Appendices

Appendix A – Notice of Preparation (NOP)

California Department of Fish and Wildlife – Lead Agency

Notice of Preparation of a

Draft Environmental Impact Report for the

Ocean Ranch Restoration Project

June 13, 2018

Notice of Preparation of a Draft Environmental Impact Report for the
Ocean Ranch Restoration Project

Lead Agency:

California Department of Fish and Wildlife
619 2nd Street
Eureka, CA 95501
Attention: Gordon Leppig
Senior Environmental Scientist Supervisor
(707) 441-2062

Project Sponsor:

Ducks Unlimited, Inc.
17700 SE Mill Plain Blvd., Suite 100
Vancouver, WA 98683
Attention: April Zohn
Environmental Compliance Specialist
(360) 450-3223

Prepared by:

GHD Inc.
718 Third Street
Eureka, CA 95501
Attention: Misha Schwarz
Project Manager
(707) 443-8326

June 13, 2018

Table of contents

Appendices

1. Introduction

1.1 CEQA Requirements

The Ocean Ranch Restoration Project (Project) is subject to the requirements of the California Environmental Quality Act (CEQA). The CEQA lead agency and decision-making body is the California Department of Fish and Wildlife (CDFW). The CDFW is responsible for assuring the completion of the appropriate evaluation and processes required by CEQA. The CDFW has the sole responsibility to make the appropriate findings and determinations with respect to the CEQA process and disposition of the Project. The purpose of this Notice of Preparation (NOP) is to inform responsible and trustee agencies and the public that an Environmental Impact Report (EIR) will be prepared for the Ocean Ranch Restoration Project (Project), and to solicit comments on the proposed project and potential impacts to be addressed in the EIR. The EIR being prepared is intended to satisfy the requirements of CEQA (Public Resources Code, Division 13, Section 21000-21177), and the State CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15000-15387).

1.2 General Information

Protect Title: Ocean Ranch Restoration Project

Lead Agency: California Department of Fish and Wildlife
Northern Region (Region 1) – Eureka Field Office
619 2nd Street
Eureka, CA 95501
Attention: Gordon Leppig, Sr Environmental Scientist Supervisor

1.2.1 Availability of Project Documents/Files

This NOP is available for review during the business week at the CDFW Northern Region (Region 1) Eureka field office between the hours of 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 4:30 p.m. The CDFW Region 1 field office is located at 619 2nd Street in Eureka, California. An electronic version of this NOP is available for review on the CDFW website (https://www.wildlife.ca.gov/Notices).

1.2.2 Written Comments

Written comments on the scope of the EIR can be sent to Gordon Leppig at the CDFW Region 1 Eureka field office at the above-noted address. Additionally, comments may be submitted electronically via email to:

Email: orurestoration@wildlife.ca.gov

1.2.3 Comment Period

CEQA Guidelines Section 15082 (b) requires a 30-day response period for input about the scope and content of the EIR. The comment period for the NOP begins

on June 13, 2018, and ends on July 16, 2018. The deadline for submitting written comments is July 16, 2018 at 5:00 p.m.

1.2.4 Public Scoping Meeting

A public scoping meeting will be held to further inform agencies and interested parties about the Project, and to accept comments on the environmental issues germane to the Project. The meeting will be held on July 9, 2018 from 5:30 p.m. to 7:00 p.m. at the Fortuna River Lodge Conference Center. The Fortuna River Lodge is located in Fortuna, California at the following street address:

1800 Riverwalk Drive
Fortuna, California 95540

2. Project Location and Setting

The Ocean Ranch Unit (ORU) of the Eel River Wildlife Area is located north of the mouth of the Eel River and northwest of the town of Loleta in Humboldt County, California. The ORU encompasses approximately 933-acres (378-hectares) and is generally bounded by the Pacific Ocean to the west, Table Bluff to the north, McNulty Slough to the east and North Bay to the south. The ORU, which is part of the approximately 2,600-acre (1,052-hectare) Eel River Wildlife Area (ERWA), is owned and managed by the CDFW as fish and wildlife habitat and public recreational uses. The Project Area described in this NOP includes all portions of the ORU where restoration and construction activities are proposed under the Project. Figure 1 Project Vicinity (Figure 1) depicts the Project Area and vicinity.

Historically, much of the area that is now the ORU was estuarine tidal marsh. Sometime between 1916 and 1948, the saltmarsh portion of the ORU (herein referred to as “Ocean Ranch”) was diked, isolated from tidal waters, and drained for pasture through tide gates to McNulty Slough. In 1968, Ocean Ranch was acquired by CDFW with Wildlife Conservation Board coastal wetland acquisition funds. Ocean Ranch was subsequently subdivided by CDFW into five distinct areas using earthen dikes. The five subdivided areas, defined as Areas A through E, were managed as shallow freshwater habitat for waterfowl and other native wildlife.

The ORU also encompasses portions of the coastal dunes that separate Ocean Ranch from the Pacific Ocean to the west. Significant areas within the dunes are dominated by invasive European beachgrass (*Ammophila arenaria*), which established on the north spit of the Eel River in the 1970’s. The prevalence and density of European beachgrass in the coastal dunes affects the ability for native plants to establish and limits dune function, including sand movement. Figure 2 Project Area (Figure 2), located in Appendix A, depicts Areas A through E of the ORU, as well as the coastal dunes portion of the Project Area targeted for European beachgrass eradication. The existing conditions in Areas A through E and the coastal dunes are described below.

2.1 Area A

Area A comprises approximately 306 acres of tidal wetlands. Area A is connected to McNulty Slough through a large breach along its eastern boundary. Three main channels drain the site. One of the three channels consists of a constructed ditch that runs along the inside of the levee system. It is likely that this channel was a "borrow ditch" from which material was excavated to improve the perimeter levee and counteract loss of elevation from settlement and for maintenance. Area A is well connected to the tides and is predominately exposed salt marsh with interspersed mudflats at low tide. Brackish marsh is present in the northern reaches of Area A near Area E. A fresh water seep is located within Area A along its southwest corner just inside of the perimeter levee. This seep is isolated by an earthen berm with dimensions similar to the perimeter levee and has formed a pond approximately 0.33 acres in size.

2.2 Area B

Area B encompasses approximately 111 acres of both remnant tidal channels and linear ditches. Area B has subsided over the last 70 years on the order of one to two feet, likely from agricultural activities in the 1940s. Area B has been managed in the past as seasonal freshwater wetlands; however a 48-inch diameter water control structure has failed, having lost its tide gate. The water control structure is now functioning as an open culvert instead of a drain, and tide water enters Area B during high tides. Currently, Area B is functioning as a muted tidal basin. In general, water elevations are shallow throughout the unit with depths around one to two feet at high tide and deeper where a historic channel is present. The tidal influence causes water levels to fluctuate throughout the day, typically within a range of one foot or less. The area has converted to a brackish marsh which is evidenced by a shift in vegetation types.

2.3 Area C

Area C consists of approximately 40 acres of remnant tidal channels and managed freshwater wetlands, and similar to Area B, has subsided one to two feet. A water control structure connects Area C to Area B and allows a small amount of water exchange between the two areas. A borrow ditch parallels the perimeter levee for most of its length and, as with Area B, elevations are on average lower than those in Area A. Area C is bound on the north by Table Bluff with the upland slope having at least two springs/seeps which have created riparian zones adjacent to the Area C wetlands.

2.4 Area D

Area D, consisting of approximately five acres, is isolated from Area C by an internal levee. Area D consists of a brackish tidal marsh connected to McNulty Slough by two small open culverts. The tide range within Area D is highly muted due to constriction caused by existing culverts.

2.5 Area E

Area E, consisting of approximately 13 acres, is a managed freshwater wetland separated from Area A by a levee. A large freshwater spring on Table Bluff delivers a significant amount of freshwater to this unit. Water levels are controlled by a single flashboard weir that drains to Area A. A portion of this wetland is covered by willows and other woody vegetation.

2.6 Coastal Dunes

The coastal dunes within the Project Area encompass approximately 330-acres and extend along about 3-miles of shoreline (Figure 2). The densest stands of European beachgrass (mapped in 2015 as having 61% to 100% cover) are located along the northern 2.6 miles of the Project Area; beachgrass within the southern portion of the Project Area is mapped as having less than 61% cover. Dune mat and associated native plants species, including the federal and state endangered beach layia (*Layia carnosa*) are found within the coastal dunes, but are limited (or non-existent) in areas where dense stands of beachgrass have established.

2.7 Surrounding Land Uses

The Humboldt Bay National Wildlife Refuge, Table Bluff County Park, and Table Bluff Ecological Reserve lie to the north of ORU. A cluster of residential parcels associated with the Weott Rancheria borders Area D at the northeast portion of the Project Area. The Pacific Ocean boarders the western portion of the Project Area. State lands and tidal sloughs are located to the south and east of the Project Area. Private agricultural lands are generally located east of the Project Area.

2.8 Existing Infrastructure

The Project Area can be accessed from two locations off of Table Bluff Road. A single lane graveled interior road extends south from Table Bluff Road for approximately 0.5 miles to a barn and associated corrals/loading chutes. A flat, stable pad is found at this location which was the site of previous dairy operations. The second access is Sand Dune Road which runs south from South Jetty Road and passes just inside the dune line from Table Bluff County Park. This road is primarily sand and extends all the way to the mouth of the Eel River.

2.9 Site Physical Characteristics

2.9.1 Geology and Soils

Ocean Ranch and the rest of the Eel River estuary is an alluvial valley in the Coast Range of Northern California. The native soils are primarily dark gray, stiff clayey silt underlain by unconsolidated Holocene to Pleistocene fluvial and flood plain deposits, consisting of sand, silt, and gravel (LACO 2014).

The Project Area is within a seismically active region, which is subject to frequent moderate to large earthquakes. The Eel River Valley is a broad northwest-southeast trending syncline formed by compression tectonics. Although not located within a “Fault Rupture Hazard Zone” (Bryant and Hart 2007), or within an area currently

designated as a “Seismic Hazard Zone” by the State of California (State), numerous faults of various activity levels are located within 30 miles of the Project Area.

2.9.2 Invasive Plants

The natural plant communities within the ORU have been highly altered in many areas by invasive plant infestations. Years of dairy farm operations, cattle grazing, and other disturbance regimes have facilitated the establishment and dominance of non-native and invasive species. Areas A and D have large dense stands of dense-flowered cordgrass (*Spartina densiflora*) that form vegetation monocultures and exclude native plants. Areas B, C, and E have more native plant diversity with smaller patches of dense-flowered cordgrass.

European beachgrass is a highly invasive species that is widespread in coastal dunes throughout the west coast of the United States. As with dense-flowered cordgrass, this species forms dense monoculture stands and has the ability to displace entire native plant communities. As noted above, it is prevalent within the dunes along the western boundary of the Project Area where it has displaced native dune mat habitat and continues to invade and increase in cover.

2.9.3 Special-Status Species

Numerous state-listed, federally-listed, and/or sensitive species and natural communities (e.g., state animal Species of Special Concern, and plants or communities with State Rank 1 to 3) are found in the Eel River Watershed. Some of these sensitive species and natural communities are known to occur, or have the potential to occur within the Project Area. In 2008 and 2009, CDFW conducted fish monitoring and water quality sampling in McNulty Slough. The monitoring goals were to determine the presence of juvenile salmonids in McNulty Slough and/or within the ORU; to determine the presence of other estuarine aquatic species in the ORU; and to provide baseline data to evaluate the feasibility and success of future habitat restoration. The 2008 and 2009 monitoring documented numerous listed fish species within McNulty Slough, including Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), steelhead trout (*O. mykiss*), and longfin smelt (*Spirinchus thaleichthys*) outside the ORU boundary; however, none of these salmonid species were found within ORU. Following the completion of the 2008 and 2009 monitoring, CDFW conducted fish monitoring in 2012 to determine whether or not the tidewater goby (*Eucyclogobius newberryi*) was present within the ORU. Tidewater gobies were documented within ORU during the 2012 monitoring, with the highest quantities documented in the north end of Area A and south end of Area E. Green sturgeon (*Acipenser medirostris*) are also known to the project vicinity.

Rare plants observed in the Project Area during surveys conducted between 2014-2017 include seacoast angelica (*Angelica lucida*), Lyngbye's sedge (*Carex lyngbyei*), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*), Point Reyes salty birds-beak (*Chloropyron maritimum* ssp. *palustre*), dark-eyed gilia (*Gilia millefoliata*), and beach layia, as well as natural communities of Coastal Brackish Marsh, Northern Coastal Salt Marsh, and Active Coastal Dunes.

Western snowy plover are also known to the coastal dunes within the Project Area.

2.9.4 Watershed

The Eel River watershed encompasses over 3,684 square miles and drains a rugged area spanning five counties within the Coast Range of California. The soils of the Eel River drainage basin are highly friable and susceptible to erosion, especially given the basin's steep geography and intense rainfall.

2.9.5 Hydrology

The Eel River discharges an average of 9,500 cubic feet of water per second (cfs) annually with peak discharges occurring during the winter months and periods of high rainfall. The drainage basin of the Eel River is uniquely situated to receive copious amounts of rainfall during atmospheric river events. These large rainfall events, combined with steep terrain and a large watershed drainage basin, produce flash flood conditions where river discharges can increase from less than 1,000 cfs to upwards of 250,000 cfs within 24 to 48 hours. The maximum river flow was recorded in December 1964 with an estimated flow of 936,000 cfs, the highest recorded in California. During flood events water levels will be elevated within the ORU on the order of one to five feet and will typically return to normal after one to two days.

The Eel River estuary is a bar built estuary. These estuaries occur around the mouths of rivers with extended periods of low flow where ocean waves and currents can form sand bars that significantly restrict the size of the mouth. The size and location of the mouth vary with a process that is driven by high river flows prevalent during the winter months. The estuary is classified as intermittent, which means the salinity profile within the estuary varies dramatically, ranging from a salt wedge to partially mixed, and is dependent upon the amount of freshwater flowing from the Eel River.

The Eel River estuary is tidally dominated and, as a result, water throughout the estuary is brackish, continually ranging in salinity from fresh to saltwater (from 0 to approximately 35 parts per thousand). Mixed semidiurnal tides bring saltwater from the ocean into the estuary and associated sloughs. Tidal influence extends up the Eel River and is generally considered to reach Fernbridge, a river crossing approximately 7.5 miles upstream from the mouth of the Eel River.

2.10 Land Use, Zoning and Williamson Act

The parcels comprising the Project Area are owned by the State of California. As all Project Area parcels are state-owned, local zoning and general plan designations do not apply to the Project. The following section provides a zoning and land use designation summary for general reference; however, implementation of the Project on state-owned lands would not require land use review or permitting by Humboldt County.

The General Plan land use designation for the Project Area is Agriculture Exclusive (AE) with the exception of the northernmost parcel, which is designated as Commercial Recreation (CR) (County of Humboldt 2017). Principal uses allowed by the County for AE parcels are limited to the production of food, fiber or plants, with residence as a use incidental to this activity. Principal uses within CR designated

parcels include: commercial recreation facilities, accommodations, and recreation/tourist tourist-oriented sales and services geared to local and visitor needs (County of Humboldt 2017).

Zoning for the AE-designated parcels within the Project Area is AE-60 with the combining zones of Archaeological Resource Area Outside Shelter Cove (A), Coastal Wetland Areas (W), Flood Hazard Areas (F), Streams and Riparian Corridor Protection (R), and Transitional Agricultural Lands (T)., which is consistent with the land use designation (County of Humboldt 2000). Zoning for the CR-designated parcel is CR/B, including a combining zone of Beach and Dune Areas (B) (County of Humboldt 2000).

