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STAFF REPORT: REGULAR CALENDAR

Application No.:	**1-12-032**
Applicant:	**California Department of Parks and Recreation**
Location:	Gold Bluffs Beach between Home Creek and Carruthers Cove within the northwestern portion of Prairie Creek Redwoods State Park, approximately 50 miles north of the City of Eureka and 50 miles south of the Oregon state line, Humboldt County.
Project Description:	Restore approximately 550 acres of coastal dune habitats by removing invasive European beachgrass (*Ammophila arenaria*) using a combination of manual, mechanical, and flaming removal techniques.
Staff Recommendation:	Approval with conditions.

SUMMARY OF STAFF RECOMMENDATION

The California Department of Parks and Recreation proposes to implement the "North Gold Bluffs Beach Coastal Dune Restoration Plan" within an approximately 550-acre portion of the 14,000-acre Prairie Creek Redwoods State Park located approximately 50 miles north of the City of Eureka in Humboldt and Del Norte Counties (**Exhibit 1**-**2**). The proposed project would be undertaken in the northern Gold Bluffs Beach portion of the Park (APNs 106-010-05). **Exhibit 3** shows the areas within the project boundaries that propose the removal of European beachgrass.

The major goals of the project are to restore natural dune processes by removing European beachgrass and other invasive exotic plants, thus promoting revegetation by native dune species and restoration of sand movement. These efforts will increase available suitable habitat for the federally threatened western snowy plover as well as other native plants and animals.

The primary Coastal Act issues associated with this project include protection of coastal wetlands and other types of environmentally sensitive habitat areas, including habitats for rare plants, Northern red-legged frog, and Western snowy plover. The project proposes to use heavy equipment within 43 acres of dune wetlands (delineated 1-parameter and 2-parameter wetlands) and across 229 acres of other types of environmentally sensitive dune habitats to remove European beachgrass and other invasive exotic plants. The removal of invasive exotic plants will in turn promote revegetation by native dune species and restore sand movement, thereby increasing available suitable habitat for western snowy plover and other native plants and animals. In addition to the proposed use of heavy equipment, in an effort to minimize impacts, the project also includes the manual removal of invasives using hand-pulling, shovels, and other hand tools from 11 acres of 3-parameter wetlands and 152 acres of "wetland/upland mosaic" habitat.

Staff believes that because the proposed dune restoration project is inherently dependent upon the presence of dune wetlands and other types of dune ESHA in which to carry out the restoration activities, the project constitutes "restoration purposes" under Section 30233(a)(6) of the Coastal Act and a use dependent on the resources of the ESHA consistent with the use requirements of Section 30240(a) of the Coastal Act. Staff further believes that as conditioned, the proposed project will provide feasible mitigation measures to minimize adverse environmental effects and ensure ESHA is protected against any significant disruption consistent with Sections 30231, 30233, and 30240(a). There are no feasible less environmentally damaging alternatives to the project. Staff recommends Special Conditions 1 through 7 to protect sensitive species habitats and archaeological resources. **Special Condition 1** requires CDPR to undertake development in accordance with the approved Restoration Plan, including all mitigation measures proposed. **Special Condition 2** requires that CDPR submit a final monitoring report within 5 years after the commencement of mechanical *Ammophila* removal comparing pre- and post-restoration conditions and evaluating whether, in light of all monitoring reports prepared in accordance with the Restoration Plan, native dune mat vegetation has increased relative to the coverage by *Ammophila* or other exotic invasive species in the treated areas. If CDPR cannot demonstrate such improvement, the condition establishes the requirement that CDPR secure a permit amendment to implement additional restoration activities or additional adaptive management measures necessary to achieve the required favorable restoration result. **Special Conditions 3**, **4**, **5,** and **6** require the implementation of various rare plant, snowy plover, northern red-legged frog, and water quality protection measures, respectively. **Special Condition 7** requires that if an area of cultural deposits is discovered during the course of the project all construction shall cease and shall not recommence until a qualified cultural resource specialist analyzes the significance of the find.

Commission staff recommends **approval** of CDP application 1-12-032, as conditioned.

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I. MOTION AND RESOLUTION

The staff recommends that the Commission adopt the following resolution:

Motion:

> *I move that the Commission approve coastal development permit 1-12-032 pursuant to the staff recommendation.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

Resolution:

> *The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.*

II. STANDARD CONDITIONS

This permit is granted subject to the following standard conditions:

1. **Notice of Receipt and Acknowledgment**: The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Expiration**: If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable amount of time. Application for extension of the permit must be made prior to the expiration date.

3. **Interpretation**: Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. **Assignment**: The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. **Terms and Conditions Run with the Land**: These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

This permit is granted subject to the following special conditions:

1. **Development in Accordance with Approved Restoration Plan.** The permittee shall undertake all development authorized by coastal development permit 1-12-032 in accordance with the approved "North Gold Bluffs Beach Coastal Dune Restoration Plan" dated August 31, 2012, including the additional mitigation measures included in the draft CEQA document prepared for the project dated November 19, 2012, and as modified by the special conditions. The Executive Director may approve for cause minor changes to the approved Restoration Plan that are *de minimis* in nature and scope and would not result in significant adverse impacts to coastal resources. No other changes to the approved Restoration Plan shall occur without a Commission approved amendment to this coastal development permit, unless the Executive Director determines no amendment is legally required.

2. **Monitoring Reports.** The applicant shall submit to the Executive Director by December 31 of each year following commencement of the mechanical *Ammophila* removal an annual progress report as proposed in the Restoration Plan referenced in Special Condition 1 that discusses the progress of the project and how successful the project has been to date in achieving restoration goals. Five years after the commencement of mechanical *Ammophila* removal authorized by coastal development permit 1-12-032, the permittee shall submit a final monitoring report for the review and written approval of the Executive Director comparing pre- and post-restoration conditions and evaluating whether, in light of all the data collected in the monitoring reports prepared in accordance with the Restoration Plan referenced in Special Condition 1, native dune mat vegetation has increased relative to the coverage by *Ammophila* or other exotic invasive species in the treated areas. If the Executive Director determines that the final monitoring report does not demonstrate such improvement, the permittee shall, within ninety (90) days after receipt of written notice of the Executive Director's determination, submit a complete application for an amendment to CDP 1-12-032 to implement additional restoration activities or additional adaptive management measures necessary to achieve the required favorable restoration result.

3. **Rare Plant Protection Measures**.
   a. PRIOR TO ISSUANCE OF THIS COASTAL DEVELOPMENT PERMIT, the applicant shall submit, for the Executive Director's review and approval, a rare plant protection plan, which demonstrates that potential impacts to rare plant species within the project area will be minimized throughout the course of the authorized restoration activities. The rare plant protection plan shall demonstrate all of the following: (i) sensitive plant surveys conducted in conformance with Department of Fish and Game current guidelines will be completed prior to the initiation of ground disturbing activities; (ii)

sensitive plants will be flagged for avoidance using temporary flagging, which will be removed upon completion of work in an area; (iii) a minimum 10-foot buffer zone will be established and maintained around all sensitive plant occurrences, and no heavy equipment will be allowed to pass through or work within sensitive plant areas or their associated buffer zones ("sensitive plant protection areas"); (iv) only manual methods (e.g., hand-pulling, shovels, and other hand tools) will be used to remove European beachgrass and other target invasive plants within sensitive plant protection areas, and sensitive plants will be avoided to the maximum extent feasible during the course of manual removal activities; and (v) where impacts to sensitive plants cannot be avoided, either invasive plant removal activities will be delayed until the rare plants have set seed and naturally dispersed, and/or individual rare plants will be transplanted to nearby suitable habitat that will be protected from project impacts. The rare plant protection plan shall include, at a minimum, all of the following: (i) the results of an up-to-date seasonally appropriate botanical survey conducted by a qualified botanist according to current DFG guidelines, (ii) a map(s) depicting the locations of rare plants and rare plant buffer zones in relation to proposed mechanical and manual *Ammophila* removal activities, (iii) a description of proposed transplant areas for rare plants that cannot feasibly be avoided by restoration activities and the approximate number of plants to be transplanted, and (iv) a schedule for the implementation of rare plant protection measures and authorized restoration activities.

b. The permittee shall undertake development in accordance with the approved final plan. Any proposed changes to the approved final plan shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required

4. **Western Snowy Plover Protection Measures**. CDPR shall adhere to all western snowy plover protection measures proposed in the project description (**Exhibit 4**) and as directed by the FWS in its concurrence letter for the proposed project (File #8-14-1999-77, **Exhibit 7**).

5. **Northern Red-Legged Frog Protection Measures**. CDPR shall avoid impacts to frog egg masses that may be encountered during the course of the authorized restoration work. No restoration activities of any kind shall be conducted within any delineated wetland during periods of time when the wetland is inundated.

6. **Water Quality Protection Measures**. CDPR shall adhere to all water quality protection measures proposed in the project description (**Exhibit 4**), including, but not limited to, the following: (1) a hazardous material spill prevention plan shall be maintained on site to ensure adequate and safe cleanup of any accidental release of hazardous substances to the ground or water; (2) equipment fueling shall occur only during daylight hours in designated fueling areas outside of wetlands and environmentally sensitive habitat areas; (3) no maintenance or fueling activities shall occur within 100 feet of a stream, the ocean, or any coastal wetland; (4) equipment cleaning and repairs (other than emergency repairs) shall only be conducted outside of the Park boundaries; (5) equipment shall be inspected for leaks prior to the start of daily restoration activities and regularly during the course of the

proposed restoration work; (6) any discovered leaks shall be immediately repaired in the field and work shall be suspended until such repairs can be made; and (6) work shall immediately cease in the event of any spill or release of any chemical in or adjacent to the project area, and all appropriate agencies, including the Executive Director, shall be contacted in the event that spillage amounts exceed one-half gallon.

