Invasive plant management treatments involving the use of herbicide, and potential impacts to fish and aquatic species from herbicide application, are discussed below under the “Water Quality” heading.

Maintenance

Maintenance activities include periodic infrastructure repair and maintenance of amenities (trail, non-motorized boat put-in, parking lot, road), and monitoring activities. The non-motorized boat put-in and potentially monitoring activities would be the only maintenance activities in proximity to aquatic species. Maintenance of the non-motorized boat put-in would be completed within the footprint of the proposed infrastructure and would not cause deterioration of aquatic habitat for fish species. Similarly, monitoring activities would be conducted on foot and would be minimally invasive to the surrounding environment. No impact to aquatic wildlife species would occur from maintenance activities.

Mitigation Measure: Implement Mitigation Measure BIO-1a.

Mitigation Measure BIO-1a: Avoidance and Minimization Measures for Fish and other Aquatic Species.

The following measures will be implemented to avoid and minimize impacts to fish and other aquatic species during construction, invasive plant management and maintenance activities:

- The in-water work window for construction, invasive plant management and maintenance activities will be limited to the dry-season (between June 15 and October 15) to avoid or minimize impacts to Tidewater Goby, juvenile salmonids, and Longfin Smelt. Although dry-season work windows may coincide with Tidewater Goby spawning and larval development, the footprint of available Tidewater Goby habitat may be smaller because summer conditions are typically drier, reducing the

area in which Tidewater Goby may be present. In addition, conducting work during the dry season will minimize the impact on water quality from sediment or from spills that could occur during construction, invasive plant management and/or maintenance activities (e.g., oil, fuel, hydraulic fluid) because there would be a lower probability sediment or chemicals would be mobilized to surface waters. Dredging and filling activities should be conducted as late into the construction work window as feasible, to minimize impacts to Goby burrows (Stillwater Sciences 2006), and because temperatures in the Project Area where dredging is likely to occur tend to be too warm for rearing salmonids after July (Wallace & Gilroy 2008, Ray 2018a).

- Project construction would be phased to allow Tidewater Goby, juvenile salmonids, Longfin Smelt and Pacific Lamprey to move on their own or be relocated to sites outside of where active ground disturbance is occurring. Before potential dewatering or other in-water Project activities begin, a qualified biologist shall ensure that native aquatic vertebrates, and large native invertebrates (if feasible), are relocated out of the construction footprint into a flowing tidal channel segment. Where dewatering needs to occur, all pump intakes will be screened in accordance with NMFS and CDFW fish screening criteria (NMFS 1997, CDFG 2010c). In deeper or larger areas, water levels shall first be lowered to manageable levels using methods to ensure no adverse impacts to fisheries and other special-status aquatic species occur. The qualified biologist shall then perform appropriate seining or other trapping procedures to a point at which the qualified biologist is assured that almost all individuals within the construction area have been caught. These individuals shall be kept in buckets with aerators and relocated to an appropriate flowing tidal channel segment or other appropriate habitat as identified by the qualified biologist in consultation with NMFS, USFWS and CDFW.
- A pre-construction fish screening shall take place before any in-water Project activities take place in channels that are not dewatered, or are partially dewatered in areas where Tidewater Goby and other native aquatic species have been known to occur (based on previous surveys, see Ray 2018b, and Scheiff and Gilroy 2013). The pre-construction fish screening shall include in-water movement in the proposed work area in order to scare fish species away from the work area.
- Amphibious vehicles, or other low ground pressure equipment, will not be allowed to contact the channel substrate where special-status fish species may be present. The vehicles will be operated in such a manner that they avoid causing erosion into the channels, to the extent possible.
- To minimize erosion effects, silt fencing (or a similar best management practice [BMP]) will be installed along the edge of the work area when adjacent to a waterway (as feasible) and in locations where native aquatic species typically occur (based on previous surveys Ray 2018b, Scheiff and Gilroy 2013, or CNDDDB). Silt fencing shall be installed when

using methods that are most likely to cause erosion such as grinding, tilling, disking and digging/excavating. Silt fencing is not required if conducting construction, invasive plant management or maintenance activities by hand, or if the Project activity does not involve soil disturbance (such as top mowing, herbicide application or smothering).

Level of Significance: Less than significant with mitigation.

Implementation of Mitigation Measure BIO-1a provides protection measures during construction, invasive plant management and maintenance activities for aquatic species including seasonal work windows, relocation guidance for individual fish species if any are located within dewatering areas, and pre-construction actions. Mitigation Measure BIO-1a is consistent with applicable recovery plans (see Section 3.4.6 Cumulative Impacts for additional information on the recovery plans this Project upholds). The Project would result in a long-term benefit to Tidewater Goby, juvenile salmonids, Longfin Smelt, Eulachon, Green Sturgeon and Pacific Lamprey due to the establishment of access to additional and improved tidal areas. With implementation of Mitigation Measure BIO-1a, impacts derived from construction, invasive plant management, and maintenance activities would be less than significant.

Water Quality

Water quality may be a stressor to aquatic species during construction and following the first substantial rain event after construction due to increased sediment in the water column. The potential mobilization of sediment would be temporary, is not expected to persist beyond the first substantial rain event following the completion of construction, and is not considered a long-term threat to aquatic species. The last bullet listed in Mitigation Measure BIO-1a would reduce erosion associated with ground disturbing activities in proximity to where native aquatic species typically occur. Therefore, due to the temporal nature and with implementation of Mitigation Measure BIO-1a, impacts from a temporary increase in sediment are considered less than significant with mitigation.

The use of herbicide to control invasive plants has the potential to directly or indirectly affect the survival, health, or reproduction of non-target plants, and reduce plant cover leading to increased soil erosion and surface water runoff. The risks to non-target species from herbicide use depend on the application method; timing of the application; and plant species present, as well as environmental factors such as precipitation rates and soil types. If not properly managed, the use of herbicide for invasive plant management could result in adverse impacts to water quality (aquatic species' habitat) or non-target species. This impact is considered potentially significant.

Mitigation Measures: Implement Mitigation Measures HHM-2, HHM-4, WQ-1 and WQ-2.

The Project would implement Mitigation Measures HHM-2, HHM-4, WQ-1, and WQ-2, as defined from the Programmatic Final EIR for the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey and GHD 2013) hereafter referred to as the 2013 Spartina PEIR, to reduce potential impacts to water quality, aquatic species, and non-target plant species from the use of herbicide. The 2013 Spartina PEIR

measures have been slightly adapted to reflect that their implementation would also apply to treatment of European beachgrass, and to other project activities that could result in comparable potential impacts on water quality, aquatic species, and non-target plant species (e.g., use of equipment to implement the tidal restoration component of the project).

Mitigation Measure HHM-2: Accidents Associated with Release of Chemicals and Motor Fuel.

Contractors and equipment operators on site during Project activities will be required to have emergency spill cleanup kits immediately accessible. If fuel storage containers are utilized exceeding a single tank capacity of 660 gallons or cumulative storage greater than 1,320 gallons, a Hazardous Materials Spill Prevention Control and Countermeasure Plan (HMSPPCCP) would be required and approved by the NCRWQCB. The HMSPPCCP regulations are not applicable for chemicals other than petroleum products; therefore, the contractor shall prepare a spill prevention and response plan for the specific chemicals utilized during Project activities. This mitigation is intended to be carried out in conjunction with Mitigation WQ-2.

Mitigation Measure HHM-4: Avoid Health Effects to the Public and Environment from Herbicide.

For areas targeted for application of herbicide that are within 500 feet (152 meters) of human sensitive receptors (i.e., houses, schools, hospitals), prepare and implement a herbicide drift management plan to reduce the possibility of chemical drift into populated areas. The Plan shall include the elements listed below. To minimize risks to the public, mitigation measures for herbicide application methods related to timing of herbicide use, area of treatment, and public notification, shall be implemented by entities engaging in treatment activities as identified below:

- Herbicide will be applied in accordance with the manufacturer's label.
- CDFW will coordinate with the County Agricultural Commissioner to identify and avoid impacts to any nearby sensitive areas (e.g., schools, hospitals) that require notification prior to herbicide applications.
- CDFW will identify nearby sensitive habitat and, where feasible, establish buffer zones to avoid affecting sensitive receptors.
- Herbicide will be applied using the coarsest droplet size possible that maintains sufficient plant coverage while minimizing drift into adjacent areas.
- Herbicide shall not be applied when winds exceed 10 miles per hour or when inversion conditions exist (consistent with the herbicide labels); or when wind could carry spray drift into inhabited areas. Refer to Section 3.3 (Air Quality), for discussion on inversions.
- Public access to treatment sites will be restricted during treatment windows.
- No surfactants containing nonylphenol ethoxylate will be used.

Mitigation Measure WQ-1: Managed Herbicide Control

Herbicide shall be applied directly to plants and at low or receding tide to minimize the potential application of herbicide directly on the water surface, as well as to ensure proper dry times before tidal inundation. Herbicide shall be applied by a certified applicator or under the direct supervision of trained, certified or licensed applicators, and in accordance with application guidelines and the manufacturer label. The Project shall obtain coverage under the current statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters of the U.S. from Algae and Aquatic Weed Control Applications (SWRCB 2013).

Mitigation Measure WQ-2: Minimize Herbicide Spill Risks

Herbicide shall be applied by or under the direct supervision of trained, certified or licensed applicators. Herbicide mixtures shall be prepared by, or under the direct supervision of trained, certified or licensed applicators. Storage of herbicide and surfactants on or near the Project Area shall be allowed only in accordance with a Spill Prevention and Control Plan approved by the NCRWQCB; on-site mixing and filling operations shall be confined to areas appropriately bermed or otherwise protected to minimize spread or dispersion of spilled herbicide or surfactants into surface waters. This mitigation is intended to be implemented in conjunction with Mitigation Measure HMM-2.

Level of Significance: Less than significant with mitigation.

Mitigation Measures HMM-2, HMM-4, WQ-1 and WQ-2 provide guidelines on how herbicide can be applied and who can apply them, and requirements for spill clean-up kits to be onsite in order to address accidental spills of herbicide or motor fuel. With implementation of Mitigation Measures HMM-2, HMM-4, WQ-1 and WQ-2 potential impacts to aquatic species habitat (water quality) and non-target species from use of herbicide would be reduced to be less-than-significant.

Habitat Changes and Predation by Invasive Species

Estuarine restoration within the Project Area would benefit other aquatic species, including non-native species such as Sacramento Pikeminnow, which can prey on Tidewater Goby, juvenile salmonids, Longfin Smelt, and Pacific Lamprey. It is anticipated these potential impacts would be offset by the overall net gain in the post-construction quality and quantity of tidal habitats in the Project Area, which would allow populations of sensitive native aquatic species to expand into restored areas and be able to better withstand a potential increase in predation. Although invasive Sacramento pikeminnow are tolerant of low salinities, restoring brackish water habitat would provide refuge for native species from this invasive freshwater fish. Therefore, a less than significant impact to aquatic species due to habitat changes and potential increases in predation would occur.

Bird Species

Resident and Migratory Birds

Special-status avian species could be present at the Project Area year-round (nesting, wintering, migrating and fly-over species) and could be impacted by noise, ground and/or visual disturbance during Project construction and invasive plant management activities. No trees are present within the Project Area, however abundant marsh habitat exists which is used by many bird species. Construction activities which may adversely impact special-status bird species include: channel excavation, levee breaching, lowering and removal of levees, filling of wetlands to create high marsh and habitat ridges, excessive noise, and removal of or damage to vegetation during construction (e.g., in order to clear access pathways). Invasive plant management activities that may adversely impact special-status bird species include: prescribed burning, herbicide application, mechanical removal of invasive plants, excessive noise, and visual impacts. For wintering and fly-over avian species, these potential impacts are considered less-than-significant because ecologically similar breeding and foraging habitat is regionally abundant and not a limiting factor for these species. Maintenance activities, including trail and parking lot maintenance, would typically not include the use of heavy machinery in the tidal marsh or dunes and would have a less than significant impact on migratory birds.

For ground nesting species, which nest in high grasses or similar vegetation in marshes, wetlands, dunes or uplands, the construction and invasive plant management activities listed above could result in injury, mortality, or nest abandonment due to earth movement, vegetation removal and noise. Project activities (including construction and invasive plant management) occurring during the avian breeding season which generally occurs March 16th through July 31st in northern California may have an adverse impact on breeding success for ground nesting special-status bird species. Adverse impacts to ground nesting special-status bird species would be a significant impact.

Mitigation Measures: Implement Mitigation Measure BIO-1b.

Mitigation Measure BIO-1b: Conduct Pre-construction Nest Surveys for Ground Nesting Special-status and Migratory Avian Species

The following measures will be implemented prior to and during construction and invasive plant management activities to avoid and minimize impacts to nesting birds. Maintenance activities that include ground disturbance are also subject to this mitigation measure.

- CDFW shall attempt to conduct all Project construction and invasive plant management activities in areas where nesting could occur to the period outside the bird nesting season (generally August 1 to March 15). If Project activities are proposed to occur outside the bird nesting season, no further mitigation is necessary. If activities are proposed in the bird nesting season (generally considered between March 16 and July 31), a qualified biologist shall conduct pre-construction surveys within the vicinity of the impact area to check for nesting activity and to evaluate the site for nesting bird species. The qualified biologist shall conduct a minimum of one pre-construction survey within the seven-day

period prior to Project construction or invasive plant management activities. If Project activities lapse for seven days or longer during the nesting season, a qualified biologist shall conduct a supplemental avian survey before Project work is reinitiated.

- If an active nest is found, the qualified biologist shall determine the size of an appropriate construction-avoidance buffer zone to be established around the nest and/or operational restrictions in consultation with the CDFW and USFWS (if Federally-listed). Buffer zones shall be delineated with flagging and maintained until the nestlings have fledged and are independent of the nest. Buffer sizes shall take into account factors such as (1) noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity; (2) distance and amount of vegetation or other screening between the construction site and the nest in order to reduce visual stress; (3) sensitivity of nesting species and behavior of the nesting birds; (4) location of the nest in relation to areas to be treated with herbicide.

Level of Significance: Less than significant with mitigation.

Mitigation Measure BIO-1b provides protection measures to special-status ground nesting birds if Project activities are implemented in areas that could potentially contain nesting birds. Implementation of this measure would mitigate potential impacts to special-status, resident and migratory birds to less-than-significant levels by requiring pre-construction surveys by a qualified biologist to determine whether special-status, resident, or migratory bird nests are present at or near the Project Area and ensure the protection of nests and nestlings via buffer zones until they have fledged.