No portion of the Project Area is enrolled in a Williamson Act contract. Parcels to the east, outside of the Project Area boundary, are under Williamson Act contract (County of Humboldt 2018).

3. Project Description

3.1 Project Goals and Objectives

The goals of the Project are:

1. To restore and expand natural estuarine function in the restoration area, and to assist in recovery and enhancement of habitat for native fish, invertebrates, wildlife and plant species.
2. To restore natural dune function, and to assist in recovery and enhancement of habitat for native species, state and federally-listed or otherwise sensitive plants, and associated natural communities.

3.2 Overall Project Concept

The Project would include restoration and enhancement of tidal estuarine and coastal dune habitats within an 805-acre (326-hectare) restoration area. Restoration and expansion of estuarine functions would be accomplished by implementing actions that increase the tidal prism, improve connectivity between the restoration area, McNulty Slough and North Bay, increase habitat complexity, and control non-native plant species.

Restoration of a portion of the ORU to tidal marsh would reduce the long-term maintenance obligations associated with ongoing management of existing infrastructure, while addressing a critical regional need for enhancement and restoration of tidal estuarine habitats both regionally and within the Eel River estuary. Enhancement of dune functions would be accomplished by eradication of invasive species, primarily European beachgrass, and reestablishment of native dune mat natural communities.

Tidal restoration activities contemplated under the Project include:

1. Breach external and internal levees
2. Lower portions of the external levee along McNulty Slough

3. Remove portions of internal levees
4. Excavate tidal channels
5. Create transitional high marsh habitat
6. Construct habitat ridges
7. Install ditch plugs and fill internal ditches
8. Install large wood habitat structures

Invasive species management activities would include: controlling dense-flowered cordgrass with mowing, grinding, excavation, burning, and/or chemical control; controlling dwarf eelgrass using mechanical excavation and smothering; and eradicating European beachgrass using manual, mechanical, burning and/or chemical control methods. Public access improvements would include improving the access road into the restoration area, improving the existing parking area, constructing a new parking area, installing a kayak put-in, and establishing a trail system.

3.3 Proposed Project Activities

The location of the proposed Project design elements, as described in the following subsections, are illustrated on Figure 3 Restoration Project Design Elements (Figure 3) located in Appendix A.

3.3.1 Levee Breaches

The Project would construct four new external levee breaches, identified as BR-1 through BR-4, to connect the ORU to North Bay and McNulty Slough. Breach BR-1 would connect Area A to North Bay downstream of the McNulty Slough and Hawk Slough confluence. Breaches BR-2, BR-3, and BR-4 would connect Areas B, C and D, respectively, directly to McNulty Slough at historic slough locations. Areas A, B, C, and E would be interconnected through four internal levee breaches, noted as BI-1 through BI-4. The location of levee breaches are shown on Figure 3 (Appendix A).

3.3.2 Tidal Channels

Up to 8,520 linear feet (2,597 meters) of new tidal channels would be excavated in Areas A, B, C, and E, beginning at BR-1 and extending south to North Bay. A new channel would be excavated south from BR-1, connecting Area A to North Bay. The length of the new channel would be approximately 860 linear feet (262 meters). Similarly, a 2,390-foot (728-meter) long channel would be excavated north from BR-1 to facilitate water conveyance into the lower reaches of Area A. A portion of a remnant slough channel in Area B would be enlarged to connect BR-2 to the northern reaches of Area A and subsequently Area E. A tidal channel would also be extended from BR-3 through Area C to connect to McNulty Slough.

3.3.3 Levee Lowering/Removal

Sections of the perimeter levee along the east side of Areas A, B, C and D would either be left intact, or altered. Sections of the perimeter levee left intact would be

used to maintain upland refugia and roosting habitat for wildlife and provide wave refraction during flood events. Altered perimeter levees would be either lowered to a crest elevation (referenced hereinafter to vertical datum NAVD 88) of eight feet, or lowered to marsh plain elevation. Portions lowered to a crest elevation of eight feet would be recontoured with varying flat, gradual slopes to provide transitional habitat. Large wood may be placed along some sections of lowered levee to provide high tide refugia for wildlife and a break from wind generated waves coming from the west. Sections of levee lowered to marsh plain elevation would be used to increase tidal exchange. Internal levees between Areas B, C, and D would be removed, including a part of the internal levee separating Areas A and B, to improve tidal exchange and water quality.

3.3.4 High Marsh Elevation Fill

Material excavated to create the tidal channel from BR-1 to North Bay and through the lower portion of Area A may be used to create higher elevation marsh habitat in Area B. Higher marsh elevations may also provide resiliency to sea level rise over time. Alternatively, if the cost or feasibility of moving excavated soils from Area A to Area B is prohibitive, excavated material may be relocated to the west side of Area A and/or placed as habitat ridges adjacent to the new tidal channel within Area A.

3.3.5 Habitat Ridges

Habitat ridges are un-engineered spoil piles that are placed along the outside meander of newly constructed channels to guide channel formation and facilitate revegetation. Habitat ridges would be placed along the new tidal channel in Area B, constructed to a crest elevation of approximately seven feet, at approximately the level of mean higher high water (MHHW), and allowed to develop as high marsh vegetation.

3.3.6 Ditch Block and Ditch Fill

A ditch block is a small plug constructed of compacted earthen fill that is used to block the path of water, help guide natural channel formation, and accelerate accretion of sediment in isolated portions of a ditch. Ditch blocks would be installed at strategic locations in several borrow ditches in Area A and Area B. Some ditches would also be filled to facilitate channel formation.

3.3.7 Placement of Large Wood

Large wood would be placed in Areas A, B and C to increase habitat complexity in tidal channels. Logs would be embedded into the channel bank and pinned to limit movement. Large wood would also be installed along the lowered sections of the perimeter levee of McNulty Slough to increase habitat complexity and provide wave attenuation.

3.3.8 Beneficial Reuse of Excavated Sediments

All soil excavated to construct the tidal estuary restoration project elements, including soil excavated during levee breaching, levee lowering, and tidal channel

excavation, would be reused onsite. Proposed onsite soil reuses include: creating high marsh habitat, filling internal ditches and lower elevation areas, installing ditch plugs, and repairing damaged levees and berms not proposed for removal. Excess soil not used for one of the above Project components may be spread as a thin layer (less than six-inches [15-centimeters] deep) in lower elevation saltmarsh.

In all instances, excavated soil reused onsite would be placed at an elevation to ensure wetland habitat characteristics persist (i.e., mudflats or saltmarsh would be converted to higher elevation estuarine marsh, not to upland). No fill material would be imported to the restoration area.

3.3.9 Invasive Species Management

Dense-Flowered Cordgrass Management

Under the Project, up to 326 acres (132 hectares) of cordgrass would be treated after the tidal restoration project is complete using one or more of the methods described in the following subsections. The methods utilized to control cordgrass would be carried out using a comprehensive integrated pest management program comprised of a series of treatments implemented over time based on seasonality, weather, tides, and labor availability.

Dense-flowered cordgrass treatment methods would include one or more of the following methods: top mowing, grinding, tilling, excavation, flaming, prescribed burning, and/or chemical control. In general, treatments would occur between February 1 and March 15, or after August 1, to avoid the nesting bird season. It is anticipated that the first treatment of cordgrass would occur after implementation of the tidal restoration project has been completed.

Dwarf Eelgrass Management

Under the Project, if observed during ongoing eelgrass surveys of McNulty Slough, dwarf eelgrass would be removed using mechanical control or smothering. Control of dwarf eelgrass would occur, if observed, on the Ocean Ranch side (west side) of McNulty Slough, from the edge of the perimeter levee to mean low water. Control of dwarf eelgrass is not proposed along the eastern portion of the slough. Control of dwarf eelgrass would likely occur between June and August, concurrent with eelgrass surveys timed to correlate with the flowering period of the species.

Dwarf eelgrass treatment methods would include manual removal and/or smothering (i.e., covering stands with burlap and clean mud).

European Beachgrass Management

Under the Project, up to 232 acres (94 hectares) of beachgrass would be removed from the restoration area. Management efforts would be concentrated in an area defined as the “Primary Treatment Area”. The Primary Treatment Area would extend along approximately 2.6 miles (4.2 kilometers) of shoreline and generally correspond with the 155 acres (63 hectares) where the densest stands of beachgrass (61 percent to 100 percent cover) are located. Removal of beachgrass from a supplemental area, defined as the “Secondary Treatment Area”, would occur in coordination with USFWS to ensure impacts to western snowy plover are minimized.

The Secondary Treatment Area would include an 0.3 miles (0.5 kilometers) of shoreline along the southern portion of the restoration area and generally encompasses 77 acres (31 hectares).

Removal of beachgrass within the restoration area would be phased temporally and spatially to reduce edge effects and provide natural communities time to re-establish and ameliorate susceptibility to foredune erosion. In general, beachgrass treatments in both treatment areas would occur between February 1 and March 15, or after August 1, to avoid the nesting bird season.

Treatment methods would include one or more of the following: manual removal, mechanical removal, burning, and/or chemical control. Treatment methods would generally be used in combination, meaning that a treatment area may be initially burned to remove thatch, followed by an herbicide application to kill rhizomes, with remaining plants manually removed or chemically treated if they re-sprout after initial treatments.

3.4 Public Access Improvements

The Project would include improvements to an existing access road and parking area, construction of a new parking area, construction of a pedestrian trail system, and construction of a kayak put-in. These improvements would be designed and located to be wildlife-friendly, with some uses prohibited or seasonally restricted to minimize impacts to wildlife.

A 0.5-mile (0.8-kilometer) segment of the modified levee separating Areas A and B would be managed as a pedestrian trail, extending from the new parking area to the levee breach between Areas A and B. A second 0.25-mile (0.4-kilometer) trail would extend from the new parking area to Sand Dune Road, utilizing the modified levee between Areas A and E. This trail would provide access between the restoration area and the Pacific Ocean. Construction of the trail system would include a bridge crossing having a span of about 50 feet (15 meters) over the BI-3 breach, as well as a box culvert crossing at BI-4.

Under the Project, the existing parking area at the north end of Table Bluff Road and the existing gravel access road would be improved, including grading and resurfacing. A new parking area would be established near the south end of the access road to accommodate vehicle parking in association with the proposed pedestrian trail system. A kiosk and interpretive display would be located in the parking area. A second kiosk and interpretive display would be installed at the entrance to the sand road off of South Jetty Road.

A kayak put-in would be constructed in Area B near the new parking area and pedestrian trail system. The launch would provide kayakers with water access during most tides and would connect to the tidal channel system in Area B.

3.5 Project Implementation

Primary access to the restoration area during construction of the tidal restoration project would be from the existing single-lane gravel road on the north end of the ORU. Construction equipment would be staged in the existing improved parking area on the north side of the restoration area, as well as in the adjacent uplands north of

the tidal restoration area. Construction equipment would access individual work sites from the top of existing levees and berms, where possible, and along the sand road, where necessary. Low-ground pressure equipment, and/or equipment staged from barges, would be used in discrete restoration areas that are not accessible from existing levees or berms. Construction equipment would not be stored in or near water or inundation areas.

Vegetation management under the Project would utilize the same access roads and parking areas as those described for the tidal restoration component of the project. All areas disturbed by temporary staging and access would be de-compacted and naturalized as needed prior to Project completion.

Tidal restoration project construction would be phased into two construction seasons based on available funding and sequencing earthwork. Construction work may occur year-round, if feasible, but would likely occur primarily between May and October. Construction is currently anticipated for years 2019 and 2020. Initial phases of construction would include isolating Areas B, C and D and constructing interior site elements, such as channel excavation, habitat ridges, and ditch blocks. Public access elements would likely be implemented concurrent with the interior site work. Subsequent phases would include excavation of the BR-1 breach and channel to North Bay, followed by breaching and lowering levees throughout the remainder of the site.

4. Probable Environmental Effects

Per CEQA Guidelines Section 15082 (a)(1)(c), the probable environmental effects of the Project, are summarized below based on a preliminary review of the Project. Probable environmental effects are organized by the environmental resource categories identified in Appendix G of the CEQA Guidelines. Because there is the potential for significant impacts to occur as a result of the Project, even with the use of mitigation measures, CDFW has determined that an EIR will be prepared. The EIR will provide site specific information and analysis relevant to the Project; evaluate Project alternatives; and will identify mitigation measures where significant impacts are identified.

For the reasons described below, CDFW does not anticipate the Project will have any impact on three environmental resource categories: Mineral Resources, Population and Housing, and Public Services. These resource categories will not be analyzed in the EIR unless input from responsible agencies, trustee agencies, or the public during the scoping period indicate an analysis is warranted.

4.1 Aesthetics

Would the project:
a) Have a substantial adverse effect on a scenic vista?
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
c) Substantially degrade the existing visual character or quality of the site and its surroundings?
d) Create a new source of substantial light or glare which would adversely affect day or night time views in the area?

The Project Area is in a highly scenic area and includes coastal dunes, riparian woodlands, tidal mudflats, tidal slough channels, salt marshes, and freshwater marshes. Project activities are not anticipated to substantially degrade scenic resources in the Project Area, rather they are intended to restore and expand natural estuarine and dune functions, including the recovery and enhancement of native species (estuarine fish, invertebrates, wildlife, and plants) and their habitats and provide public access. However, the EIR will analyze the potential impacts to aesthetic resources, and if appropriate, include feasible mitigation measures.

4.2 Agricultural and Forestry Resources

Would the project:
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?
d) Result in the loss of forest land or conversion of forest land to non-forest use?
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Agriculture began on the prairies of Table Bluff around 1850. Sometime between 1916 and 1948, the Ocean Ranch site was diked, isolated from tidal waters and drained for pasture through tide gates to McNulty Slough. Historical use consisted primarily of livestock grazing and dairy farming, although imagery from 1948 shows

that some areas of Ocean Ranch were actively farmed for agriculture. Active farm practices on Ocean Ranch ceased when it was acquired by CDFW in 1968, to be managed as a Wildlife Area.

No project site parcels are under Williamson Act contract, however there are Williamson Act parcels located east of the Project Area (County of Humboldt 2018). According to the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) Web Soil Survey, the majority of the ORU is located on soils that are not designated as prime farmland. The only exception is the Weott soil unit, which is prime farmland if irrigated. Although, irrigated or non-irrigated, this soil has a 5w capability class designation, which typically is not considered prime as defined by the Local Coastal Program (LCP) or the Coastal Act. Weott soils are found in a small north-south band within Area A of the ORU and most likely are much saltier than depicted in the current NRCS mapping unit.

The EIR will analyze the potential effects to agricultural resources from implementation of the Project and include feasible mitigation measures, if needed, to reduce any potentially significant impacts to a less than significant level. The Project Area does not include any forest land or land zoned timberland. A Land Evaluation Site Assessment (LESA) will be prepared to aid in the analysis of agricultural resources impacts and be included as an Appendix in the DEIR.

4.3 Air Quality

Would the project:
a) Conflict with or obstruct implementation of the applicable air quality plan?
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
c) Result in a cumulatively considerable net increase in any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
d) Expose sensitive receptors to substantial pollutant concentrations?
e) Create objectionable odors affecting a substantial number of people?