7. **Protection of Archaeological Resources.** If an area of cultural deposits is discovered during the course of the project, all construction shall cease and shall not re-commence until a qualified cultural resource specialist analyzes the significance of the find and prepares a supplementary archaeological plan for the review and approval of the Executive Director, and either: (a) The Executive Director approves the Supplementary Archaeological Plan and determines that the Supplementary Archaeological Plan's recommended changes to the proposed development or mitigation measures are *de minimis* in nature and scope, or (b) the Executive Director reviews the Supplementary Archaeological Plan, determines that the changes proposed therein are not *de minimis*, and the permittee has thereafter obtained an amendment to coastal development permit 1-12-032 approved by the Commission.

8. **Protection of Public Access.** All development authorized by coastal development permit (CDP) 1-12-032 shall be conducted in a manner that does not obstruct or close the section of the California Coastal Trail that runs parallel to and east of the project area. Public access restrictions in the project area during implementation of the project, including, but not limited to, dune restrictions that may be enforced by the use of symbolic fencing and temporary signage as proposed in the CDP application, shall (a) be minimized, (b) be implemented only in areas where heavy equipment is actively working and/or in areas potentially subject to liquefaction hazards as detailed in the CEQA document prepared for the proposed project (**Exhibit 6**), and (c) not be implemented for longer than a 6-month period during any given year in which the authorized restoration work is conducted.

IV. FINDINGS AND DECLARATIONS

The Commission hereby finds and declares as follows:

A. PROJECT DESCRIPTION AND BACKGROUND

The California Department of Parks and Recreation (applicant, hereinafter "CDPR") proposes to implement the "North Gold Bluffs Beach Coastal Dune Restoration Plan" (**Exhibits 3-4**) within an approximately 550-acre portion of the 14,000-acre Prairie Creek Redwoods State Park located approximately 50 miles north of the City of Eureka in Humboldt and Del Norte Counties (**Exhibit 1-2**). The proposed project would be undertaken in the northern Gold Bluffs Beach portion of the Park (APNs 106-010-05). **Exhibit 3** shows the areas within the project boundaries that propose the removal of European beachgrass (*Ammophila arenaria*).

The major goals of the project are to restore natural dune processes by removing European beachgrass and other invasive exotic plants, thus promoting revegetation by native dune species and restoration of sand movement. These efforts will increase available suitable habitat for the

federally threatened western snowy plover (*Charadrius nivosus nivosus*) as well as other native dune-adapted plants and animals.

The proposed project would complement an earlier restoration project undertaken in northern Gold Bluffs Beach, which the Commission approved in September of 2005 under CDP 1-05-022. CDP 1-05-022 authorized the removal of European beachgrass using a combination of mechanical and manual removal techniques across approximately 100 acres between Ossagon Creek and Carruthers Cove at the northern boundary of the Park (**Exhibit 10**). A CDPR evaluation of this earlier restoration project determined that the project was successful (see Exhibit 10 for details).

Removal and disposal of *Ammophila*

The Restoration Plan proposes the removal of *Ammophila* across an approximately 550-acre area of dune habitats within the boundaries of the overall project site shown in **Exhibits 3-4** (see Table 1 below for project summary). CDPR estimates that the project would be completed in phases over approximately five years. CDPR proposes to remove *Ammophila* and restore native habitat and dune processes by (a) mechanical removal, using an excavator and/or dozer, across ~279 acres of foredunes and hummocks and deflation plain/transition zone areas; and (b) manual removal, using hand-pulling, shovels, and other hand-tools, on ~271 acres of wetlands and rare plant habitat areas within dune swales, the back dune wetland/upland mosaic, and the nearshore wetland/upland mosaic to. In addition, flaming, which involves the use of a small propane torch to either wilt or incinerate target plants, would be utilized on exotic herbaceous vegetation such as exotic grasses.

Table 1. Summary of proposed dune restoration activities.

Invasive Plant Removal Technique	Description	Locations	Acreages	Disposal Methods
Mechanical (heavy equipment)	Use a dozer and/or excavator to extract *Ammophila* and other target invasive exotic plants	This technique would be used for initial treatment only. It would occur in foredunes and hummocks and deflation plain/transition zone areas.	279	Spoils would be buried to a depth of 2 feet onsite within removal areas
Manual	Use hands and shovels and other hand tools to remove *Ammophila* and other target invasive exotic plants	This technique would be used in and around environmentally sensitive wetlands and rare plants. It would occur in dune swales, the back dune wetland/ upland mosaic, and the nearshore wetland/ upland mosaic	271	Spoils would be consolidated into brush piles (no larger than 4 feet by 4 feet) that would then be burned individually.
Flaming	Use a small propane torch to either wilt or	This technique would target individual plants	Not calculated	Left in place

Invasive Plant Removal Technique	Description	Locations	Acreages	Disposal Methods
	incinerate target plants – primarily exotic annual grasses.	throughout the project area to avoid or minimize impacts to sensitive resources		

Revegetation
Based on its experience with similar restoration projects in Prairie Creek and other Parks, the CDPR anticipates that native dune plants will naturally recolonize the treatment areas over time. As discussed below, CDPR will conduct monitoring of plant cover for a minimum of five years to verify revegetation success. If natural revegetation does not appear to be adequate, CDPR will actively (as funding allows) revegetate areas using direct seeding, transplanting, and planting of seedlings.

Retreatments
CDPR proposes to manually retreat *Ammophila* resprouts as needed until achieving the restoration objective of 5% or less *Ammophila* cover. Frequency of retreatment would be dependent upon beachgrass growth and funding availability.

Temporary signage and fencing
CDPR proposes to post temporary signage along the perimeter of the treatment areas to inform the public of the temporary closure of areas during heavy equipment restoration activities to protect public safety (**Exhibit 5**). The CDPR also proposes to use symbolic fencing around ephemeral wet areas that are treated by heavy equipment, which would be maintained until the water table has lowered to average mid-summer levels as determined by biologists and geologists familiar with the site. The purpose of the proposed temporary closure and signage of these areas, as explained in the CEQA document adopted for the project (see **Exhibit 6**), is to warn of and protect the public from the potential liquefaction in these areas during the rainy season. The CDPR anticipates that these seasonally wet areas would be temporarily fenced and signed for closure for no more than 6 months. The proposed project would not affect the California Coastal Trail that runs parallel to and east of the project area.

Avoidance measures for sensitive resources
CDPR has proposed a number of measures to protect wetlands, rare plants, western snowy plovers, and archaeological resources (**Exhibits 4** and **6**). These include, but are not limited to, (1) maintaining equipment exclusion buffers around three-parameter wetlands and rare plant habitat, (2) restricting the timing of mechanical removal activities to the non-breeding plover season (September 15-March 1), (3) conducting snowy plover surveys each day prior to commencing heavy equipment removal operations, (4) maintaining a minimum 100-meter buffer between any documented plovers and restoration activities, (5) halting operations and consulting with a qualified archaeologist in the event that the proposed activities unearth previously undiscovered archaeological resources, and various other measures as discussed in the project application and CEQA document adopted for the project.

Monitoring and reporting
The CDPR proposes to conduct effectiveness monitoring to detect changes in plant community composition and species cover over time, track locations of sensitive resources, and provide feedback for adaptive management to determine whether further action is necessary for the restoration success. Proposed monitoring and reporting details are provided in **Exhibit 4**.

B. ENVIRONMENTAL SETTING

Gold Bluffs Beach is located within Prairie Creek Redwoods State Park, one of the three state park units in the Redwood National and State Parks (RNSP) partnership with the National Park Service. The project area comprises approximately 550 acres with an eight-mile-long stretch of beach and dune habitats that is accessed from Davison Road, three miles north of the community of Orick near the Humboldt/Del Norte County border. Public access to the shoreline and along the coast is provided by trails and roads from Davison Road and from Highway 101. A gravel road runs parallel to the shoreline from Espa Lagoon to Home Creek. From there, the California Coastal Trail continues north from Home Creek to the northern extent of the project area, and RNSP boundary, north of Carruthers Cove.

Gold Bluffs Beach is named for a ridge of low mountains along the west side of the Prairie Creek watershed, which terminate near the ocean in a series of bluffs from 100 to 400 feet in height. Historically, waves broke on the bluffs, but over the past approximately 150 years, the beach has increased substantially in width through accretion or progradation. As recently as 1980, Ossagon Rocks, sea stacks at the north end of the beach, were subject to daily wave action. Today, the most seaward of Ossagon Rocks is approximately 600 feet inland from the swash zone. Other portions of Gold Bluffs Beach are over 2,000 feet wide between the bluffs and the ocean. Factors contributing to the formation of beaches and dunes in this system include a predominant southward littoral drift, northwesterly winds, sand deposition from the Klamath River, and shoreline orientation. Bluff erosion, creek alluvium, and beach deposits all contribute to the north/south-oriented dune system found in the project area.

The dune system at Gold Bluffs Beach consists of a primary foredune (ridge of sand parallel to the beach above the mean high tide line), nearshore dune hummocks (oriented parallel to the prevailing northwesterly winds), deflation plains, dune swales, and older, stabilized back dunes. Most of the dunes are stabilized, at least in part, as a result of European beachgrass colonization. Ossagon Creek flows into the northern portion of the project area and forms a small lagoon at its mouth, which is disconnected from the ocean. The lagoon connects to a linear deflation basin oriented parallel to the shoreline between the primary foredune and the back dune complex that extends throughout much of the proposed project area. During high-flow events, this basin receives overland flow from Ossagon Creek and its associated “lagoon.” During the summer months, the lagoon and associated basin are dry.