Western Snowy Plover

The Western Snowy Plover occurs on and above the wave slope up to the foredune west of the Project Area. The largest current concentrations of nests are located along the southern portion of the Project Area near the mouth of the Eel River (Colwell 2019). Critical habitat was designated in 1999 and revised in 2012 (77 Federal Register [FR] 36727-36869) and includes the entire dune complex from the Humboldt Bay South Spit, south to Centerville Beach, including the dunes within the Project Area and adjacent beaches (see Figure 3.4-5 – Critical Habitat for Western Snowy Plover).

Proposed dune enhancement has the potential to directly and indirectly affect this species through long-term improvements in habitat, as well as through temporary visual and noise disturbance during European beachgrass removal activities. Prescribed burning and herbicide use for European beachgrass removal is not anticipated to harm Western Snowy Plovers, because Plovers utilize open beach areas rather than dense stands of European beachgrass. Drift from herbicide application could adversely impact Western Snowy Plover habitat, although these potential impacts would be unlikely because herbicide would be hand applied and very targeted when applied proximate to nesting habitat (i.e., along the fringes of European beachgrass stands near open sand areas). Equipment necessary for

European beachgrass control, such as bulldozers, may harm Western Snowy Plover through visual disturbance, and disturbance to nests or habitat when accessing work areas. Additionally, equipment utilized in construction and dense-flowered cordgrass removal may utilize the dunes to access the construction and tidal portion of the invasive plant management area, which may harm Western Snowy Plover individuals or habitat. The noise and visual disturbance from equipment conducting invasive plant management, or accessing the tidal portion of the Project Area, may also adversely impact Western Snowy Plover. Although dune restoration and European beachgrass removal is expected to result in a long-term net benefit for Western Snowy Plover, there could be short term adverse impacts from noise and equipment movement that could be significant.

Mitigation Measures: Implement Mitigation Measure BIO-1c.

Mitigation Measure BIO-1c: Avoid and Minimize Potential Impacts to Western Snowy Plover.

Suitable nesting habitat for Western Snowy Plover includes areas of open sand, or sparsely vegetated dunes, above the high tide line (NAVD88). This measure applies to all Project activities that occur within 50 feet (15 meters) of suitable Western Snowy Plover habitat. For the purposes of this measure, Project activities include construction; construction-related access; and all invasive plant management activities targeting removal of European beachgrass (including prescribed burning, herbicide application, manual or mechanical removal, or movement of equipment through European beachgrass).

- Project activities in Western Snowy Plover nesting habitat shall occur if feasible between September 16 and March 15, outside of the generally accepted Western Snowy Plover nesting season, unless CDFW and USFWS approve a wider season treatment based on survey data and site-specific conditions.
- If any proposed Project activities occur in suitable habitat in the dunes within the Western Snowy Plover nesting season (generally between March 16 and September 15), a qualified biologist shall conduct pre-construction surveys within the vicinity of the impact area to check for nesting activity. The qualified biologist shall conduct a minimum of one pre-construction survey within the seven-day period prior to Project activities. If Project activities lapse for seven days or longer during the nesting season, a qualified biologist shall conduct a supplemental avian survey before Project work is reinitiated.
- If an active Western Snowy Plover nest is found, the qualified biologist shall establish a 300-foot avoidance buffer zone around the nest and/or implement operational restrictions in consultation with CDFW and the USFWS. No herbicide application will occur within this buffer zone during the Western Snowy Plover nesting period unless approved by CDFW and the USFWS. Buffer zones shall be delineated with flagging and maintained until the chicks have fledged, or nesting activity has ceased. Buffer zones may exceed 300 feet (91 meters) upon taking into

account factors such as (1) noise and human disturbance levels at the Project site at the time of the survey and the noise and disturbance expected during the Project activity; (2) distance and amount of vegetation or other screening between the Project activity site and the nest in order to reduce visual stress; (3) sensitivity of individual nesting species and behaviors of the nesting birds; (4) location of the nest in relation to areas to be treated with herbicide.

Level of Significance: Less than significant with mitigation.

Mitigation Measure BIO-1c avoidance and minimization measures within 50 feet (15 meters) of suitable habitat for Western Snowy Plover, including seasonal work windows, pre-work surveys, restrictions on the use of heavy equipment, and guidelines to herbicide application. Implementation of Mitigation Measure BIO-c would reduce impacts to Western Snowy Plover to a less than significant level.

Reptiles and Amphibians

Northern Red-legged Frogs are known to occur within the freshwater-dominant portions of the Project Area, located in the northern extent of Areas C and E (M. van Hattem pers. comm. 2019). Implementation of the Project is expected to result in increased tidal amplitude, thereby resulting in conversion of some areas of fresh to slightly brackish marsh and freshwater shrub wetland to tidally influenced saltwater/brackish marsh and subtidal channels. However, freshwater seeps are located north of Areas C and E, and although tidal amplitude would increase, existing habitat for Northern Red-legged Frog is expected to remain suitable in and near the freshwater seeps.

Additional potential habitat characterized as a freshwater dominant pond exists in Area A. However, Northern Red-legged frog have not been documented in this pond (CDFW 2019a), presumably because water in the pond is surrounded by tidally influenced marsh and because the water is more saline than preferred by the species. Implementation of the Project is not expected to significantly change the available Northern Red-legged Frog habitat in the northern extent of Areas C and E, or remove known habitat in the freshwater pond in Area A. Therefore potential impacts to Northern Red-legged Frog breeding and rearing habitat would not significantly change from implementation of the Project, and are considered less than significant.

Although Northwestern Pond Turtles have not been observed in the Project Area, they have been reported in the Project vicinity and could inhabit fresh and brackish water wetlands in the Project Area. Suitable habitat for this species is located in the northern extent of Areas C and E, where the freshwater seeps occur. As described above, the freshwater seeps would not be affected by the Project and suitable habitat for this species would remain unaffected by the Project. It is uncertain whether Northwestern Pond Turtle breeding occurs in the cool coastal climate, and in any case upland breeding habitat is not expected to be impacted by the Project. Accordingly, Northwestern Pond Turtle breeding and rearing habitat in the Project Area would not significantly change as a result of implementation of the Project, and any potential impacts are considered less than significant.

During Project activities, some direct mortality to Northern Red-legged Frog and Northwestern Pond Turtle could occur during excavation of wetlands or channels (construction), or invasive plant management activities in areas of suitable habitat extent, should individuals be present during those activities. As a result, Project-related impacts to Northern Red-legged Frogs and Northwestern Pond Turtle could be significant if individuals are present when equipment is operating.

Mitigation Measures: Implement Mitigation Measure BIO-1d.

Mitigation Measure BIO-1d: Avoid, and Minimize Potential Impacts to Northern Red-legged Frog and Northwestern Pond Turtles

The following measures will be incorporated into the Project to avoid and minimize impacts to Northern Red-legged Frog and Northwestern Pond Turtles during construction, invasive plant management, and maintenance activities within 50 feet (15 meters) of suitable habitat. Suitable habitat is located in the northern extent of Areas C and E; therefore, this Mitigation Measure applies to construction, invasive plant management, or maintenance activities within 50 feet (15 meters) of the northern extents of Areas C and E.

- Project construction, invasive plant management, or maintenance activities shall be limited to the period of the year between July 1 and October 30 to avoid disturbance to breeding Northern Red-legged Frogs, as feasible.
- If work is proposed during the breeding season (generally December to February), a qualified biologist shall conduct two surveys in proposed work areas within suitable habitat as defined above. Any Northern Red-legged Frog egg masses located shall be relocated to suitable aquatic habitat outside of proposed work areas.
- Throughout areas of suitable habitat, any juvenile or adult Northern Red-legged Frog or Northwestern Pond Turtle encountered during construction, invasive plant management or maintenance activities will be safely relocated by a qualified biologist to suitable habitat out of harms way.

Level of Significance: Less than significant with mitigation.

Mitigation Measure BIO-1d identifies suitable habitat for Northern Red-legged Frog and Northwestern Pond Turtle, and avoidance and minimization measures within 50 feet (15 meters) of suitable habitat. These measures include seasonal work windows, pre-work surveys, and relocation guidance. Implementation of Mitigation Measure BIO-1d would reduce potential impacts caused by construction, invasive plant management or maintenance activities to Northern Red-legged Frog and Northwestern Pond Turtle to a less than significant level.

Mammals

The Project would result in changes in habitat types in the Project Area, including a shift from fresh to slightly brackish marsh, freshwater shrub wetland to tidally influenced salt water/brackish channels, and an increase in intertidal channel/mudflat. This change would alter vegetation composition within the Project

Area, which could impact bat foraging habitat. This impact is considered less than significant because ecologically similar foraging habitat is regionally abundant and not a limiting factor for these species, and because bats are mobile and able to readily respond to shifts in foraging availability over short distances. The Project would not impact or modify buildings, bridges, rocky areas, or trees, which could provide roost sites, and no potential impact on roosting habitat is anticipated to occur within the Project Area. Other mammals (Humboldt Mountain Beaver, Fisher, Sonoma Tree Vole, and North American Porcupine) have an extremely low potential to occur in the Project Area due to an absence of suitable habitat, and would not be impacted by the Project.

Marine mammals, including Pacific Harbor Seal and California Sea Lion, have been observed in McNulty Slough and have high potential of occurring in and adjacent to the Project Area. Potential impacts to these species include temporary adverse impacts on water quality (e.g., an increase in turbidity in McNulty Slough during construction) which could impact their ability to forage; however both of these species are highly mobile and suitable habitat is abundant regionally. Underwater noise issues are not anticipated as high impact pile drivers or other highly noisy pieces of equipment are not planned for use. Potential adverse impacts to marine mammals would be temporary. Because of these reasons, the Project would have a less than significant impact on mammals.

Invertebrates

Invertebrate species with moderate or high potential to occur in the study area include the Obscure Bumble Bee. It is unlikely that the Project would impact Obscure Bumble Bee. The Project may result in a small, temporary reduction of foraging habitat for this species; however, due to the regional abundance of similar habitats, temporary habitat loss is not expected to result in an adverse effect on the species. No Project-related impacts are anticipated.

Special-Status Plants

Eight special-status plant species occur within the Project Area: four species – Lyngbye's sedge, Humboldt Bay owl's clover, Point Reyes bird's-beak, and seaside angelica – are known to occur in the estuarine restoration portion of the Project Area, and five species – dark-eyed gilia, short-leaved evax, beach layia, American glehnia, and seaside angelica – are known to occur in the dune restoration portion of the Project Area (Table 3.4-2). Current locations of special-status plant populations and special-status plant habitat are based upon data collected by Pacific Coast Restoration in 2018, as depicted on Figure 3.4-2; however, the area and size of these populations may change over the life of the Project. As described below, implementation of the Project would significantly benefit these special-status plants in the long-term by improving habitat conditions preferred by native species and controlling populations of invasive plants; however temporary adverse impacts to these species may occur during construction and invasive plant management activities.

Construction and Invasive Plant Management Activities (Except Prescribed Burns)

Short-term potential adverse effects on special-status plants that may occur due to construction and invasive plant management activities include inadvertent trampling

or crushing by equipment, and potential impacts on the survival, health, or reproduction of plants if accidentally exposed to herbicide (see below for a discussion of the potential effects of prescribed fire on special-status plants). With the exception of prescribed burning, the invasive plant treatment methods specific to the removal of dense-flowered cordgrass, including potential impacts on special-status plants, were analyzed in the 2013 Spartina PEIR (H.T. Harvey and GHD 2013). The types of impacts on special-status plants that may be caused by the removal of European beachgrass in the dune restoration area would be similar (e.g., damage from equipment or exposure to herbicide), and also offset by the mitigation measures prescribed in the 2013 Spartina PEIR. Specifically, the Project would implement Mitigation Measures HHM-2, WQ-1 and WQ-2 as defined in the 2013 Spartina PEIR to avoid and reduce ground disturbance and invasive plant treatment-related impacts, including those that may be caused by the application of the herbicide imazapyr on dense-flowered cordgrass and European beachgrass.

Mitigation Measure BIO-1e would also be implemented to avoid inadvertent damage to plants from Project activities located proximate to known populations of special-status plants. With the exception of Lyngbye's sedge, all of the special-status plants known to the Project Area are annual species that typically seed by late summer (September); the exception is Point Reyes birds-beak, whose flowering period extends from June to October (Pacific Coast Restoration 2018b). All estuarine restoration activities and invasive plant management treatments would occur outside of the nesting bird window, which is generally considered between March 16 and July 31, which would ensure that most Project-related activities would occur after annual plants have seeded. Where there could be an overlap in a proposed work window and the blooming period of an annual plant species, and/or where work would be located near populations of Lyngbye's sedge, the staking requirements provided in Mitigation Measure BIO-1e would be implemented to minimize impacts to special-status plants in or near the footprint of the proposed work.

Finally, dune habitat special-status plant species almost entirely occur in dune mat habitat and where sand still moves, outside of areas of European beachgrass. Therefore, potential impacts to these species, such as trampling, mortality or general harm due to equipment use, are only expected to occur along the fringe of European beachgrass locations. For these special-status plants, avoidance shall occur by using only treatment methods that are highly selective; for example, heavy equipment would not be operated where these plants occur (see Mitigation Measure BIO-1e).

The implementation of the mitigation measures from the 2013 Spartina PEIR along with Mitigation Measure BIO-1e would reduce impacts to special-status plant species from construction and invasive plant management activities to a less than significant level.

An analysis of the impacts of prescribed burning on special status plants is provided in the following subsection.

Mitigation Measure: Implement Mitigation Measures BIO-1e, HHM-2, WQ-1 and WQ-2.

Mitigation Measure BIO-1e: Minimize Impacts to Special-Status Plant Species

A qualified biologist shall stake out locations of special-status plant populations prior to construction. Staking efforts shall target consolidated populations (i.e., more than 10 plants in a grouping), and shall only identify annual species if work is proposed during their blooming period. The qualified biologist shall also provide training to construction or plant management crews to ensure that they avoid and minimize impacts to these plants.

No heavy equipment shall be used to carry out invasive plant management within 10 feet (3 meters) of dune mat habitat.

Project-related access routes located in the dunes shall be marked and shall avoid dune mat habitat.

Level of Significance: Less than significant with mitigation.

Mitigation Measures BIO-1e would protect special-status plant species during ground disturbing activities, including invasive plant management. Mitigation Measures HHM-2, WQ-1 and WQ-2 provide guidelines on how herbicide can be applied and who can apply them, and requirements for spill cleanup kits to be onsite in order to address accidental spills. With implementation of Mitigation Measures BIO-1e, HHM-2, WQ-1 and WQ-2 potential impacts to special-status plant species would be reduced to a less than significant level.