The Project Area is located within the North Coast Air Basin (NCAB), which is under the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD). The NCAB is currently in attainment (or is unclassified) for all state and federal ambient air quality standards, with the exception of the state standard for particulate matter less than ten micrometers in diameter (PM_{10}). The EIR will discuss temporary air quality impacts from construction of the Project (e.g., equipment and vehicle exhaust emissions) and restoration activities, including invasive species management activities (e.g., controlled burning). The EIR will also discuss the Project's conformity with applicable air quality plans and exposure of sensitive receptors to criteria air pollutants and odors. Mitigation measures for significant impacts will be included where applicable and feasible.

4.4 Biological Resources

Would the project:
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The Project Area includes wetlands, riparian areas, coastal dunes and uplands that support a diverse array of aquatic and terrestrial biological resources. The EIR will utilize a number of special studies in the preparation of this section, including a site-specific wetland delineation, rare plant assessment and sensitive plant surveys, natural community map and report, invasive plant map and report, and fish assemblage surveys, among others. The EIR will analyze potential impacts to special status-species, wetlands, riparian habitat, and coastal dunes and will include feasible mitigation measures if significant impacts are identified. The EIR will also discuss the Project's conformity with other federal and state policies and plans protecting biological resources.

4.5 Cultural Resources

Would the project:
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
d) Disturb any human remains, including those interred outside of formal cemeteries?

A Cultural Resources Investigation is being prepared to inventory cultural resources in the Project Area, and to assess potential impacts on these resources from Project activities. Potential impacts could include the destruction of known or unknown cultural resources. The EIR will include the results from this investigation and identify mitigation measures if significant impacts would occur.

4.6 Geology & Soils

Would the project:
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.
ii) Strong seismic ground shaking?
iii) Seismic related ground failure, including liquefaction?
iv) Landslides?
b) Result in substantial soil erosion or the loss of topsoil?
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on, or off, site landslide, lateral spreading, subsidence, liquefaction or collapse?
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Geologic and soils issues include potential erosion, loss of topsoil, and sedimentation during and after construction due to proposed grading, dredging, channel reconfiguration, and levee reconfiguration, as well as changes in sand movement associated with removal of European beachgrass from the coastal dunes. The EIR will describe the site's existing geologic conditions and soils based on existing information and technical reports prepared for the Project. The EIR will include an analysis of the geology of the site as it relates to slope stability, earthquake hazards, landslides, and other potential geologic hazards, and recommend appropriate mitigation measures if significant impacts are identified.

4.7 Greenhouse Gas Emissions

Would the project:
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The EIR will evaluate climate change and sea level rise projections and the potential effects of those projections on the proposed Project, as well as any potential effects the Project may have on sea level rise or greenhouse gas (GHG) emissions. Potential GHG emissions resulting from the Project would also be estimated and quantified using CalEEMod emissions modeling software. The NCUAQMD has not adopted a threshold for construction-related GHG emissions against which to evaluate significance and has not established construction-generated criteria air pollutant screening levels above which quantitative air quality emissions would be required; however, this potential impact will be further discussed in the EIR.

4.8 Hazards & Hazardous Materials

Would the project:
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Would the project:
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The EIR will discuss potential hazards in the Project Area, identify appropriate spill prevention measures, identify potential impacts to construction workers and recreation users due to potential soil contamination and other potential hazards at the site. Phase I and II Environmental Site Assessments were not completed for the Project and are not assumed to be needed; however, a database search through Environmental Data Resources, Inc. (EDR) will be conducted to access the California Department of Toxic Substances Control (DTSC) Cortese List, and to assess the proximity of known contaminated sites to the Project Area. This information will be used in the analysis and appropriate mitigation measures incorporated if significant impacts are identified.

4.9 Hydrology & Water Quality

Would the project:
a) Violate any water quality standards or waste discharge requirements?
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off- site?
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off- site?

Would the project:
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
f) Otherwise substantially degrade water quality?
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?
j) Inundation by seiche, tsunami, or mudflow?

The Project could affect water quality through the release of contaminants and sediment from construction activities. The Project could also alter hydrodynamic processes, which control local salinity levels, or increase turbidity during and after construction, adversely affecting water quality. In addition, flows in McNulty Slough are likely to change with the increased tidal prism following restoration; these increased flows could affect water quality, erosion along this waterway, and fisheries use of this waterway. The EIR will discuss these issues and potential effects and incorporate mitigation measure if significant impacts are identified.

4.10 Land Use & Planning

Would the project:
a) Physically divide an established community?
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

The Project is within the Coastal Zone and will require a Coastal Development Permit or Federal Consistency Determination from the California Coastal Commission per the California Coastal Act and Coastal Zone Management Act. The EIR will describe existing land uses in the Project Area, assess Project impacts and identify any potential land use conflicts. The EIR will summarize applicable goals and policies and assess the Project's consistency with the Eel River Area Plan and the Coastal Act. As noted above, because the Project would be located solely within state-owned lands, local land use and zoning review by Humboldt County is not required.

4.11 Mineral Resources

Would the project:
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

There are no existing mining operations in the Project Area. The Project Area is primarily comprised of fine silt, sand and water, and contains no known mineral resources available for extraction. There are no Surface Mining and Reclamation Act (SMARA)-designated parcels located within the Project Area. Although Humboldt County has not yet been included in the California Mineral Land Classification System by the State Mining & Geology Board (SMGB) to designate lands containing mineral deposits of regional or statewide significance, it seems evident that the Project Area would not rise to the level of significance for sand or gravel extraction. Therefore, the Project is not anticipated to result in a loss of mineral resources.

4.12 Noise

Would the project:
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Noise levels would increase temporarily during construction activities at the Project Area. The EIR will describe the existing noise levels in the Project Area and identify any noise sensitive receptors in the Project vicinity. The EIR will evaluate the potential for temporary noise impacts from construction. Future noise levels will be compared to existing noise levels and applicable noise standards to determine if the

Project will cause a significant increase in ambient noise levels. Appropriate mitigation measures will be incorporated if significant impacts are identified.

4.13 Population & Housing

Would the project:
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

The proposed Project would not add any new homes or businesses, nor extend any roads or other infrastructure on the site. The Project would not displace any housing or people, on or adjacent to the site. No aspect of the Project would induce substantial population growth or displace substantial numbers of housing or people. Therefore, the Project is not anticipated to impact population and housing.

4.14 Public Services

Would the project:
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
Fire Protection?
Police protection?
Schools?
Parks?
Other public facilities?

The Project would not directly increase population, therefore, it is not anticipated that the Project would increase the need for public services. The Project would not place additional demands on schools, parks, or other services. The Project does not include the construction of residential or commercial structures, and the Project is not anticipated to result in population growth in the area. Therefore, the Project is not anticipated to impact public services.

4.15 Recreation

Would the project:
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?
b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

The Project is not anticipated to place additional demands on recreational facilities, or require recreational facility construction or expansion. The Project would include improvements to the trail system and parking area, construction of a new boat/kayak launch, and the addition of other public access amenities, such as viewing platforms and interpretive signage. The EIR will analyze potential impacts to recreational resources and identify feasible mitigation measures if significant impacts are identified.

4.16 Transportation & Traffic

Would the project:
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
e) Result in inadequate emergency access?
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The Project would result in increased traffic during construction, which may temporarily decrease the overall performance and safety of local roadways. The Project may also result in increased operational traffic, potentially affecting levels of service on local streets. The EIR will discuss existing and proposed project traffic

volumes and level of service in the Project Area and recommend mitigation measures if significant impacts are identified.

4.17 Tribal Cultural Resources

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Tribal cultural resources are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either included or determined to be eligible for inclusion in the California Register of Historical Resources; or included in a local register of historical resources as defined in subdivision (k) of Section 5020.1; or a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. The Project may potentially encounter known or as-of-yet unknown archaeological materials during Project-related construction activities. If such resources were to represent “tribal cultural resources” as defined by CEQA, any substantial change to or destruction of such resources would be a significant impact. The EIR will analyze tribal cultural resources per Public Resources Code Section 21080.3.1, and include mitigation measures, if applicable, per Public Resources Code Section 21080.3.2.

4.18 Utilities & Service Systems

Would the project:
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Would the project:
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?
g) Comply with federal, state, and local statutes and regulations related to solid waste?

The Project does not include the construction of facilities (residential, commercial, or industrial) that would place additional long-term demands on public water systems, wastewater systems, or landfills. Landfills may be used for disposal of damaged water control infrastructure removed from the Project Area. The EIR will include information obtained from the County of Humboldt and applicable utility providers regarding any potential constraints, and feasible mitigation measures would be incorporated if significant impacts are identified.

5. References

Bryant W.A. and Hart, E.W., 2007.Fault-rupture hazard zones in California: California Division of Mines & Geology Special Publication 42. California Geological Survey, Sacramento, CA.

County of Humboldt, 2000. Humboldt County Zoning Regulations, Title III, Land Use and Development, Division 1 Planning.

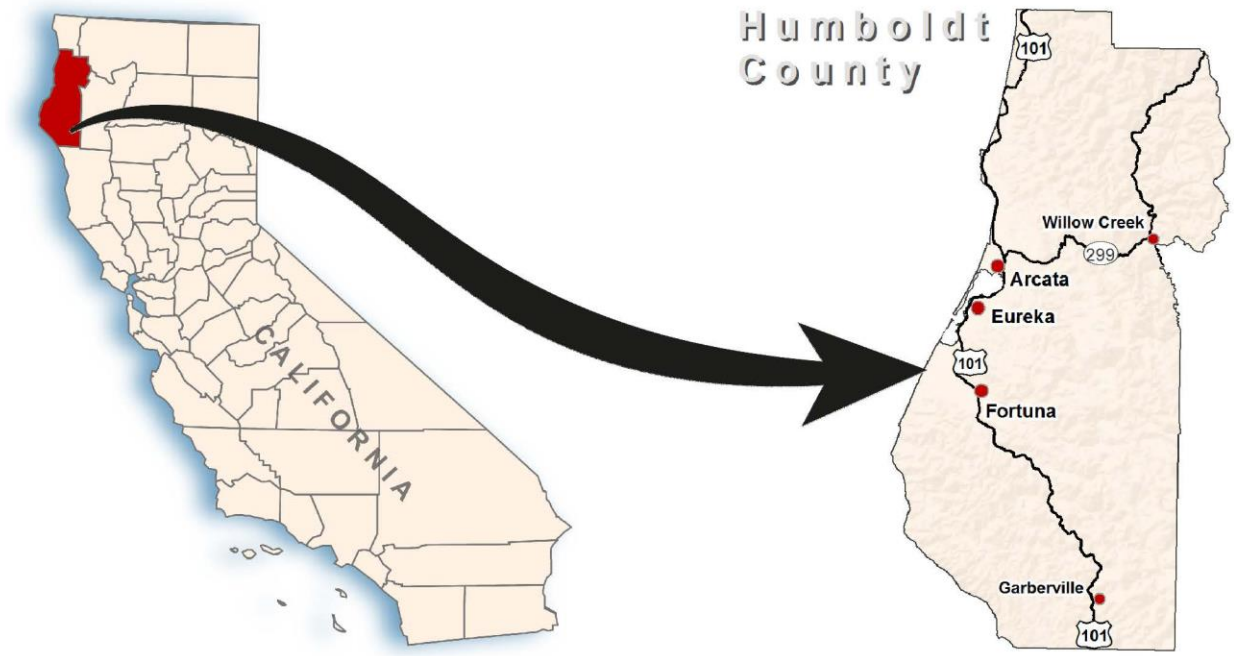
County of Humboldt, 2017. Humboldt County General Plan, Chapter 3, page 245, Section 163.1.9.3.

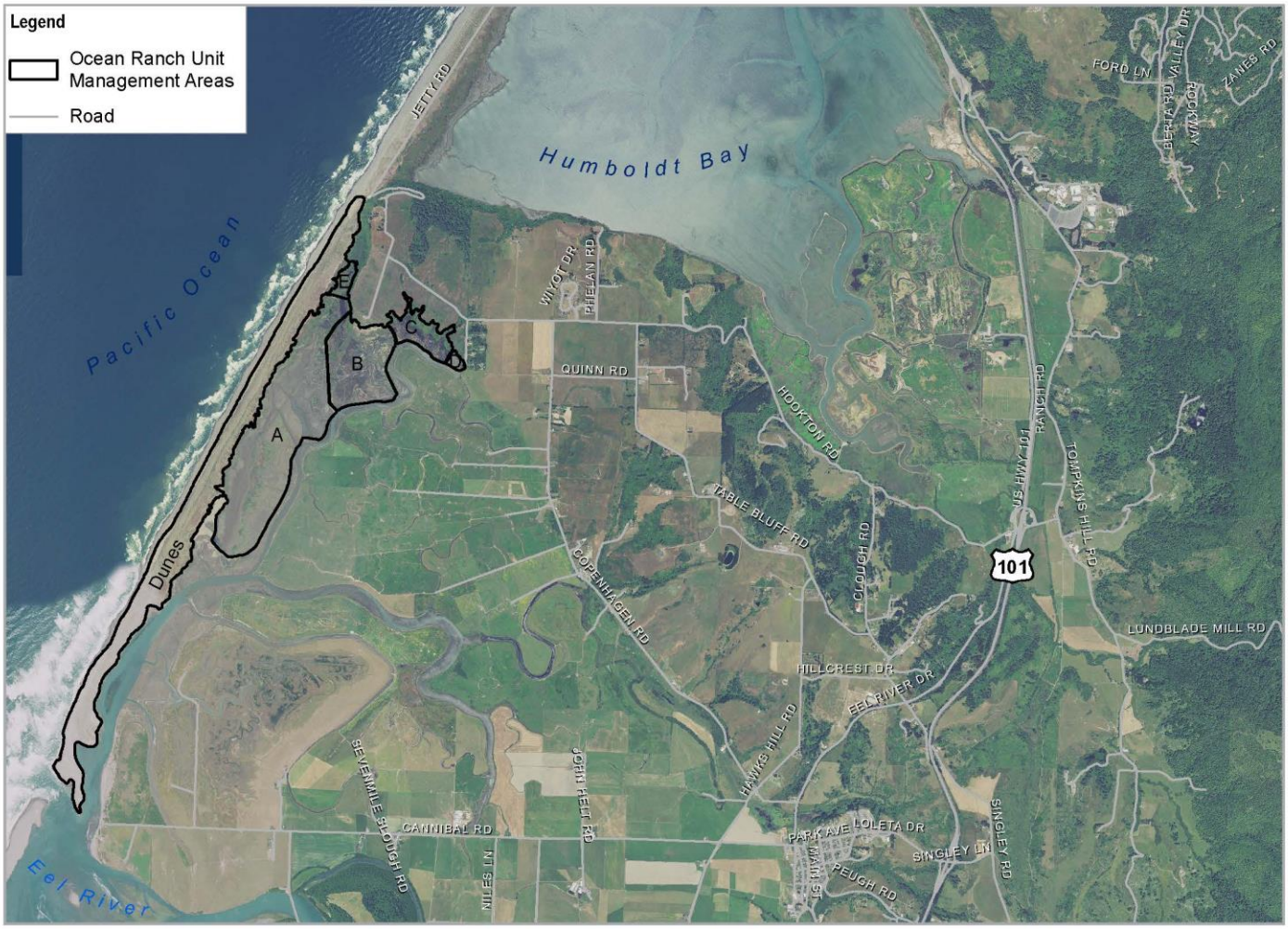
County of Humboldt, 2018. Humboldt County Web GIS, accessed via http://webgis.co.humboldt.ca.us/HCEGIS2.0/ on May 23, 2018.

Ducks Unlimited, Inc. (DU), 2015.Feasibility Study for the Restoration of the Ocean Ranch Unit of the Eel River Wildlife. Prepared for California Department of Fish and Wildlife, December, 2015.