Vegetation throughout the project area consists primarily of European beachgrass, though pockets of native vegetation persist, primarily in open sand areas. Small patches of native dunegrass (*Elymus mollis* ssp. *mollis*) grow along the primary foredune, often with evidence of heavy grazing by Roosevelt elk (*Cervus elaphus roosevelti*), which frequent the project area. Dune mat habitat behind the primary foredune is relatively poorly developed compared to other

local dune systems, vegetated primarily by beach strawberry (*Fragaria chiloensis*), yellow sand verbena (*Abronia latifolia*), beach morning glory (*Calystegia soldanella*), and a few other species. Patches of pink sand verbena (*Abronia umbellata* ssp. *breviflora*) and sand pea (*Lathyrus japonicus*), considered rare by the California Native Plant Society and the Department of Fish and Game, occur in dune mat habitat in the project area, and potential habitat for the federally endangered beach layia (*Layia carnosa*) and dark-eyed gilia (*Gillia millefoliata*) also occurs in the area. Both the Commission and Humboldt and Del Norte Counties in past permitting actions for projects in the region have considered these rare plant habitat areas to be ESHA under the Coastal Act and certified LCP. CDPR notes that the subject dunes are considered a particularly valuable ecosystem and a very rare type of habitat on the Pacific Coast. The entire project area therefore meets the definition of ESHA set forth in the Coastal Act.

The CDPR completed a wetland delineation for the project, which identified a variety of wetland types throughout the project area (**Exhibit 8**), including 11 acres of 3-parameter wetlands, 14 acres of 2-parameter wetlands, 29 acres of 1-parameter wetlands, and 152 acres of "wetland/upland mosaic." The 3-parameter wetlands occur around the mouth of Ossagon Creek and interspersed throughout the dune swale system to the south of the creek's associated "lagoon." Plants such as willow dock (*Rumex crassus*), slough sedge (*Carex obnupta*), Brewer's rush (*Juncus breweri*), pennyroyal (*Mentha pulegium*), nutsedge (*Cyperus eragrostis*), hairy hawkbit (*Leontodon saxatilis* ssp. *longirostris*), sea rocket (*Cakile maritima*), and more are found in these wetlands. The wetland delineation identified remnant egg masses of Northern red-legged frog (*Rana aurora*) in some of the 3-paramter wetlands (among other wetland hydrology indicators). The 2-parameter wetlands represent transitional habitats slightly higher in elevation than the 3-parameter wetlands that experience less frequent and prolonged periods of inundation and/or soil saturation. Vegetation characteristic of the delineated 2-parameter wetlands is similar to the 3-parameter wetlands, except with a greater cover of European beachgrass. The delineated 1-parameter wetlands consist of areas where indicators of wetland hydrology were observed, but generally indicators of hydric soil and hydrophytic vegetation were lacking. The delineated single-parameter wetland areas tend to be sparsely vegetated with European beachgrass, hairy hawkbit, sea rocket, and other herbaceous species. These wetlands occur along the upper extensions of the dune swale system. The wetland-non-wetland "mosaic" area is located along the length of the eastern portion of the project area between the bluffs and the stabilized, historic foredune where the co-occurring wetland and upland features are too small and intermingled to delineate and map accurately.

In addition to the species mentioned above, Gold Bluffs Beach also provides habitat for the federally threatened western snowy plover (*Charadrius alexandrinus*). Snowy plovers primarily nest and forage in open beach habitats along the shoreline. Listed as federally threatened since 1993, loss and modification of plover habitat has, in general, resulted from a combination of European beachgrass invasion, urban development, recreational activities, and predation exacerbated by human disturbance. Removal of European beachgrass and other nonnative invasive vegetation from existing and potential breeding sites is part of the species' recovery strategy. The proposed project is anticipated to increase the amount of available plover breeding habitat.

In addition to European beachgrass, which CDPR indicates has increased markedly at the park since 2001, two other invasive exotic species are present at the project area: Dalmation toadflax (*Linaria genistifolia* ssp. *dalmatica*), and jubata grass (*Cortaderia jubata*). Dalmatian toadflax infestations often form large colonies that displace desirable native vegetation. Toadflax is highly competitive for soil moisture with winter annuals and shallow rooted perennials. Occupying the same inner dune area as the perennial form of pink sand verbena, toadflax has the potential to displace this important source of genetic diversity. Toadflax is not known to occur elsewhere in the park. Jubata grass (sometimes mistaken for Pampas grass) is an aggressive colonizer, which competes with native plants and alters the aesthetic character of vegetation within the park. Jubata grass establishes rapidly in open plant communities including coastal dunes and bare alluvium throughout northern California. Since infestations of these two species are presently restricted to localized areas, CDPR indicates that early management and eradication is required to control the spread and establishment of these species at Gold Bluffs Beach.

C. STANDARD OF REVIEW

The proposed project area is bisected by the boundary between the retained CDP jurisdiction of the Commission and the CDP jurisdictions delegated to the counties of Humboldt and Del Norte by the Commission through each county's certified local coastal program (LCP). Most of the project area, including areas where CDPR proposes to use mechanical removal techniques, is within the Commission's area of retained jurisdiction. The easternmost portions of the project area are within the CDP jurisdictions of Humboldt or Del Norte County.

Section 30601.3 of the Coastal Act authorizes the Commission to process a consolidated coastal development permit application when requested by the local government and the applicant and approved by the Executive Director for projects that would otherwise require coastal development permits from both the Commission and from a local government with a certified LCP. In this case, Humboldt and Del Norte Counties adopted resolutions, and both the applicant and the Counties submitted letters in December of 2012 requesting consolidated processing of the coastal development permit application for the subject project by the Commission. The Executive Director agreed to the consolidated permit processing request.

The policies of Chapter 3 of the Coastal Act provide the legal standard of review for a consolidated coastal development permit application submitted pursuant to Section 30601.3. The local governments' certified LCPs may be used as guidance.

D. OTHER AGENCY APPROVALS

Department of Parks and Recreation

The applicant, CDPR, served as the lead agency for the project for California Environmental Quality Act (CEQA) purposes. A draft Mitigated Negative Declaration (MND) was prepared in November of 2012 and submitted to the State Clearinghouse. See Finding IV-H for more details.

North Coast Unified Air Quality Management District (NCUAQMD)

CDPR proposes that dried *Ammophila* detritus collected by crews may be burned on site. The NCUAQMD has approved a burn permit and smoke management plan for this burning activity.

U. S. Fish & Wildlife Service
CDPR has obtained a concurrence letter from the U. S. Fish & Wildlife Service (**Exhibit 7**), which conveys the finding that the activities proposed would not result in the take of federally listed species. The letter provides numerous recommendations for the protection of the western snowy plover during proposed project activities, which CDPR has incorporated into the proposed Restoration Plan.

E. PROTECTION OF ESHA, WETLANDS, & WATER QUALITY

Section 30231 of the Coastal Act states as follows:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Section 30232 of the Coastal Act states as follows:

> *Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

Section 30233(a) of the Coastal Act states, in applicable part, as follows (emphasis added):

> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*
>
> …
>
> *(6) Restoration purposes.*
>
> …
>
> *(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary…*
>
> …

Section 30240 of the Coastal Act states:

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*

> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The project proposes to use heavy equipment within 43 acres of dune wetlands (delineated 1-parameter and 2-parameter wetlands) and across 229 acres of various types of environmentally sensitive dune habitats to remove European beachgrass and other invasive exotic plants, which in turn will promote revegetation by native dune species and restore sand movement, thereby increasing available suitable habitat for western snowy plover and other native plants and animals. In addition to the proposed use of heavy equipment, in an effort to minimize impacts, the project also proposes to manually remove, using hand-pulling, shovels, and other hand tools, European beachgrass from 11 acres of 3-parameter wetlands and 152 acres of "wetland/upland mosaic" habitat. As noted above, the subject dunes are considered a particularly valuable ecosystem and a rare type of habitat on the Pacific Coast. Therefore, the entire project area meets the definition of environmentally sensitive habitat area (ESHA) set forth in the Coastal Act.

The above-cited policies set forth a number of different limitations on what development projects may be allowed within ESHA and coastal wetlands, and include standards requiring that ESHA, coastal wetlands, and water quality be protected from the impacts of development and maintained and enhanced where feasible.

Allowable uses within ESHA and wetlands
Section 30240(a) of the Coastal Act limits activities that may be undertaken within ESHAs to only those uses that are dependent on the resources of the subject ESHA. Coastal Act Section 30233 limits the filling, diking, or dredging of wetlands to only seven allowable uses. Subsection (a)(6) lists "*restoration purposes*" among the allowable uses for fill and dredging in wetlands.

The fragile dune habitats within the subject site are highly disturbed and have been significantly colonized by *Ammophila*. The infestation has changed the physical shape of the dunes and affects ongoing dune processes in ways that favor further growth of *Ammophila* and successional species at the expense of the native dune vegetation and the dune ecosystem as a whole. If the proposed restoration project is implemented, CDPR predicts that substantial dune ecosystem improvement will be realized within the project area, and that the recovery and maintenance of native dune mat vegetation will follow thereafter. Rare native plant populations are expected to recover as well, and the amount of available breeding habitat for the federally listed western snowy plover will increase.

Neither the Coastal Act nor the Commission's administrative regulations contain a precise definition of "restoration." The dictionary defines "restoration" in terms of actions that result in returning an article "back to a former position or condition," especially to "an unimpaired or improved condition."[1] The particular restorative methods and outcomes vary depending upon the subject being restored. For example, the Society for Ecological Restoration defines "ecological restoration" as "the process of intentionally altering a site to establish a defined indigenous,

[1] Merriam-Webster's Collegiate Dictionary, Tenth Edition

historical ecosystem. The goal of the process is to emulate the structure, function, diversity, and dynamics of the specified ecosystem."[2] Implicit in all of these varying definitions and distinctions is the understanding that the restoration entails returning something to a prior state.

As described above, the proposed project involves using heavy equipment to excavate within approximately 43 acres of delineated dune wetlands (1-parameter and 2-parameter wetlands) and 229 acres of upland dune ESHA, as well as manual removal methods in an additional 11 acres of 3-parameter wetlands and 152 acres of an wetland/upland mosaic area, for the purpose of removing invasive exotic species and restoring the areas to natural native habitats and processes. Resource management agencies consider *Ammophila* the most pervasive exotic plant species currently threatening coastal dunes on the west coast of the United States. *Ammophila* is a better sand accumulator than the native dune grass and dune mat vegetation, and creates a higher, steeper foredune profile. Dune formations anchored by *Ammophila* tend to form in parallel to the shoreline, further decreasing sand flow to the inner dunes and thus limiting the supply of sand substrate needed to support the native dune vegetation. In contrast, natural dune processes typically result in more perpendicular dune patterns, allowing sand drift to maintain the inner dunes. Although cyclic stabilization of dunes is a naturally occurring phenomenon in the Pacific Northwest regulated by tectonic events, the presence of *Ammophila* shortens the time for stabilization, eliminates or occupies habitat niches for native species, and drastically alters natural succession.