Prescribed Burns

Prescribed burning is considered a possible invasive plant treatment method under the Project due to the large-scale stands of dense-flowered cordgrass and European beachgrass that dominate the Project Area, and the significant amount of large wood onsite that may make mowing or excavation difficult in the estuarine restoration area. Prescribed burns would be used as an initial treatment method to reduce biomass and expose aboveground large wood. Subsequent manual or mechanical treatments, or herbicide applications would be applied following prescribed burning, as needed.

Prescribed burns have the potential to harm special-status plant species (i.e., damage or destroy individual plants) where those plant communities overlap with a prescribed burn area; however these plant communities are anticipated to ultimately benefit from prescribed burning due to the subsequent removal of invasive plants that otherwise limit their ability to persist in the Project Area. Mitigation Measure BIO-1f would be implemented to avoid potential impacts to special-status plant species while implementing prescribed burns.

Mitigation Measures: Implement Mitigation Measure BIO-1f.

Mitigation Measure BIO-1f: Avoidance and Minimization of Special-status Plant Species during Prescribed Burns

In order to minimize potential impacts to special-status plant species during a prescribed burn, the following measures will be implemented:

Prescribed burns will occur between August 1 and March 15 (i.e., outside the nesting bird window,) which is after the primary blooming period for annual species known to the dunes.

All prescribed burn treatments will be conducted in accordance with an approved burn plan coordinated with the California Department of Forestry and Fire Protection (CAL FIRE).

Level of Significance: Less than significant with mitigation.

Mitigation Measure BIO-1f provides prescribed burn timeframe windows and requires coordination with CAL FIRE prior to conducting a burn. With implementation of Mitigation Measure BIO-1f, potential impacts to special-status plant species due to prescribed fire would be reduced to less than significant.

Post-Construction Potential Habitat Changes

The Project is anticipated to have overarching positive benefits to special-status plant species through the eradication of invasive plants in the estuarine and dune restoration areas, and because of increased tidal influence. However, short-term adverse impacts may potentially occur following construction activities. The expansion and increase in depth of tidal waters is anticipated to have a short-term adverse impact to some special-status plant species, due to increased duration of inundation. This potential impact would be temporary, because plants that may be subjected to increased total inundation are anticipated to migrate upslope and inhabit newly expanded habitat. Special-status dune plants are expected to expand in population size following the removal of European beachgrass. Special-status plants either observed or with potential to occur in the Project Area, and each species' response to increased post-construction habitat changes, including increased frequency of tidal inundation and removal of invasive plant populations is described below.

Tidal Marsh Habitat Special-status Plants

[Lyngbye's Sedge](#)

Lyngbye's sedge is a perennial species found within saltmarsh habitat, mostly along McNulty Slough on the outboard side of the levees in southern and central Area A. Post-construction conditions, i.e. greater tidal amplitude, within the Project Area are not anticipated to adversely affect this species due to the rhizomatous nature of its rooting structure, and its ability to establish in suitable habitat. Additionally, the tidal elevations of McNulty Slough are not anticipated to vary significantly after the Project is implemented as compared to pre-Project conditions, and therefore Lyngbye's sedge is unlikely to be impacted. Implementation of the Project is anticipated to improve and expand habitat for this species and increase its range and abundance after dense-flowered cordgrass is removed. No mitigation would be implemented.

[Humboldt Bay owl's-clover](#)

In general, Humboldt Bay owl's-cover is found in relatively high elevation saltmarsh in native saltmarsh patches. Within the Project Area, it is located in patches in southern Area A, Area B, and to a lesser degree in Area D along or close to McNulty Slough. Post-construction conditions – and specifically greater tidal amplitude within the Project Area – are anticipated to cause this species to establish into newly

expanded coastal salt and brackish marsh habitat types due to improved habitat conditions (i.e., increased number of subtidal channels and improved hydrologic connection with McNulty Slough). Minimal changes to tidal elevation in Area A are expected following construction activities. The channel excavations proposed in Areas A and B are located in the general pathway of an observed population of Humboldt Bay owl's-clover. If feasible, this species will be avoided during channel excavation. In Area A, this species is anticipated to be re-distributed to areas adjacent to and downstream of the proposed excavated channel, due to seed transport via the proposed channel. In Areas B and D, enhanced hydrology is anticipated to transport seeds further within the Project Area where they would be deposited in saltmarsh areas adjacent to the proposed channel excavation in Area B. Implementation of the Project is anticipated to improve habitat for this species after dense-flowered cordgrass is removed. No mitigation would be implemented.

Point Reyes bird's-beak

Point Reyes bird's-beak is located in the southern portion of Area A and in Area B within saltmarsh habitat. Similar to Humboldt Bay owl's-clover, the BR-1 breach and excavation in Area A would be located in the general vicinity of an observed population of Point Reyes bird's-beak. If feasible, this species will be avoided during channel excavation. The tidal elevation in Area A is expected to change minimally, and this species is anticipated to be re-establish in newly expanded habitat adjacent to and downstream of the proposed excavated channel, due to tidal seed transport. Re-distribution of this species due to the improved hydrology is anticipated throughout the tidal marsh portion of the Project Area. Implementation of the Project is anticipated to benefit this species as coastal saltmarsh would expand in the study area and would be enhanced by increased tidal influence. Implementation of the Project is anticipated to improve habitat for this species after dense-flowered cordgrass is removed. No mitigation would be implemented.

Seaside angelica

Seaside angelica grows at the upper marsh margins, especially in the transition zone to coastal dunes, and also along the sides of levees. Implementation of the Project involves channel excavation into upper Area B, A and E, which is where seacoast angelica has been observed. Habitat is anticipated to become increasingly estuarine in this area due to the channel excavation. Existing freshwater seeps north of Area E and the transition zone between the dunes to the west and the saltmarsh area is not expected to change. Therefore, although portions of the Project Area where seaside angelica has been observed would become more brackish and less freshwater dominant, abundant habitat exists for this species in the transitional area between the saltmarsh and the dunes and in the upper fringes of Area E, C and D where freshwater seeps would remain. No mitigation would be implemented.

Eelgrass

This species was observed in North Bay and McNulty Slough outside the Project Area (Pacific Coast Restoration 2018b, also mapped by Garwood 2018). Post-construction conditions within the Project Area are anticipated to benefit this species, and potentially cause the species to expand its range in the Project Area

due to the channel excavation in southern Area A and Area B. No mitigation would be implemented.

Coastal Dune Habitat Special-status Plants

Dark-eyed gilia

Dark-eyed gilia is an annual herb that is predominantly located throughout the existing dune mat habitat in the study area. Occurrences of this species are expected to increase following removal of European beachgrass, which has displaced dune mat. Until Project actions result in greater movement of sand, suitable habitat is anticipated to remain where existing species were observed during vegetation mapping (Figure 3.4-2; Pacific Coast Restoration 2018b). Implementation of the Project is anticipated to improve habitat for this species after European beachgrass is removed and sand movement in the Project Area increases.

Short-leaved evax

Short-leaved evax is an annual herb that is present in the dune mat vegetation alliance within the Project Area. This species was observed along the entirety of dune mat habitat within the dunes north of North Bay, and is particularly concentrated in the northern portion of the Project Area. Implementation of the Project is anticipated to improve habitat for this species after European beachgrass is removed and there is consequently greater movement of sand.

Beach layia

Beach layia occurs in dune mat, with two disjunct populations, one in the northern and one in the southern sections of the dune restoration area. Implementation of the Project is anticipated to improve habitat for this species after European beachgrass is removed.

American glehnia

American glehnia occurs in a few scattered locations in dune mat in the dune restoration area. Implementation of the Project is anticipated to improve habitat for this species after European beachgrass is removed.

In summary, the proposed Project is a restoration project designed to improve and expand native plant habitat. Post-construction conditions within the Project Area, including tidal inundation changes and the removal of dense-flowered cordgrass and European beachgrass, is not anticipated to adversely affect special-status plant populations due to the adaptability of each plant species as discussed above and because the Project makes improvements in the habitat conditions necessary for these species to expand. A less than significant impact would occur.

Maintenance

Maintenance activities include periodic repairs and improvements to the non-motorized boat put-in, trails, parking lots and road within the Project Area, as well as monitoring activities. These activities would occur in previously disturbed areas and would continue to support public recreation. No special-status plants were

observed in these areas, and none are expected to occur in areas where maintenance would occur.

Specific monitoring activities are to be determined, however are anticipated to include observations and measurements to determine whether the Project has been successful in improving habitat conditions for special-status plants and wildlife. Observations would likely occur on foot or by non-motorized boat and would not include the use of heavy machinery. Adverse impacts to special-status plants from monitoring activities are not anticipated, and the overall impact from maintenance activities would be less than significant.

Impact BIO-2: Would the Project 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 CDFW or USFWS?

Eleven Sensitive Natural Communities (S1 through S3 ranking) totalling 214.35 acres (86.74 hectares) were identified within the study area (Table 3.4-2). Under the Coastal Act, the Sensitive Natural Communities would also likely be considered ESHA, which is assumed in this analysis. See Figures 3.4-3 for locations of mapped Sensitive Natural Communities within the Project Area.

Riparian habitat does not exist in the study area, as no freshwater channels exist.

Construction

The Project would implement construction activities to improve tidal exchange, and thereby restore and improve the diversity of native saltmarsh habitat. In order to improve tidal exchange, existing levees would be lowered adjacent to McNulty Slough in Areas A, B, C and D; levees would be removed between Areas A and B, B and C and C and D, and channel excavation would take place in southern Area A, central Area B and Area E (see Figure 2-3 – Conceptual Design Elements). Construction would also include: high marsh creation, habitat ridges, and the installation of ditch blocks and large wood. Fill would be placed in Area B and in the southern portions of Areas A, C and D, totalling approximately 45.4 acres (18.4 hectares). The fill would be placed predominantly in intertidal channel/mudflat and coastal salt and brackish marsh and fresh to slightly brackish marsh habitat types to create transitional high marsh and habitat ridges. According to GIS analysis of vegetation mapping (Figures 3.4-3), construction activities would potentially adversely affect Sensitive Natural Communities due to earth work and earth movement (excavation and filling) in the tidal marsh portion of the Project Area.

Although adverse impacts would occur, these impacts are anticipated to be temporary. Once implemented, the Project would result in an overall benefit to native vegetation and Sensitive Natural Communities affected by construction activities, due to increased variations in elevation and tidal exchange within the high marsh and habitat ridge areas. It is expected that there would be a long-term increase in the area of Sensitive Natural Communities and ESHA resulting from the Project due to the restored natural conditions within the tidal marsh. A less than significant impact would occur.

Invasive Plant Management

The Project would also implement invasive plant management activities to control dense-flowered cordgrass, dwarf eelgrass, and European beachgrass, which is expected to have a long-term positive impact on Sensitive Natural Communities, including ESHA, as well as native plant and wildlife species in the tidal marsh and dunes. Efforts to control the invasive plants would consist of either mowing, grinding, excavation, prescribed burning, smothering or herbicide application, or a combination of approaches. Invasive plant management would occur independent of construction activities. Sensitive Natural Communities are generally not extensively intermixed with invasive plants because invasive plants displace most native species, therefore Sensitive Natural Communities are generally found adjacent to areas of invasive plants within the Project Area.

Dense-flowered cordgrass

Sensitive Natural Communities found adjacent to dense-flowered cordgrass include: *Juncus lescurii* (salt rush swales) alliance and a small area of *Leymus mollis* (sea lyme grass patches) alliance in the southern extent of the Project Area. Treatment of dense-flowered cordgrass may temporarily affect both Sensitive Natural Communities, however the removal of dense-flowered cordgrass would demonstrably improve habitat for these Sensitive Natural Communities because there would be greater availability for natural recruitment which is currently displaced by dense-flowered cordgrass. Potential impacts would be temporary, and benefits to Sensitive Natural Communities outweigh the potential temporary impacts. Therefore, a less than significant impact would occur and no mitigation would be implemented.

Dwarf eelgrass

Dwarf eelgrass was observed in McNulty Slough between 2008 and 2011, however recent surveys by CDFW (2018) did not detect the species. If observed in the future, dwarf eelgrass would be removed from McNulty Slough using manual removal or smothering. Native eelgrass has been consistently observed in McNulty Slough. If warranted, control of dwarf eelgrass would occur on the Ocean Ranch side (west side) of McNulty Slough, from the edge of the perimeter levee to mean low water and would likely occur between June and August, concurrent with eelgrass surveys and flowering period of the species. Manual removal would utilize hand tools to detach rhizomes while the top of the plant is pulled by hand, and smothering would involve placement of burlap fabric on top of stands of dwarf eelgrass to block sunlight. Standard water quality best management practices would be utilized to minimize sediment from entering McNulty Slough. Removal of the species utilizing the methods discussed would result in a less than significant impact to native eelgrass, and no mitigation would be implemented.

European beachgrass

Sensitive Natural Communities found adjacent to European beachgrass include: *Salix hookeriana* (coastal dune willow thickets) shrubland alliance (in the northern extent of the Project Area), and *Abronia latifolia - Ambrosia chamissonis* (dune mat) alliance. Implementation of primary or secondary treatments to eradicate European beachgrass is expected to significantly improve Sensitive Natural Community habitat availability in the long-term. In the short-term, removal of European

beachgrass adjacent to the coastal dune willow thicket is not expected to adversely impact this Sensitive Natural Community because no willow thicket would be removed or modified. As described in Impact BIO-1, dune mat habitat does not typically overlap with European beachgrass and treatment activities would only potentially affect this Sensitive Natural Community incidentally due to driving or walking, or when conducting treatment activities on the fringe of European beachgrass colonies. Although potentially significant, these impacts would be reduced to less than significant levels through implementation of Mitigation Measures BIO-1e and BIO-1f, which prescribes methods of European beachgrass removal (including prescribed burning) dependent on distance to areas of existing dune mat alliance communities.

Mitigation Measures: Implement Mitigation Measures BIO-1e and BIO-1f.

Level of Significance: Less than significant with mitigation.

Implementation of Mitigation Measure BIO-1e and BIO-1f would reduce the potential impact to Sensitive Natural Communities found in the dunes during invasive plant management activities to a less-than-significant level.

