2. Project Description

2.1 Project Location and Setting

The Ocean Ranch Unit (ORU) of the Eel River Wildlife Area (ERWA) is located north of the mouth of the Eel River and northwest of the community of Loleta in Humboldt County, California (Figure 2-1 – Vicinity). 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 approximate 2,600 acre (1,052 hectare) ERWA, is owned and managed by the California Department of Fish and Wildlife (CDFW) as fish and wildlife habitat and for public recreational uses. The north spit of the Eel River was acquired from the State Lands Commission in 1951 as the first property in the ERWA, and included the dune restoration portion of the present day ORU. The estuary portion of the ORU was purchased by CDFW in 1986.

Historically, much of the area that is now the ORU was estuarine saltmarsh. 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. Once acquired by CDFW, management of Ocean Ranch transitioned out of dairy production and towards shallow freshwater and estuarine wildlife habitat for waterfowl and other native wildlife. At that time, the Ocean Ranch property was divided into five distinct management areas, denoted as Areas A through E, to support wildlife habitat management. In 1994 a levee breach occurred along McNulty Slough (east side of Area A) and caused tidal inundation of Area A. The breach, in combination with subsequent failures of other water control structures within Ocean Ranch and between Ocean Ranch, McNulty Slough and North Bay, resulted in decisions to discontinue management and maintenance of artificial freshwater wetland habitat and have allowed most of the area to revert to saltmarsh or brackish marsh (Ducks Unlimited, Inc. 2015).

Restoration activities proposed under the Ocean Ranch Restoration Project (Project) would occur within an 850 acre (344 hectare) restoration area within the ORU, including approximately 571 acres (231 hectares) of saltmarsh and 279 acres (113 hectares) of coastal dunes along the north spit of the Eel River (Figure 2-2 – Project Area). Restoration activities within the existing saltmarsh are proposed to improve tidal exchange, control invasive plant species (including dense-flowered cordgrass [*Spartina densiflora*] and dwarf eelgrass [*Zostera japonica*]) and restore native tidal marsh habitat. Restoration activities within the coastal dunes would focus on eradication of European beachgrass (*Ammophila arenaria*), an invasive non-native plant species.

Restoration of Ocean Ranch to saltmarsh 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. Invasive plant control both within the estuarine and dune restoration areas is proposed to improve

native species diversity and ecosystem function. Dense-flowered cordgrass, which is widespread in Areas A through D, reduces saltmarsh productivity, displaces and outcompetes native saltmarsh vegetation, degrades foraging habitat for and reduces diversity of native birds and migratory waterfowl, reduces invertebrate and algal diversity, and alters saltmarsh morphology and channel habitat by forming dense meadows in open water areas and mudflats (SFEISP 2017). Non-native dwarf eelgrass has the potential to colonize mudflats, bind sediments and impact habitat for shorebirds and mud dwelling and burrowing organisms. European beachgrass, which was established on the north spit of the Eel River in the 1970s and now dominates the dunes along the western boundary of the ORU, forms a dense monoculture that outcompetes native plant communities, contributes to the decline of certain native plants, limits dune function (e.g., limits sand movement), and decreases shorebird nest success by displacing nesting sites and enhancing cover for predators (Pickart 1997). Control and eradication of these invasive plants would improve ecological function and habitat diversity in the restoration area to the benefit of native fish and wildlife species (including State and Federally-listed species), Sensitive Natural Communities, and water quality.

2.2 Project Goals and Objectives

The Project goals 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 (Goal 1)
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 Sensitive Natural Communities (Goal 2)

2.2.1 Goal 1 – Estuarine Restoration

The primary objective of the estuarine restoration component of the Project is to restore the natural tidal prism[1] and improve connectivity of tidal and freshwater habitats within the ORU. Supplementary objectives of Goal 1 include:

- Improve the complexity of the channel network within the ORU relative to existing conditions
- Maintain the existing level of flood protection for adjacent private landowners
- Control invasive dense-flowered cordgrass and other non-native plant species, including dwarf eelgrass
- Improve public access
- Reestablish a permanent elevation benchmark within the ORU to monitor sea level rise and/or tectonic subsidence or uplift

[1] For the purposes of this document, tidal prism is defined as the change in the volume of water covering an area, such as a wetland, between low tide and the subsequent high tide (NAVD88).

- Continue to monitor habitat characteristics, distribution of target populations, and ecosystem processes to evaluate progress towards the goal
- Allow for adaptive management of the ORU as conditions, needs, and goals evolve

2.2.2 Goal 2 – Dune Restoration

The primary objective of the dune restoration component of the Project is to restore Sensitive Natural Communities and dune function within the restoration area. Supplementary objectives of Goal 2 include:

- Eradication of invasive European beachgrass and other invasive plant species found in dune habitats, such as iceplant (*Carpobrotus edulis*) and yellow bush lupine (*Lupinus arboreus*)
- Expand native dune mat community and associated native species, including the State and Federally-listed endangered beach layia (*Layia carnosa*)
- Maintain public access
- Allow for adaptive management and native plant reintroductions as conditions, needs and goals evolve
- Minimize any new non-native plant species invasion through vigilance and early response

2.3 Project Overview

As described above, the Project includes restoration and enhancement of saltmarsh and dune habitats within an 850 acre (344 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 invasive plants. Enhancement of dune function would be accomplished by eradication of invasive plant species, primarily European beachgrass, and reestablishment of native dune mat natural communities.

Table 2-1 Project Component Summary, describes the activities relating to estuarine restoration, invasive plant management and public access. The estuarine restoration activities proposed under the Project include the following:

- Breach external and internal levees
- Lower portions of the external levee along McNulty Slough
- Remove portions of internal levees
- Excavate tidal channels
- Create transitional high marsh habitat
- Construct habitat ridges
- Install ditch plugs and fill internal ditches
- Install large wood habitat structures

Invasive plant management activities include:

- Controlling dense-flowered cordgrass with mowing, grinding, excavation, prescribed burning, and/or herbicide application methods
- Controlling dwarf eelgrass using mechanical excavation and smothering methods
- Eradicating European beachgrass using manual, mechanical, prescribed burning and/or herbicide application methods

Public access improvements include:

- Improving the access road into the restoration area
- Improving the existing parking area
- Constructing a new parking area
- Installing a non-motorized boat put-in
- Establishing a formal trail system
- Installing interpretive signage

Table 2-1 Project Component Summary

Project Component	Description
Estuarine Restoration	
External Levee Breach	Construct four external levee breaches along North Bay and McNulty Slough
Internal Levee Breach	Construct four internal levee breaches within restoration area
Tidal Channel Excavation	Excavate up to 8,520-linear feet (2,515 meters) of internal tidal channels
Levee Lowering	Lower up to 14,650-linear feet (4,465 meters) of external levees along McNulty Slough
Levee Removal	Remove up to 2,460-linear feet (750 meters) of internal levees between Areas B, C, and D, and between Areas A and B
High Marsh Creation	Place soil in lower lying areas to establish higher elevation marsh habitat and improve water conveyance within the restoration area
Habitat Ridges	Place un-engineered spoil piles (i.e., habitat ridges) adjacent to tidal channels to guide formation and accelerate revegetation
Ditch Blocks and Ditch Fill	Install earthen plugs (i.e., ditch blocks) and fill borrow ditches to guide natural channel formation and facilitate accretion of sediment

Project Component	Description
Large Wood Installation	Install large wood structures in tidal channels in Areas A and B, and along the lowered portions of the McNulty Slough perimeter levee, to improve aquatic species habitat
Invasive Plant Management	
Dense-flowered Cordgrass Control	Targeted control of dense-flowered cordgrass on up to 571 acres (231 hectares) using mowing, grinding, excavation, prescribed burning, and/or herbicide application methods
Dwarf Eelgrass Control	Targeted control of dwarf eelgrass populations in McNulty Slough using manual removal and smothering methods
European Beachgrass Control	Targeted control of European beachgrass on up to 279 acres (113 hectares) using manual, mechanical, prescribed burning and/or herbicide application methods
Public Access	
Public Access Improvements	Public access improvements include the following: – Improved access road and gate – Improved parking areas – Formalized public trail system – Non-motorized boat put-in – Interpretive signage

2.4 Proposed Project Construction Components

The location of the proposed Project components, which are further described in the following subsections, are illustrated in Figure 2-3 – Proposed Project Components.