As stated above, the purpose of the proposed project is to restore and protect native vegetation and to return natural ecosystem function to the coastal dune habitat within the Park. CDPR proposes to accomplish this purpose through a combination of mechanical and manual removal of exotic invasive plants. Thus, as the project is inherently designed to achieve the restoration of the dune wetlands and other environmentally sensitive dune habitat areas, the Commission finds that the proposed development activities within the wetlands and ESHA, including exotic plant removal, are designed exclusively for the benefit of the wetlands and dune ESHA. The Commission has further determined because the proposed dune restoration project is inherently dependent upon the presence of dune wetlands and other types of dune ESHA to carry out the restoration activities, the project constitutes "restoration purposes" under Section 30233(a)(6) and a use dependent on the resources of the ESHA consistent with the use requirements of Section 30240(a) of the Coastal Act.

This finding that the proposed project constitutes "restoration purposes" and is for a use dependent on the resources of the ESHA is based in part on the assumption that the proposed project will be successful in restoring various historic habitats and processes as proposed and increasing habitat values. As such, there must be assurance that the proposed project will be successful in increasing and enhancing habitat values. Otherwise, should the project be unsuccessful at increasing and/or enhancing habitat values, or worse, if the proposed impacts of the project actually result in long term degradation of the habitat, the proposed activities could not be found to be for "restoration purposes."

The applicant has proposed to conduct effectiveness monitoring to detect changes in plant community composition and species cover over time, track locations of sensitive resources, and

[2] "Definitions," *Society of Ecological Restoration News*, Society for Ecological Restoration; Fall, 1994

provide feedback for adaptive management to determine whether further action is necessary for the restoration success. Proposed monitoring and reporting details are provided in **Exhibit 4**. To ensure that the proposed project ultimately achieves the objectives for which it is intended (i.e., for the restoration of dune habitat by removing invasive *Ammophila* to promote the growth of native dune mat vegetation and increase the availability of western snowy plover breeding habitat), and thus would be consistent with the requirements of Coastal Act Sections 30233(a)(6) and 30240(a), the Commission attaches **Special Condition 1**. This condition requires that the project be undertaken in accordance with the approved final Restoration Plan, including proposed monitoring and reporting procedures outlined in the plan. In addition, **Special Condition 2** requires that CDPR submit annual progress reports and a final monitoring report within five years after the commencement of mechanical *Ammophila* removal comparing pre- and post-restoration conditions and evaluating whether, in light of all monitoring reports prepared in accordance with the Restoration Plan, native dune mat vegetation has increased relative to the coverage by *Ammophila* or other exotic invasive species in the treated areas. If CDPR cannot demonstrate such improvement, the condition establishes the requirement that CDPR secure a permit amendment to implement additional restoration activities or additional adaptive management measures necessary to achieve the required favorable restoration result.

Therefore, the Commission finds that the proposed diking, dredging, and filling activities associated with the restoration of dune habitats is allowable under Sections 30233(a)(6) and 30240(a).

Measures to protect ESHA, Wetlands, and Water Quality

Sections 30240(a), 30233, and 30231 of the Coastal Act contain a number of provisions requiring that ESHA, coastal wetlands, and water quality be protected from the impacts of development. Section 30240(a) requires that ESHA be protected against any significant disruption of habitat values. Section 30233(a) requires that feasible mitigation measures be provided to minimize the adverse environmental effects of any filling or dredging of wetlands. Section 30231 requires that the biological productivity and the quality of coastal waters and wetlands appropriate to maintain optimum populations of marine organisms and for the protection of human health be maintained.

Depending on the manner in which the proposed project is conducted, the significant adverse impacts of the project on ESHA, coastal wetlands, and water quality may include (a) disturbance of rare plant habitat, (b) disturbance to Western snowy plover habitat, (c) disturbance to Northern red-legged frog habitat, and (d) impairment of wetland and ocean water quality from fuel and hydraulic spills. The potential impacts and their mitigations are discussed in the following sections:

a. Mitigation Measures to Protect Rare Plants

Two rare plants are known to occur in the proposed project area: pink sand verbena (*Abronia umbellata* ssp. *breviflora*) and seaside pea (*Lathyrus japonicus*). Pink sand verbena is a perennial herb in the Four-O'Clock family (Nyctaginaceae) that is known to grow on coastal dunes along

the northern California coast (Marin, Sonoma, Mendocino, Humboldt, and Del Norte Counties) and on the coasts of Oregon and Washington. It has a California Rare Plant Rank[3] of 1B.1 Seaside pea is a perennial herb in the Legume family (Fabaceae) that is known to grow on coastal dunes along the northern California coast (Humboldt and Del Norte Counties) and on the coasts of Oregon, Washington, Alaska, the east and interior coastlines of the United States, and parts of South America. It has a California Rare Plant Rank of 2.1. In addition, the project area supports potential habitat for additional sensitive plant species, including beach layia (*Layia carnosa*, 1B.1, also state- and federally listed as "endangered"), dark-eyed gilia (*Gilia millefoliata*, 1B.2), and others.

The CEQA document adopted for the project identifies various mitigation measures proposed to minimize impacts to sensitive plants, including the following: (i) sensitive plant surveys conducted in conformance with DFG current guidelines will be completed prior to the initiation of ground disturbing activities; (ii) sensitive plants will be flagged for avoidance using temporary flagging, which will be removed upon completion of work in an area; (iii) a minimum 10-foot buffer zone will be established and maintained around all sensitive plant occurrences, and no heavy equipment will be allowed to pass through or work within sensitive plant areas or their associated buffer zones; (iv) only manual methods (e.g., hand-pulling, shovels, and other hand tools) will be used to remove European beachgrass and other target invasive plants within sensitive plant protection areas, and sensitive plants will be avoided to the maximum extent feasible during the course of manual removal activities; and (v) where impacts to sensitive plants cannot be avoided, either invasive plant removal activities will be delayed until the rare plants have set seed and naturally dispersed, and/or individual rare plants will be transplanted to nearby suitable habitat that will be protected from project impacts.

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[3] The **California Rare Plant Rank** (see http://www.rareplants.cnps.org/glossary.html#threatrank) is a ranking system used by the California Native Plant Society (CNPS) and the California Department of Fish and Game (DFG) to categorize degrees of rarity in certain California native plants. The rarity ranks are defined as follows:
1A = plant is presumed extinct because it has not been seen or collected in the wild in California for many years. This rank includes plants that are both presumed extinct as well as those plants which are presumed extirpated in California. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range;
1B = plants that are rare throughout their range with the majority of them endemic to California;
2 = similar to 1B, except plants with this ranking are more common outside the boundaries of California.
All of the plants ranked 1B and 2 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the DFG Code, and are eligible for state listing.
3 = plants lack the necessary information to assign them to one of the other ranks or to reject them; may be taxonomically problematic; some of the plants with this rank meet the definitions of Sec. 1901, Chapter 10 (NPPA) or Secs. 2062 and 2067 (CESA) of the DFG Code, and are eligible for state listing; and
4 = plants of limited distribution or infrequent throughout a broader area in California. Many plants in this category are significant locally, and CNPS strongly recommends that Rank 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA. This may be particularly appropriate for populations at the periphery of a species' range, areas where the taxon is especially uncommon, areas where the taxon has sustained heavy loss, or populations exhibiting unusual morphology or occurring on unusual substrates.
The "**Threat Rank**" is an extension added onto the Rare Plant Rank and designates the level of endangerment by a 1 to 3 ranking with 1 being the most endangered and 3 being the least endangered. **0.1**-Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat); **0.2**-Fairly threatened in California (20-80% of occurrences threatened/high degree and immediacy of threat); **0.3**-Not very threatened in California (less than 20% of occurrences threatened/high degree and immediacy of threat).

According to the applicant, CDPR contracted a seasonally appropriate botanical survey of the project area in 2012, and populations of both pink sand-verbena and seaside pea were located and documented with a high-accuracy GPS unit. To ensure that rare plants are protected to the maximum extent feasible during the course of the proposed restoration work, the Commission attaches **Special Condition 3**. This condition requires submittal of a rare plant protection plan prior to permit issuance for the Executive Director's review and approval. The plan shall demonstrate that all of the measures proposed in the CEQA document (summarized above) will be implemented. The plan shall prove the results of the updated seasonally appropriate botanical survey, a map depicting the locations of rare plants and rare plant buffer zones in relation to proposed mechanical and manual *Ammophila* removal activities, and other pertinent details.

Therefore, the Commission finds that the proposed project, as conditioned, provides feasible mitigation measures to minimize potential adverse environmental effects to rare plants, as required by Section 30233(a), and will protect rare plant ESHA against any significant disruption of habitat values as required by Section 30240(a).

b. Mitigation Measures to Protect Western Snowy Plover

Western snowy plovers (*Charadrius alexandrinus*) were first documented on Gold Bluffs Beach in 2005, when three chicks were observed shortly after hatching. In 2006, two nests were discovered along the waveslope near Fern Canyon (near the southern end of the project area). No nests or breeding activity has been documented since 2006. However, wintering birds have been detected annually since that time.

As described above, plovers primarily nest and forage in open beach habitats along the shoreline. Listed as federally threatened since 1993, loss and modification of plover habitat has, in general, resulted from a combination of European beachgrass invasion, urban development, recreational activities, and predation exacerbated by human disturbance. Removal of European beachgrass and other nonnative invasive vegetation from existing and potential breeding sites is part of the species' recovery strategy. The proposed project is anticipated to increase the amount of available plover breeding habitat. Nevertheless, unless proper protocols and avoidance measures are followed, the project also has the potential to harm plovers.