Maintenance

Maintenance activities would occur after Project construction activities, and either after or concurrent with invasive plant management activities. Maintenance activities could include periodic repairs to the access road and parking area, cleaning debris from the non-motorized boat put-in and trail bridges, and mowing vegetation along the trail system. Maintenance would also include monitoring, which would potentially include observations of Sensitive Natural Communities and ESHA on foot or in a non-motorized boat. Because these impacts would be temporary and not require the use of heavy equipment in Sensitive Natural Communities or ESHA, they would be considered less than significant.

Impact BIO-3: **Would the Project have a substantial adverse effect on state or federally protected wetlands (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?**

Construction Activities

The study area includes approximately 564.9 acres (2286 hectares) of one- or three-parameter wetlands, or open waters, collectively known as aquatic resources (see Table 3.4-1). Construction of the estuarine restoration portion of the Project would result in direct and indirect impacts to aquatic resources from excavation of tidal channels; levee breaching, lowering and removal; placement of soil to create high marsh habitat, habitat ridges, and to install ditch blocks; installation of large wood; and construction of public access features, including improvements to the access road at the north end of the study area. See Figure 2-3 (Conceptual Design Elements) for the location of earthwork including excavation and fill, and Figure 3.4-1 (Existing Aquatic Resources) for the location of aquatic resource types. Construction-related impacts could include direct disturbance (removal, crushing, damage) of wetland vegetation by heavy equipment; increased turbidity and degradation of aquatic habitat; soil compaction; spread of invasive plants to new

areas; and water contamination from inadvertent spills associated with equipment use in wet areas. In addition to construction-related disturbance, excavation and fill activities would result in some aquatic habitat types transitioning to another aquatic habitat type. For example, excavation of new tidal channels would convert some areas of coastal salt and brackish marsh to subtidal habitat, and placement of soil to create high marsh habitat would convert some areas of intertidal mudflat and subtidal habitat to coastal salt and brackish marsh. Project implementation would not, however, result in conversion of aquatic resources to upland, and would not result in a net loss of wetland acreage from placement of soil or other fill material.

Table 3.4-5 summarizes the acreage of each aquatic resource type that would be impacted by the proposed estuarine restoration activities. In total, construction of the Project, including all earthwork, would directly impact about 82.10 acres (33.2 hectares) of aquatic resources within the study area. Implementation of Mitigation Measure BIO-3, which includes a series of BMPs for work in sensitive areas, would reduce short-term and temporary impacts to aquatic resources during construction.

In the long-term, the Project would restore tidal flows within the estuarine restoration area to create a mosaic of saltmarsh, intertidal mudflat, and subtidal channels. The tidal elevation range in portions of the restoration area would increase by up to two feet (0.6 meters), which would alter the location and extent of existing habitats, and in particular would transition some existing areas of coastal salt and brackish marsh to intertidal mudflat. In turn, it is anticipated some coastal salt and brackish marsh communities would transition to higher elevation areas, where the depth and duration of tidal inundation would be better suited to their establishment.

Table 3.4-5 Construction Impacts to Aquatic Resources

Project Component	Other Waters (acres)			Aquatic Resource Type (acres)				Total Construction Impact (acres)
	Sub-tidal channel	Inter-tidal channel/mudflat	Fresh-water Pond	Coastal salt and brackish marsh	Fresh to Slightly brackish marsh	Coastal Scrub/upland/ruderal	Brewer's rush dunes	
Channel Excavation	20.95	0.20	0.00	0.03	0.00	0.00	0.00	21.18
Levee Breach	0.19	0.14	0.00	0.13	0.00	0.04	0.00	0.50
Levee Lowering	0.57	1.78	0.00	8.16	0.00	0.01	0.00	10.52
Levee Removal	0.00	0.65	0.20	0.95	0.00	1.06	0.00	2.66
Habitat Fill	0.00	18.44	0.00	26.51	0.00	0.51	0.00	45.46
Habitat Ridge	0.03	0.89	0.00	0.16	0.00	0.00	0.00	1.08
Ditch Block	0.02	0.08	0.00	0.16	0.00	0.00	0.00	0.26
Large Wood	0.06	0.35	0.00	0.03	0.00	0.00	0.00	0.44
Total	21.82	22.53	0.20	36.13	0.00	1.62	0.00	82.10

To evaluate potential shifts in aquatic resource types after the Project is implemented, existing ground elevation data (AECOM 2019) and mapped wetland types (Pacific Coast Restoration 2018a) were used to estimate the range of elevations typical of each aquatic resource type within the Project Area (Table 3.4-6) (GHD 2019). The elevations displayed in Table 3.4-6 and associated with each aquatic resource type is based upon existing conditions in Area A, which is already at nearly a full tidal exchange and is not expected to significantly change in tidal amplitude following Project implementation. These estimated elevation ranges were then compared to the results of the Project hydraulic model (AECOM 2019), which simulated maximum (mean higher high water [MHHW]) and minimum (mean lower low water [MLLW]) water levels over a 14-day tidal period.¹ Anticipated changes in water level tidal datums and ranges derived from the model were used to evaluate if the Project would likely result in a change in the existing vegetation community, or a shift in the aquatic resource type.

Figure 3.4-6 depicts the anticipated aquatic resource types following Project implementation, using the corresponding elevation ranges presented in Table 3.4-6 and the tidal amplitude results of the hydraulic model from AECOM (2019). Based upon the Project hydraulic model, it is assumed that aquatic resource types above eight feet (2.4 meters) in elevation would remain the same as pre-Project conditions. Therefore, the post-Project aquatic resource types above eight feet (2.4 meters) are displayed on Figure 3.4-6 using pre-Project aquatic resource type data shown in Figure 3.4-1 (Existing Aquatic Resources).

Table 3.4-6 Aquatic Resource Types by Elevation Range Based on Management Unit A

Aquatic Resource Type	Elevation Range (ft) (NAVD88 datum)
Subtidal channel	< 2.5
Intertidal channel/mudflat	2.5 - 4.9
Coastal salt and brackish marsh	4.9 - 8.0
Freshwater to slightly brackish marsh	
Freshwater shrub wetlands	> 8.0
Brewer's rush dunes	
Ruderal (facultative)	

Notes: The elevation associated with coastal salt and brackish marsh and freshwater to slightly brackish marsh overlapped from approximately six to eight feet (1.8 to 2.4 meters), i.e. both resource types were recorded within

¹ See Table A-2 in AECOM (2019) for a summary comparison of water level tidal datums and ranges within and adjacent to the Project Area under current and proposed conditions.

the six to eight feet elevation range. For this analysis, a conservative approach was used to assume that any freshwater to slightly brackish marsh aquatic resource type below eight feet (2.4 meters) would convert to coastal salt to brackish marsh because there is no way to predict which wetlands under eight feet would remain fresh or would convert to salt to brackish marsh. Additionally, the freshwater dominant aquatic resource types overlapped at varying degrees at elevations higher than eight feet. For this analysis, existing aquatic resource types at elevations higher than eight feet were assumed to remain the same as displayed in Figure 3.4-1 (Existing Aquatic Resources).

The change in tidal amplitude after the Project is implemented would have minimal impact on vegetation communities in Areas A, D, and E. These areas are either already subject to the full tidal range (Area A) or are located at ground surface elevations where changes in tidal elevations would not significantly impact the vegetative communities (Areas D and E). The primary shift in aquatic resource types in these areas would be associated with locations where tidal channels would be located and designed to remain inundated even at the lowest of tides. The proposed change in tidal amplitude would, however, likely transition portions of Area B (which is currently muted tidal marsh) to have additional coastal salt and brackish marsh and reduce the extent of intertidal mudflat (see Table 3.4-7).

Table 3.4-7 Extent of Coastal Salt and Brackish Marsh and Intertidal Mudflat by Management Area – Existing and Proposed (Acres)

Management Area	Coastal Salt and Brackish Marsh			Intertidal Mudflat		
	Existing Conditions	Proposed	Difference	Existing Conditions	Proposed	Difference
A	199.1	211.5	12.4	65.5	50.5	-15.0
B	24.6	49.5	24.9	69.7	48.7	-21.0
C	13.1	17.6	4.5	9.9	14.5	4.6
D	3.2	4.0	0.8	0.3	0.1	-0.2
E	2.2	4.6	2.4	0.9	0.2	-0.7

Overall, it is anticipated that the total acreage of subtidal channel and coastal salt and brackish marsh within the Project Area would increase slightly after the Project is implemented, and that the acreages of intertidal mudflat, freshwater to slightly brackish marsh, Brewer's rush dunes, freshwater shrub wetland, ruderal (facultative) and freshwater pond would decrease (Table 3.4-8).

Table 3.4-8 Aquatic Resource Types Before and After Project Implementation

Aquatic Resource Type	Existing (Acres)	Proposed (acres)	Net Gain or Loss
Wetlands			
Coastal salt and brackish marsh	306.5	347.0	40.5
Fresh to slightly brackish marsh	36.9	12.9	-24.0
Freshwater shrub wetland	6.9	5.2	-1.7
Brewer's rush dunes	33.4	27.7	-5.7
Ruderal (facultative)	7.4	6.5	-0.9
Other Waters of the U.S./State			
Subtidal channel	11.7	36.1	24.4
Intertidal channel/mudflat	161.9	129.5	-32.4
Freshwater Pond	0.20	0.0	-0.2
Total	564.9	564.9	

As described above, the changes are attributed to excavation and fill activities that would occur due to construction of the Project, and changes in the tidal amplitude associated with restoring tidal flows to the Project Area. These changes in aquatic resource type are not deemed a significant impact because they represent a shift from a degraded and disconnected muted tidal system, to a fully functioning and interconnected estuarine system, with an improved tidal prism and overall habitat quality for estuarine dependent fish and wildlife. Potential temporary and short-term impacts associated with the use of construction equipment in or near aquatic resources would be reduced through implementation of Mitigation Measure BIO-3.

Mitigation Measure: Implement Mitigation Measure BIO-3.

Mitigation Measure BIO-3: Mitigate Temporary and Short-term Impacts to Aquatic Resources Through Construction Minimization and Avoidance Measures

The following measures will be implemented to avoid and minimize impacts to aquatic resources during construction, or when heavy equipment is proposed for use in aquatic resources:

- With the exception of Area A (which is fully tidal), work areas will be isolated prior to ground disturbance to avoid delivery of sediment to downstream waters. To the extent possible, construction will occur when the work area has been dry or dewatered. Within Area A, adverse impacts on water quality will be minimized by installing restoration elements at low tide and using amphibious or low ground pressure equipment in fully tidal areas.
- Site disturbance shall be minimized to the greatest extent feasible by using existing disturbed areas for access and staging and concentrating the area of disturbance associated with restoration actions within the minimum space(s) necessary to complete the Project. Where feasible,

temporary measures for access or construction, such as the use of temporary tracks or pads, shall be used to minimize impacts.

- Contractors shall sign a document stating that they have read, understand, and agree to the required resource avoidance measures, and shall have construction/invasive plant management crews participate in a training session on avoiding and minimizing impacts to wetlands.

Level of Significance: Less than significant with mitigation.

Implementation of Mitigation Measure BIO-3 would reduce the impact of Project construction activities on aquatic resources to a less-than-significant level by isolating work areas; utilizing existing disturbed areas for access roads and staging as much as feasibly possible, and ensuring the contractor is aware of aquatic resources to be avoided.

Invasive Plant Management

Invasive plant management activities could also directly impact aquatic resource areas targeted for treatment. Specifically, up to 571 acres (231 hectares) of dense-flowered cordgrass occurs in areas delineated as aquatic resources, and would be targeted for removal using mowing, excavation, prescribed burning, and herbicide application under the Project. Similarly, removal of dwarf eelgrass would occur in McNulty Slough, as needed, which could temporarily impact water quality in/around removal sites. Proposed treatments of European beachgrass would not substantially occur in aquatic resources, however the western fringe of Brewer's rush dunes may be affected by invasive plant management treatments in the dunes.

By design, removal of invasive aquatic plants would impact wetland vegetation community structure and habitat suitability for certain plants. The implementation of Mitigation Measure BIO-3 would reduce any short-term impacts to wetlands during invasive plant management activities that utilize heavy equipment and occur in aquatic resources. As a result, this impact would be less than significant with mitigation.

Mitigation Measures: Implement Mitigation Measure BIO-3.

Level of Significance: Less than significant with mitigation.

Implementation of Mitigation Measure BIO-3 would reduce the impact of invasive plant management activities that utilize heavy equipment on aquatic resources to a less-than-significant level by isolating work areas, utilizing existing disturbed areas for access roads and staging as much as feasibly possible, and ensuring the contractor implementing invasive plant management activities is aware of aquatic resources to be avoided.

Maintenance

Maintenance activities, including litter removal and general management of the trails, the non-motorized boat put-in, signage and the parking lot, would occur within the footprint of the areas to be maintained. With the exception of the non-motorized boat put-in, these areas would be disturbed and would not contain wetlands or other aquatic resources that would need to be avoided. Any cleaning and maintenance of the non-motorized boat put-in would be completed within the footprint of the

proposed infrastructure and would not cause deterioration to surrounding wetlands or aquatic resources. Monitoring activities would be conducted on foot and would be as minimally invasive as possible to document post-Project conditions. A less than significant impact would occur.

Impact BIO-4: **Would the Project 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?**

One of the primary goals of the Project is to improve the tidal prism and restore the marsh's function as an estuary, which is expected to increase the accessibility of the area to salmonids and other aquatic species. Currently, existing infrastructure (berms, water control structures) and seasonal or other periodic barriers block the movement of fish and other aquatic species within the Project Area. Thus, there would be a net gain in the area of accessible habitat and potential for movement of salmonids, Tidewater Goby and other aquatic species following Project implementation.

However, there may be some temporary interference with movement of aquatic species during construction while silt fences are in place and during in-water construction. Because of the large size of the Project Area, there would be alternative corridors for movement, and the duration of any interference would be of relatively short duration. Additionally, Mitigation Measure BIO-1a requires that all in-water portions of construction, invasive plant management and maintenance activities take place during the dry-season work window (May through October) to avoid the most vulnerable life stages of sensitive fish species that occur in the study area.

The Project may also temporarily interfere with movement of terrestrial species, such as migratory birds through trimming or removal of vegetation onsite, and resident Western Snowy Plover through removal of European beachgrass. However, with implementation of Mitigation Measures BIO-1b and BIO-1c, surveys would be conducted and work windows implemented if Project activities were to take place within the nesting season for migratory birds, and Western Snowy Plover, respectively. In general, the effect on fish and wildlife species movement from Project construction, invasive plant management, and maintenance activities would be temporary and reduced through implementation of construction-related Mitigation Measures.