2.4.1 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, to McNulty Slough at historic slough locations. Areas A, B, C, and E would be interconnected through four internal levee breaches, designated as BI-1 through BI-4.

The maximum width of external breaches would be between 30 feet (9 meters) and 140 feet (43 meters) wide, with the widest breaches located at BR-1 and BR-2. Internal breaches would have a maximum width between 30 feet (9 meters) and 100 feet (30 meters), with the widest breach at BI-1.

The Project would not affect the existing breach from McNulty Slough into Area A.

2.4.2 Tidal Channels

Up to 8,520 linear feet (2,597 meters) of new tidal channels would be excavated under the Project. Table 2-2 summarizes the maximum dimensions (lengths and widths) planned for these channels. A new 860-foot (262 meter) long channel would be excavated south from BR-1, connecting Area A to North Bay. 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.

Table 2-2 Channel Dimensions

Channel Location	Channel Length Linear Feet (Meters)	Channel Width at MHHW Linear Feet (Meters)
North Bay	860 (262)	140 (43)
Area A	2,390 (728)	140 (43)
Area B	3,410 (1,039)	100 (30)
Area C	975 (297)	50 (15)
Area E	885 (270)	30 (9)

Notes:

- Units are reported in linear feet (LF) with meters (m) noted in parentheses
- MHHW = Mean higher high water (NAVD88)

2.4.3 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 lowered. Sections of the perimeter levee left intact would be used to maintain upland refugia and roosting habitat for shorebirds and waterfowl and to provide wave refraction during flood events. Perimeter levees would be either lowered to a crest elevation of eight feet[2] or lowered to marsh plain elevation, depicted in Figure 2-3 as purple and pink lines, respectively. 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.

[2] All elevations are in North American Vertical Datum (NAVD) 1988.

2.4.4 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 (see Section 2.7.2, Construction Equipment and Methodology), 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.

2.4.5 Habitat Ridges

Habitat ridges are non-engineered earthen 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 (i.e., approximately the level of mean higher high water [MHHW]), and allowed to develop as high marsh vegetation.

2.4.6 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.

2.4.7 Large Wood

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

2.4.8 Beneficial Reuse of Excavated Sediments

All soil excavated to construct the estuarine 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, creating habitat ridges, installing ditch plugs, repairing damaged levees and berms that would be lowered to crest elevation, and repairing damaged levees and berms not proposed for removal including but not limited to the location between Areas A and B (northern portion) and within Area E that would not otherwise be removed or lowered. 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 or exported from the Project Area for estuarine restoration activities.

2.5 Proposed Invasive Plant Management

2.5.1 Dense-Flowered Cordgrass Management

Up to 571 acres (231 hectares) would be treated to remove dense-flowered cordgrass after the estuarine restoration component of the Project is complete using one or more of the methods described in the following subsections. The methods utilized to control dense-flowered cordgrass would be carried out using a series of treatments implemented over time based on seasonality, weather, tides, labor availability, and other factors.

Figure 2-4 – Dense-flowered Cordgrass Cover (2017) illustrates the most recent mapped locations of dense-flowered cordgrass within the Project Area (CDFW 2017). Areas of dense-flowered cordgrass treatment are shown in Figure 2-3, and generally correspond with the locations mapped in Figure 2-4. Proposed treatment methods are generally consistent with those outlined in the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey 2013). The descriptions of these methods below are derived, in part, from the Programmatic Final EIR for the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey 2013 and GHD 2013).

In general, treatments would occur outside the avian nesting window (i.e., between August 1 and March 15). One primary treatment, such as mowing or grinding, and one secondary treatment, such as prescribed burning or herbicide application, would be applied in the first year (Year 1), with follow-up treatments implemented annually thereafter (as needed and as funding allows). It is anticipated that the first treatment of dense-flowered cordgrass would occur after implementation of the estuarine restoration component of the Project has been completed.

2.5.2 Dense-Flowered Cordgrass Treatment Methods

Top Mowing

Top-mowing would involve cutting above-ground stems, leaves, and flowering stalks, typically using handheld gas-powered equipment (e.g., tri-bladed brushcutter, corded weedwhacker) or heavy equipment (e.g., Marshmaster outfitted with mowing attachment). Examples of handheld and heavy equipment are depicted on Image 2-1 – Representative Vegetation Removal Equipment. Biomass generated during and as a result of mowing would be left in place to decompose or to be washed away by the tide; tilled into the soil as mulch during grinding (see below); and/or raked into piles and burned.

Mowing would be used to clear aboveground vegetation in preparation for other treatments, such as grinding or herbicide application, or could be used as a seed suppression measure. In general, handheld equipment would be used to mow areas with low to moderate cordgrass density, limited access, or for seed suppression where handheld equipment can readily remove seedlings without compacting or disturbing too much soil. Heavy equipment would be used to treat larger areas, or areas supporting dense stands of dense-flowered cordgrass.


Image 2-1 – Representative Vegetation Removal Equipment. Handheld brushcutter (left) used to remove above-ground vegetation. Marshmaster (right) used to mow larger areas and grind (via rototiller) dense-flowered cordgrass rhizomes. Photo credit: A. Pickart (USFWS 2017)

Grinding

Grinding involves the use of gas-powered hand tools (e.g., brushcutter), or heavy equipment (e.g., Marshmaster outfitted with a rototiller attachment), to target dense-flowered cordgrass rhizomes below the soil surface. After aboveground vegetation has been removed, the blades of the brushcutter or rototiller are advanced vertically or diagonally into the substrate to grind (macerate) the root crown and rhizomes into small fragments. Grinding depths typically extend three to six inches below the ground surface, with precise depths depending on site conditions and the maturity and density of the dense-flowered cordgrass stand. Follow-up treatments, which are less intensive than the initial grinding, are typically required to address re-sprouts that regenerate from rhizome fragments remaining in the soil.

Tilling

An alternative to grinding is tilling, where a mini-tiller may be used to macerate rhizomes. Mini-tillers, if utilized, are most advantageous when dense-flowered cordgrass cover is less than 50 percent (H.T. Harvey and GHD 2013).

Excavation

Excavation involves complete removal of the plant, including rhizomes, either by hand or using heavy equipment. Excavated material would subsequently be stockpiled and buried onsite, or chipped onsite using brush cutters and used for mulch. In addition, dense-flowered cordgrass may be buried during restoration activities (e.g., in high marsh or habitat ridge areas), as appropriate.

Flaming

Flaming is a form of weed control in which a flame is passed over a plant until it wilts, causing the fluid in the plant's cells to expand and rupture and ultimately killing the plant (H.T. Harvey and GHD 2013). Flaming would utilize handheld propane torches to deliver a small controlled flame to a targeted plant. Since flaming is not an effective method to kill mature dense-flowered cordgrass plants, it would only be used to treat dense-flowered cordgrass seedlings under the Project.