The U.S. Fish and Wildlife Service wrote a letter of concurrence (informal consultation) for the project (among other exotic plant management projects elsewhere in Redwood National and State Parks) affirming that the project as proposed "may affect but is not likely to adversely affect" the western snowy plover (**Exhibit 7**). The FWS based its concurrence on the following factors (in part), all of which are incorporated into the proposed Restoration Plan as part of the project description (see **Exhibits 4** and **7** for full details): (i) regular plover surveys will be conducted throughout the breeding season and on a daily basis prior to commencing operations each day; (ii) no suitable habitat will be removed or degraded; (iii) a spatial buffer zone will be maintained between any plovers identified during surveys and restoration activities; (iv) no heavy equipment will be used for restoration activities during the plover breeding season (March 1-September 15); and (v) vehicles accessing the work site will travel at slow speeds along the waveslope/wet sand areas and will not drive during periods of diminished visibility.

To ensure that plovers are adequately protected, as proposed, during the course of the proposed work, the Commission attaches **Special Condition 4**. This condition requires CDPR to adhere to all plover protection measures proposed in the project description (**Exhibit 4**) and as directed by the FWS in its concurrence letter (File #8-14-1999-77, **Exhibit 7**).

Therefore, the Commission finds that the proposed project, as conditioned, provides feasible mitigation measures to minimize potential adverse environmental effects to plovers, as required by Section 30233(a), and will protect plover ESHA against any significant disruption of habitat values as required by Section 30240(a).

c. Mitigation Measures to Protect Red-Legged Frogs

As noted in the Environmental Setting finding, the wetland delineation completed for the project identified remnant egg masses of Northern red-legged frog (*Rana aurora*) in some of the 3-parameter wetlands. The eggs require an aquatic environment to survive. The CEQA document completed for the project also discusses the presence of the species in the project area.

In California, populations of northern red-legged frog inhabit humid forests, woodlands, grasslands, and streamside habitats between sea-level and about 1,000 feet from Marin County north to the Oregon state line. The species is listed as a "Species of Special Concern" by the DFG. Threats to the species include urban encroachment, construction of reservoirs and water diversions, habitat conversion, timber harvesting practices, introduction of exotic predators and competitors (such as American bullfrog), livestock grazing, and habitat fragmentation.

The project as proposed will minimize impacts to red-legged frogs by excluding the use of heavy equipment in red-legged frog potential breeding habitat areas (3-parameter wetlands) and by avoiding all restoration activities (hand- and mechanical-removal) during periods when seasonal wetlands are inundated (1-, 2-, and 3-parameter wetlands). **Special Condition 5** requires that any frog egg masses encountered during the project be avoided, and that no restoration activities take place in delineated wetlands while those wetlands are inundated to ensure that Northern red-legged frog breeding habitat is avoided.

Therefore, the Commission finds that the proposed project, as conditioned, provides feasible mitigation measures to minimize potential adverse environmental effects to rare frogs, as required by Section 30233(a), and will protect Northern red-legged frog ESHA against any significant disruption of habitat values as required by Section 30240(a).

d. Mitigation Measures to Protect Water Quality

The project as proposed involves the use of heavy equipment, transporting small amounts of diesel fuel to the work site, and restoration activities that require the use of certain potentially hazardous materials, such as fuels, oils, and solvents. If accidentally spilled, these materials could degrade the water quality of the ocean or nearby wetlands. However, as proposed, the project will incorporate standards to reduce any potential water quality impacts to a less than significant level. These include (i) maintaining a hazardous material spill prevention plan on site to ensure adequate and safe cleanup of any accidental release of hazardous substances to the

ground or water; (ii) fueling equipment only during daylight hours in designated fueling areas; (iii) no maintenance or fueling activities within 100 feet of a stream, the ocean, or a coastal wetland; (iv) conducting equipment cleaning and repairs (other than emergency repairs) outside of the Park boundaries; (v) inspecting equipment for leaks prior to the start of restoration activities and regularly during the course of the proposed restoration work; repairing any discovered leaks immediately in the field or suspending work until repairs can be made; and (vi) immediately ceasing work in the event of any spill or release of any chemical in or adjacent to the project area, and contacting appropriate agencies in the event that spillage amounts exceed one-half gallon. **Special Condition 6** requires that CDPR fully implement the water quality protection measures as proposed.

Therefore, the Commission finds that the proposed project, as conditioned, (i) provides feasible mitigation measures to minimize adverse environmental effects on water quality as required by Section 30233(a), (ii) will protect water quality so as to prevent any significant disruption of habitat values as required by Section 30240(a), and (iii) will ensure that the biological productivity and the quality of coastal waters and wetlands appropriate to maintain optimum populations of marine organisms and for the protection of human health will be maintained as required by Section 30231.

Least Environmentally Damaging Feasible Alternative

Section 30233(a) of the Coastal Act requires that any approved filling or dredging of wetlands be the least environmentally damaging feasible alternative. In this case, the Commission has considered alternatives and determines that there are no feasible less environmentally damaging alternatives to the proposed diking, dredging, and filling of dune wetlands, as conditioned. Alternatives that have been identified include: (a) no project, (b) manual removal methods only, and (c) other methods.

a. No Project

This alternative would entail doing nothing within the 206 acres of dune wetlands that currently have *Ammophila* proposed for removal using mechanical and manual means. This alternative would continue to allow European beachgrass to increase in cover and spread across Gold Bluffs Beach and other nearby dune habitats in Humboldt and Del Norte Counties. Allowing European beachgrass to remain in the area would result in the further spread of the invasive species and the further decline of the area's sensitive resources, including rare plant species (such as pink sand verbena), rare animals that depend on open sand habitat to breed (such as the western snowy plover), and environmentally sensitive dune habitats in the Park (such as dune mat and dune wetlands). Therefore, this alternative is not a feasible less environmentally damaging alternative to the proposed project as conditioned.

b. Manual Removal Methods Only

This alternative would eliminate the proposed use of heavy equipment within 43 acres of dune wetland habitats, and restoration activities would entail only the use of manual labor and hand tools throughout the 550-acre project site.

Although this alternative may ultimately achieve the desired restoration results, the alternative would require significantly more time and staffing resources, including up to an additional 16 retreatments, an additional 10 years to implement. Due to the significant additional time required to implement the project, this alternative would not necessarily achieve the goal of eradicating *Ammophila* from the area before the invasive plant further degrades surrounding sensitive habitats. Thus, this alternative is not a feasible less environmentally damaging alternative to the proposed project as conditioned.

c. Other Methods

Alternative methods considered but rejected include chemical control, salting, biological control, and burning. The use of herbicide to remove *Ammophila* from dune wetlands would be more cost-effective than the proposed project, but this method could have significant water quality impacts over such a large area. Salting *Ammophila* with rock salt has been tried experimentally on dunes near Humboldt Bay, but this method was found to be ineffective at eradicating the invasive weed as well as detrimental to surrounding desirable native plants. In terms of biological control, the USDA has not approved any insects or fungi for control of European beachgrass in the United States. Grazing would be ineffective at removing the species because of the plant's ability to resprout from below-ground rhizones. Finally, burning has been shown to be ineffective, as it stimulates *Ammophila* to resprout. Burning also is impractical due to the length of time required between burns for sufficient thatch build up for reburning.

Therefore, for the various reasons discussed above, the Commission finds that the alternative of using other methods is not a feasible less environmentally damaging alternative to the proposed project as conditioned.

d. Conclusion

Based on the above alternatives analysis, the Commission concludes that there are no feasible less environmentally damaging alternatives to the proposed project as conditioned.

Maintenance and Enhancement of Habitat Values

Sections 30233 and 30231 of the Coastal Act contain provisions requiring that coastal wetlands and water quality be maintained and enhanced where feasible. Section 30233(c) requires that any filling or dredging of wetlands shall maintain or enhance the functional capacity of the wetland. Section 30231 requires that the biological productivity and the quality of coastal waters and wetlands appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and where feasible, restored.

As previously discussed, the dune habitats in the project area are highly disturbed and have been significantly colonized by *Ammophila*, which has changed the physical shape of the dunes and affects ongoing dune processes in ways that favor further growth of *Ammophila* and successional species at the expense of the native dune vegetation and the dune ecosystem as a whole. The proposed project is expected to result in substantial dune ecosystem improvement and the recovery and maintenance of native dune vegetation. Rare native plant populations are expected

to recover, and the amount of available breeding habitat for the federally listed western snowy plover will be increased.

Therefore, the Commission finds that (i) the proposed project development, as conditioned, will maintain and enhance the functional capacity of the wetlands at the site consistent with Section 30233(c), and (ii) the biological productivity and the quality of coastal waters and wetlands will be maintained and restored consistent with Section 30231.

Conclusion

In conclusion, the Commission finds that the proposed project, as conditioned, is an allowable use, there is no feasible less environmentally damaging alternative, adequate mitigation is required to minimize adverse environmental effects and ensure ESHA is protected against any significant disruption, and habitat values will be maintained and enhanced. Therefore, the Commission finds that the proposed development, as conditioned, is consistent with Sections 30231, 30233, and 30240 of the Coastal Act.

F. ARCHAEOLOGICAL RESOURCES

Section 30244 of the Coastal Act states:

> *Where development would adversely impact archeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

The project area is located within the ethnographic territory of the Yurok peoples. CDPR contracted with the CSU Chico Research Foundation in June of 2011 to conduct an archaeological survey of the project area. The resulting confidential report, "A Linear Archaeological Survey at Gold Bluffs Beach, Prairie Creek Redwoods State Park, Humboldt County, California" (Dalton 2011) is summarized in the CEQA document adopted for the project. CDPR also consulted with the Native American Heritage Commission and with the Tribal Historic Preservation Officer for the Yurok Tribe on the project.