Mitigation Measures: Implement Mitigation Measures BIO-1a, BIO-1b, BIO-1c, and BIO-1d.

Level of Significance: Less than significant with mitigation.

Implementation of Mitigation Measures BIO-1a, BIO-1b, BIO-1c, and BIO-1d would reduce potential impacts to the movement of fish and wildlife species during construction and invasive plant management activities to a less-than-significant level.

Impact BIO-5: **Would the Project conflict with any local policies or ordinances protecting biological resources such as a tree preservation policy or ordinance?**

Lands within the Project Area are owned by CDFW or are under the jurisdiction of the SLC, and therefore would not require adherence to the Humboldt County General Plan or compliance with local policies or ordinances. The Project is subject to the Coastal Act; the policies within the Coastal Act that pertain to biological resources include the following:

California Coastal Act

Sections of the Coastal Act that pertain to protection of biological resources include Sections 30240 and 30233 of the Coastal Act. Section 30240 states that environmentally sensitive habitat areas shall be protected from a significant disruption in habitat values, and Section 30233 discusses allowable uses of fill in coastal wetlands. Although no wetlands would be converted to uplands as a result of the Project, restoration is one of the allowable uses for placing fill in coastal wetlands.

The following mitigation measures address and reduce impacts to sensitive species and habitats where feasible:

- Mitigation Measures BIO-1a (Avoidance and Minimization Measures for Fish and other Aquatic Species)
- Mitigation Measure HHM-2 (Accidents Associated with Release of Chemicals and Motor Fuel)
- Mitigation Measure HHM-4 (Avoid Health Effects to the Public and Environment from Herbicide)
- Mitigation Measure WQ-1 (Managed Herbicide Control)
- Mitigation Measure WQ-2 (Minimize Herbicide Spill Risks)
- Mitigation Measure BIO-1b (Conduct Pre-construction Nest Surveys for Ground Nesting Special-status and Migratory Avian Species)
- Mitigation Measure BIO-1c (Avoid and Minimize Potential Impacts to Western Snowy Plover)
- Mitigation Measure BIO-1d (Avoid, and Minimize Potential Impacts to Northern Red-legged Frog and Northwestern Pond Turtles)
- Mitigation Measure BIO-1e (Minimize Impacts to Special-status Plant Species found in Tidal Marsh),
- Mitigation Measure BIO-1f (Avoidance and Minimization of Special-status Plant Species during Prescribed Burns)
- Mitigation Measure BIO-3 (Mitigate Temporary and Short-term Impacts to Aquatic Resources Through Construction Minimization and Avoidance Measures).

Mitigation Measures: No additional mitigation is necessary.

Level of Significance: Less than significant with mitigation.

With implementation of the mitigation measures listed above, the Project would not conflict with local plan or ordinances for the protection of biological resources. A less than significant impact would occur.

3.4.6 Cumulative Impacts

Impact BIO-C-1: Would the Project contribute to a cumulatively significant impact to biological resources?

Many of the projects identified in Table 3-1 (Projects Considered for Cumulative Impacts) are ecological enhancement or restoration projects and infrastructure improvement projects which could result in impacts to sensitive biological resources, including special-status species, wetlands, and Sensitive Natural Communities (and therefore ESHA). However, these potential impacts would be temporary, and would be mitigated through avoidance measures, BMPs, and long-term ecological benefits. Implementation of the Project discussed in this Draft EIR would ultimately enhance the habitat value of the Eel River estuary by increasing the amount of tidally inundated habitat managed for native fish, plants, and wildlife, and improving resilience to future habitat disturbances such as sea level rise. The proposed Project upholds goals from the following recovery plans:

- Recovery Plan for the Tidewater Goby (*Eucyclogobius newberryi*) (USFWS 2005)
- Southern Oregon/Northern California Coast (SONCC) Coho Salmon Recovery Plan (NMFS 2014b)
- Final Coastal Multispecies Recovery Plan, California Coastal Chinook Salmon (volume 2), Northern California Steelhead (volume 3) (NMFS 2016)
- Recovery Strategy for California Coho Salmon (CDFA 2004)
- Updated Statewide 2013 Task List for the Steelhead Trout Restoration and Management Plan for California (DFG 1996) (CDFW 2013)
- Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly (USFWS 1998), including beach layia
- Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*) (USFWS 2007)
- California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies and Distinct Populations of Birds of Immediate Conservation Concern in California (Shuford and Gardall 2008)
- West Coast Governors' Agreement on Ocean Health Action Plan (Office of the Governors – Washington, Oregon, California 2008)

Construction at the Salt River Ecosystem Restoration Project, located near the Project Area, is mostly completed at the downstream end (e.g., closest to the Eel River mouth). Tidewater Goby are known to use habitat in Riverside Ranch and in the Eel River Estuary Preserve, located upstream and south, respectively, of the proposed Project. Juvenile salmonids and Longfin Smelt are known to use the Salt River, located upstream of the Project, and Eel River estuary. Impacts of construction and invasive plant management from within the Project Area are

unlikely to cumulatively impact aquatic species analyzed in this Draft EIR - including Tidewater Goby, juvenile Salmonids, Longfin Smelt, Eulachon, Green Sturgeon and Pacific Lamprey - because there is suitable regional habitat for these species to utilize should numerous projects take place concurrently. Potential impacts would be mitigated through avoidance measures and BMPs including implementation of mitigation measures, such as Mitigation Measure BIO-1a (Avoidance, Minimization, and Mitigation for Fish and other Aquatic Species). Implementation of the proposed Project would expand estuarine habitat and provide access and connectivity between freshwater and brackish habitat (such as in Area E).

In addition, the Project includes invasive plant management activities that would significantly improve plant habitat in the tidal marsh and along the dunes through the strategic treatment and removal of two invasive plants: dense-flowered cordgrass and European beachgrass. Some projects listed on Table 3-1 include an invasive plant management component, and have either been completed or are in the planning phase, such as the Salt River Ecosystem Restoration Project, Cannibal Island Restoration Study Area, Eel River Estuary and Centerville Slough Enhancement Project, and the Wetland Reserve Program or Floodplain Easement Projects. Soil may become more erosive during mechanical or manual invasive plant removal, which could become mobilized within the water column and a cumulative adverse impact on water quality or aquatic species could occur due to increased sedimentation in the Eel River or tributaries. Construction of each project could result in short-term impacts to sensitive biological resources, however these impacts would be mitigated through avoidance measures and BMPs. Overall, the benefits of invasive plant removal substantially outweigh potential and temporary impacts to biological resources due to the anticipated long-lasting improvement to the Project Area's ecological functions and the increased abundance and distribution of numerous State and Federally-listed, and otherwise sensitive species. Cumulative biological impacts would be less than significant with implementation of the mitigation measures presented in this Draft EIR.

Mitigation Measures: No additional mitigation is necessary.

Level of Significance: Less than significant.

3.4.7 References

- AECOM. 2019. Ocean Ranch Hydraulic Study Report. Prepared for Ducks Unlimited, Inc.
- Altman, B. and R. Sallabanks. 2012. Olive-sided Flycatcher (*Contopus cooperi*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.502>
- AmphibiaWeb. 2019. University of California, Berkeley, CA, USA.
<http://amphibiaweb.org>
- Bierregaard, R. O., A. F. Poole, M. S. Martell, P. Pyle, and M. A. Patten. 2016. Osprey (*Pandion haliaetus*), version 2.0. In The Birds of North America (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.
<https://birdsna.org/Species-Account/bna/species/osprey>

- BirdLife International. 2019. Species factsheet: *Phoebastria albatrus*.
<http://www.birdlife.org>
- Brown, C. R. and S. Tarof. 2013. Purple Martin (*Progne subis*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.287>
- Buehler, D. A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://birdsna.org/Species-Account/bna/species/baleag>
- Bull, E. L. and C. T. Collins. 2007. Vaux's Swift (*Chaetura vauxi*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.77>
- CDFG (California Department of Fish and Game). 2004. Recovery Strategy for California Coho Salmon. February. Species Recovery Strategy 2004-1. California Department of Fish and Game, Native Anadromous Fish and Watershed Branch, Sacramento. Prepared for the California Fish and Game Commission.
- CDFG (California Department of Fish and Game). 2010a. Lower Eel River Watershed Assessment. Coastal Watershed Planning and Assessment Program. Department of Fish and Game.
- CDFG (California Department of Fish and Game). 2010b. 2010 Northern Red-Legged Frog (*Rana aurora*) Survey. CDFG Eel River Wildlife Area Ocean Ranch Unit.
- CDFG (California Department of Fish and Game). 2010c. California Salmonid Stream Habitat Restoration Manual. Appendix S. Fish Screen Criteria. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=22672>
- CDFW (California Department of Fish and Wildlife). 2008. Life History – Hoary Bat. California Wildlife Habitat Relationships System.
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=2341&inline=1>
- CDFW (California Department of Fish and Wildlife). 2013. Updated Statewide 2013 Task List for the Steelhead Restoration and Management Plan for California (DFG 1996). Available at:
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=58603>
- CDFW (California Department of Fish and Wildlife). 2014. Western Lily (*Lilium occidentale*). Available at:
<https://www.wildlife.ca.gov/Conservation/Plants/Endangered/Lilium-occidentale>
- CDFW (California Department of Fish and Wildlife). 2015. Fish Species of Special Concern Accounts, 3rd Edition. Available at:
<https://www.wildlife.ca.gov/Conservation/SSC/Fishes>
- CDFW (California Department of Fish and Wildlife). 2016. A status review of Townsend's Big-eared Bat (*Corynorhinus townsendii*) in California – report to the Fish and Game Commission. California Department of Fish and Wildlife, Sacramento, CA, USA.

- CDFW (California Department of Fish and Wildlife). 2017. Ocean Ranch Unit Vegetation and Rare Plant Assessment. Conducted by Golec, C., Miller, L. August 2017. Shapefiles updated in 2019.
- CDFW (California Department of Fish and Wildlife). 2018. Classification of remaining unmapped vegetation at Ocean Ranch. Conducted by Leppig, G. November 8. Shapefiles updated in 2019.
- CDFW (California Department of Fish and Wildlife). 2019a. State and federally listed endangered and threatened animals of California. State of California Natural Resources Agency Department of Fish and Wildlife Biogeographic Data Branch. California Natural Diversity Database (CNDDDB) Rarefind. Sacramento, California.
- CDFW (California Department of Fish and Wildlife). 2019b. Coho Salmon. Available at: <https://www.wildlife.ca.gov/Conservation/Fishes/Coho-Salmon>
- Cal-IPC (California Invasive Plant Council). 2019a. *Ammophila arenaria*. <https://www.cal-ipc.org/plants/profile/ammophila-arenaria-profile/>
- Cal-IPC (California Invasive Plant Council). 2019b. *Spartina densiflora*. <https://www.cal-ipc.org/plants/profile/spartina-densiflora-profile/>
- Cal-IPC (California Invasive Plant Council). 2019c. The Cal-IPC Inventory: Explanation of Ratings. Available at: <https://www.cal-ipc.org/plants/inventory/>
- CNPS (California Native Plant Society). 2019. A Manual of California Vegetation, Online Edition; <http://www.cnps.org/cnps/vegetation/>; searched on July 22, 2019. California Native Plant Society, Sacramento, CA.
- CNPS (California Native Plant Society). 2019. Inventory of Rare and Endangered Plants of California. Available at: <http://www.rareplants.cnps.org/>
- CalTrout (California Trout). 2019. Southern Oregon/Northern California Coast Coho Salmon. Available at: <https://caltROUT.org/sos/species-accounts/salmon/cohohsalmon/southern-oregonnorthern-california-coast-coho-salmon>
- Cannata, S., and T. Hassler. 1995. Spatial and temporal distribution and utilization patterns of juvenile anadromous salmonids of the Eel River estuary, June 1994-September 1995. In: J. Duncan-Vaughn (ed.), Proceedings of the Thirteenth Annual Salmonid Restoration Federation Conference, February 23-26, Santa Rosa CA.
- Cannata, S., and S. Downie. 2009. Information summary of longfin smelt (*Sprinichthys thalychthys*) occurring in CDFG northern region. CDFG, Fortuna CA.
- Colwell, M. 2019. Western Snowy Plover (*Charadrius nivosus*) nest locations on the Ocean Ranch Unit of the Eel River Wildlife Area, 2001-2019. Prepared for GHD by the California Department of Fish and Wildlife.
- Crossman, M. S., Jules, E., Gwenzi, D., and O'Dowd. A. 2017. Effects of manual and mechanical *Ammophila arenaria* removal techniques on coastal dune

- plant communities and dune morphology. Departments of Environmental Science and Management, and Department of Biological Sciences, Humboldt State University. California State Parks. https://www.cal-ipc.org/wp-content/uploads/2018/02/2017_Symposium-Effects-Ammophilia-arenaria-removal-coastal-dune-Crossman.pdf
- Downie, S. T., and K. P. Lucey. 2005. Salt River Watershed Assessment. Coastal Watershed Planning and Assessment Program. Department of Fish and Game.
- Dugger, B. D. and K. M. Dugger. 2002. Long-billed Curlew (*Numenius americanus*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.628>
- Dunk, J. R. 1995. White-tailed Kite (*Elanus leucurus*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.178>
- eBird. 2019. An online database of bird distribution and abundance. Ithaca, New York. <http://www.ebird.org>. Accessed: July 2019.
- Elkinton, Elizabeth. 2013. Foraging and energy acquisition by Black Brant (*Branta bernicla nigricans*) on South Humboldt Bay, California. Master Thesis, Humboldt State University, CA, U.S.A.
- EPA (Environmental Protection Agency). 2018. Wetlands and Nature. Available at: <https://www.epa.gov/wetlands/why-are-wetlands-important>
- Erickson, Gregg A., E. D. Pierson, et al. 2002. Bat and Bridges Technical Bulletin (Hitchhiker Guide to Bat Roosts). California Department of Transportation, Sacramento, CA, USA.
- Franklin, K. 1999. Vertical flight. Journal of North American Falconers Association no. 38:68-72.
- Garrison, B. A. 1999. Bank Swallow (*Riparia riparia*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://birdsna.org/Species-Account/bna/species/banswa>
- Garwood, R. 2018. Eelgrass survey of McNulty Slough. California Department of Fish and Wildlife Field Note. July 2018.
- Grassetti Environmental Consulting, California State Coastal Conservancy, and Kammen Hydrology & Engineering. 2011. Final Environmental Impact report: Salt River Ecosystem Restoration Project.
- H. T. Harvey & Associates. 2013. Humboldt Bay regional *Spartina* eradication plan (final report). Project #3192-01. Report prepared for the California State Coastal Conservancy. Arcata, CA. http://humboldtbay.org/sites/humboldtbay.org/files/HB_Invasive_Spartina_Eradication_Plan.pdf