Prescribed Burning

Prescribed fire may be used to remove aboveground plant material (biomass) prior to manual, mechanical, or herbicide applications. All prescribed fire treatments would be conducted in accordance with an approved Burn Plan coordinated with the California Department of Forestry and Fire Protection (CAL FIRE). The Burn Plan would be developed and implemented to ensure that prescribed burns are conducted in compliance with regulations and that the risk of uncontrolled wildfire is minimized. Recommended actions in the approved Burn Plan may include, but are not limited to:

- Evaluation of vegetation community and dominant species, topography, vegetation moisture, wildlife/fisheries habitat, and presence of cultural resources.
- Evaluation of smoke patterns and community sensitivity to prescribed burns.
- Provision and use of adequate fire suppression equipment.
- Use of spark arrestors on internal combustion engines and separation of equipment from flammable materials.
- Advanced notification to the public on the timing and location of prescribed burns.
- Development and implementation of a contingency plan to implement initial actions or trigger the need for additional resources if the prescribed burn exceeds or threatens to exceed the Project Area boundary, or is not meeting the objectives, prescribed burn parameters, minimum implementation organization, smoke management objectives, or other prescribed burn elements stated within the Burn Plan. The contingency plan would identify potential additional resources, should they be needed, and the maximum acceptable response time for those resources.
- The Incident Commander shall have final authority to amend, approve and implement the Burn Plan to achieve the Project objectives related to burning treatments. The Loleta Fire Protection District shall be listed as a Participating Agency in the Burn Plan.

Prescribed burning is the only dense-flowered cordgrass treatment method proposed by the Project that was not previously considered and analyzed in the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey 2013) and associated Programmatic EIR (H.T. Harvey and GHD 2013). Prescribed burning is considered a possible treatment method under the Project due to the large-scale stands of dense-flowered cordgrass that occur in the restoration area, as well as the significant amount of large wood onsite that may make mowing or excavation difficult. Prescribed burning would be used as an initial treatment method to reduce invasive plant biomass. Subsequent manual, mechanical or herbicide applications would be applied following prescribed burning to target removal of underground rhizomes.

Herbicide Application

Eradication of non-native plants through use of herbicide involves the application of herbicide, typically sprayed on plant leaves during the active growing season. Under the Project the herbicide Imazapyr, in conjunction with mechanical treatments (e.g., mowing, grinding), could be used to control dense-flowered cordgrass where other methods have proven ineffective, or where treatment costs would be substantially reduced. Herbicide applications would be performed by a Qualified Applicator, or under the supervision of a Qualified Applicator, in accordance with the manufacturer's recommendations for aquatic use and application. Herbicide would be applied by workers moving through the marsh on foot using backpack sprayers or wick applicators. Alternatively, herbicide would be applied from spray equipment mounted on boats, trucks, or amphibious tracked vehicles. This Project would not include aerial applications of herbicide, such as broadcasting herbicide from helicopters or airplanes.

2.5.3 Dwarf Eelgrass Management

Stands of dwarf eelgrass were observed adjacent to the estuarine restoration area and within McNulty Slough between 2008 and 2011 (K. Ramey pers. comm. 2018). Although recent (2018) surveys of McNulty Slough did not detect the species, if observed in the future, dwarf eelgrass would be removed from McNulty Slough using mechanical control or smothering, as described below.

Control of dwarf eelgrass under the Project would occur on the Ocean Ranch side (west side) of McNulty Slough, from the edge of the perimeter levee to mean low water. As warranted by eelgrass survey observations, 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.

2.5.4 Dwarf Eelgrass Treatment Methods

Manual Removal

Manual removal would utilize hand tools (e.g., shovels) to detach rhizomes while the top of the plant is pulled by hand. Plant material would be placed onsite in a stable location above MHHW.

Smothering

Smothering would involve placing burlap fabric on top of stands of dwarf eelgrass and covering the burlap with native silt to smother the rhizomes.

2.5.5 European Beachgrass Management

Up to 279 acres (113 hectares) of European beachgrass would be removed from the dune restoration area with management efforts concentrated in an area defined as the Primary Treatment Area. The Primary Treatment Area is comprised of the northern 2.6 miles (4.2 kilometers) of shoreline and generally corresponds to the 207 acres (84 hectares) having the highest European beachgrass cover (61 percent to 100 percent) in the restoration area, mapped in 2017 and shown in Figure 2-5 – Primary and Secondary European Beachgrass Treatment Areas. The Secondary

Treatment Area includes the southerly one mile (1.6 kilometers) of shoreline and generally corresponds to the 72 acres (29 hectares) having lower European beachgrass cover (less than 61 percent cover) (Figure 2-5).

Removal of European beachgrass within both the Primary and Secondary Treatment Areas would be phased, as described below and summarized in Table 2-3. 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 re-applied with herbicide if they re-sprout after initial treatments.

European Beachgrass Management Phasing

Removal of European beachgrass within the restoration area would be phased temporally and spatially to reduce edge effects and provide native vegetation time to re-establish. Native vegetation is needed to reduce wind speeds, trap sand, and semi-stabilize the dune surface. In general, European beachgrass treatments in both treatment areas would occur between August 1 and March 15 to avoid the nesting bird season. In areas of Western Snowy Plover (*Charadrius alexandrines*) nesting, treatments would generally occur between September 16 and March 15 unless, based upon survey data and site-specific conditions, CDFW and the U.S. Fish and Wildlife Service (USFWS) approve a wider season of treatment.

Primary Treatment Area

Removal of European beachgrass from the Primary Treatment Area would generally occur over a six-year period in two phases. Phase 1 would treat five approximately 1,312 feet (400 meters) long plots, each spatially separated by approximately 1,312 feet (400 meters), beginning at the northern boundary of the restoration area. Phase 2 would treat an additional five approximately 1,312 feet (400 meters) long plots covering areas not treated during Phase 1. It is important to note that the initial treatments in either phase, as summarized in Table 2-3, could also occur after the avian nesting season (generally after August 1 through March 15), depending on the year and on Western Snowy Plover ground survey results.

In total, approximately 207 acres (84 hectares) of European beachgrass would be targeted for removal from the Primary Treatment Area under both phases.

Table 2-3 provides a conceptual schedule and treatment approach for European beachgrass removal within the Primary Treatment Area.

Table 2-3 Conceptual Schedule and Treatment Methods for European Beachgrass Primary Treatment Area

Year	Activity	Treatment Method (Timeframe)	Initial Treatment Area Size
1	Initial Treatment Phase 1 / Baseline Monitoring	Burn Phase 1 Plots (February-March) Apply Herbicide to Phase 1 Plots (August)	104 acres (42 hectares)
2	Monitoring & Adaptive Management Phase 1	Plant Phase 1 Plots (January) Reapply Herbicide to Phase 1 Plots (as needed) (May)	
3	Initial Treatment Phase 2 / Monitoring & Adaptive Management Phase 1	Manually Remove Re-sprouts from Phase 1 Plots (January) Re-Plant Phase 1 Plots (as needed) (January) Burn Phase 2 Plots (February-March) Apply Herbicide to Phase 2 Plots (August)	103 acres (42 hectares)
4	Monitoring & Adaptive Management Phase 2	Plant Phase 2 Plots (January) Reapply Herbicide to Phase 2 Plots (as needed) (May)	
5	Monitoring & Adaptive Management Phases 1 & 2	Manually Remove Re-sprouts from Phase 1 & 2 Plots (January) Re-Plant Phase 2 Plots (as needed) (January)	
6	Monitoring & Adaptive Management Phases 1 & 2	Manually Remove Re-sprouts from Phase 1 & 2 Plots (January)	

Secondary Treatment Area

Similar to the Primary Treatment Area, removal of European beachgrass from the Secondary Treatment Area would occur over several years and could utilize all of the treatment methods noted in

Table 2-3 and described in Section 2.5.6 below (i.e., prescribed burning, herbicide application, manual removal, and mechanical removal). Treatments would take advantage of natural breaks in the plant communities and would likely reflect a "spot treatment" approach, rather than removal of European beachgrass from contiguous plots. It is anticipated that invasive plant management within the Secondary Treatment Area would occur after management of the Primary Treatment Area (which is considered the priority treatment area), and may need to be modified (scope, location) to account for natural fluctuations in the morphology of the Eel River estuary.