The archaeological field survey did not identify any archaeological sites within the proposed project's area of potential effects. However, the project as proposed includes the mitigation measure of halting ground-disturbing activities in the event that archaeological resources are inadvertently unearthed during the course of the restoration activities until a qualified archaeologist analyzes the significance of the find and determines appropriate steps to avoid, preserve, or recover the resources prior to work resuming in the area. CDPR also proposes in the Restoration Plan and adopted CEQA document to, upon request, coordinate and contract with a tribal cultural monitor from the Yurok Tribe to be present on site during project implementation. To ensure that these measures are implemented, **Special Condition 7** requires that if an area of cultural deposits is discovered during the course of the project, all construction shall cease and shall not recommence until a qualified cultural resource specialist analyzes the significance of the find. Thereafter, the condition requires the permittee to submit a supplementary archaeological plan based on the specialist's analysis for the review and approval of the Executive Director. After review of the supplementary plan, the Executive Director would either authorize recommencement of the project activities or require that the permittee obtain an

amendment to coastal development permit 1-12-032, depending on the extent and significance of the discovery.

Therefore, the Commission finds that the proposed project, as conditioned, is consistent with Coastal Act Section 30244, as the development as conditioned will include reasonable mitigation measures to ensure that the development will not result in significant adverse impacts to archaeological resources.

G. PUBLIC ACCESS

Section 30210 of the Coastal Act requires that maximum public access be provided consistent with public safety needs and the need to protect natural resource areas from overuse. Section 30212 requires that access from the nearest public roadway to the shoreline be provided in new development projects except where it is inconsistent with public safety, military security, or protection of fragile coastal resources, or adequate access exists nearby. Section 30211 requires that development not interfere with the public's right to access gained by use or legislative authorization. Section 30214 provides that the public access policies of the Coastal Act shall be implemented in a manner that takes into account the capacity of the site and the fragility of natural resources in the area. In applying Sections 30210, 30211, 30212, and 30214, the Commission must show that any denial of a permit application based on these policies or any decision to grant a permit subject to special conditions requiring public access is necessary to avoid or offset a project's adverse impact on existing or potential access.

The proposed project will not have significant adverse effects on public access. A section of the California Coastal Trail runs parallel to and east of the project area, but the trail is separated from the project area by a large wetland complex that, due to its wet nature, is effectively inaccessible in many areas. Thus, the project will not affect the use of the Coastal Trail. The public uses the waveslope west of the project area and the project area itself for beachcombing, nature study, and other passive recreational uses. The proposed project would not impose any permanent restriction on the existing authorized uses of the project area. However, from time to time, portions of the project area will need to be temporarily closed to public use while heavy equipment is operating. CDPR proposes to post temporary signage along the perimeter of the treatment areas to inform the public of the temporary closure of areas during heavy equipment operations to protect public safety. These exclusions will be very limited and applicable only to relatively small subareas of the Park for short durations of time as necessary during project activities. In addition, CDPR proposes also to use symbolic fencing around ephemeral wet areas that are treated by heavy equipment, and to maintain the symbolic fencing in these areas until the water table has lowered to average mid-summer levels as determined by biologists and geologists familiar with the site. The purpose of the proposed temporary closure and signage of these areas, as explained in the CEQA document adopted for the project, is to warn of and protect the public from the potential liquefaction in these areas during the rainy season. The CDPR anticipates that these seasonally wet areas would be temporarily fenced and signed for closure for no more than 6 months.

To ensure that public access restrictions are minimized and temporary as proposed, the Commission includes **Special Condition 8**, which states that access restrictions shall be minimized and implemented only as proposed, in areas where heavy equipment is actively

working and/or in areas potentially subject to liquefaction hazards for no longer than a 6-month period.

Therefore, the Commission finds that the proposed project, as conditioned, will not have any significant adverse effect on public access to the shoreline, and the project as proposed without new public access is consistent with the public access policies of Coastal Act cited above.

H. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The applicant served as the lead agency for the project for CEQA purposes. The applicant prepared a Draft Mitigated Negative Declaration for the project dated November 19, 2012. The document was circulated for public comment from November 26 through December 26, 2012. As of the date of this staff report, CDPR has received no comments on the CEQA document.

Section 13906 of the Commission's administrative regulation requires Coastal Commission approval of coastal development permit applications to be supported by a finding showing the application, as modified by any conditions of approval, is consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits approval of a proposed development if there are any feasible alternatives or feasible mitigation measures available, which would substantially lessen any significant adverse effect the proposed development may have on the environment.

The Commission incorporates its findings on Coastal Act consistency at this point as if set forth in full. As discussed above, the proposed project has been conditioned to be consistent with the policies of the Coastal Act. No public comments regarding potential significant adverse environmental effects of the project were received by the applicant as the lead agency during CEQA review of the project (at least not as of the date of this staff report), nor were any public comments received by the Coastal Commission prior to preparation of the staff report. As specifically discussed in these above findings, which are hereby incorporated by reference, mitigation measures that will minimize or avoid all significant adverse environmental impacts have been required. As conditioned, there are no other feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impacts which the activity may have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found consistent with the requirements of the Coastal Act to conform to CEQA.

APPENDIX A: SUBSTANTIVE FILE DOCUMENTS

- **Coastal Development Permit Application Materials**

Application file for Coastal Development Permit (CDP) Application No. 1-12-032, received 10/23/12.

- **Environmental Documents Submitted in Support of the CDP Application**

Draft Initial Study and Mitigated Negative Declaration for the North Gold Bluffs Beach Coastal Dune Restoration Plan, Prairie Creek Redwoods State Park, dated November 19, 2012. State Clearinghouse No. 2012112053: Review commenced November 26, 2012.

North Gold Bluffs Beach - Coastal Dune Restoration Plan, Prairie Creek Redwoods State Park, dated August 31 2012, California Department of Parks and Recreation, North Coast Redwoods District, Eureka CA. 50 pp.

Wetland Delineation Report: North Gold Bluffs Beach Coastal Dune Restoration Project, Prairie Creek Redwoods State Park, Humboldt County, California, submitted September 28, 2012, prepared by J.B. Lovelace & Associates, Covelo, CA.

- **Published Reports and Proceedings**

Proceedings of 1997 Symposium of the California Exotic Pest Plant Council. *Control of European Beachgrass (Ammophila arenaria) on the West Coast of the United States,* Andrea J. Pickart, The Nature Conservancy Lanphere-Christensen Dunes Preserve, Arcata CA 95521.

CDP 1-12-007. Staff Report for CDP 1-12-007 (California Dept. of Fish & Game). At the mouth of Lake Tolowa lagoon, within the Lake Earl Wildlife Area, approximately five miles north of Crescent City, Del Norte Co. (APN 106-010-05). Restoration of approximately 34 acres of dune habitat by removing invasive European beachgrass on either side of the Lake Tolowa lagoon mouth, using a combination of manual and mechanical removal techniques.

CDP 1-10-004. Staff Report for CDP 1-10-004 (California Dept. of Parks & Recreation). Little River State Beach, off of Clam Beach Rd, near Highway 101 and Crannell Ave., McKinleyville area, Humboldt Co. Restoration of dune habitats through the removal of 74 nonnative Monterey cypress and Monterey pine trees and other invasive species and the restoration of natural dune topography using heavy equipment, flaming, manual, and hot water treatment removal techniques.

CDP 1-09-026. Staff Report for CDP 1-09-026 (California Dept. of Parks & Recreation). Little River State Beach, near Highway 101 and Crannell Ave., McKinleyville area, Humboldt Co. Restoration of approximately 81 acres of dune habitats through the removal of invasive exotic plant species and the restoration of natural dune topography using heavy equipment, flaming, and manual removal techniques.

CDP 1-09-047. Adopted Findings for CDP 1-09-047 (California Dept. of Fish & Game). On the beach at the Lake Earl/Lake Tolowa sandbar, two miles north of Crescent City, Del Norte Co.

1-12-032 (California Department of Parks and Recreation)

Periodic breaching of the Lake Earl/Lake Tolowa sandbar for flood control purposes during the 2010-2011 through 2014-2015 rainy seasons (September 1 to February 15) whenever lagoon elevations reach 8 feet above mean sea level, and again on or about February 15 if lagoon elevations are 5 feet or more above mean sea level.

CDP 1-07-050. Staff report for CDP (Administrative Permit) 1-07-050 (California Dept. of Fish & Game). At five sites within the Pacific Shores Subdivision near the unincorporated community of Fort Dick, Del Norte Co. Implement *Oregon Silverspot Butterfly Experimental Habitat Improvement Pilot Project* entailing a variety of experimental vegetation removal and management techniques, involving mowing, livestock grazing, burning, and manual release techniques to be performed seasonally over a two-year period.

CDP 1-05-022. Staff report for CDP 1-05-022 (California Dept. of Parks and Recreation). Gold Bluffs Beach, Prairie Creek Redwoods State Park, north of Orick, Humboldt Co. Remove approximately 15 acres of European beachgrass and other invasive, exotic vegetation from the dunes using an experimental heavy equipment method to determine optimal removal techniques.