- H.T. Harvey and GHD. 2013. Final Programmatic Environmental Impact Report for the Humboldt Bay Regional Spartina Eradication Plan (2013 Spartina PEIR). Volume 1. Prepared for the California State Coastal Conservancy. https://scc.ca.gov/webmaster/ftp/pdf/sccbb/2013/1304/20130418Board08_H_B_Invasive_Spartina_Eradication_Ex4.pdf
- Harris, J., P. Brown, D. Alley, and R. Duke. 2000. Townsend's Big-eared Bat. California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=18059>
- Hatfield, R., S. Jepsen, R. Thorp, L. Richardson, and S. Colla. 2014. *Bombus caliginosus*. The IUCN (International Union for Conservation of Nature) Red List of Threatened Species 2014, Gland, CH. <https://www.iucnredlist.org/species/44937726/69000748>
- Hatfield, R., S. Jepsen, R. Thorp, L. Richardson, S. Colla, and S. Foltz Jordan (2015). *Bombus occidentalis*. The IUCN Red List of Threatened Species 2015: e.T44937492A46440201. <http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T44937492A46440201.en>
- Healy, S. and W. A. Calder. 2006. Rufous Hummingbird (*Selasphorus rufus*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.53>
- Hellmair, M., and A.P. Kinziger. 2014. Increased Extinction Potential of Insular Fish Populations with Reduced Life History Variation and Low Genetic Diversity. PLoS ONE 9(11): e113139. doi:10.1371/journal.pone.0113139
- Higgins, P. 2013. Eel River Recovery Project & Trees Foundation. Humboldt County Fish and Game Advisory Committee. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=104356>
- Hothen, R. L., B. E. Brussee, and W. E. Davis Jr. 2010. Black-crowned Night-Heron (*Nycticorax nycticorax*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.74>
- Humboldt County. 2017. Humboldt County General Plan. <https://humboldtgov.org/205/General-Plan>
- Humboldt County. 2019. Humboldt County Web GIS. <http://webgis.co.humboldt.ca.us>
- iNaturalist. 2019. Observations. iNaturalist Department, California Academy of Sciences and National Geographic Society, San Francisco, CA, USA. <https://www.inaturalist.org>
- Jepson Herbarium. 2020. The Jepson Flora Project. Includes resources from the Consortium of California Herbaria, CalPhotos, California Native Plant Society, California Exotic Pest Plant Council and USDA-Plants database. U.C. Berkeley. Available at: <https://ucjeps.berkeley.edu/jepsonflora/>
- Julian, L. J. 2012. A comparison of bee fauna in two northern California coastal dune systems. Masters Thesis. Humboldt State University.

- Kramer, S. 2016. Tidewater goby habitat assessment for the Eel River estuary and Centerville Slough enhancement project. H. T. Harvey & Associates, Arcata CA.
- Lafferty, K. D., C. C. Swift, and R. F. Ambrose. 1999a. Postflood persistence and recolonization of endangered tidewater goby populations. North American Journal of Fisheries Management 19:618–622.
- Lafferty, K. D., C. C. Swift, and R. F. Ambrose. 1999b. Extirpation and recolonization in a metapopulation of an endangered fish, the tidewater goby. Conservation Biology 13:1447–1453.
- Lau, M. J. 2015. Geospatial modeling of Common Raven activity in Snowy Plover habitats in coastal northern California. Masters Thesis. Humboldt State University.
- Legal Information Institute. 2020. 16 U.S. Code Chapter 35 – Endangered Species. 16 USC 1531 *et seq.* Available at: <https://www.law.cornell.edu/uscode/text/16/chapter-35>
- Leja, S. D. 2015. Habitat selection and response to restoration by breeding Western Snowy Plovers in coastal northern California. Masters Thesis. Humboldt State University.
- Lewis, T. L., D. H. Ward, J. S. Sedinger, A. Reed, and D. V. Derksen. 2013. Brant (*Branta bernicla*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.337>
- Lindley, S. T., D. L. Erickson, Daniel, M. L. Moser, G. Williams, O. P. Langness, B. W., McCovey Jr., M. Belchik, D. Vogel, W. Pinnix, J. T. Kelly, J. C. Heublein, and A. P. Klimley. 2011. Electronic tagging of green sturgeon reveals population structure and movement among estuaries. Transactions of the American Fisheries Society 140:108–122.
- Lowther, P. E., C. Celada, N. K. Klein, C. C. Rimmer, and D. A. Spector. 1999. Yellow Warbler (*Setophaga petechia*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.454>
- Lowther, P. E., A. F. Poole, J. P. Gibbs, S. M. Melvin, and F. A. Reid. 2009. American Bittern (*Botaurus lentiginosus*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.18>
- Marine Mammal Center. 2019. Marine Mammal Information. Pinnipeds. Available at: <https://www.marinemammalcenter.org/education/marine-mammal-information/pinnipeds/>
- Mccrimmon, Jr., D. A., J. C. Ogden, and G. T. Bancroft. 2011. Great Egret (*Ardea alba*), The Birds of North America Online (A. Poole, Ed.), Ithaca: Cornell Lab of Ornithology. Available at: <http://bna.birds.cornell.edu/bna/species/570>

- Mierzwa, K. 2018 GHD. Senior Biologist and Project Manager. Personal communication.
- Moore, J. E., M. A. Colwell, R. L. Mathis, and J. M. Black. 2013. Staging of Pacific flyway brant in relation to eelgrass abundance and site isolation, with special consideration of Humboldt Bay, California. *Biological Conservation* 115:475-486.'
- Mowbray, T. B. 2002. Canvasback (*Aythya valisineria*), version 2.0. In *The Birds of North America* (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.659>
- Moyle, P.B. 2002. Inland fishes of California. University of California Press, Berkeley and Los Angeles, California, USA.
- Moyle, P.B., J. A. Israel, and S. E. Purdy. 2008. Salmon, steelhead, and trout in California: Status of an emblematic fauna. A report commissioned by California Trout, 2008.
- Muir, J. J. and M. A. Colwell. 2010. Snowy Plovers select open habitats for courtship scrapes and nests. *Condor* 112:507-510
- Nafis, G. 2019. California Herps – A Guide to the Amphibians and Reptiles of California. <http://www.californiasherps.com>
- NatureServe. 2019. NatureServe Explorer. <http://explorer.natureserve.org/index.htm>
- NMFS (National Marine Fisheries Service). 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service Southwest Region. January.
- NMFS (National Marine Fisheries Service). 2014a. California eelgrass mitigation policy and implementing guidelines. West Coast region.
- NMFS (National Marine Fisheries Service). 2014b. Southern Oregon/Northern California Coast (SONCC) Coho Salmon Recovery Plan. Available at: <https://repository.library.noaa.gov/view/noaa/15985>
- NMFS (National Marine Fisheries Service). 2016. Final Coastal Multispecies Recovery Plan. California Coastal Chinook Salmon – volume 2, Northern California Steelhead – volume 3. Available at: <https://www.fisheries.noaa.gov/resources/document/final-coastal-multispecies-recovery-plan-california-coastal-chinook-salmon>
- NMFS (National Marine Fisheries Service). 2019. California species list tools. NOAA (National Oceanic and Atmospheric Administration) Fisheries, West Coast Region. https://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html. Accessed July 2019.
- NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for U.S. Pacific Populations of the Olive Ridley Turtle (*Lepidochelys olivacea*). National Marine Fisheries Service, Silver Spring, MD.

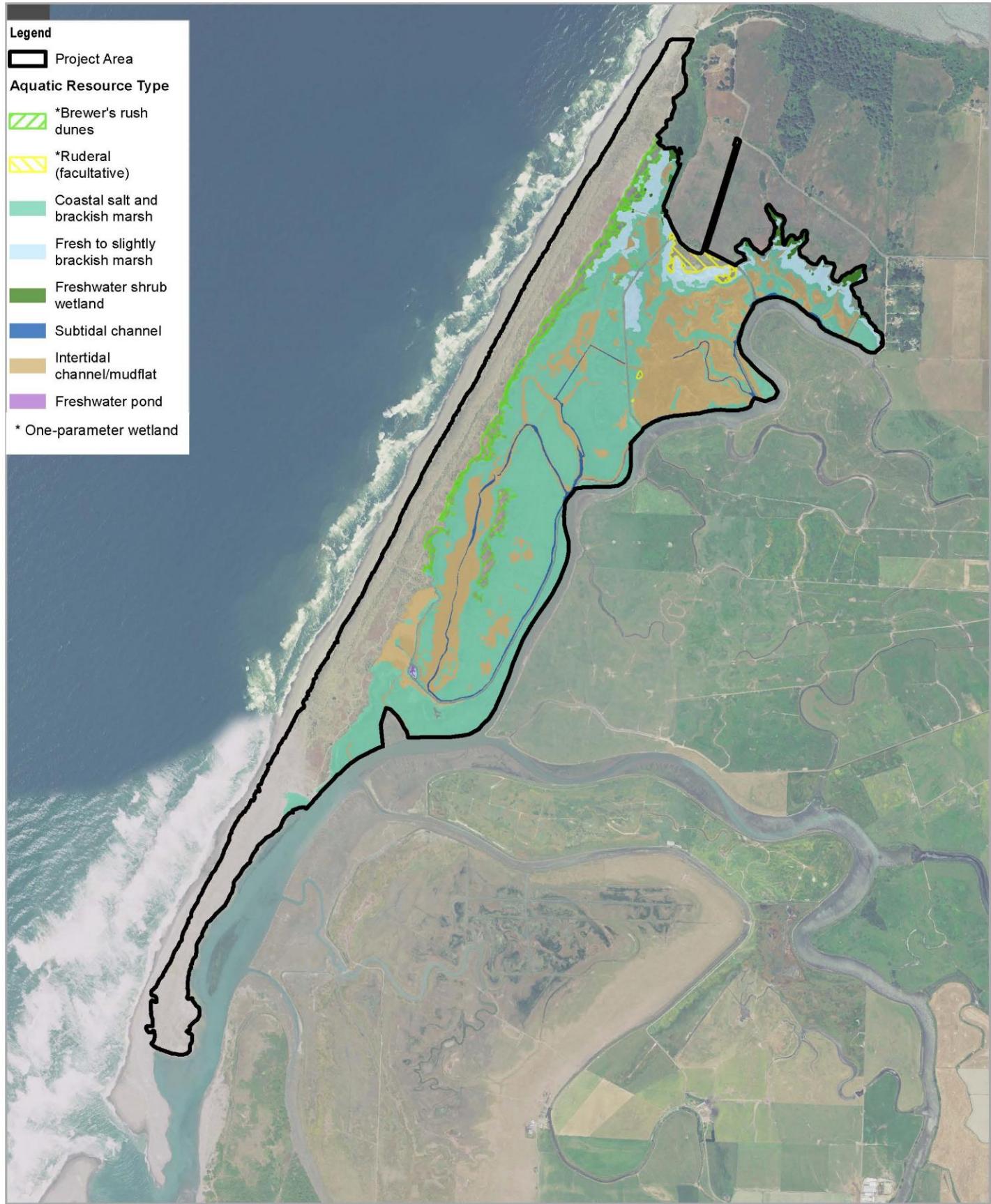
- Nickelson, T. E., J. W. Nicholas, A. M. McGie, R. B. Lindsay, D. L. Bottom, R. J. Kaiser, and S. E. Jacobs 1992. "Status of anadromous salmonids in Oregon coastal basins." Unpublished paper.
- Office of the Governors – Washington, Oregon, California. 2008. West Coast Governors' Agreement on Ocean Health Action Plan. Available at: http://www.westcoastoceans.org/media/WCGA_ActionPlan_low-resolution.pdf
- Olson, J. 2018. CDFW. Environmental Scientist. Personal communication.
- Oregon Department of Agriculture. Nd. Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*). Available at: <https://www.oregon.gov/ODA/shared/Documents/Publications/PlantConservation/CordylanthusMaritimusPalustrisProfile.pdf>
- Pacific Coast Restoration (Pacific Coast Fish, Wildlife and Wetlands Restoration Association). 2018a. Preliminary aquatic resources delineation for the Ocean Ranch Estuary Restoration Project (DU Project No. US-CA-398-4). Draft report (revised October 05, 2018) prepared for the California Department of Fish and Wildlife and Ducks Unlimited, Inc.
- Pacific Coast Restoration (Pacific Coast Fish, Wildlife and Wetlands Restoration Association). 2018b. Special Status Plant Survey for the Ocean Ranch Restoration Project (DU Project No. US-CA-398-4). Draft report prepared for the California Department of Fish and Wildlife and Ducks Unlimited, Inc.
- Pacific Flyway Council. 2002. Pacific Flyway management plan for Pacific brant. Pacific Flyway Study Comm, [c/o USFWS, DMBM] Portland, OR Unpubl. rept., 40 pp. + appendices.
- Page, G. W., L. E. Stenzel, J. S. Warriner, J. C. Warriner, and P. W. Paton. 2009. Snowy Plover (*Charadrius nivosus*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.154>
- Palmer, R. S., J. S. Gerrard and M. V. Stalmaster. 1988. Bald Eagle. Handbook of North American birds. Yale University Press, New Haven, Connecticut, USA.
- Parsons, K. C. and T. L. Master. 2000. Snowy Egret (*Egretta thula*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.489>
- Patterson, K. 2013. National Wetlands Inventory Map Report. Eel River/Humboldt Bay Mapping Project. July. Available at: <https://www.fws.gov/wetlands/Data/SupMapInf/R08Y11P03.pdf>
- Pickart. A. 2001. The distribution of *Spartina densiflora* and two rare salt marsh plants in Humboldt Bay 1998-1999. U.S. Fish and Wildlife Service, Arcata, CA.
- Pickart, A. 2005. A preliminary description of the Table Bluff unit wetland vegetation, Humboldt Bay National Wildlife Refuge 18

- Pickart, A. 2006. Vegetation of diked herbaceous wetlands of Humboldt Bay National Wildlife Refuge: classification, description, and ecology. U.S. Fish and Wildlife Service. Arcata, CA. 81 pp.
- Pickart, A. J. and Sawyer, J. O. 1998. Ecology and Restoration of Northern California Coastal Dunes. California Native Plant Society. Sacramento, California.
- Poulin, R. G., L. D. Todd, E. A. Haug, B. A. Millsap, and M. S. Martell. 2011. Burrowing Owl (*Athene cunicularia*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.61>
- Puckett, L. 1968. A compendium of the water requirements of Eel River anadromous fish and summary of the 1967–68 fisheries investigation of the Van Duzen and North Fork Eel River. California Department of Fish and Game, Eureka, CA. 35 pp.
- Puckett, L.K. 1977. The Eel River Estuary--Observations on Morphometry, Fishes, Water Quality, and Invertebrates. California Department of Fish and Game Memorandum Report, Eureka, CA. 55 pp.
- Ray J. 2018a. Fish Assemblage of the Ocean Ranch Unit Tidal Wetlands. California Department of Fish and Wildlife Field Note. December 2018.
- Ray J. 2018b. Presence/Absence of Tidewater Goby (*Eucyclogobius newberryi*) in the Eel River Wildlife Area, Ocean Ranch Unit, 2017. California Department of Fish and Wildlife Field Note. October 2018.
- Ross Taylor and Associates. 2015. Fisheries sampling in the lower Salt River during the fall and winter of 2014–2015. McKinleyville, California. Prepared for NOAA Fisheries, the Humboldt County Resource Conservation District, and Ducks Unlimited.
- Rousseau, J. and C. J. Ralph. 2012. Abundance of Willow Flycatchers throughout the year, Humboldt County, Northern California. Memo to CDFW from Klamath and Humboldt Bay Bird Observatories and USFS Redwood Science Laboratory. February.
- SDBWG (South Dakota Bat Working Group). 2004. South Dakota bat management plan. South Dakota Bat Working Group, Wildlife Division.
- Sawyer, J. O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento.
- Scheiff A, Gilroy M. 2013. Tidewater Goby and Water Quality Sampling, Ocean Ranch Unit, Eel River Wildlife Area, Summer 2012. California Department of Fish and Wildlife Field Note. January 24, 2013.
- Scheiff, A., M. Wallace, and M. Gilroy. 2013. McNulty Slough, Thence Eel River Estuary Fish and Water Quality Sampling January 2008 through June 2009. California Department of Fish and Wildlife Field Note. April 20, 2013.