LACO, 2014. McNulty Slough Levee Assessment, Ocean Ranch Restoration Project. Eureka, California.

Appendix A – Figures





Paper Size ANSI A

0 0.25 0.5 0.75 1

Miles

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

N

California Department of Fish and Wildlife
Ocean Ranch Restoration Project

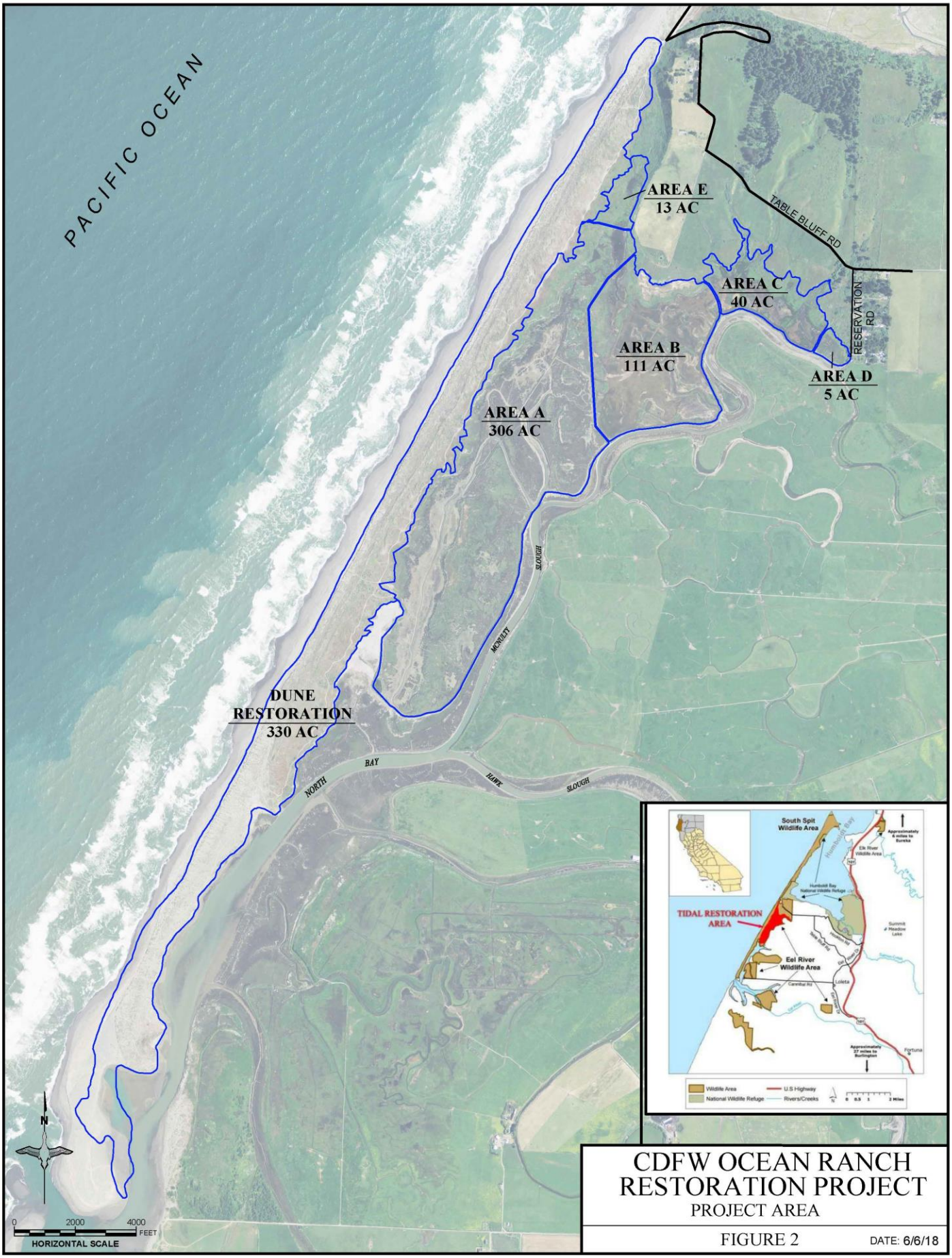
Project No. **11152100**
Revision No. **-**
Date **6/11/2018**

Vicinity Map

FIGURE 1

G:\111\11152100 – DU Ocean Ranch Estuary CEQA\08-GIS\Maps\Deliverables\11152100_001_VicinityMap_RevD.mxd
Print date: 11 Jun 2018 - 17:23

Data source: Humboldt County roads, 2008; NAIP orthoimagery 2016; . Created by: gldavidson

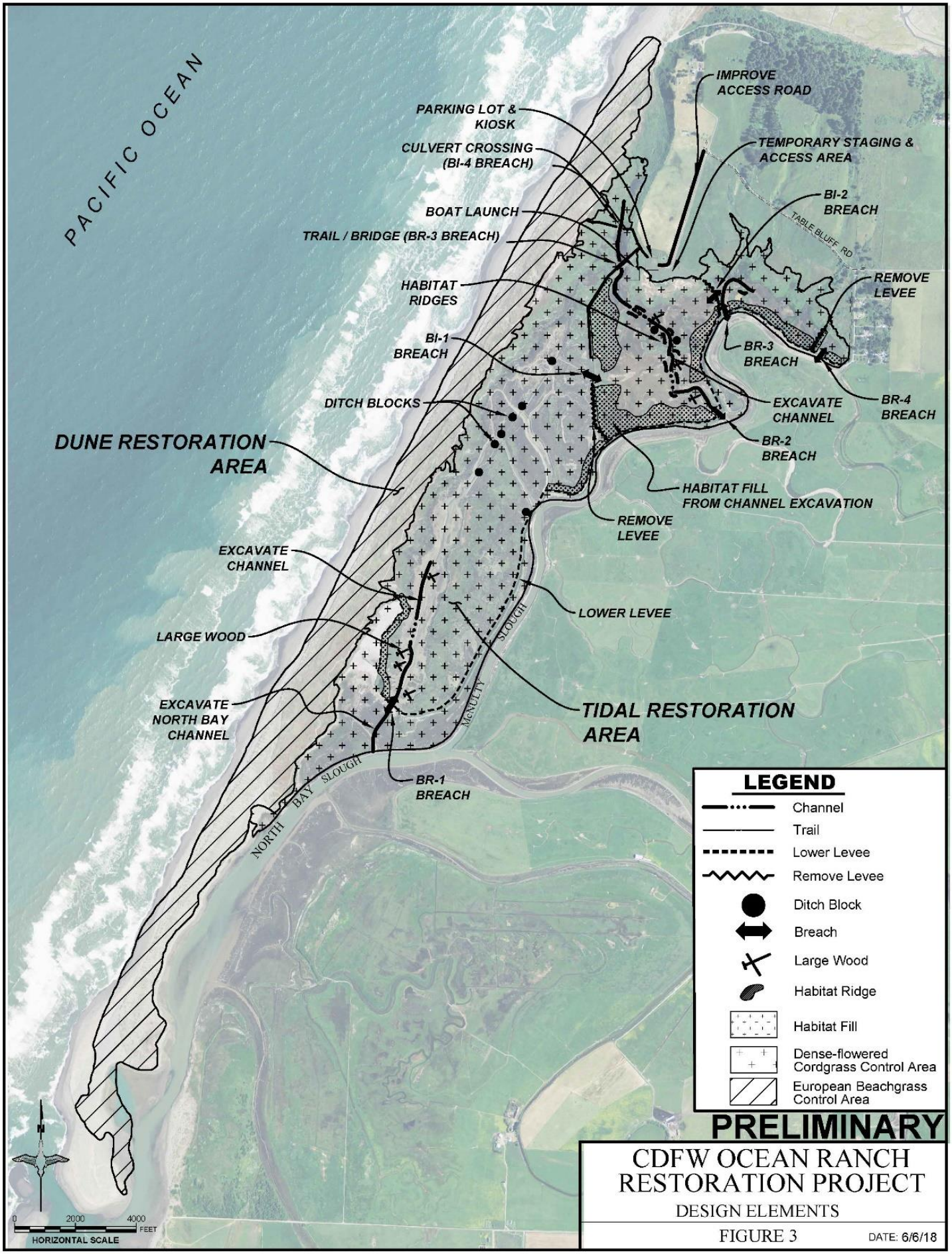


CDFW OCEAN RANCH RESTORATION PROJECT

PROJECT AREA

FIGURE 2

DATE: 6/6/18



PRELIMINARY

CDFW OCEAN RANCH RESTORATION PROJECT

DESIGN ELEMENTS

FIGURE 3

DATE: 6/6/18

Appendix B – Special-status Wildlife Species Accounts

Appendix B – Special-status Wildlife Species Accounts

This section provides species accounts for all special-status species listed in Table 3.4-4 that are present or have a moderate or high potential to occur within the study area of the Ocean Ranch Restoration Project. As defined in Section 3.4 of this Draft EIR, the study area for biological resources 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.

A key to the various codes utilized in this section is provided at the end of Appendix B.

Mammals

Townsend's Big-eared Bat (*Corynorhinus townsendii*), CDFW SSC (S2), WBWG High Priority, Moderate Potential

Townsend's Big-eared Bats are medium-sized bats, distinguished from other co-occurring bat species by their large ears and a two-pronged horseshoe-shaped lump on the muzzle. The species occurs throughout the western U.S. and Canada. In California, the species is found throughout the state with the exception of the high elevations in the Sierra Nevada Mountain Range (CDFW 2016). Townsends' Big-eared Bats are typically associated with coastal redwood forests, foothill oak woodlands, inland deserts, pinyon-juniper and pine forests, and mixed coniferous-deciduous forests (Erickson et al. 2002, CDFW 2016). The species roosts colonially in a variety of structures including hollow trees, buildings (barns), mines, and lava tubes. Roost site fidelity is high. Maternity colonies (of females) occur between March and June (CDFW 2016) and males roost singly (Erickson et al. 2002). Females give birth to a single pup per year between May and July. The species winters in mixed sex groups in caves and lava tubes. Townsend's Big-eared Bats feed primarily on moths (Erickson et al. 2002, CDFW 2016).

There are no records of the species from the immediate Project Area. The closest known record is from 2015 at Lanphere Dunes (Weller 2015). Foraging habitat for the species could be present in the Project Area. It is unknown whether the species may roost on the few structures in the Project vicinity and would require surveys to confirm. However, based on historical records and available habitat, the species has a moderate potential to be present and forage around the Project Area.

Hoary Bat (*Lasiurus cinereus*), WBWG Medium Priority, Moderate Potential.

The Hoary Bat is a relatively large bat, brown to rufous in color with a white "frosting" on the fur tips (SDBWG 2004). They are found throughout North, Central and South America but not usually in great densities (SDBWG 2004, NatureServe 2019). The species is found throughout California with the exception of xeric desert habitats in the southeast. The species breeds in inland forest habitat and winters along the coast and in the southern portion of the state. The species engages in seasonal movements which result in sexual segregation during the warmer months (males are found in greater numbers in western portions of the state while the females are more common in the northeast). Hoary Bats migrate between the summer and winter ranges from September through November. Mating occurs during migration or on

the wintering grounds. Females give birth to one to four pups in May through July of the following year (Harris et al. 2008).

Preferred habitat includes a mosaic of forested habitat for roosting and open/edge habitat for foraging. Hoary bats are insectivorous and feed primarily on moths (usually over water or over the forest canopy). The species roosts solitarily in dense tree foliage typically near water (species requires water for drinking) (SBDWG 2004, Harris et al. 2008). Threats to the species include deforestation, wind energy developments (common source of mortality for the species), and reduced prey from over application of pesticides (NatureServe 2019).

There are no records of the species from the immediate Project Area. The closest known record is from 2015 at Lanphere dunes (Weller 2015). Foraging habitat for the species could be present in the Project vicinity. It is unknown whether the species roosts in the Project vicinity (there are no trees in the Project Area that could serve as roosts). Based on available data, the presence of the species in the Project Area is currently unknown and would require surveys to confirm. However, based on historical records and available habitat, the species has a moderate potential to be present and forage around the study area.

Pacific Harbor Seal (*Phoca vitulina richardii)* MMPA Protected Species. High Potential. Known to Occur in Study Area.

The species is found in temperate waters off the coast of North America, from the California/Mexico border to Alaska (NOAA Fisheries 2018a). Pacific Harbor Seals are non-migratory and show strong fidelity to haul-out sites. However, the species will travel to find breeding and foraging sites (Herder 1986, NOAA Fisheries 2018c, NOAA Fisheries 2018b).

Harbor Seals do not reach sexual maturity until three to seven years old. Breeding occurs in the water and pups are born at haul-out sites (NOAA Fisheries 2018d). Haul-out sites are located on the mainland as well as on offshore islands and may include beaches, rocky shores, and intertidal sandbars (NatureServe 2020). The peak haul-out period occurs from May to July in California (NOAA Fisheries 2018c). Pupping season primarily occurs during the spring and summer. Female Harbor Seals raise their pups in large nurseries (NOAA Fisheries 2018d). Harbor Seals feed on a variety of prey items including shellfish, crustaceans, and fish (NOAA Fisheries 2018b). Foraging sites may be located in the open ocean as well as in bays (Ougzin 2013). Along the west coast of the U.S., the Pacific Harbor Seal population is stable or increasing (NOAA Fisheries 2018b).

This species has been observed within McNulty Slough (M. van Hattem pers. comm. 2019). Due to the previous observation and suitable habitat in McNulty Slough and along the beach, there is high potential for this species to be present in the study area.

California Sea Lion (*Zalophus californianus)* MMPA Protected Species. High Potential. Known to Occur in Study Area.

The species is found in the eastern North Pacific Ocean. California Sea Lions generally range from the U.S./Mexico border to Canada, although males may be found foraging during the winter as far north as southern Alaska (NatureServe 2020, NOAA Fisheries 2018b). California Sea Lions are polygynous, with males defending

breeding territories of up to 14 females. Although sea lions reach sexual maturity at four to five years old, males do not defend territories until 9 years of age, when they reach "social" maturity (NOAA Fisheries 2018d). The breeding season occurs in summer and early fall and pups are born in spring and summer the following year (NatureServe 2020, NOAA Fisheries 2018b). The largest breeding colonies are found on offshore islands from the Channel Islands in California south to Baja. California Sea Lions breed on sandy beaches or in rocky coves. They also commonly haul-out on jetties, ocean buoys, and on marina docks (NOAA Fisheries 2018b). California Sea Lions feed at night on a variety of prey including squid and fish (Hawes 1983, NatureServe 2020).

This species has been observed within McNulty Slough (M. van Hattem pers. comm. 2019). Due to the previous observation and suitable habitat in McNulty Slough and along the beach, there is high potential for this species to be present in the study area.

Birds

Great Egret (*Ardea alba*), CDFW Special Animals List (S4), High Potential, Foraging Only. Known to Occur in Study Area.

Great Egrets are year-round residents in western California, with breeders concentrated in the Klamath and Warner basin in Siskiyou and Modoc Counties, along the coast in Humboldt County, the San Francisco Bay area, Monterey County, the Salton Sea, and the Central Valley. This species favors wetlands, estuaries, lakes, rivers, ponds, streams, marshes, and tidal flats. Great Egrets utilize a variety of substrates for nesting including trees, woody vegetation, or artificial nest platforms. Nests platforms are typically constructed of sticks and vegetation. Great Egrets nest communally or in mixed-species colonies. They are opportunistic foragers, wading in shallow water to feed on fish, amphibians, and invertebrates. They also hunt on shore for reptiles, birds, and small mammals (Mccrimmon Jr. et al. 2011).