2.5.6 European Beachgrass Treatment Methods

Prescribed Burning

Prescribed burning may be used to remove aboveground biomass prior to manual, mechanical, or herbicide application. All prescribed burn treatments would be conducted in accordance with an approved Burn Plan coordinated with CAL FIRE. The Burn Plan would be developed and implemented to ensure that prescribed burns are conducted in compliance with regulations and that the risk of uncontrolled wildfire is reduced to low. Recommended actions to include in the Burn Plan would be similar to those summarized under "Prescribed Burning" in Section 2.5.5.

Herbicide Application

Similar to the estuarine restoration portion of the Project, the herbicide Imazapyr could be applied in the Primary and Secondary Treatment areas within the dune restoration portion of the Project to kill rhizomes after prescribed burning, or to selectively treat target re-sprouts after mechanical or manual removal efforts. Herbicide applications would be performed by a Qualified Applicator or under the supervision of a Qualified Applicator, in accordance with label requirements. Herbicide would be applied using backpack sprayers or wick applicators, depending on the need for selective control. The Project would not include aerial applications of herbicide (broadcast using helicopter or airplane).

Manual Removal

Manual removal would utilize hand tools (e.g., shovels) to detach rhizomes while the top of the plant is pulled and piled by hand. Excavation using hand tools would extend less than two feet (0.6 meters) below the ground surface, and sidecast plant material would either be burned in piles or allowed to decompose on site. After initial removal, work crews would return during the growing season to remove any plants that re-sprout from remaining rhizomes. Maintenance treatments would likely occur for two growing seasons. Additional maintenance treatments beyond the first and second growing seasons would occur, as needed, based on the abundance of re-sprouting plants.

In general, hand removal would be utilized in the most sensitive areas, such as areas proximate to known populations of beach layia, and to remove plants that re-sprout after other treatment methods have been employed.

Mechanical Removal

Mechanical removal would utilize heavy equipment (bulldozers or excavators) to excavate and bury European beachgrass, typically under three to six feet (0.9 to 1.8 meters) of sand. Alternately, equipment, such as a bulldozer with a wing ripper, could be used to “rip” rhizomes below the surface.

Mechanical removal could be used in areas with dense European beachgrass cover, and that are accessible, relatively flat, and without substantial native or special status plant resources.

Additional invasive plants which may be removed include but are not limited to: pampas grass (*Cortaderia selloana*) and Himalayan blackberry (*Rubus armeniacus*). The same techniques proposed to remove dense-flowered cordgrass and European beachgrass would be used to remove the invasive plant species listed above, with the addition of grubbing via hand tools to remove Himalayan blackberry, when necessary.

2.6 Public Access Elements

The Project includes improvements to an existing access road and parking area, construction of a new parking area, construction of a non-motorized multi-use trail system, and construction of a non-motorized boat put-in. These improvements would be designed and located to be wildlife-friendly.

2.6.1 Access Road and Parking Area

An existing gravel parking area is located at the north end of an existing gravel road that leads south from Table Bluff Road to the estuarine restoration area. Under the Project, both the existing parking area and road would be improved by grading and resurfacing; the road would be resurfaced with asphalt or pervious concrete and the existing parking area with gravel. A footpath running parallel to the roadway would be surfaced with gravel. A new asphalt or pervious concrete parking area would be established near the south end of the access road. The new parking area would contain six to ten parking spaces to accommodate vehicles and offer connection to the proposed non-motorized multi-use trail system. An American with Disabilities Act (ADA)-accessible parking space with a van pull out area would also be provided. Three concrete picnic tables and a concrete pad would be installed adjacent to the parking area.

Currently, there is a locked gate that restricts vehicle access into the estuarine restoration area from Table Bluff Road. Under the Project, the gate would be replaced and operated to provide access during daylight hours. A kiosk and interpretive display would be located in the parking area. A second gate, kiosk and interpretive display would be installed at the entrance to the sand road off of South Jetty Road.

2.6.2 Non-motorized Multi-Use Trail System

A 0.5-mile (0.8 kilometer) segment of the modified levee separating Areas A and B would be established and managed as a pedestrian, equestrian and bicycling 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 be established to extend from the new parking area to the sand road, utilizing the modified levee between Areas A and E. This trail would provide access between the estuarine restoration area and the Pacific Ocean. Construction of the trail system includes 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. The trails would also be ADA-accessible and would be surfaced with graveled rock.

2.6.3 Non-motorized Boat Put-in

A non-motorized boat put-in would be constructed in Area B near the new parking area and trail system. Depending on funding, the put-in would either consist of a floating dock with gangway ramps, or a simple foot accessible ramp with all-weather gravel surfaces sloped from the trail system to the water. The non-motorized boat put-in would be ADA-accessible and would be surfaced with pervious concrete or gravel.

The put-in would provide boaters with water access during most tides and would connect to the tidal channel system in Area B. The non-motorized boat put-in would complement the existing boat launch at the end of Reservation Road, whose use is limited by the lack of available parking and high tide-only boat access.

2.7 Project Implementation

2.7.1 Site Access and Staging

Primary access to the Project Area during construction of the estuarine restoration portion of the Project would be from the existing single-lane gravel road on the north end of the ORU. This road would be improved (graded, resurfaced) as part of the Project to provide construction access and to improve recreational access after the Project is complete. The north end of the access road terminates at Table Bluff Road, a two-lane paved road maintained by Humboldt County. From the northern extent of the Project Area Table Bluff Road extends west towards Table Bluff County Park and South Jetty Road (which provides beach access to the Pacific Ocean), and east towards Loleta and California State Route 1. Construction equipment and materials would be transported to the restoration areas via these roads.

Construction equipment would be staged in the improved parking area, and the adjacent uplands north of the estuarine restoration area (Figure 2-3). 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 areas that are not accessible from existing levees or berms. Construction equipment would not be stored in or near water or inundation areas. Invasive plant management activities would utilize the same access roads and parking areas as those described for the estuarine 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.

2.7.2 Construction Equipment and Methodology

Table 2-4 lists the type and quantity of equipment that may be utilized during construction of the estuarine restoration component of the Project. The equipment listed in Table 2-4 would be the primary noise generating equipment and emission sources during construction. Construction is anticipated to occur over two seasons. After construction of the estuarine restoration portion of the Project is complete, noise generating equipment would be limited to heavy machinery (e.g., mowers) and handheld tools (e.g., backpack sprayers) for invasive plant management activities and vehicles for implementing ongoing monitoring, management or maintenance activities. Sources of noise and emissions would generally be infrequent and limited in duration.

Table 2-4 Estimate of Equipment Needed for Project Construction

Equipment Type	Estimated Quantity
Excavators (Conventional and/or Amphibious)	2-4
Dozers	2-4
Loaders	1-3
Dump Trucks	2-8
Small Tractors	1-3
Compactors	1-2
Graders	1-2
Water Trucks	1-2
Hydraulic Dredge	1
Crane	1
Pumps	1-2

Proposed excavation work in Areas B, C, and D would occur in a dry or dewatered condition. These areas would most efficiently be dewatered by repairing or isolating the existing water control structure at the BR-2 breach location and draining work areas passively at low tides[3]. Existing open culverts in Areas C and D would be removed to ensure no additional tidal inflow. Pumps may be required to remove remaining water that won't discharge through gravity. Cofferdams would be needed to isolate the work area around BI-3 due to tidal influence from Area A to the north. Earthen cofferdams constructed of native soils and/or sheetpile walls pushed into the subsurface would be utilized to isolate the work area around BI-3 from tidal water.