- Schlosser, S., and A. Eicher. 2012. Humboldt Bay and Eel River estuary benthic habitat project. California Sea Grant College Program, Scripps Institute of Oceanography, La Jolla CA, Publication T-075.
- Sherrod, S. K. 1978. Diets of North American Falconiformes. Raptor Research 12:49-121.
- Shuford, W. D., G. W. Page, and C. M. Hickey (1995). Distribution and abundance of Snowy Plovers wintering in the interior of California and adjacent states. Western Birds 26:82-98.
- Shuford, W. D., and T. Gardall., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
- Smith, K. G., S. R. Wittenberg, R. B. Macwhirter, and K. L. Bildstein. 2011. Hen/Northern Harrier (*Circus cyaneus/hudsonius*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.210>
- Spinks, Phillip Q., Robert C. Thomson, and H. Bradley Shaffer. 2014. The advantages of going large: genome wide SNPs clarify the complex population history and systematics of the threatened western pond turtle, Molecular Ecology, 23(9): 2228-2241.
- Steele, D. T. 1989. An ecological survey of endemic mountain beavers (*Aplodontia rufa*) in California, 1979-83. California Department of Fish and Game, Wildlife Management Division Administrative Report No. 89-1.
- Stillwater Sciences. 2006. Guidelines to Evaluate, Modify and Develop Estuarine Restoration Projects for Tidewater Goby Habitat. Final Report. Prepared for U.S. Fish and Wildlife Service. May.
- Stillwater Sciences. 2010. Pacific lamprey in the Eel River basin: a summary of current information and identification of research needs. Prepared by Stillwater Sciences, Arcata, California for Wiyot Tribe, Loleta, California.
- Stillwater Sciences, C. W. Anderson, and Wiyot Tribe Natural Resources Department (2016). Adult life history of Pacific lamprey in Freshwater Creek, a tributary to Humboldt Bay, California. Final Report. Prepared for United States Fish and Wildlife Service, Sacramento, CA, USA.
- Stillwater Sciences and Wiyot Tribe (Stillwater Sciences and Wiyot Tribe Natural Resources Department). 2017. Status, distribution, and population of origin of green sturgeon in the Eel River: results of 2014–2016 studies. Prepared by Stillwater Sciences, Arcata, California and Wiyot Tribe, Natural Resources Department, Loleta, California, for National Oceanic and Atmospheric Administration, Fisheries Species Recovery Grants to Tribes, Silver Springs, Maryland.

- Thompson, R. C., A. N. Wright, and H. B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern. University of California Press, Oakland, CA, USA.
- USDA (U.S. Department of Agriculture), NRCS (Natural Resources Conservation Service). 2020. The PLANTS Database. National Plant Data Team, Greensboro, NC 27401-4901 USA. Available at: <http://plants.usda.gov>
- USFWS (U.S. Fish and Wildlife Service). 2005. Recovery Plan for the Tidewater Goby (*Eucyclogobius newberryi*). U. S. Fish and Wildlife Service, Portland, Oregon.
- USFWS (U.S. Fish and Wildlife Service). 2007. Recovery plan for the Pacific coast population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*). U.S. Fish and Wildlife Service, Sacramento, California, USA.
- USFWS (U.S. Fish and Wildlife Service). 2008. Menzies' Wallflower (*Erysimum menziesii*) 5-Year Review: Summary and Evaluation. USFWS Arcata Field Office, Arcata CA. Available at:
https://ecos.fws.gov/docs/five_year_review/doc1937.pdf
- USFWS (U.S. Fish and Wildlife Service). 2009. *Lilium occidentale* (Western lily), 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service (USFWS), Arcata, CA. Available at:
https://ecos.fws.gov/docs/five_year_review/doc2408.pdf
- USFWS (U.S. Fish and Wildlife Service). 2011. *Layia carnosa* (Beach layia) Draft 5-Year Review: Summary and Evaluation. USFWS Arcata Fish and Wildlife Office, Arcata, CA. Available
at:https://www.fws.gov/arcata/es/plants/beachLayia/documents/Signed%20beach%20layia%205yr%20review_2012.pdf
- USFWS (U.S. Fish and Wildlife Service). 2017a. Beach layia General Information, accessed online at:
<http://www.fws.gov/arcata/es/plants/beachLayia/layia.html>, Updated September 21.
- USFWS (U.S. Fish and Wildlife Service). 2017b. Menzies wallflower General Information, Accessed online at:
[http://www.fws.gov/arcata/es/plants/menziesWallflower/menie.html](http://www.fws.gov/arcata/es/plants/menziesWallflower/menzie.html), updated September 21.
- USFWS (U.S. Fish and Wildlife Service). 2017c. Western lily General Information. Accessed online at:
<https://www.fws.gov/arcata/es/plants/westernLily/lily.html>, updated September 21.
- USFWS (U.S. Fish and Wildlife Service). 2018. Species Status Assessment Report for beach layia (*Layia carnosa*) (Version 1.1). U.S. Fish and Wildlife Service, Pacific Southwest Region, Arcata, California. 85 pp
- USFWS (U.S. Fish and Wildlife Service). 2019. Information for Planning and Consultation (IPaC). Powered by ECOS - the Environmental Conservation Online System. <https://ecos.fws.gov/ipac/>. Accessed July 2019.

- van Hattem, M. 2019. CDFW. Senior Environmental Scientist. Personal communication. October 14.
- Vennesland, R. G. and R. W. Butler. 2011. Great Blue Heron (*Ardea herodias*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://birdsna.org/Species-Account/bna/species/grbher3>
- Wallace, M., and M. Gilroy. 2008. McNulty Slough, Thence Eel River Estuary February through October, 2007. California Department of Fish and Wildlife Field Note. January 2008.
- Weitkamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. Status review of Coho Salmon from Washington, Oregon, and California. NOAA Technical Memorandum NMFS-NWFSC-24. 258 p.
- Weller, T. 2015. Albee and Lanphere 2015. BatAMP (Bat Acoustic Monitoring Portal), DataBasin. <https://batamp.databasin.org/>
- Wiemeyer, S. N., C. M. Burick and C. J. Stafford. 1993. Environmental contaminants in Bald Eagle eggs 1980-1984 and further interpretations of relationships to productivity and shell thickness. Archives of Environmental Contamination and Toxicology 24:213-227.
- White, C. M., N. J. Clum, T. J. Cade, and W. G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.660>
- Wiggins, D. A., D. W. Holt, and S. M. Leasure. 2006. Short-eared Owl (*Asio flammeus*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.62>
- Wrege, P. H. and T. J. Cade. 1977. Courtship Behavior of Large Falcons in Captivity. Journal of Raptor Research 11:1-46.



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Map Projection: Lambert Conformal Conic
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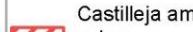
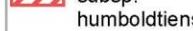
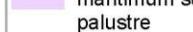
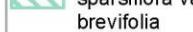
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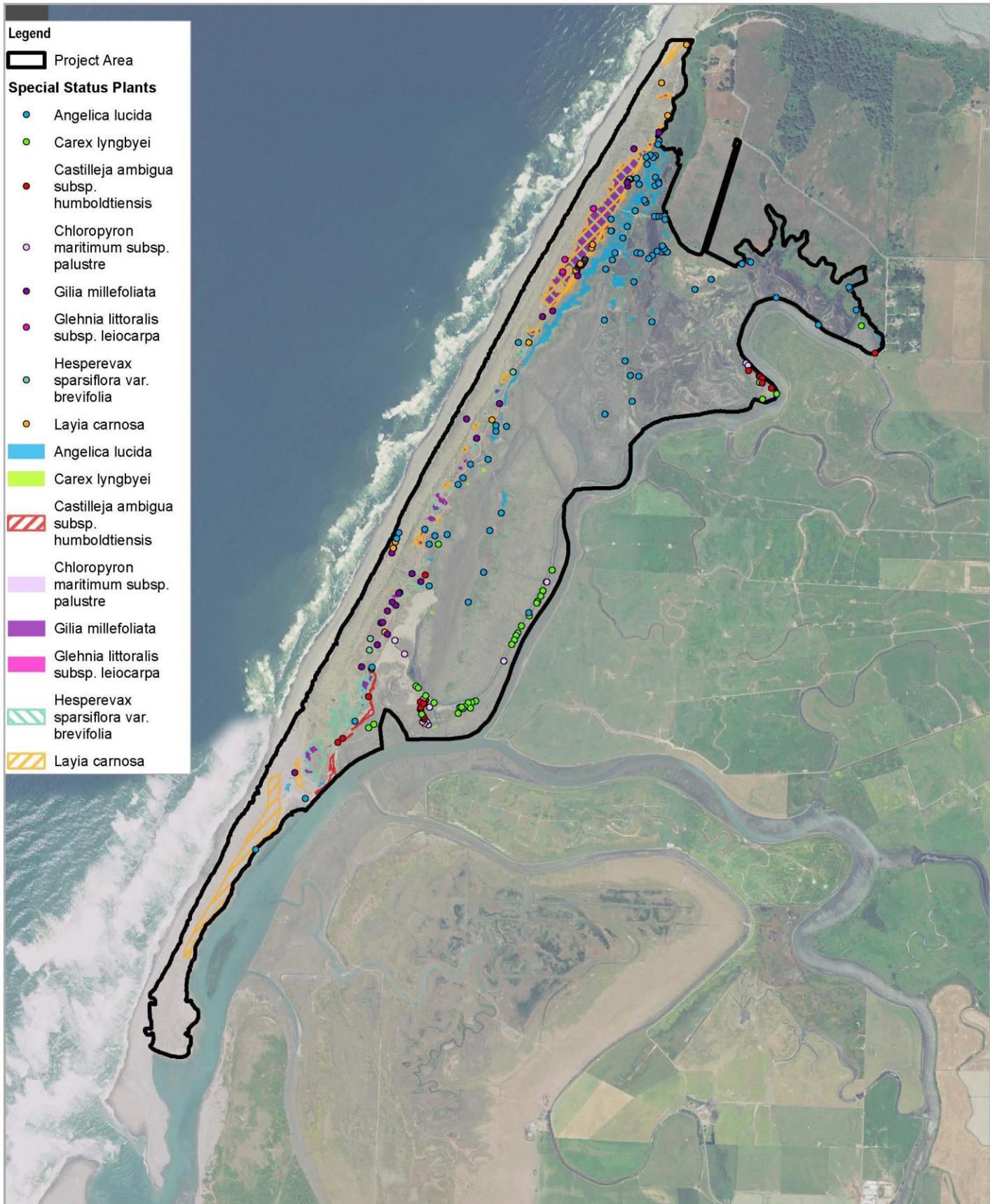
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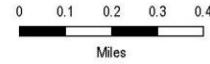
Legend

 Project Area

Special Status Plants

- Angelica lucida
- Carex lyngbyei
- Castilleja ambigua
- *subsp.*
humboldtiensis
- Chloropyron
maritimum *subsp.*
palustre
- Gilia millefoliata
- Glehnia littoralis
subsp. leiocarpa
- Hesperevax
- sparsiflora var.
brevifolia
- Layia carnosa
-  Angelica lucida
-  Carex lyngbyei
-  Castilleja ambigua
subsp.
humboldtiensis
-  Chloropyron
maritimum *subsp.*
palustre
-  Gilia millefoliata
-  Glehnia littoralis
subsp. leiocarpa
- Hesperevax
-  sparsiflora var.
brevifolia
-  Layia carnosa