There are numerous records of this species from the study area. The Project Area provides foraging habitat for Great Egrets. Historical rookeries were present on an island in the nearby Eel River Delta (eBird 2019). However, the lack of large nest trees in the Project Area precludes the chance of breeding onsite. Based on historical records and available habitat, the species has a high potential to be present and forage within the study area.

Great Blue Heron (*Ardea Herodias*), CDFW Special Animals List (S4), High Potential, Foraging Only. Known to Occur in Study Area.

Great Blue Herons are year-round residents in most of coastal and central California. Notable exceptions include the Sierras and the very southeastern desert regions of the state. Great Blue Herons are extremely adaptable to a variety of habitats including most saltwater and freshwater bodies, agricultural land, and wetlands, as well as commercial and residential areas such as golf courses. Nesting habitat includes trees, bushes, or artificial structures. Nests platforms are typically constructed out of sticks and lined with material such as grass, moss, and reeds. Great Blue Herons are colonial nesters in mixed-species colonies. They are opportunistic foragers, wading in shallow water to feed on fish, amphibians, and

invertebrates. They also hunt on shore for reptiles, birds, and small mammals. Additionally, they are known to scavenge carrion (Vennesland and Butler 2011).

There are numerous records of this species from the study area. Historical rookeries were present on an island in the nearby Eel River Delta (eBird 2019). The Project Area does contain potential foraging habitat for Great Blue Herons, however the lack of large nest trees in the Project Area restricts the potential for breeding onsite. Based on historical records and available habitat, the species has a high potential to be present and forage within the study area.

Short-eared Owl (*Asio flammeus*), CDFW SSC (S3), High Potential, Foraging Only During Winter. Known to Occur in Study Area.

Short-eared Owls are a widely distributed raptor species, with year-round residents in most of northern California (north of the San Francisco Bay), and seasonal wintering throughout most of the rest of the state. Short-eared Owls are associated with open habitat such as agricultural areas, tundra, prairies, and shrub-steppe. Many of these habitats are declining due to land conversion, wetland destruction, and monotypic farming. Short-eared Owls have been designated as a CDFW Species of Special Concern, with further research necessary to determine the actual state-wide status of the species. Short-eared Owls prefer to nest on the ground in dense grasslands, marshes, or on elevated areas of tundra. Nests consist of a scrape lined with grass and down feathers. Prey items include small mammals such as voles and birds (Wiggins et al. 2006).

Short-eared owls are known from wetland and agricultural areas surrounding Humboldt Bay, including the Humboldt Bay National Wildlife Refuge and the Fay Slough and Mad River Slough Wildlife Areas. Nesting is not confirmed for this region, however displaying birds have been observed during the breeding season at the Humboldt Bay National Wildlife Refuge (MRB/PWA 2004). In addition, an adult Short-eared Owl was observed feeding two fledglings at Mad River Slough Wildlife Area in June of 1990 (Harris 196 in Hunter et al. 2005). There are also numerous records of this species from the Project Area during the winter (eBird 2019). Based on historical records and available habitat, the species has a high potential to seasonally be present and forage around the Project Area.

Western Burrowing Owl (*Athene cunicularia*), CDFW SSC (S3), USFWS BCC, High Potential, Foraging Only During Winter.

Western Burrowing Owls are found in many grasslands and arid regions of western North and Central America. In California, Western Burrowing Owls are found year-round south of the San Francisco Bay, with seasonal breeders to north and east of this area. Western Burrowing Owls are declining in many areas as a result of agricultural activities, pesticides, and habitat loss. The species prefers grassland, steppe, and desert habitats and can be found in open/developed landscapes such as golf courses, cemeteries, and airports. Western Burrowing Owls typically nest in burrows created by other animals such as California ground squirrels, badgers, prairie dogs, or skunks. They may also excavate their own burrows or use artificial burrows. Western Burrowing Owls feed on insects, small mammals, reptiles, and amphibians (Poulin et al. 2011).

Western Burrowing Owls are known to winter in the Project vicinity and suitable habitat for the species is present in the Project Area (eBird 2019). Based on available data, the presence of any established breeders at or near the site is unlikely. However, this species has been observed in the study area regularly during the fall/winter (M. van Hattem pers. comm. 2019), and therefore based on historical records and available habitat, the species has a high potential to seasonally be present and seasonally forage around the study area.

Canvasback (*Aythya valisineria*). CDFW Special Animals List (S2), High Potential, Foraging Only . Known to Occur in Study Area.

Canvasbacks are a species of waterfowl restricted to the Americas. The species breeds in prairie potholes in Alaska, western Canada, and northwestern and north central U.S. In California, Canvasbacks are primarily encountered during migration (although some populations breed in the very northeast corner of the state). During the breeding season, the species may use multiple ponds for nesting, loafing, foraging, and brooding. Nests are constructed in aquatic emergent vegetation such as reeds and sedges and lined with down. The species tends to feed in shallow water but can dive up to 9 meters while foraging. Preferred food items are the roots and tubers of submerged vegetation as well as benthic invertebrates (Mowbray 2002).

Canvasbacks have been documented in the Project Area during the winter and wintering birds occur seasonally in the Project vicinity (eBird 2019). Based on historical records and available habitat, the species has a high potential to be seasonally present and forage around the study area.

American Bittern (*Botaurus lentiginosus*), CDFW Special Animals List (S3S4), High Potential, Foraging and Nesting.

The American Bittern is a crepuscular mid-sized heron with cryptic plumage. They breed in most of Canada and the northern U.S. states and winter in the southern U.S. There are pockets of year-round residents along the coast in the Pacific Northwest and along the Carolinas. The species is associated with freshwater wetlands containing tall emergent vegetation, although they will occasionally also use saltwater marshes. The species builds its nests in tall emergent vegetation (such as reeds) or riparian trees over water. Nest platforms are constructed out of reeds, sedges, and cattails. American Bitterns are opportunistic predators and will feed on a variety of invertebrates and vertebrates including frogs, small mammals, insects, and fish (Lowther et al. 2009).

The species is relatively rare in Humboldt County and only documented as a breeder in freshwater habitat locally (Hunter et al. 2005). This species has been detected in the Project Area year-round and suitable habitat is present on site (eBird 2019). Because no freshwater marsh habitat is present in the Project Area, breeding is unlikely. However, based on historical records and available habitat, the species has a high potential to be present, nest or forage within the study area.

Black Brant (*Branta bernicla nigricans*). CDFW SSC (S2), High Potential, Foraging Only. Known to Occur in Study Area.

Black Brant are a species of sea goose that breed in the arctic and sub-arctic and primarily winter in coastal bays and estuaries in Baja California. Humboldt Bay

serves as a critical wintering area and spring staging site for Black Brant (Lewis et al. 2013). In fact, Humboldt Bay is believed to be the most important spring staging site for Brant in California, and the fourth most important staging site in the Pacific Flyway (Moore et al. 2013). This is due to the presence of large eelgrass beds in Humboldt Bay, which serve as a critical food resource for Black Brant. Black Brant build energy stores necessary for breeding by foraging on eelgrass during the winter. The population of Black Brant that use Humboldt Bay as a stop-over site have an estimated population size of 150,000 birds and harvest is allowed during the winter under the species management plan (Pacific Flyway Council 2002).

Black Brant have been documented to feed on eelgrass beds during both low and high tides in Humboldt Bay and are relatively common winter visitors to the area (Elkinton 2013). Surveys have documented brant in both the North and South Bays (Moore et al. 2013). Black Brant have also been detected during the winter and spring migration in the Project Area and seasonal presence is possible (eBird 2019). Based on historical records and available habitat, the species has a high potential to be seasonally present and forage around the Project Area.

Vaux's Swift (*Chaetura vauxi*). CDFW SSC (S2S3), Moderate Potential, Foraging Only.

Swifts are summer residents in California, breeding on the coast from central California northward and in the Cascade and Sierra Nevada mountains. Nesting occurs in large, accessible, chimney-like tree cavities that allow birds to fly within the cavity directly to secluded nest sites. Such cavities usually occur in conifers, particularly redwoods. Chimneys and similar human-made substrates are also used for nesting. This species is highly aerial and forages widely for insects in open air. During migration, nocturnal roosting occurs communally; favored roosts may host thousands of individuals (Bull and Collins 2007).

The Project Area contains no trees or structures. Thus, the absence of suitable nesting and structures is a limiting factor for potential roosting or nesting in the study area. However, there are numerous records of this species from the Project vicinity (eBird 2019) and foraging habitat is likely present on the Project Site. The presence of nests/colonies in the Project Area is unknown and would require surveys to confirm. Based on historical records and available habitat, the species has a moderate potential to be present and forage around the study area.

Western Snowy Plover (*Charadrius nivosus nivosus*), Federally Threatened, CDFW SSC (S2S3). High Potential, Foraging and Nesting. Known to Occur in Study Area.

The Western Snowy Plover is a small, six-inch long shorebird, distinguishable from other shorebirds by its black legs, dark bars on either side of its breast, a dark fore-crown, dark eye patch, and brown to gray back (Page et al. 2009). Two distinct breeding populations of Western Snowy Plovers are known: the Pacific coast population and an interior population that breeds in Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma, and Texas (USFWS 2007).

Snowy Plovers are year-round residents in suitable habitat along the California coast as well as the San Joaquin Valley and Salton Sea. There are also seasonal breeding populations in northeastern California and the eastern edge of the San Joaquin

Valley (Page et al. 2009). The Pacific coast population nests on beaches from the central Washington coast to the Baja California peninsula. The breeding season of the Pacific coast Western Snowy Plover lasts from early March through mid-September. Pair bonds are formed in mid-February.

Plovers prefer to nest in open areas such as blowouts above the high tide line on sand spits, dune-backed beaches, lagoon and estuary salt pans, and beaches near river and estuary mouths (USFWS 2007). They also may nest on sparsely vegetated dunes, salt pond levees, and river bars (Colwell et al. 2005, USFWS 2007). In Humboldt County, plovers preferentially select for gentle slopes of 0-4% on wide stretches of beach (220 ± 98 meters [m]) when choosing nest sites (Leja 2015). Nesting microhabitat within these larger landscape features include: open ground adjacent to driftwood, beached kelp, small plants, pebbles, shells, or other conspicuous items in an otherwise barren landscape (Page et al. 2009, Leja 2015). Nest scrapes are also constructed in areas relatively free of European beachgrass cover (Muir and Colwell 2010). Clutches tend to be three eggs and are laid in scrapes or depressions in the sand. These scrapes are lined with debris such as shell fragments, fish bones, pebbles, and bits of vegetation.

Wintering areas are usually similar to those used for nesting and include tidal flats, dune-backed beaches, salt-evaporation ponds, and agricultural waste-water ponds (Shuford et al. 1995, USFWS 2007). Pacific coast plovers commonly forage amongst piles of beached kelp and in the wet sand of the intertidal zone. Above the high tide line, they feed in dry sandy areas, saltpans, spoil sites, and along the edges of saltmarsh and ponds (USFWS 2007). Small invertebrates comprise the bulk of the Western Snowy Plover's diet and include but are not limited to Pacific mole crabs (*Emerita analoga*) and Striped Shore Crabs (*Pachygrapsus crassipes*), beetles, amphipods, insect larvae, flies, and caterpillars (Jacobs 1986, Page et al. 2009, Tucker and Powell 1999). Important habitat components for plover foraging sites include open, sandy areas within the high-tide line that contain tide-cast wrack, such as kelp and drift wood, that typically attract invertebrates (77 FR 36727-36869).

During the 20th century, the Snowy Plover breeding range along the California coast became extremely fragmented due to habitat loss (e.g., coastal development). Habitat loss is only one of numerous threats to the species. Other threats include but are not limited to human disturbance, predation by species associated with human development (e.g., corvids), and pesticides/inorganic contaminants, all of which affect reproductive success (Page et al. 2009, USFWS 2007). Further, the invasion of European beachgrass has led to declines in Western Snowy Plover wintering and nesting habitat along the Pacific coast (USFWS 2007). Predation by ravens may be the primary limiting factor for plovers in northern California. In addition, off-highway vehicle use of river bars has crushed nests and disturbed nesting plovers (Colwell et al. 2005, Lau 2015).

Critical habitat for the species was designated in 1999 and revised in 2012 (77 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 3.4-4 – Critical Habitat for Western Snowy Plover). Western Snowy Plovers are known to use the beach adjacent to the Project Area year-round (both nesting and wintering populations). Numerous nests have been

documented on this beach, with most nesting attempts focused near the mouth of the Eel in the last few years (Colwell 2019, eBird 2019). Based on historical records and available habitat, the species has a high potential to be present, nest, and forage in the study area.

Northern Harrier (*Circus hudsonius*), CDFW SSC (S3), High Potential, Foraging and Nesting. Known to Occur in Study Area.

Northern Harriers are a widely distributed raptor species, with year-round residents on the California coast, northeastern portion of the state, and the Central Valley. They are seasonal breeders throughout most of the rest of the state. Northern Harriers are associated with open habitat such as meadows, grazing land, marshes, tundra, prairies, riparian woodlands, and shrub-steppe. Many of these habitats are declining due to land conversion, wetland conversion, and monotypic farming. As a result, Northern Harriers have been designated as a CDFW Species of Special Concern, with further research necessary to determine the actual state-wide status of the species.

Northern Harriers prefer to nest on the ground in vegetated uplands or wetlands. Nests consist of a large grass-lined cup surrounded by tall and dense vegetation such as reeds, willows, or blackberry bushes. Northern Harriers are polygynous, with one male frequently supporting/providing food for multiple nesting females. Prey items include rodents, birds, reptiles, and amphibians (Smith et al. 2011).

There are records of this species from the Project Area year-round, and requisite foraging and nesting habitat is present at the Project Site (eBird 2019). Based on historical records and available habitat, the species has a high potential to nest and forage within the study area.

Olive-sided Flycatcher (*Contopus cooperi*), CDFW SSC (S4), USFWS BCC, High Potential, Foraging Only. Known to Occur in Study Area.

The Olive-sided Flycatcher breeds in coniferous forest edges in Canada and the western U.S. from sea level to the Rockies. They winter in Central America. Olive-sided Flycatchers build cup nests in conifers and deciduous trees such as willows. Nests are constructed out of twigs, grasses, and pine needles. The species is known to aggressively defend their nesting territories. Olive-sided Flycatchers feed primarily on flying insects, including bees, by catching them via “yo-yo flights” (Altman and Salabanks 2012).

Olive-sided Flycatchers have been detected in the Project Area in low numbers (eBird 2019). The Project Area may serve as foraging habitat for the species, although breeding habitat may be precluded as there are no trees onsite. However, based on historical records and available habitat, the species has a high potential to be present or forage within the study area.

Snowy Egret (*Egretta thula*), CDFW Special Animals List (S4), High Potential, Foraging Only. Known to Occur in Study Area.

Wintering populations of snowy egret are present along much of the California coast. They prefer riparian and estuarine areas, marshes, wet meadows, inland lakes, and river courses. Snowy Egrets construct stick nest platforms in a variety of tree and shrub species including: willows, holly, birch, and wax myrtle. Nests are lined with

reeds, grasses, and moss. Snowy Egrets are colonial nesters, with colonies comprised of both the same and different species (conspecifics and allospecifics). Snowy Egrets hunt in shallow water and on shore, making use of their bill (via "bill-vibrating") and distinctly yellow feet to capture and potentially attract prey items (Kushlan 1973, Willard 1977, Meyerriecks 1959).