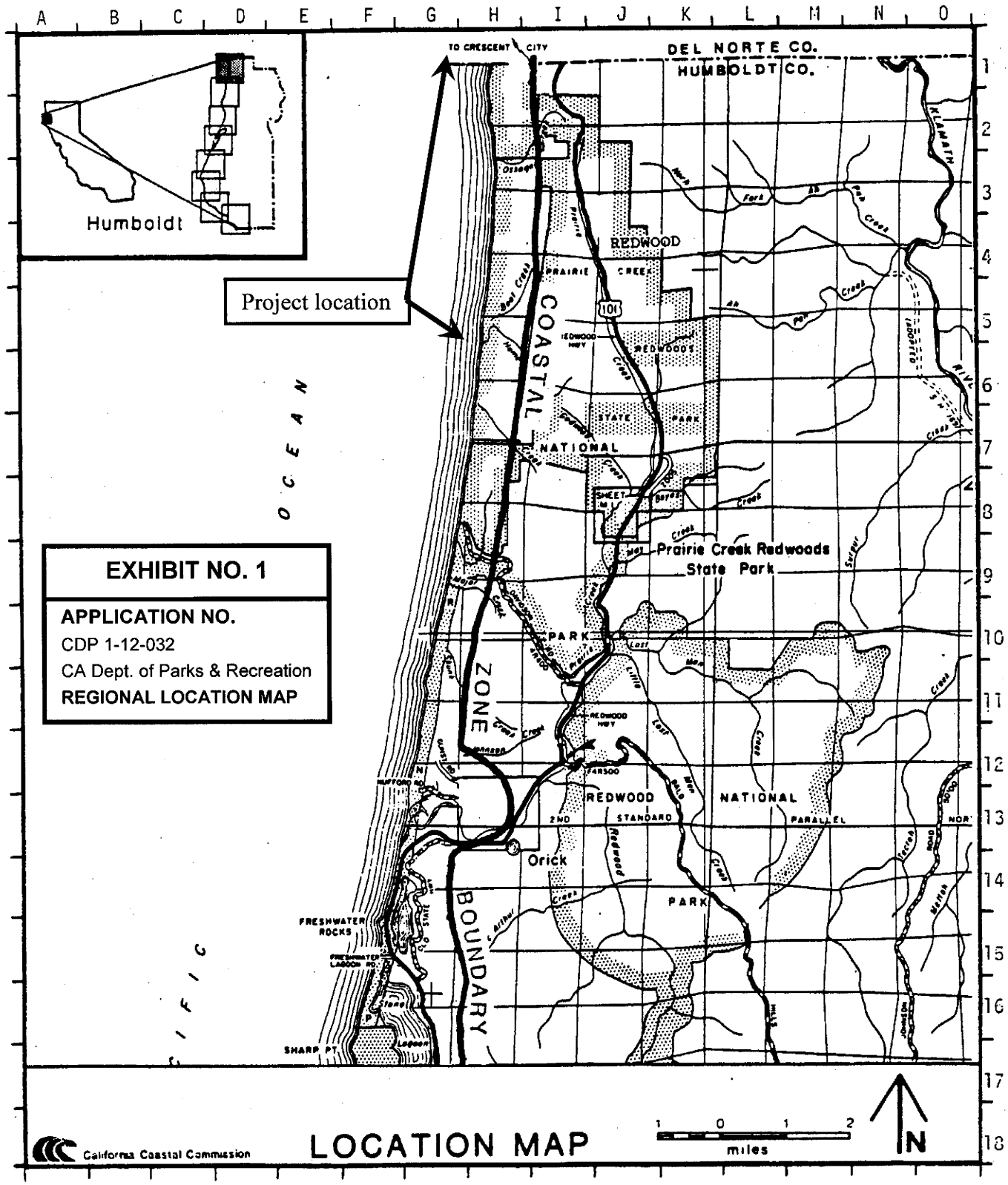
CDP 1-04-071. Staff report for CDP 1-04-071 (California Dept. of Parks & Recreation). Little River State Beach, near Highway 101 and Crannell Ave., McKinleyville area, Humboldt Co. Experimentally treat European beachgrass infested dunes to determine optimal removal and disposal techniques to restore dune habitat using eight 1.48-acre treatment areas within the dunes.

CD-052-02. Consistency Determination CD-052-02 (Bureau of Land Management). Humboldt Bay South Spit, Humboldt Co. Implementation of *South Spit Interim Management Plan*, a three-year Interim Management Plan (IMP) including habitat restoration activities. The IMP included measures to control invasive European beachgrass and to restore natural dune conditions within a 27-acre area of the South Spit.