A combination of pumps and/or gravity diversion pipes screened to exclude fish entrainment would be used to route flow around the active work area. A crane staged on the access road to the north would be used to place the bridge at BI-3 on the constructed abutments. Excavators and dump trucks would work from existing

3 Repair or isolation at this tide gate could include installation of a flap gate, or otherwise blocking the inlet with an inflatable bladder, plywood, or sheetpile.

levees or on wetland mats to prevent compaction of saltmarsh within Areas B, C, and D.

Area E is currently isolated from tidal influence by a water control structure at the proposed BI-4 breach location; however, a freshwater spring on Table Bluff keeps the unit shallowly flooded year round. As a result, it is likely that pumping will be required to dewater Area E prior to and during construction. Cofferdams, constructed of earthen berms or sheetpile walls, would be used to isolate the work area associated with the BI-4 breach and box culvert.

Excavation work in Area A, including construction of the tidal channel from BR-1 to North Bay, would occur using either a hydraulic dredge extending from North Bay into Area A (preferred method), or excavators between North Bay and BR-1 (secondary method).

The preferred method would utilize a hydraulic dredge to excavate the tidal channel extending from North Bay into Area A. The hydraulic dredge would be mounted on a barge and likely mobilized to the work area from either the boat launch at Cock Robin Island Road or the south end of Reservation Road. The hydraulic dredge would utilize a cutter head and pump to excavate a new tidal channel north from North Bay, moving the slurry of water and soil to the disposal sites in Area B using an aboveground pipeline. A temporary berm would be constructed across Area B to contain and decant the slurry. Decanted water would be allowed to flow through a series of weirs, where it would ultimately be discharged to McNulty Slough through the water control structure at the BR-2 breach.

If it is cost prohibitive or technically infeasible to mobilize a hydraulic dredge into North Bay, a secondary method would employ excavators and dump trucks to excavate the new tidal channel between North Bay and BR-1. Equipment would use the sand road to access the levee system along the south end of the estuarine restoration area. A temporary road built on wetland mats would be used to allow equipment access to North Bay over the salt marsh, where an excavator would offload sediment to dump trucks for disposal along the west side of the estuarine restoration area. The tidal channel from BR-1 into Area A would be constructed using an amphibious excavator. Soils removed from the interior tidal channel would be used to form habitat ridges adjacent to the new alignment. Silt curtains may be installed to limit the delivery of turbid water outside the immediate work area, if feasible.

Construction activities would be conducted in compliance with applicable local, state and federal requirements and in a manner that minimizes disturbance to adjacent properties and disruption to traffic. Minimal traffic control is expected for this Project because the vast majority of the Project Area has no roads, is not drivable due to wetlands and topography, and vehicles are off limits. Some limited traffic control in the form of temporary construction-related vehicle exclusions zones would likely be required for public safety.

As described above, invasive plant management activities would typically occur from late summer to early spring, depending on the treatment method utilized and whether heavy machinery or handheld equipment are utilized. Refer to Section 2.5,

Proposed Invasive Plant Management, for a treatment-specific description of proposed equipment and methods.

2.7.3 Project Schedule and Duration

Construction

Construction of the estuarine restoration component of the Project 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 2021 and 2022.

Initial phases of construction 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 include excavation of the BR-1 breach and channel to North Bay, followed by breaching and lowering levees throughout the remainder of the site.

Construction would generally occur between the hours of 6:00 AM and 6:00 PM, Monday through Saturday. It is anticipated that between five and 20 construction workers would be present within the estuarine restoration area at any given time. Up to 20 motor vehicles would access the construction area each day.

Invasive Plant Management

Invasive plant management activities including the removal of invasive dense-flowered cordgrass and, if present, dwarf eelgrass would occur after the estuarine restoration portion of the Project is complete, consistent with the timing and sequencing described in Sections 2.5.1 through 2.5.4. Invasive European beachgrass management would occur independent of the estuarine restoration portion of the Project, consistent with the timing and sequencing described in Sections 2.5.5 and 2.5.6.

Ongoing management of invasive plant species would include:

- Dense-flowered cordgrass – Removal of up to 10 acres (4 hectares) per year of dense-flowered cordgrass from the estuarine restoration area, as needed and contingent on funding. Maintenance of dense-flowered cordgrass could utilize any of the treatment methods described in Section 2.5.2, but would likely focus on targeted mowing, herbicide application, and flaming.
- Dwarf eelgrass – Any population of dwarf eelgrass observed during potential future eelgrass surveys of McNulty Slough would be removed manually or by smothering, as described in Section 2.5.4.
- European beachgrass – Removal of up to 10 acres (4 hectares) per year of European beachgrass from the Primary and/or Secondary Treatment Areas, as needed and contingent on funding. Maintenance of European beachgrass could utilize any of the treatment methods described in Section 2.5.6, but would focus on manual removal and possibly herbicide application.

It is assumed that ongoing invasive plant management activities would occur for up to ten years or as long as needed to achieve control and/or eradication.

Maintenance

Ongoing maintenance activities may be necessary to assure the long-term hydraulic and ecological functions of the Project, and to continue to support safe and reliable access to the restoration area by the public. The following maintenance actions are anticipated after the Project is constructed:

- Minor maintenance of built infrastructure, including:
  - Grading and/or resurfacing portions of the access road and parking area (once in 10 years)
  - Cleaning debris from the non-motorized boat put-in and bridges on the trail (annually)
  - Mowing vegetation from the trail system (semi-annually)

Monitoring activities are considered a subcomponent of Project maintenance. Specific monitoring activities are to be determined, however would generally include observations of plant species and measurements to determine whether the Project has been successful in improving habitat conditions for special-status plants and wildlife. The frequency of monitoring will be determined during Project permitting. Observations would occur on foot and would not include the use of heavy machinery.

2.8 Required Permits and Approvals

The Project would likely require the following permits and/or approvals:

- California Coastal Commission – Coastal Zone Management Act (CZMA) Federal Consistency Determination or Coastal Development Permit
- CDFW – Lake and Streambed Alteration Agreement
- CDFW – California Endangered Species Act (CESA) Incidental Take Permit or 2081(a)
- California State Historic Preservation Office – National Historic Preservation Act (NHPA) Section 106 Review
- North Coast Regional Water Quality Control Board – Clean Water Action (CWA) Section 401 Water Quality Certification and Porter-Cologne Waste Discharge Requirements
- State Lands Commission – Lease or Lease Amendment
- National Marine Fisheries Service – Federal Endangered Species Act (ESA) Consultation, Magnuson-Stevens Fishery Conservation Management Act Essential Fish Habitat Assessment
- U.S. Army Corps of Engineers – CWA Section 404 Permit and/or Rivers & Harbors Act Section 10 Permit
- USFWS – ESA Consultation

The Project is being funded in part by the National Oceanic and Atmospheric Administration's (NOAA) Restoration Center through a Community-Based Restoration Program (CRP) Grant. As a federal funding agency, the NOAA Restoration Center is completing an evaluation of the Project under the National Environmental Policy Act (NEPA) and anticipates appending the Project to the Final Programmatic Environmental Impact Statement for Habitat Restoration Activities Implemented Throughout the Coastal United States (NOAA Restoration Center 2015). The NOAA Restoration Center is also acting as the lead federal agency responsible for compliance with the CZMA, NHPA, and ESA.