Snowy Egrets are known to occur in the study area year-round and the Project Area contains potential foraging habitat for the species. The presence of any established colonies in the Project Area is unlikely (the closest known rookery is from Hookton Slough); however, based on historical records and available foraging habitat, the species has a high potential to be present and forage within the study area.

White-tailed Kite (*Elanus leucurus*), CDFW FP (S3S4), High Potential, Foraging Only.

White-tailed Kites are year-round residents in most of California west of the Sierra Nevada Mountains including the majority of the coastal foothills, Central Valley, and some arid regions such as Kern and Inyo Counties. White-tailed Kites prefer open landscapes at low elevations including marshes, grasslands, oak woodlands, savannahs, and agricultural land. Nests are typically constructed on habitat edges on the top or upper third of a tree or bush. Nests consist of small sticks, grass, hay, and leaves placed in a variety of tree or shrub species including coastal redwoods and Sitka spruce. White-tailed Kites feed almost exclusively on small mammals captured via hover hunting (Dunk 1995).

White-tailed Kites are common in the Project vicinity and likely to occur year-round in the study area (eBird 2019). Marsh and grassland areas exist in the Project Area that could serve as foraging habitat for this species (nesting is precluded as no trees exist onsite). Accordingly, there is a high potential for them to forage in the study area.

Little Willow Flycatcher (*Empidonax traillii brewsteri)* State Endangered, USFWS BCC, High Potential, Fall Migration Only.

The Little Willow Flycatcher is a long-distance neotropical migrant that breeds west of the Cascade in the Sierra Nevada mountains up to southwestern British Columbia. The Little Willow Flycatcher is one of three subspecies of willow flycatcher that occur in California. The species winters in southern Mexico and northern South America. In California, known breeding locations are from Shasta, Kern, Alpine, Inyo, Mono, Santa Barbara, Riverside, and San Diego counties. The species was formerly widespread in California and has declined significantly as a result of riparian habitat loss and degradation.

The Willow Flycatcher is distinguished from other *Empidonax* flycatchers by its characteristic "fitz-bew" call (USFWS 2002). Willow Flycatchers are late spring migrants with abbreviated breeding seasons of only 70-90 days (Sedgwick 2000). They arrive on their breeding ranges in California in mid-May (Small 1994). They favor willow thickets in valleys, canyon bottoms, and mountain seepages, and riparian areas around lakes and streams adjacent to open areas (Sedgwick 2000). Territory size may range from roughly 3 to 5 kilometers (km) (Prescot 1986). Cup nests are created out of twigs, grass, and bark and lined with hair, grass, and

feathers. Nest are typically located low to the ground in willow shrubs and bushes. Willow Flycatchers primarily capture insects in flight (Sedgwick 2000).

The Little Willow Flycatcher may occur in Humboldt County during the spring, winter, and fall. Peak occurrences are during mid-May to mid-June and mid-August through September. The subspecies is an occasional breeder in Humboldt County (Hunter et al. 2005). The species was detected in the Project Area in August of 2019 (Eel River Wildlife Area Ocean Ranch Unit) (eBird 2019). As coastal dune willow thicket shrubland alliance is present in the Project Area, presence cannot be completely excluded. Based on historical records and available habitat, the species has a moderate potential to be seasonally present or forage within the study area.

Merlin (*Falco columbarius*), CDFW WL (S3S4), High Potential, Foraging Only During Winter.

The Merlin is a small falcon associated with the northern prairies and forests. The species breeds in Alaska, Canada, and interior Washington and Oregon. The wintering range includes the western U.S., Mexico, Gulf Coast, eastern seaboard, and Cuba. There are also resident populations along the coast of the Pacific Northwest into Canada, and in the interior mountain states. As is common with falcons, females are larger than males in size. Breeding sites include deciduous forest, prairie shelter belts, and coniferous forest. The species does not build its own nests, and instead uses the unoccupied nests of hawks or crows. Merlin feed on small birds as well as insects, frequently by catching them in flight.

This species is a common winter visitor to the Project vicinity and may forage within the Project Area (eBird 2019). Based on historical records and available habitat, the species has a high potential to seasonally be present and forage around the study area.

American Peregrine Falcon (*Falco peregrinus anatum*), CDFW FP (S3S4), USFWS BCC, High Potential, Foraging Only. Known to Occur in Study Area.

The Peregrine Falcon is one of the world's most widely distributed raptor species, occurring in urban areas, wetlands, deserts, maritime islands, mountains, tundra, and the tropics. Peregrine Falcons received significant attention during the middle of the 20th century due to precipitous population declines. These population crashes have been attributed to the lethal and sub-lethal effects of the organochlorine pesticide Dichlorodiphenyltrichloroethane (DDT). After DDT was banned in 1972, the Peregrine Falcon started to rebound nationwide.

In western North America, resident populations of Peregrines are found along the coast of California and the majority of the interior of the state, excluding the Central Valley and arid regions in the southeast (White et al. 2002). In California, Peregrines generally prefer open landscapes for foraging and cliffs, snags, or buildings for breeding. Nests consist of a scrape in sand, gravel, or dirt on a cliff ledge, artificial nest boxes, or abandoned raptor or corvid nests (Wrege and Cade 1977, White et al. 2002). Peregrine Falcons feed on a variety of avian species including passerines, waterfowl, and shorebirds. They have also been known to take bats, amphibians, fish, and mammals. Prey are taken in flight, off the surface of water, or on land (Sherrod 1978). The Peregrine Falcon is the fastest member of the animal kingdom

with diving ("stooping") speeds recorded at speeds of 238 miles per hour (Franklin 1999).

Peregrines are a common visitor to the Project vicinity (year-round presence, although in greater numbers in the winter) and forage within the study area (eBird 2019). Based on available data and habitat criteria, nesting at or near the Project Area is highly unlikely. However, based on historical records and available habitat, the species has a high potential to be present and forage around the study area.

Bald Eagle (*Haliaeetus leucocephalus*), State Endangered, CDFW FP (S3), USFWS BCC, High Potential, Foraging Only. Known to Occur in Study Area.

The Bald Eagle is the second largest bird of prey in North America with a wingspan surpassed only by that of the California Condor (Palmer et al. 1988). Bald Eagles are found throughout North America, with year-round residents along both coasts and near large bodies of water such as rivers, lakes, and reservoirs. Seasonal breeding populations occur throughout most of Canada and Alaska, with these populations wintering through the U.S. and Central America. In California, Bald Eagle breeding is restricted primarily to the northern portion of the state, with a few breeding populations along the coast south of San Luis Obispo and on the Channel Islands (Buehler 2000, NatureServe 2019).

Bald Eagles nest in large trees, on cliffs, or on the ground in treeless regions adjacent to lakes, rivers, estuaries, and dams. Platform nests are constructed out of large sticks and lined with grass, moss, down feathers, and other soft vegetation. Bald Eagles are opportunistic feeders, taking fish, waterfowl, mammals, and even carrion during the winter (Buehler 2000).

Bald Eagles received significant attention during the middle of the 20th century due to precipitous population declines. These population crashes have been attributed to the sub-lethal effects of the organochlorine pesticide DDT (Weimeyer et al. 1993). Human persecution is also thought to have historically contributed to population declines through trapping, poisoning, and egg-collecting (Buehler 2000).

There are records of this species from the Project Area (individuals likely foraging nearshore along the coast (eBird 2019). Coniferous forest habitat adjacent to the Project Area could serve as nesting habitat for the species. Based on available data, the presence of any established breeders at or near the Project Area is currently unlikely. Based on historical records and available habitat, the species has a high potential to be present and forage around the study area.

Long-billed Curlew (*Numenius americanus*), CDFW WL (S2), USFWS BCC, High Potential, Foraging Only. Known to Occur in Study Area.

Long-billed Curlews are the largest shorebird species in North America. They breed in the northwestern U.S. and Canadian prairie states and winter in central California, Baja California, and along the Gulf of Mexico. Long-billed Curlews breed in long and short-grass prairies and build their nests on the ground. Nest are frequently constructed near conspicuous items on the landscape such as rocks, dung piles, or mounds of dirt. Both males and females participate in constructing nest scrapes. Scrapes are lined with dung, pebbles, grass, bark, twigs, and leaves. Both sexes incubate although males primarily take on parental care of chicks. Long-billed

Curlews forage on a variety of invertebrate species, but particularly select shrimp, crabs, and earthworms.

This species has declined in North America as a result of historic overharvesting and habitat loss (Dugger and Dugger 2002). The species does not breed in Humboldt County (Hunter et al. 2005, Leeman and Colwell 2005). There are numerous records of this species from the Project Area (particularly during fall migration and the winter) (eBird 2019). Based on historical records and available habitat, the species is present seasonally and has high potential to occur and forage around the study area.

Black-crowned Night Heron (*Nycticorax nycticorax*), CDFW Special Animals List (S4), High Potential for Foraging. Moderate Potential for Nesting. Known to Occur in Study Area.

Black-crowned Night Herons are year-round residents in much of California, with notable exceptions in the Sierra Nevada Mountains , Central Valley, and the arid southeast portion of the state. These herons can be found in a wide variety of habitats adjacent to water bodies including urban, wetland, partially forested, and agricultural landscapes. Black-crowned Night Herons are colonial nesters and nest with mixed species, building platform stick nests in trees, reeds, cattails, bushes, or on the ground on nearshore islands. As opportunistic feeders, Black-crowned Night Herons eat fish, insects, mammals, birds, carrion, clams, crayfish, turtles, and many other food items (Hothem et al. 2010).

There are numerous records of this species from the Project Area and requisite foraging (and potentially nesting) habitat may be present in the Project Area. Historical rookeries were present on an island in the nearby Eel River Delta (eBird 2019). Based on historical records and available habitat, the species has a high potential to be present and forage within the study area. Due to the cattails and reeds, or similar habitat, this species has a moderate potential to nest within the study area.

Osprey (*Pandion haliaetus*), CDFW WL (S4), High Potential, Fly-over or Foraging Only. Known to Occur in Study Area.

Ospreys have a nearly cosmopolitan distribution and their breeding range throughout North America is widespread. The majority of individuals within the breeding range are migratory (except for individuals in temperate southern areas of their range, e.g., in southern Florida, the Caribbean, southern California, and Baja California). In California, Ospreys breed throughout the state near various bodies of water including inland near rivers, reservoirs and lakes, as well as on the coast near bays, estuaries, and marshes. Specific nest location preferences include: proximity to shallow fish-bearing waters and a nest site free of predators (usually highly elevated but Ospreys nest on the ground on predator-free islands). Ospreys build large stick nests on a wide variety of natural and artificial nest substrates, especially trees, but also large rocks or bluffs, as well as nest platforms, towers supporting electrical lines or cell phone relays, and channel markers. Ospreys feed almost exclusively on fish, but anecdotal observations of non-fish prey have been documented (Bierregaard et al. 2016).

There are records of this species from the study area, including individuals likely foraging nearshore along the coast (eBird 2019). In addition, patches of coniferous

forest adjacent to the Project Area on Table Bluff could serve as nesting habitat for the species. Based on historical records and available habitat, the species has a high potential to be present and forage around the study area.

Bryant's Savannah Sparrow (*Passerculus sandwichensis alaundinus)* CDFW SSC S2S3, High Potential, Foraging and Nesting. Known to Occur in Study Area.

The Bryant's Savannah Sparrow is a subspecies of Savannah Sparrow that occurs year-round in coastal environments from Humboldt Bay south to Point Conception (Wheelwright and Rising 2020). Savannah Sparrows breeding in Humboldt County are considered to be strictly the *P.s. alaudinus* subspecies (those breeding in Del Norte County are considered to be *P. s. brooksi*, although this has not been confirmed via genetic studies). Other subspecies of Savannah Sparrow are present in Humboldt County during the non-breeding season (Hunter et al. 2005, Shuford et al. 2008). The *alaudinus* subspecies is primarily restricted to the coastal fog belt, but individuals have been documented as far 40 km inland in Humboldt County, near the town of Willow Creek (Hunter et al. 2005).

Habitat preferences include grasslands, tidal marshes, sparsely vegetated dunes, and agricultural areas such as dairy pastures (Wheelwright and Rising 2020, Hunter et al. 2005, Shuford et al. 2008). Occupancy of tidal marsh habitat appears to have declined as a result of habitat loss or conversion and no Savannah Sparrows have been recently documented nesting in this habitat in Humboldt County (Hunter et al. 2005, Shuford et al. 2008). In grassland habitat, grass height may be a limiting factor to nesting (i.e. species prefers short grass) (Kwasny 2000). The subspecies breeds from early April to as late as mid-August (Hunter et al. 2005, Shuford et al. 2008). Nests are open cups constructed under dense cover, either on the ground or in clumps of grass or pickleweed. The subspecies feeds on insects, seeds, and fruit (Shuford et al. 2008).

The 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). Due to the suitable habitat and previous observations, this subspecies is assumed to have high potential of occurring in the Project Area.

Double-crested Cormorant (*Phalacrocorax auritus)* CDFW WL, S4, High Potential, Likely Foraging, Possibly Nesting.

Double-crested Cormorants are widely-distributed in North American, with resident populations along the southern coasts and breeding populations in the Canadian and U.S. interior and northern coastal areas (Hatch 1995). Interior and eastern populations are highly migratory (Dorr et al. 2014). In California, Double-crested Cormorants breed along most of the California coast and some inland areas such as the Salton Sea, Central Valley, and Colorado River (Small 1994). Cormorants are associated with aquatic environments such as coastal or aquaculture areas with suitable roosting and loafing sites on rocks, pilings, or sandbars (Dorr et al. 2014). Double-crested Cormorants nest colonially on the ground, cliffs, power poles, rock islands, or trees or shrubs (Stenzel et al. 1995, Chapdelaine and Bédard 2005). Nests are composed of small sticks, seaweed, and trash such as rope, balloons, and

fishing line. Double-crested Cormorants typically feed in shallow, open water fairly close to shore. They are primarily eat fish but also will eat crustaceans, insects, , and amphibians (Palmer 1962, Colman et al. 2005).

In Humboldt County, breeding is restricted to offshore islands, nearshore sea stacks, or structures in Humboldt Bay such as Old Arcata Wharf (Hunter et al. 2005). The Project Area contains suitable foraging habitat. Individuals may also fly over the Project Area on the way to additional foraging habitat on the Pacific Ocean.

Purple Martin (*Progne subis*), CDFW SSC (S3), High Potential, Foraging Only. Known to Occur in Study Area.

The Purple Martin is the largest swallow species in North America. Purple Martins breed throughout the eastern U.S. (with the exception of the north Atlantic states), the Canadian prairie states, the west coast of North America, and the southwest. They winter in Central America. The species breeds colonially in human-made bird boxes, although historically, they nested solitarily in abandoned woodpecker holes. Historical habitat nesting preferences included forest edges, although now the species is found primarily in association with human development. Purple Martins feed almost exclusively on flying insects (Brown and Tarof 2013).

There are several occurrences of this species from the Project Area and the species may forage onsite. Nesting would be precluded as there are no trees or structures onsite. However, based on historical records and available habitat, the species has a high potential to forage within the study area, especially during migration.

Bank Swallow (*Riparia riparia*), State Threatened (S2), Moderate Potential, Foraging Only.