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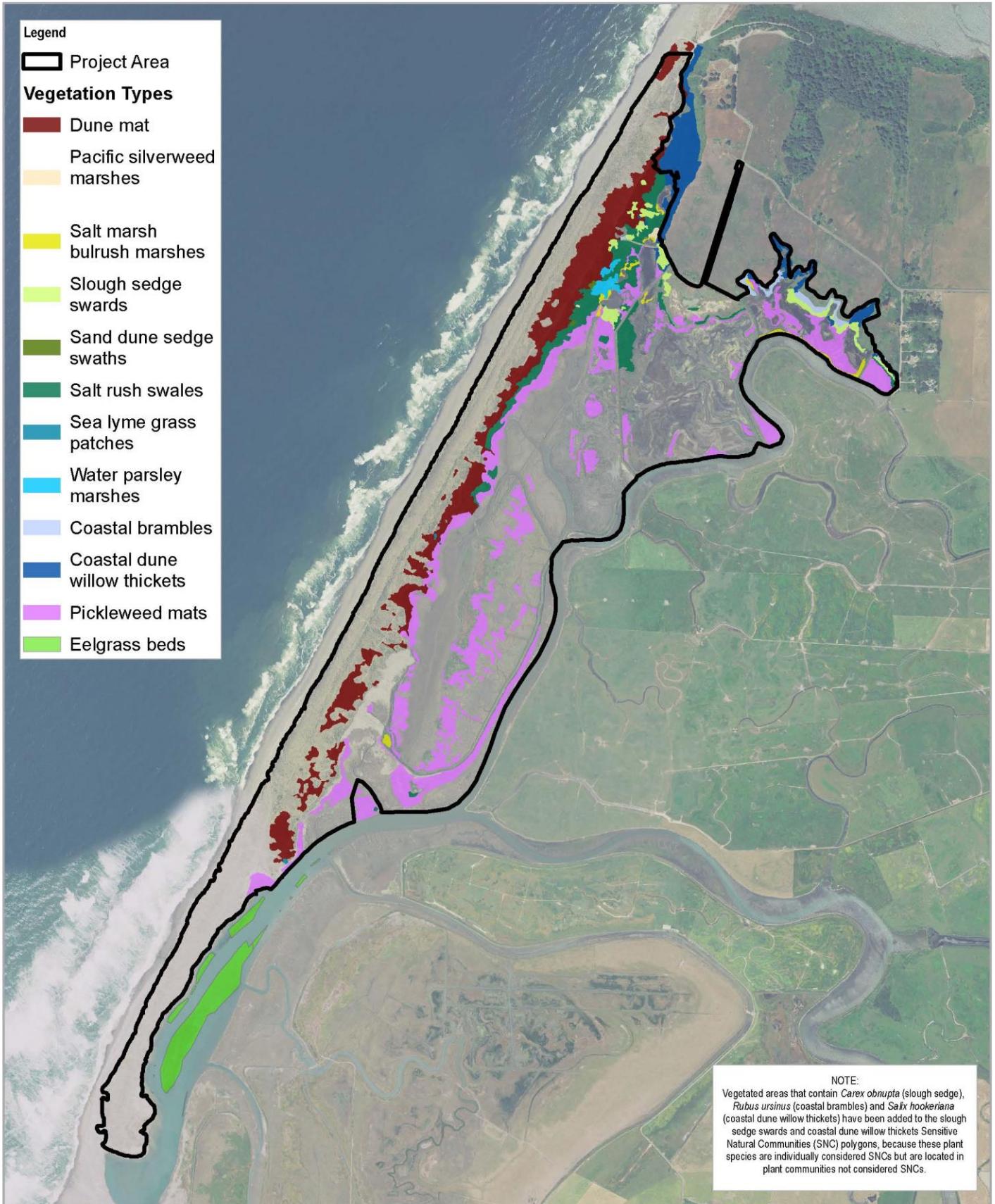


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Rare Plant Mapping

FIGURE 3.4-2



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Feet

Map Projection: Lambert Conformal Conic
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Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

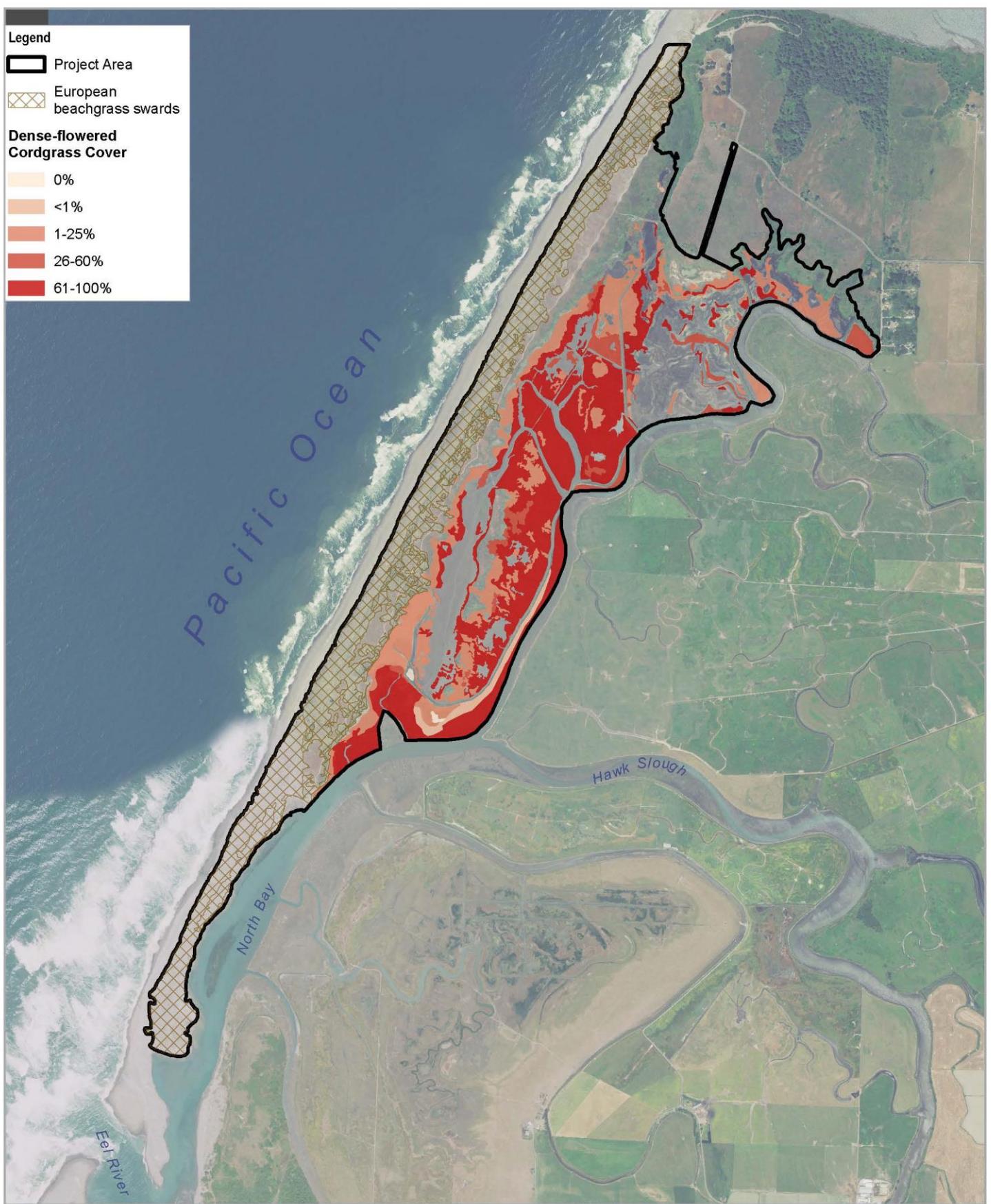


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Sensitive Natural Communities

FIGURE 3.4-3



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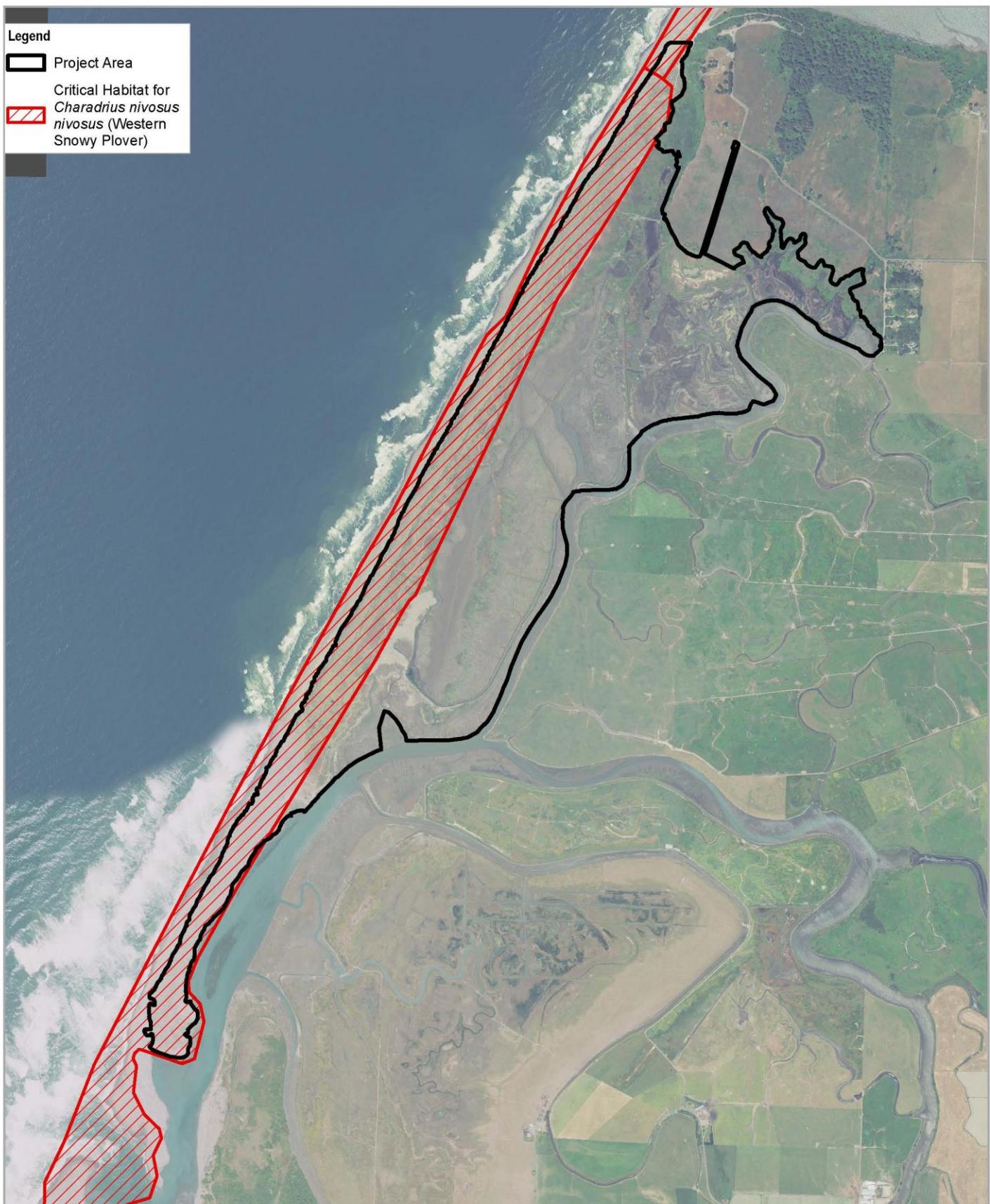


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Invasive Plant Communities

FIGURE 3.4-4



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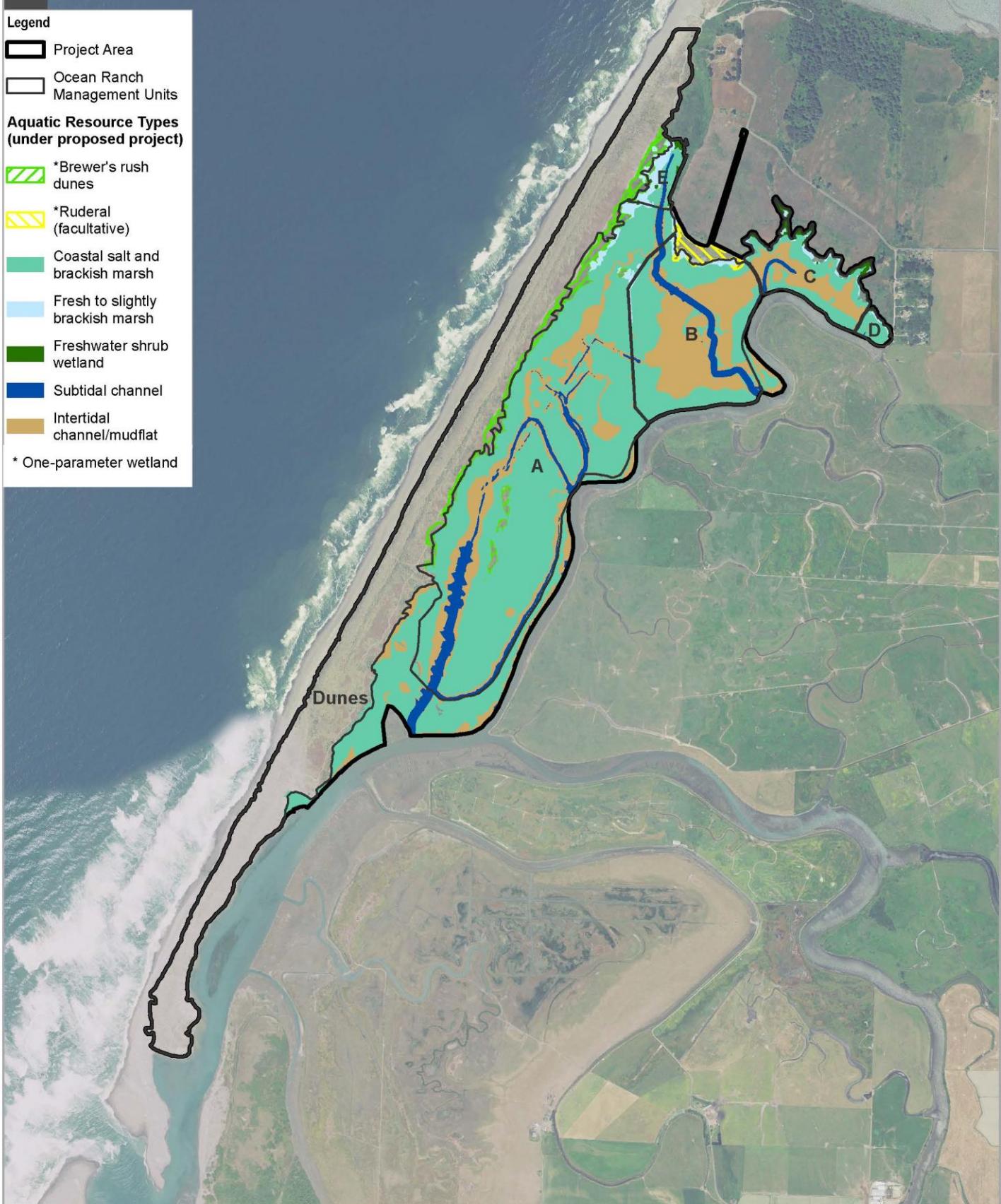


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Critical Habitat for
Western Snowy Plover

FIGURE 3.4-5



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
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Anticipated Aquatic Resources
After Project Implementation

FIGURE 3.4-6