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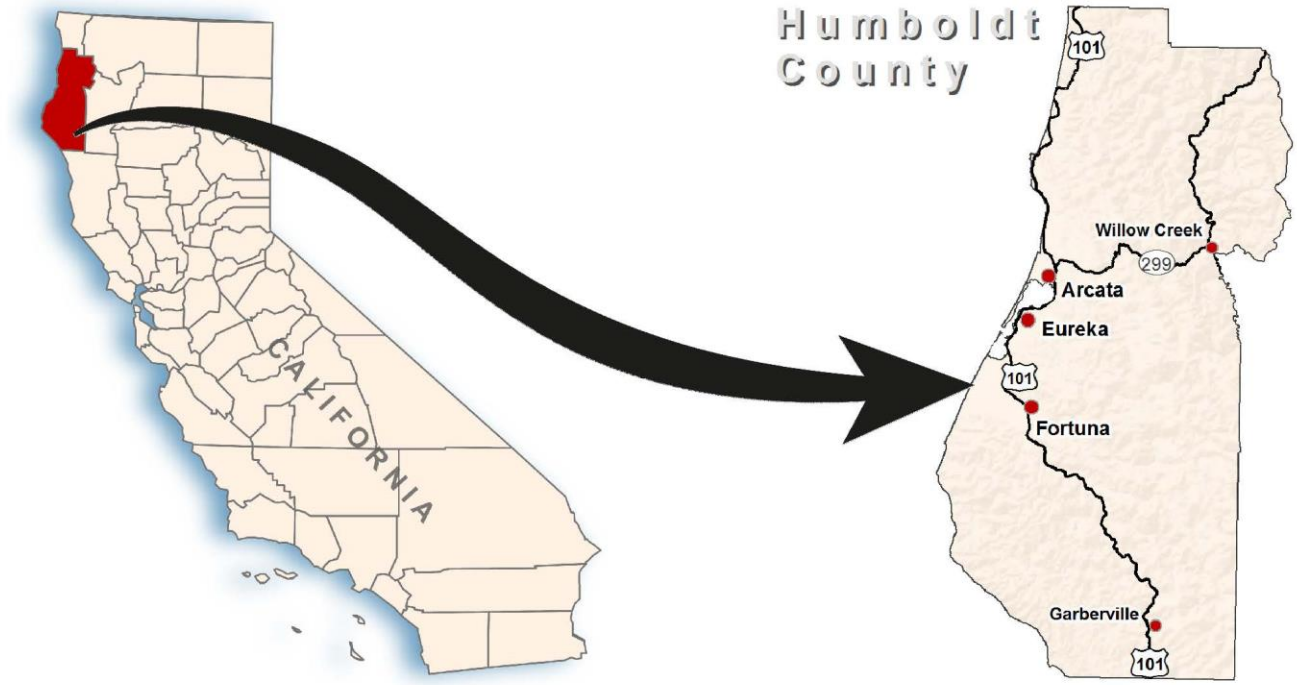

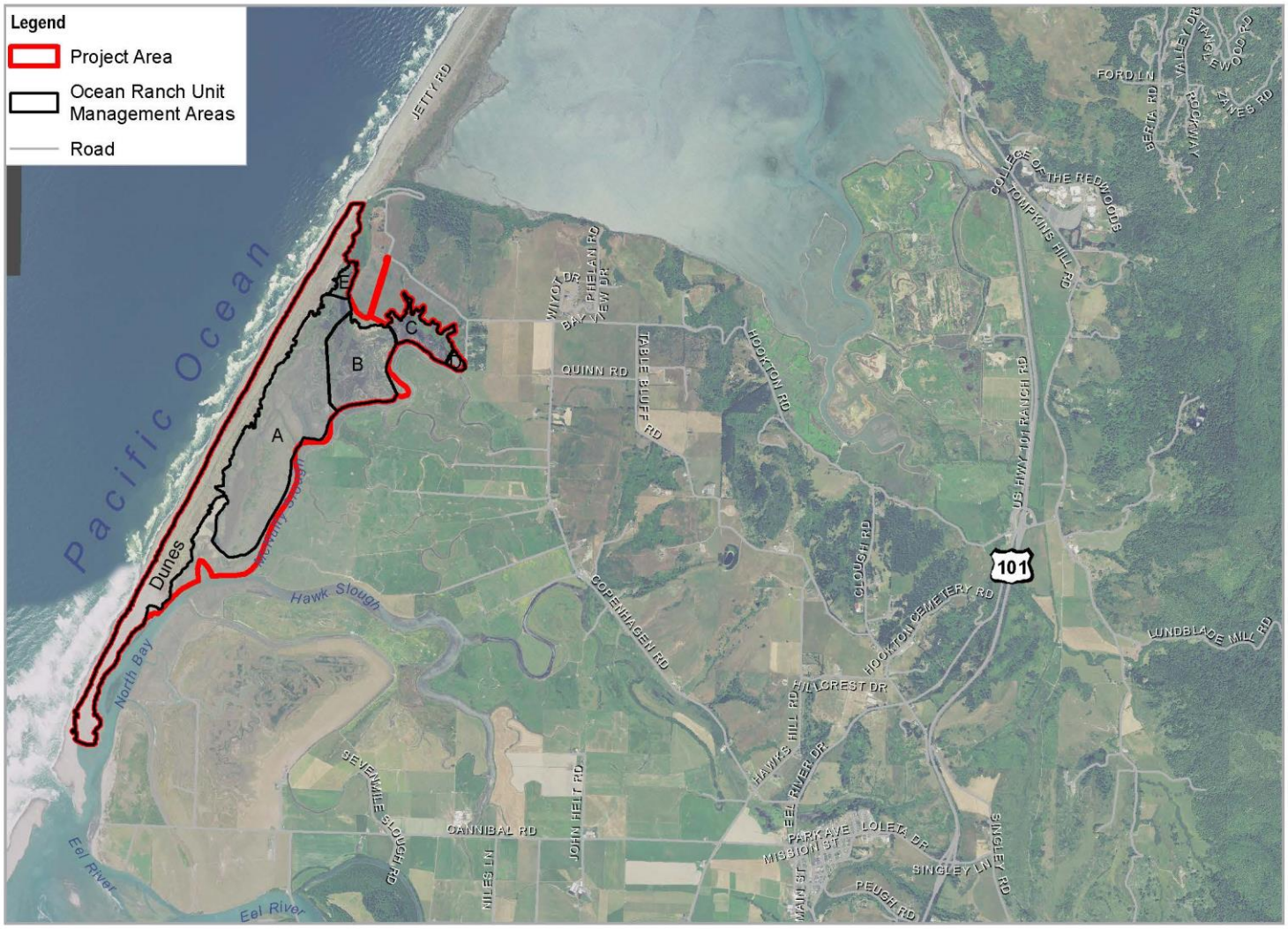

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Ocean Ranch Restoration Project