In North American, Bank Swallows breed in most of North America at low elevations in suitable habitat. Breeding ranges extend from Alaska to Northern California, and occasionally occurs in the southern half of the U.S. Wintering grounds occur along the western coast of Central America. In California, Bank Swallows are found in Siskiyou, Shasta, Yolo, Del Norte, Humboldt, and Lassen Counties. Bank Swallows favor open habitat associated with water features such as coastlines, streams, rivers, lake banks, wetlands, agricultural areas, prairies, and riparian woodlands. Bank Swallows generally nest colonially along stream/river banks in burrows excavated perpendicular to the bank. These burrows are lined with grasses, straw, leaves, feathers, and other organic material. Bank Swallows capture insects on the wing but will also consume aquatic insects and larvae (Garrison 1999).

No muddy banks/cliffs for nesting are present in the Project Area. However, there are species reliable nesting records from the Project vicinity, near the confluence of the Van Duzen and Eel River, above Fernbridge, and below Cock Robbin Island above the confluence with the Salt River (eBird 2019). Based on available habitat in the study area, the presence of any established breeding colonies at or near the Project Area is unlikely; however, the species has a moderate potential to be present and forage around the study area based on available habitat.

Rufous Hummingbird (*Selasphorus rufus*), USFWS BCC, (S1S2), High Potential, Foraging Only. Known to Occur in Study Area.

Rufous Hummingbirds breed in Alaska, Western Canada, and Western North America and winter in Baja, Mexico, and along the Gulf Coast. In California, the breeding range is restricted to northwestern coastal areas into the foothills and Sierras. Females build nests in shrubs and trees. Nests are constructed out of spider silk, bark, moss. Rufous Hummingbirds feed on floral nectar, tree sap, and small insects. The species is extremely territorial and defends food resources aggressively (Healey and Calder 2006).

There are records of this species from the study area and suitable foraging habitat for the species may be present onsite (eBird 2019). There is only one documented breeding record for this species in Humboldt County, and breeding onsite is highly unlikely (Hunter et al. 2005). Based on historical records and available habitat, the species has a high potential to be present or forage within the study area.

Yellow Warbler (*Setophaga petechia*), CDFW SSC (S3S4), USFWS BCC, High Potential, Foraging and Nesting. Known to Occur in Study Area.

The Yellow Warbler breeds in northern California along coastal regions all the way to Mexico, as well as inland regions on the eastern side of the Central Valley. However, the entire population winters south of the U.S. border. Yellow Warblers favor riparian willow thickets, disturbed early successional habitats, shrubby wetlands, bogs, wet-deciduous forest, and hedgerows. As such, nesting habitats include a variety of shrub and tree species such as dogwoods, willows, and cottonwoods. Yellow Warblers construct cup nests out of grasses and bark lined with fur, feathers, dandelion fruits, or other seed fibers (Lowther et al. 1999).

There are several occurrences of this species from the study area, and suitable riparian nesting habitat is present on the Table Bluff Slope west of Area E (eBird 2019). Based on available data, the presence of any established breeders in the Project Area is currently unknown. Based on historical records and available habitat, the species has a high potential to be present, forage, or nest within the study area.

Fish

Green Sturgeon – Northern DPS (*Acipenser medirostris)*, CDFW SSC (S1S2), AFS Vulnerable. Moderate Potential.

Green Sturgeon 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 (SWS and Wiyot 2017). The Southern DPS, which was listed as threatened under the Endangered Species Act 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. The Eel River green sturgeon appear to be of the northern Distinct Population Segment (DPS), which are not federally-protected under the Endangered Species Act (ESA) (Stillwater Sciences and Wiyot 2017); however, listed southern

DPS green sturgeon may enter the estuary to feed (Lindley et al. 2011). 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 in CDFW 2015a). This species may utilize McNulty Slough.

Pacific Lamprey (*Entosphenus tridentatus)* CDFW SSC (S3), AFS Endangered. Moderate Potential.

The Pacific Lamprey, *Entosphenus tridentatus* formerly *Lampetra tridentata*, is a primitive fish lacking true fins and jaws of true fishes (Streif 2007, Stillwater Sciences 2010). They appear eel-like and have a sucker-like mouth, no scales, and breathing holes instead of gills (Streif 2007, USFWS 2019). Pacific Lamprey range from the Japan to the Bering Sea in Alaska and along the west coast of North America to central Baja, California (Stillwater Sciences 2010). Widely distributed throughout the Eel River Basin, although population numbers have declined substantially (Stillwater Sciences 2010).

Pacific Lamprey are anadromous with typical spawning from March through July (Stillwater Sciences et al. 2016). Both sexes build redds (nests) where eggs are deposited by moving stones with their mouths, typically in riffles of gravel-bottomed streams and upstream of quality ammocoete (larval lamprey) habitat. Females may lay 30 to 240 thousand eggs (Stillwater Sciences et al. 2016). Adults then die within a few days to a month of spawning (Streif 2007). Ammocoetes hatch within approximately 19 days depending on water temperature (Streif 2007). Upon hatching, ammocoetes move downstream where they settle into silty sandy substrates (Streif 2007). They remain in these areas, often in colonies, for two to seven years filter feeding primarily on algae until they metamorphose into macropthalmia (juveniles; Streif 2007). During this metamorphosis, they develop eyes, a suctoral disc, sharp teeth, and more-defined fins allowing them to be free swimming (Streif 2007, Stillwater Sciences et al. 2016). As macropthalmia, they emigrate downstream to the ocean (Streif 2007). They mature into adults where they are parasitic on a variety of fishes. Adults return to their natal streams following one to three years in the marine environment (Streif 2007). There may be two major life strategies in which some adults spawn immediately upon returning to freshwater and other adults may overwinter in freshwater before spawning (Streif 2007, Stillwater Sciences et al. 2016).

Pacific Lamprey is of particular cultural value to many native indigenous tribes, including the Wiyot Tribe in the larger Fortuna area, and was historically a major fishery in the Eel River basin. Threats to their populations are similar to those experienced by salmonid species (Stillwater Sciences and Wiyot Tribe 2017). These threats include fish passage barriers (e.g. dams), diversions, urban development, mining, pollution, estuary modification, stream and floodplain degradation, declines in prey abundance predation by non-native species, and overharvest (Streif 2007, Stillwater Sciences and Wiyot Tribe 2017).

Pacific Lamprey are common in the Eel River year-round and ammocoetes have recently been documented at Fernbridge (GHD staff pers. obs.). 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. Due to the lack of spawning habitat (freshwater

gravel bottomed streams or riffle habitat), it is assumed that there is moderate potential for non-spawning Pacific Lamprey to be present at the study area. In the Eel River watersheds the primary threats are associated with water quality issues, such as high water temperatures and nutrient loading, as well as watershed management effects on channel morphology and bedload dynamics in the Lower Eel, and predation by Sacramento Pikeminnow (USFWS 2019).

Tidewater Goby (*Eucyclogobius newberryi*), Federally Endangered. High Potential. Known to Occur in Study Area.

Tidewater Goby occurs in coastal lagoons, brackish marshes, and estuaries that are seasonally disconnected from tidal action when sand bars form at the ocean's edge (Moyle 2002), or when structures such as culverts or tide gates mute tidal action (USFWS 2005). Storm events that result in sand bar breaches may disperse gobies up to several kilometers from extant populations (Lafferty et al. 1999a, 1999b). Tidewater Goby spend their entire life cycle in brackish estuaries and require stable low salinity, low velocity refuge habitat during their early life history (Hellmair and Kinziger 2014).

Tidewater Goby regularly occur in the Project Area, particularly in the northern portion of the Project Area (i.e., portions of Areas A and E) (Wallace and Gilroy 2008, Scheiff et al. 2013, Ray 2018b). The closest area designated as critical habitat for Tidewater Goby is located in a slough channel approximately 0.5 mile (0.8 kilometer) east of the Project Area in Cannibal Island located in the Eel River estuary. Designated critical habitat for Tidewater Goby is located in a slough channel approximately 0.5 miles east of the Project Area and within the Eel River estuary.

Coastal Cutthroat Trout (*Oncorhynchus clarkii clarkii*), CDFW SSC (S3). High Potential.

The Coastal Cutthroat Trout ranges from the southernmost extent of its range in the Eel River to Prince William Sound in Alaska. Life history strategies are more variable than for most salmonids (Moyle 2002) and Trotter (1989, 1997) recognized four main life history groupings including sea run, lacustrine, riverine, and stream resident. Ecological requirements are similar to those of Steelhead, and where the two species co-occur, Coastal Cutthroat Trout usually occupy smaller tributary streams (Moyle et al. 2008). Unlike most salmon, and similar to Steelhead, this species may spawn more than once. Adults commonly enter streams during the fall and feed on eggs from salmon redds. Spawning can occur from December through May. Young Cutthroat Trout may spend up to two weeks in the gravel before emerging and from one to nine years in freshwater before migrating to estuaries and ocean in the spring. Coastal Cutthroat Trout usually spend less than one year in salt water before returning to spawn.

Juveniles and adults are carnivorous, feeding mostly on insects, crustaceans, and other fish throughout their lives. In freshwater, adult Cutthroat Trout typically reside in large pools while the young reside in riffles, most commonly in upper tributaries of small rivers. Coastal Cutthroat Trout utilize a wide variety of habitat types during their complex life cycle. They spawn in small tributary streams, and utilize slow flowing backwater areas, low velocity pools, and side channels for rearing of young. Good forest canopy cover, in-stream woody debris, and abundant supplies of insects

are crucial for the young Cutthroat Trout's survival. During the estuarine or ocean phase of life, Cutthroat Trout utilize tidal sloughs, marshes, and swamps as holding areas and feeding grounds.

Despite widespread decline throughout its range, Coastal Cutthroat Trout are present in the Eel River estuary, and the Salt River (Downie and Lucey 2005, Scheiff et al. 2013). This species has been documented in the Eel River estuary as well as lower Eel River tributaries such as the Salt River (CDFW 2015a, CDFW 2019a). Although no Cutthroat Trout have recently been found in McNulty Slough or the Project Area, this species is assumed to either be present or have a high potential to occur in the study area based on nearby occurrences.

Coho Salmon, Southern Oregon-Northern California Coast ESU (*Oncorhynchus kisutch*). Federal Threatened, State Threatened. High Potential. Known to Occur in Study Area.

Coho Salmon in the study area are part of the Southern Oregon Northern California (SONCC) Evolutionarily Significant Unit (ESU). General life history information and biological requirements of SONCC Coho Salmon are described in the NOAA Fisheries' final rule listing SONCC Coho Salmon (May 6, 1997; 62 FR 24588). Adult Coho Salmon typically enter rivers between September and February; entry into the Eel River Estuary is reported to be November to February (Schlosser and Eicher 2012). Spawning occurs from November to January (Hassler 1987) and can extend as late as February or March (Weitkamp et al. 1995). Coho Salmon eggs incubate for 35-50 days between November and March depending on water temperature. Fry start emerging from the gravel two to three weeks after hatching and move into shallow areas with vegetative or other cover. As fry grow larger, they disperse up or downstream. In summer, Coho Salmon fry prefer pools or other slower velocity areas such as alcoves, with woody debris or overhanging vegetation. Juvenile Coho Salmon over-winter in slow water habitat with cover. Juveniles may rear in freshwater for up to 15 months then migrate to the ocean as smolts from March to June (Weitkamp et al. 1995). A small percentage (~15 %) may rear in freshwater for a second year. Estuaries are an important transition area and may be occupied for days to months (Schlosser and Eicher 2012); juvenile Coho Salmon are known to be present in the Eel River estuary in the winter months. Adult Coho Salmon typically spend two years in the ocean before returning to their natal streams to spawn as three-year olds.

Available historical and modern data are summarized by the NOAA Fisheries status review update (NOAA Fisheries 2016), and CDFW's Recovery Strategy for Coho Salmon (CDFG 2004). Coho Salmon stocks between Punta Gorda, California and Cape Blanco, Oregon are depressed relative to past abundance. There is limited data to assess population numbers and trends. The decline of SONCC Coho Salmon is not the result of one single factor, but rather the consequence of a number of natural and anthropogenic factors including dam construction, instream flow alterations, and land use activities coupled with large flood events, fish harvest, and hatchery effects (NMFS 2014, CDFW 2015b). Nearby tributary streams provide potential rearing and spawning habitat for Coho Salmon. Coho Salmon are assumed to be already present in the saltmarsh portions of the Project Area and have been found in adjacent McNulty Slough (Scheiff et al. 2013). Juvenile Coho Salmon were

captured in five of nine monthly samples during 2014 and 2015 at the nearby lower Salt River (Ross Taylor and Associates 2015). In 2019, 315 juvenile Coho Salmon were captured via a single pass with a seine net within Salt River, and two juvenile Coho Salmon were caught in tributary creeks to Salt River (R. Taylor pers. comm. 2020), suggesting that the species is able to readily utilize recently restored tidal marsh habitat.

As noted above, 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). Critical habitat for this species is designated within McNulty Slough. Young of the year Coho Salmon are not expected to utilize habitat in the Project Area in late spring and summer because water temperatures are not suitable (they are greater than 17°C) (Wallace & Gilroy 2008).

Steelhead, Northern California DPS (*Oncorhynchus mykiss*). Winter and Summer Run Federally Threatened; Summer Run State Candidate. High Potential. Known to Occur in Study Area.

Northern California DPS Steelhead include a winter run and a summer run life history. Winter run Northern California Steelhead enter freshwater between November and April and migrate to spawning areas between December and May. Adult summer run northern California Steelhead enter freshwater between April and June and migrate to summer holding areas in the mainstem and Middle Fork Eel River, and Van Duzen River. They spawn between November and January.

Steelhead trout are a unique species. Individuals develop differently depending on their environment. All steelhead trout hatch in gravel-bottomed, fast-flowing, well-oxygenated rivers and streams. Some stay in fresh water all their lives, and are called rainbow trout. Steelhead trout that migrate to the ocean typically grow larger than the ones that stay in freshwater. They then return to freshwater to spawn. Winter run Northern California Steelhead are relatively abundant and widely distributed in the Eel River watershed; conversely, summer run steelhead are less abundant and their distribution is limited to specific areas of the Mainstem and Middle Fork Eel River and Van Duzen River. Like other coastal populations throughout California, steelhead use of the Eel River estuary was undoubtedly extensive with multiple life stages utilizing the estuary throughout the year (NMFS 2016). Spawning and juvenile rearing of Steelhead generally take place in small, moderate-gradient (generally 3-5 percent) tributary streams (Nickelson et al. 1992). Steelhead juveniles rear for one to four years in tributary streams before migrating downriver between February and May. Most Steelhead smolts migrate to sea by June, although juveniles may be present in the estuary all year (Cannata and Hassler 1995; Puckett 1968).

Critical habitat for this species has been designated in the Eel River estuary. 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 (Wallace and Gilroy 2008). Accordingly, this species is assumed to be present or have a high potential to occur in saltmarsh portions of the study area.

Chinook Salmon, California Coastal ESU (*Oncorhynchus tshawytscha*), Federally Threatened. High Potential. Known to Occur in Study Area.

This ESU occurs from Redwood Creek south to the Russian River and includes Chinook Salmon in the Eel River watershed. Populations have declined considerably from historic levels. Spawning populations enter the Eel River estuary from August through January (Schlosser and Eicher 2012). Juvenile Chinook Salmon are reportedly present in the estuary from spring through fall (Cannata and Hassler 1995), and juveniles have been documented both in McNulty Slough (Scheiff et al. 2013) and in the Project Area (Ray 2018a).