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Vicinity Map

FIGURE 2-1

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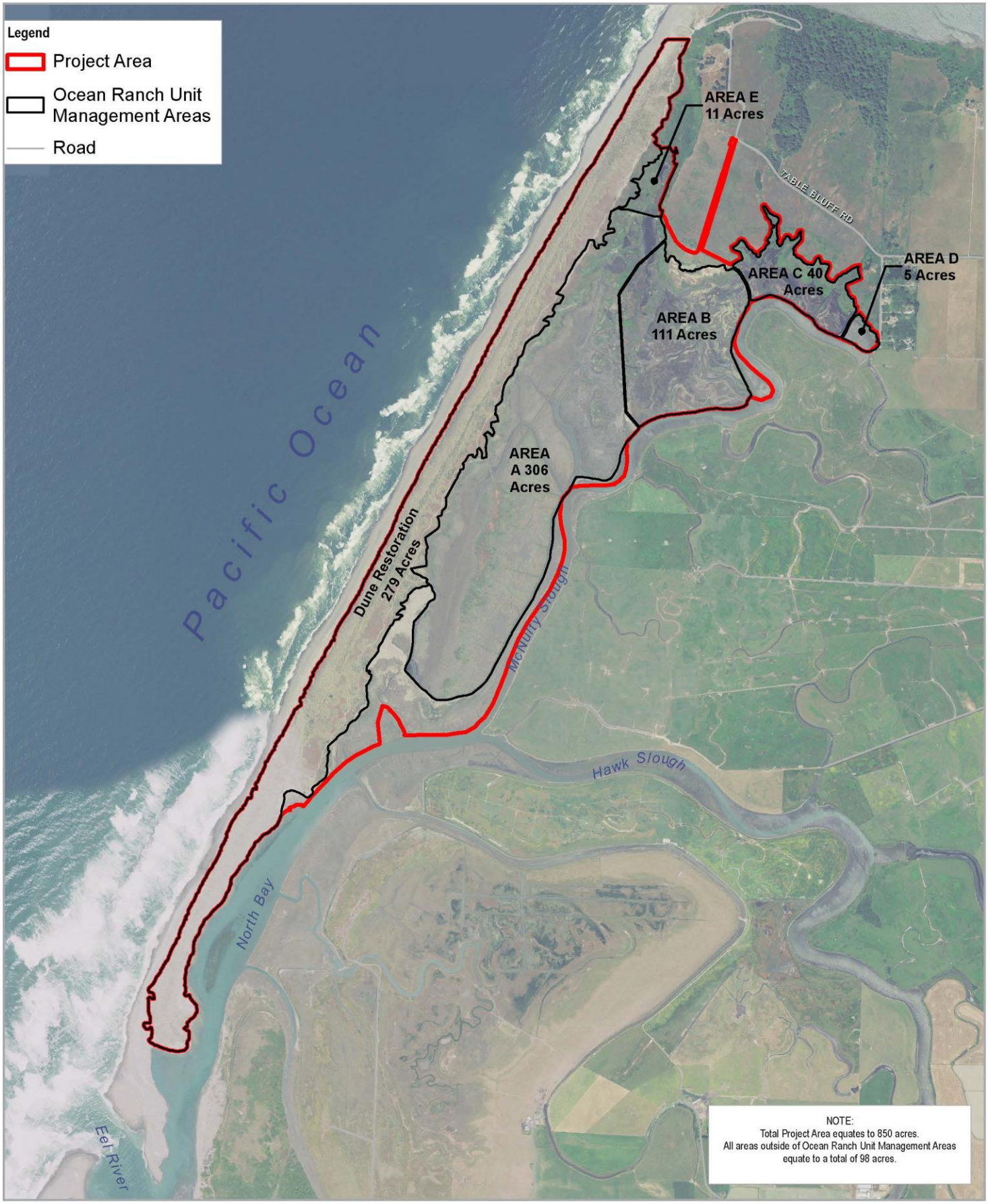

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Project Area

FIGURE 2-2

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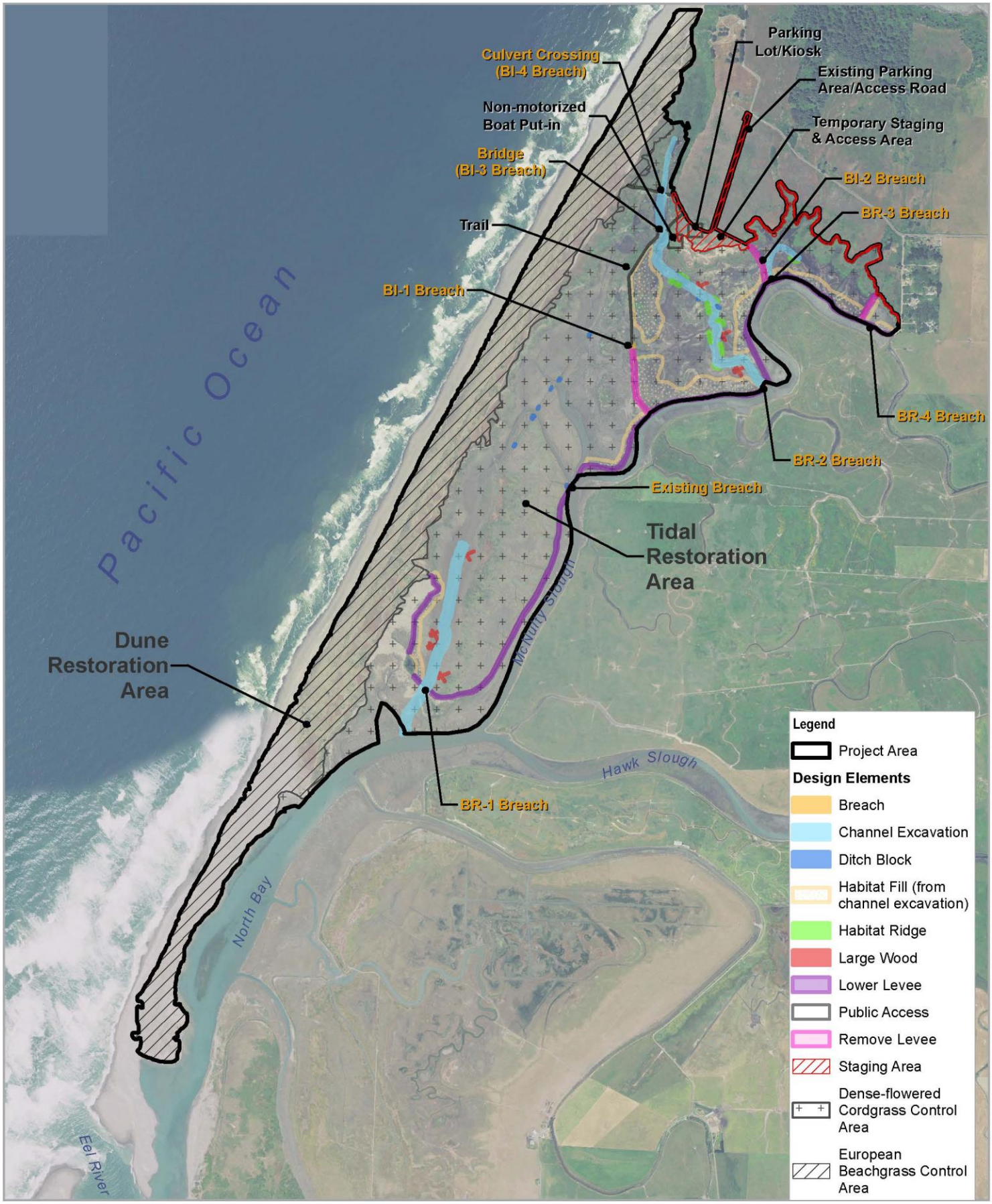