Estuaries are highly productive systems representing a mosaic of habitats connecting rivers to the sea, and are highly important for juvenile salmon species to find prey communities, shade, refuge from predation and transitional habitat for the osmoregulatory changes experienced by anadromous fishes (Goertler 2014). Studies and surveys consistently show that juvenile salmonids grow faster in backwater channel, and floodplain habitat as compared to mainstem waterways (Katz 2017, Goergler 2014, Wallace et al. 2018). This is, in part, due to the energy saved from not swimming in channelized, fast moving currents, and due to the available food sources and cover from predators.

Critical habitat for this species is designated in McNulty Slough. As noted above, this species has been documented in the Project Area and is expected to be present during spring outmigration (March through June). Water quality conditions within McNulty Slough appear to be acceptable for outmigrating juvenile Chinook Salmon (Wallace and Gilroy 2008). Accordingly, Chinook Salmon are assumed to be present or have high potential to occur in the tidal portions of the Project Area.

Longfin Smelt (*Spirinchus thaleichthys*), Federal Candidate, State Threatened. High Potential.

Longfin Smelt is a small, pelagic, estuarine fish listed as threatened under the California Endangered Species Act (CESA). This anadromous fish exhibits complex life history patterns, using a variety of habitats from nearshore waters, to estuaries and lower portions of freshwater streams (Garwood 2017). Most of the species approximately two-year lifespan is spent in brackish or saline water, while spawning may occur in freshwater. Spawning is generally from January through March (Moyle 2002).

Spawning was noted in both the Eel River and in tributaries to Humboldt Bay, with pre-and post-spawn individuals observed in tributaries to Humboldt Bay in more recent years (Garwood 2017). Use of nearshore waters was also noted with most longfin smelt collected in shallow waters relatively close to shore in the vicinity of known spawning areas (Garwood 2017). Longfin Smelt were observed in many areas throughout the Eel River estuary and mainstem portions of the Eel River coastal plain (Garwood 2017). Most of the Longfin Smelt data collected in the Eel River estuary has come from two studies, Puckett (1977) and Cannata and Hassler (1995); Cannata and Downie (2009) summarized records as far back as the 1950s. More recently approximately 50-100 Longfin Smelt individuals were captured from lower McNulty Slough in 2007 (M. Wallace pers. comm. 2020), and Longfin Smelt were observed in McNulty Slough in 2009 as well (Schieff et al. 2013). Potentially

suitable habitat is available within the Project Area, which is supported by observations of the species in 2007 and 2009 (Scheiff et. al. 2013). Eight individuals were captured during December 2014 and February 2015 sampling of nearby recently restored Salt River and Riverside Ranch locations, suggesting that Longfin Smelt may be able to colonize portions of the Eel River estuary after tidal action is restored. The species is assumed to be already present in the saltmarsh portions of the study area due to information and accounts described above.

Reptiles

Northwestern Pond Turtle (*Emys marmorata marmorata*)[1], CDFW SSC, Moderate Potential.

Northwestern Pond turtles occur in a variety of permanent and semi-permanent freshwater aquatic habitats including lakes, rivers, ponds, creeks, and marshes. The species also has the ability to regulate their physiology (increase urea concentration, excrete salt, etc.), which allows them to occupy brackish environments, including tidal estuarine marsh (Agha et al. 2019). Nesting occurs on land in areas of loose to hard-packed soils on south or west facing slopes (Rathburn et al. 1992, Reese and Welsh 1997). The species is frequently observed basking on exposed banks, logs, and rocks. Winter activity is possible but limited to unusually warm, sunny days. Normally pond turtles are dormant during winter months on the North Coast, which typically involves the turtle burrowing into loose substrate above the high-water mark (Thompson et al. 2016).

There is one recent (2017) record of this species from the Project vicinity, and freshwater aquatic habitat is present on the north end of Area E in the Project Area (CDFW 2019a). Based on historical and current records and available habitat, Northwestern Pond Turtles are likely restricted to the north end of Area E in the study area.

Amphibians

Northern Red-legged Frog (*Rana aurora*), CDFW SSC, High Potential. Known to Occur in Study Area.

Northern Red-legged Frogs occur along the west coast of North America from British Columbia to California. The geographic range split between the Northern and California Red-legged Frog species occurs just south of Elk Creek in Mendocino County where both species overlap (Nafis 2016, AmphibiaWeb 2019). Northern Red-legged Frogs are typically found near freshwater sources (e.g., wetlands, ponds, streams, etc.). However, they can range widely in uplands and inhabit damp places far from water. Northern Red-legged Frogs reproduce in water from November to March in Humboldt County, with some breeding occurring as late as

[1] Based on molecular analysis, Spinks et al (2014) proposed recognizing all pond turtles north of San Francisco Bay as *Emys marmorata*; many available literature sources refer to the species as *Actinemys marmorata*.

April. Preferred egg laying locations are in “vegetated shallows with little water flow in permanent wetlands and temporary pools” (Nafis 2016).

Northern Red-legged Frogs are relatively common in and near-coastal portions of Humboldt County (AmphibiaWeb 2019). Requisite breeding and dispersal habitat (coastal wetlands and riparian habitat) for the species is present in the Project Area on the north end of Area E and C, and there are numerous records of this species from the Project vicinity (CDFW 2019a, iNaturalist 2019). Based on historical records and available habitat, Northern Red-legged Frogs have a high potential of occurring within freshwater and upland portions the study area.

Invertebrates

Obscure Bumble Bee (Bombus caliginosus), CDFW Special Animals List, Moderate Potential.

The study area falls within the current documented range of the Obscure Bumble Bee and includes the fog-belt coastal habitat preferred by the species (Hatfield et al. 2014). Preferred plants for foraging (such as *Grindelia sp*, *Baccharis sp*., and *Lupinus sp*.) are present on or adjacent to the Project Area. California Department of Fish and Wildlife records have documented the species in Humboldt County (CDFW 2019a). In addition, the species was recorded during *Bombus* surveys on the North Spit of Humboldt Bay and Lanphere Dunes in 2010 (Julian 2012). Based on historical records and available habitat, Obscure Bumble Bees have a moderate potential of occurring within the study 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

ST = State Threatened

SC = State Candidate

SD = State Delisted

SNR = State Not Ranked

MMPA = Marine Mammal Protection Act Protection

SR = State Rare

SSC = CDFW Species of Special Concern

CWL = CDFW Watch List

CDFW Special Animal List State Ranking:

- S1: Critically Imperiled
- S2: Imperiled
- S3: Vulnerable
- S4: Apparently Secure
- S5: Secure

WBWG = Western Bat Working Group (independent group composed of agencies, organization 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 future is considered unlikely.

AFS = American Fisheries Society

- EN: Endangered
- TH: Threatened
- VU: Vulnerable

Potential to Occur:

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

<u>Low Potential:</u> 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.

<u>Moderate Potential:</u> Some of the habitat components meeting the species requirements are present and/or only some of the habitat on or adjacent to the Project Area is unsuitable. 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. The species has a high probability of being found in the Project Area.

References

Agha, M., Yanagitsuru, Y.R., Fangue, N.A., Nowakowski, A.J., Kojima, L.V., Cech Jr, J.J., Riley, M.K., Freeman, J., Cocherell, D.E. and Todd, B.D., 2019. Physiological consequences of rising water salinity for a declining freshwater turtle. Conservation Physiology, 7(1), p.coz054.

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.

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.

CDFW (California Department of Fish and Wildlife). 2015a. 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). 2015b. California State Wildlife Action Plan, 2015 update. Volume 1, Ch 5.1 North Coast & Klamath Province. Ascent Environmental, Inc. Foundations of Success, Blue Earth Consultants, LLC.

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). 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 (CNDDB) Rarefind. Sacramento, California.

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 (Sprinchus thalyichthys) occurring in CDFG northern region. CDFG, Fortuna CA.

Chapdelaine, G. and J. Bédard. 1995. Recent changes in the abundance and distribution of the Double-crested Cormorant in the St. Lawrence River, estuary and gulf, Quebec, 1978-1990. Colonial Waterbirds 18:70-77.

Coleman, J. T. H., M. E. Richmond, L. G. Rudstam and P. M. Mattison. 2005. Foraging location and site fidelity of the Double-crested Cormorant on Oneida Lake, New York. Waterbirds 28:498-510.

Colwell, M. A., C. B. Millett, J. J. Meyer, J. N. Hall, S. J. Hurley, S. E. McAllister, A. N. Transou, and R. R. LeValley. 2005. Snowy Plover reproductive success in beach and river habitats. Journal of Field Ornithology 76:373-382.

Dorr, B. S., J. J. Hatch and D. V. Weseloh. 2014. Double-crested Cormorant (Phalacrocorax auritus). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; retrieved from the Birds of North America Online Available at: http://bna.birds.cornell.edu/bna/species/441.

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 nicricans*) on South Humboldt Bay, California. Master Thesis, Humboldt State University, CA, U.S.A.

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. 2017. Historic and contemporary distribution of Longfin Smelt (*Spirinchus thaleichthys)* along the California Coast. California Department of Fish and Wildlife.

Goertler, P. 2014. Juvenile Chinook salmon (Oncorhynchus tshawytscha) life history diversity and growth variability in a large freshwater tidal estuary. Thesis. University of Washington.

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.

Hatch, J. J. 1995. Changing populations of Double-crested Cormorants. Colonial Waterbirds 18:8-24.

Hawes, S.D. 1983. An evaluation of California sea lion scat samples as indicators of prey importance. Master's Thesis. San Francisco State University.

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.

Herder, M. J. 1986. Seasonal movements and hauling site fidelity of harbor seals, Phoca vitulina richardsi, tagged at the Russian River, California. MS Thesis. Humboldt State University.

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.

Hothem, 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.

Hunter, J.E., D. Fix, G.A. Schmidt, and J.C. Power. 2005. Atlas of the breeding birds of Humboldt County, California. Redwood Region Audubon Society.

iNaturalist. 2019. Observations. iNaturalist Department, California Academy of Sciences and National Geographic Society, San Francisco, CA, USA. https://www.inaturalist.org.

Jacobs, R.A. 1986. Snowy plover (*Charadrius alexandrinus*). Section 4.4.1, U.S. Army Corps of Engineers Wildlife Resources Management Manual, Technical Report EL-86-54, Portland, OR. 25 pp.

Julian, L. J. 2012. A comparison of bee fauna in two northern California coastal dune systems. Masters Thesis. Humboldt State University.

Katz JVE, Jeffres C, Conrad JL, Sommer TR, Martinez J, Brumbaugh S, et al. 2017. Floodplain farm fields provide novel rearing habitat for Chinook salmon. PLoS ONE 12(6): e0177409.

Kwasny, D. C. 2000. Reproductive response of Savannah Sparrows (*Passerculus sandwichensis*) to livestock grazing at Humboldt Bay National Wildlife Refuge. M.S. thesis, Humboldt State Univ., Arcata, CA.

Kushlan, J.A., 1973. Bill-vibrating: A prey-attracting behavior of the Snowy Egret, *Leucophoyx thula*. *American Midland Naturalist*, pp.509-512.

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.

Leeman, T.S. and Colwell, M.A., 2005. Coastal pasture use by Long-billed Curlews at the northern extent of their non-breeding range. *Journal of Field Ornithology*, *76*(1), pp.33-39.

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.

Mad River Biologists and Pacific Watershed Associates (MRB/PWA). 2004. Bracut Marsh Ecologica Reserve Final Monitoring Report. Submitted to State Coastal Conservancy, November 5, 2004.

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.

Meyerriecks, A.J., 1959. Foot-stirring feeding behavior in herons. *The Wilson Bulletin*, *71*(2), pp.153-158.

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.californiaherps.com.

NMFS (National Marine Fisheries Service). 2014. 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

NOAA (National Oceanic and Atmospheric Administration) Fisheries. 2018a. NOAA Fisheries Marine Mammal Stock Assessment Reports by Species/Stock. Available at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock.

NOAA (National Oceanic and Atmospheric Administration) Fisheries. 2018b. Species Directory. Available at: https://www.fisheries.noaa.gov/species-directory.

Native Fish Society (2019). Eel River. Native Fish Society, Oregon City, OR, USA. https://nativefishsociety.org/watersheds/eel-river.

NatureServe. 2019. NatureServe Explorer. An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at: http://explorer.natureserve.org/index.htm.

NatureServe. 2020. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at: http://explorer.natureserve.org.

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.

Ougzin, A.M. 2013. Foraging behavior of the Pacific harbor seal (*Phoca vitulina richardsi*) in Humboldt Bay, California. Master’s Thesis. Humboldt State University.

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. 1962. Handbook of North American Birds, Vol. 1: Loons through Flamingos. New Haven: Yale University Press.

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.

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.

Prescott, D. R. C. 1986. Polygyny in the Willow Flycatcher. The Condor 88:385-386.

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.

Rathbun, G.B., Siepel, N. and Holland, D., 1992. Nesting behavior and movements of western pond turtles, Clemmys marmorata. *The Southwestern Naturalist*, *37*(3), pp.319-324.

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.

Reese, D.A. and Welsh, H.H., 1997. Use of terrestrial habitat by western pond turtles (Clemmys marmorata): implications for management. In *Pages 352-357 in Proceedings: Conservation, Restoration, and Management of Turtles and Tortoises. An International Conference. New York Turtle and Tortoise Society*.

Revised Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover; Final Rule**,** 77 Fed. Reg. 118 (June 19, 2012). *Federal Register: The Daily Journal of the United States*. Web. 19 June 2012.

R. Taylor. 2020. Fisheries Biologist, Ross Taylor and Associates. Personal Communication. Email February 29.

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.

Sedgwick, J. A. 2000. Willow Flycatcher (*Empidonax traillii*). In P. G. Rodewald, Editor. The Birds of North America. Ithaca: Cornell Lab of Ornithology. Available at: https://birdsna.org/Species-Account/bna/species/wilfly.

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 Gardali, T., 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.

Small, A. 1994. California birds: their status and distribution. Ibis Publishing Company. Vista, CA.

SDBWG (South Dakota Bat Working Group). 2004. South Dakota bat management plan. South Dakota Bat Working Group, Wildlife Division.

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

Stenzel, L. E., H. R. Carter, R. D. Henderson, S. D. Emslie and J. D. Rauzon. 1995. Breeding success of Double-crested Cormorants in the San Francisco Bay area, California. Colonial Waterbirds 18:216-224.

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, CA, USA.

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 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, CA, for National Oceanic and Atmospheric Administration, Fisheries Species Recovery Grants to Tribes, Silver Springs, MD, USA.

Streif, B. (2007). Pacific Lamprey Fact Sheet. US Department of the Interior, Fish and Wildlife Service, Portland Fish and Wildlife Service Office, OR, USA.

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.

USFWS (U.S. Fish and Wildlife Service). 2002. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, NM.

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). 2019). Pacific Lamprey *Entosphenus tridentatus* Assessment. February 1. Available at: https://www.fws.gov/pacificlamprey/Documents/PacificLamprey_2018Assessment_final_02282019.pdf.

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.

Wallace, M., E. Ojerholm, A. Scheiff, S. Allen. 2018. Fisheries Restoration Grant Program Final Report Contract P1310520. January.

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.

Wheelwright, N. T. and J. D. Rising. 2020. Savannah Sparrow (*Passerculus sandwichensis*), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.savspa.01

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.

Willard, D. E. (1977). The feeding ecology and behavior of five species of herons in southeastern New Jersey. Condor 79:462-470.

Wrege, P. H. and T. J. Cade. 1977. Courtship behavior of large falcons in captivity. Journal of Raptor Research 11:1-46.