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Proposed Project Components

FIGURE 2-3

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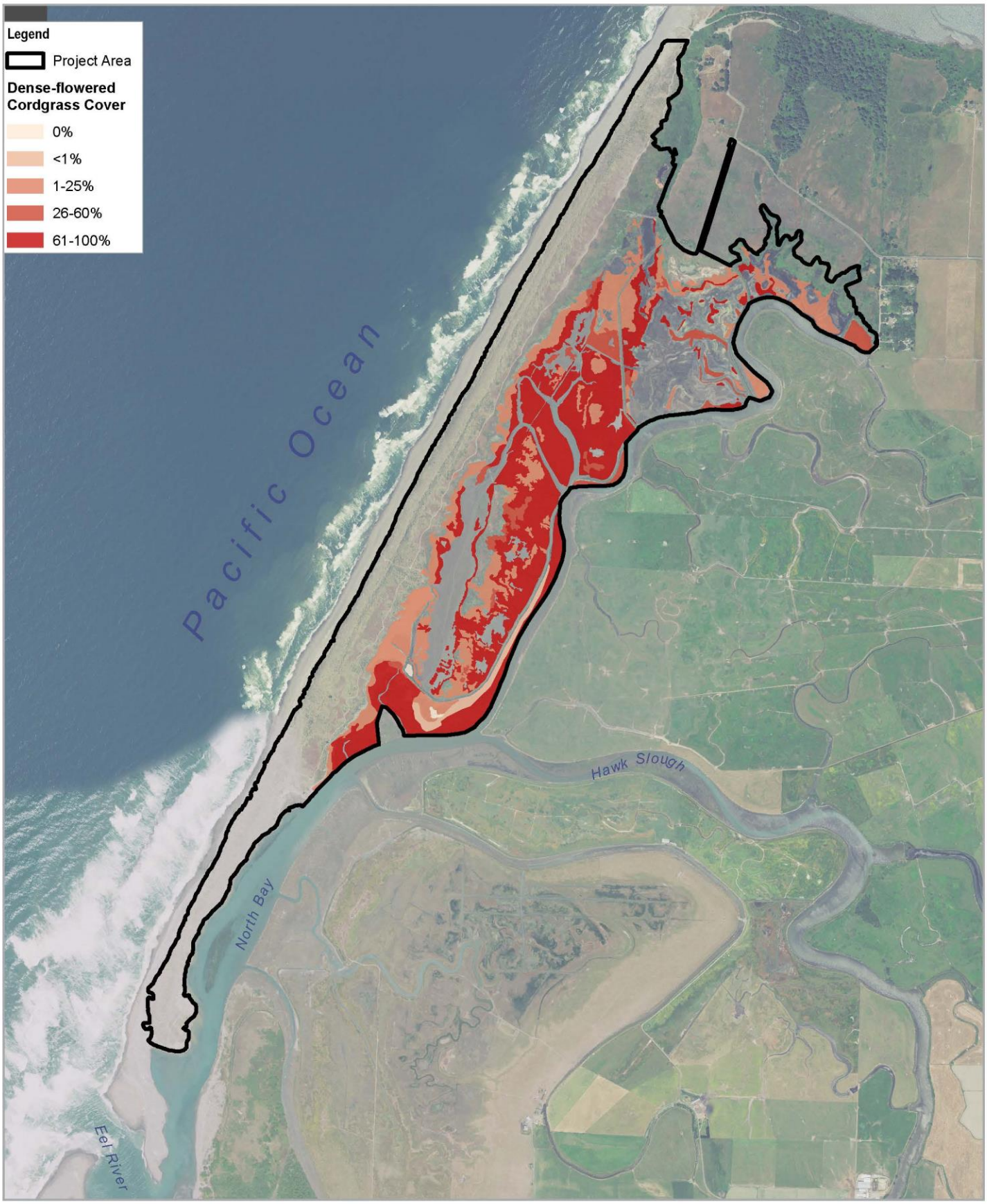

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Dense-flowered Cordgrass Cover (2017)

FIGURE 2-4

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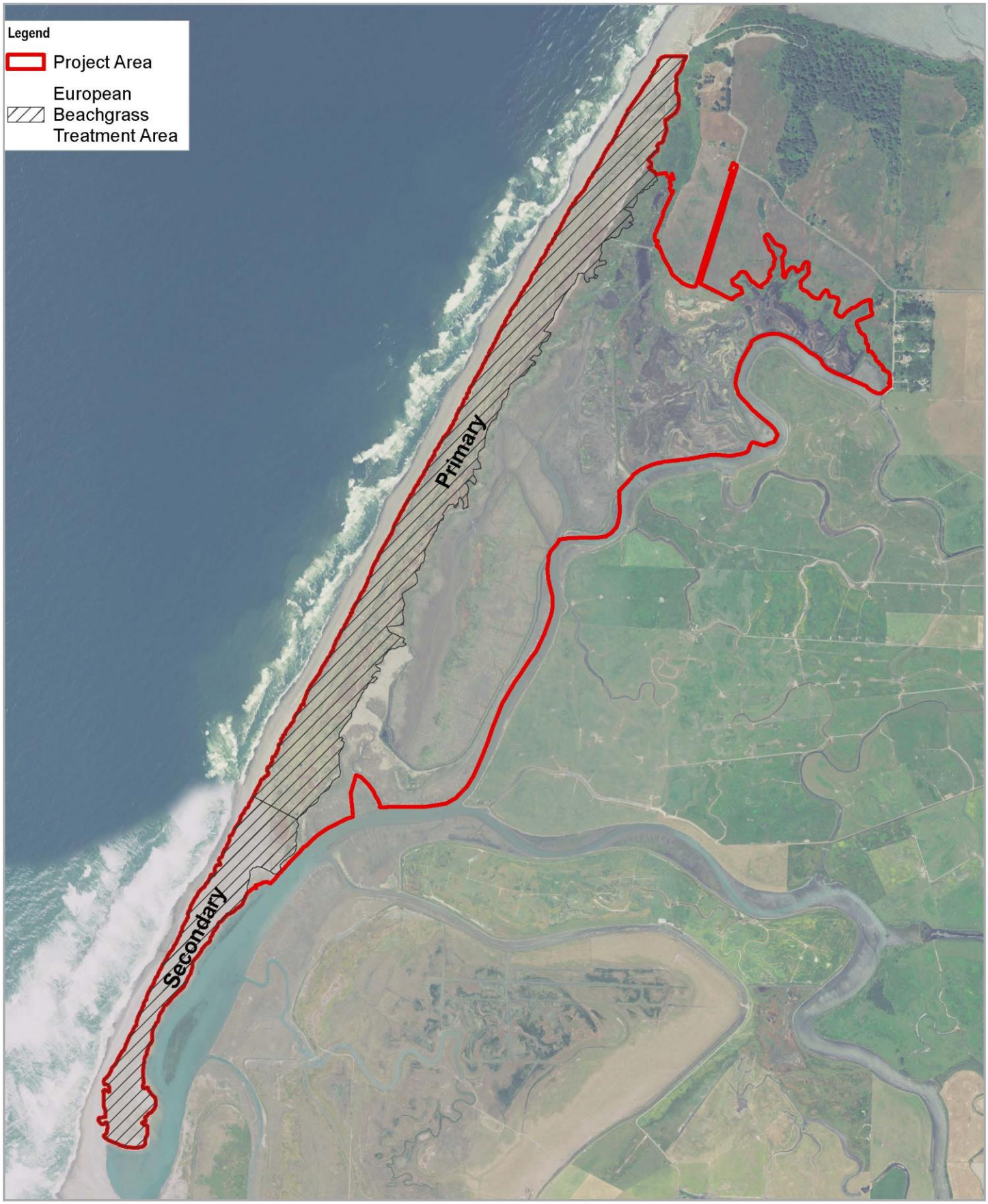

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Primary and Secondary European Beachgrass Treatment Areas

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FIGURE 2-5

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Data source: Dune Restoration Area Stages, 12/10/2018; Project Boundary, GHD, 10/17/2018; NAIP Orthoimagery 2016; Created by: jclark2