- **Miscellaneous**

County of Humboldt Local Coastal Program

County of Del Norte Local Coastal Program



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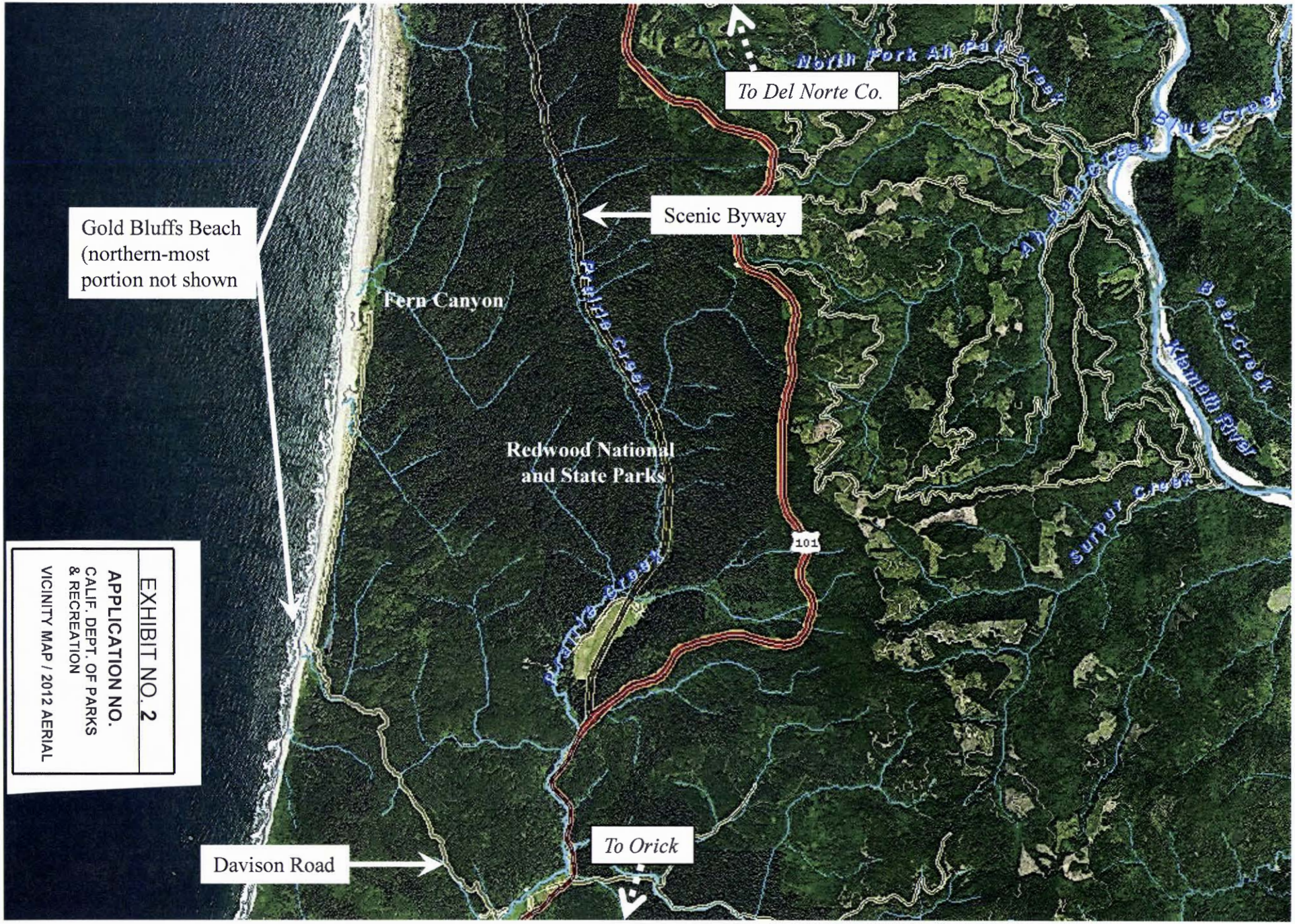
To Del Norte Co.
Scenic Byway
Gold Bluffs Beach
(northern-most
portion not shown
Fern Canyon
Redwood National
and State Parks
Davison Road
To Orick
101
Prairie Creek
Klamath River
Bear Creek
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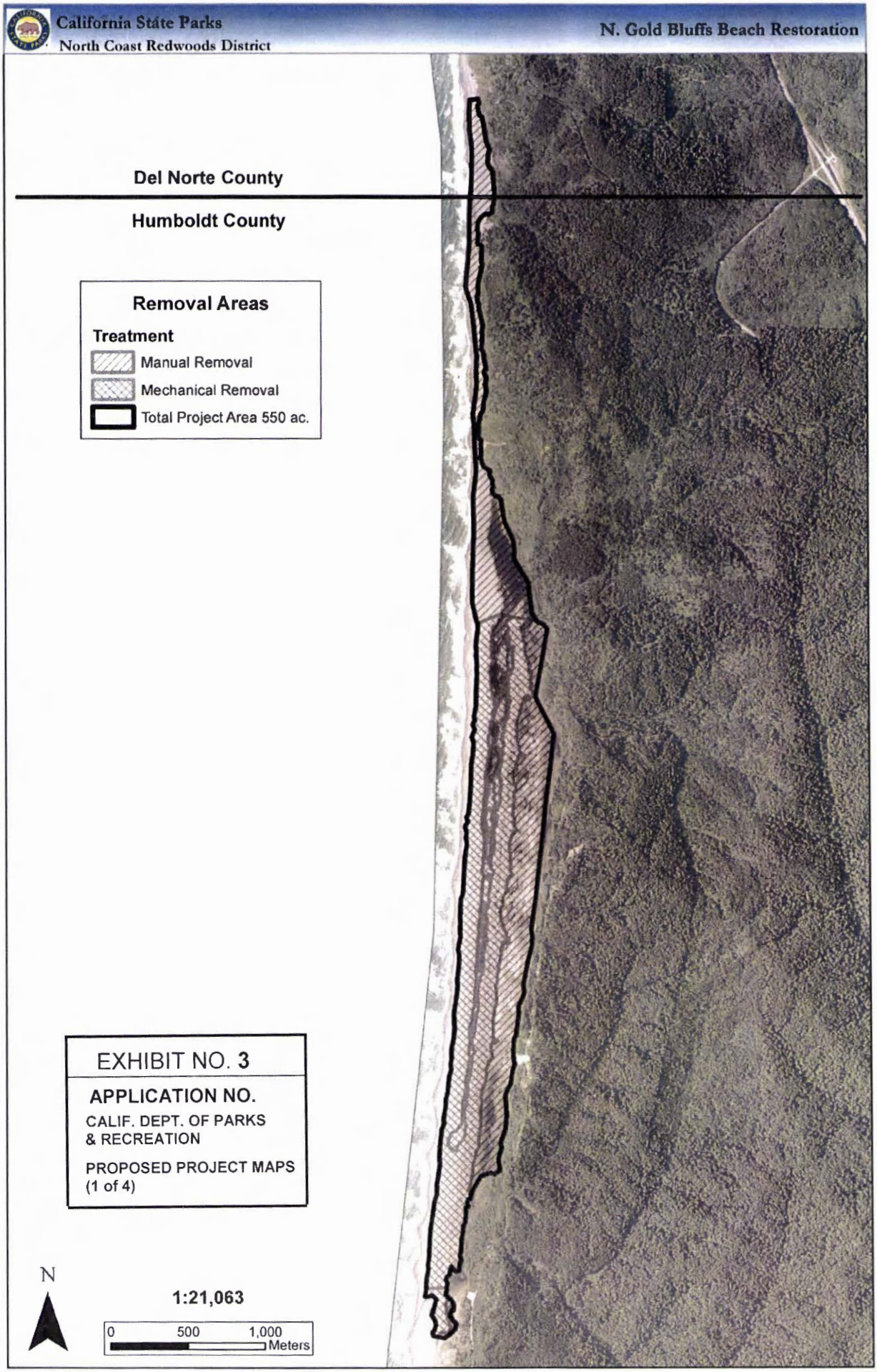
EXHIBIT NO. 2
APPLICATION NO.
CALIF. DEPT. OF PARKS
& RECREATION
VICINITY MAP / 2012 AERIAL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North Coast Redwoods District
N. Gold Bluffs Beach Restoration
Del Norte County
Humboldt County
Removal Areas
Treatment
Manual Removal
Mechanical Removal
Total Project Area 550 ac.
EXHIBIT NO. 3
APPLICATION NO.
CALIF. DEPT. OF PARKS & RECREATION
PROPOSED PROJECT MAPS (1 of 4)
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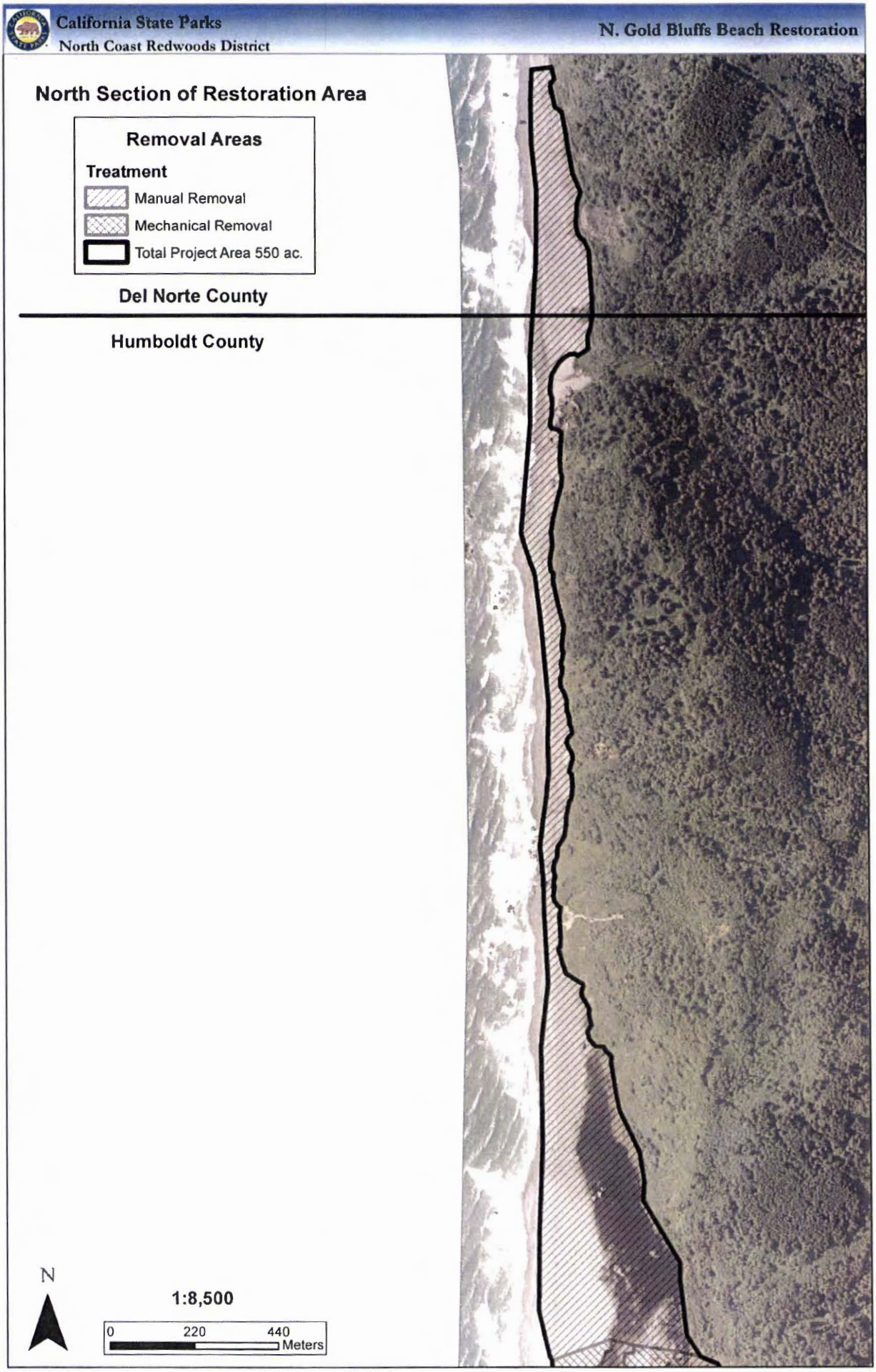
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North Coast Redwoods District
N. Gold Bluffs Beach Restoration
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Removal Areas
Treatment
Manual Removal
Mechanical Removal
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Humboldt County
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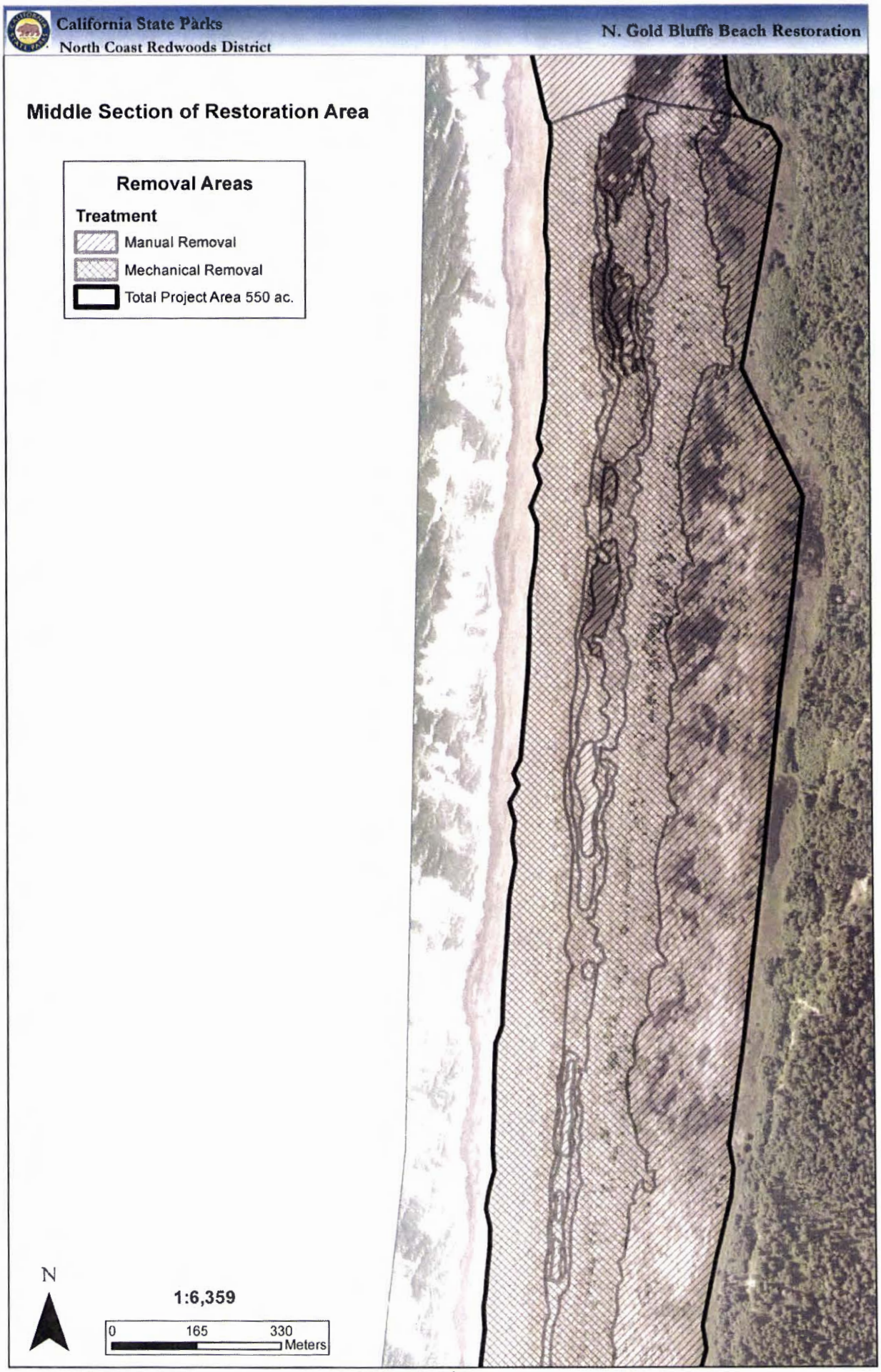
Meters


California State Parks
North Coast Redwoods District
N. Gold Bluffs Beach Restoration
Middle Section of Restoration Area
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Treatment
Manual Removal
Mechanical Removal
Total Project Area 550 ac.
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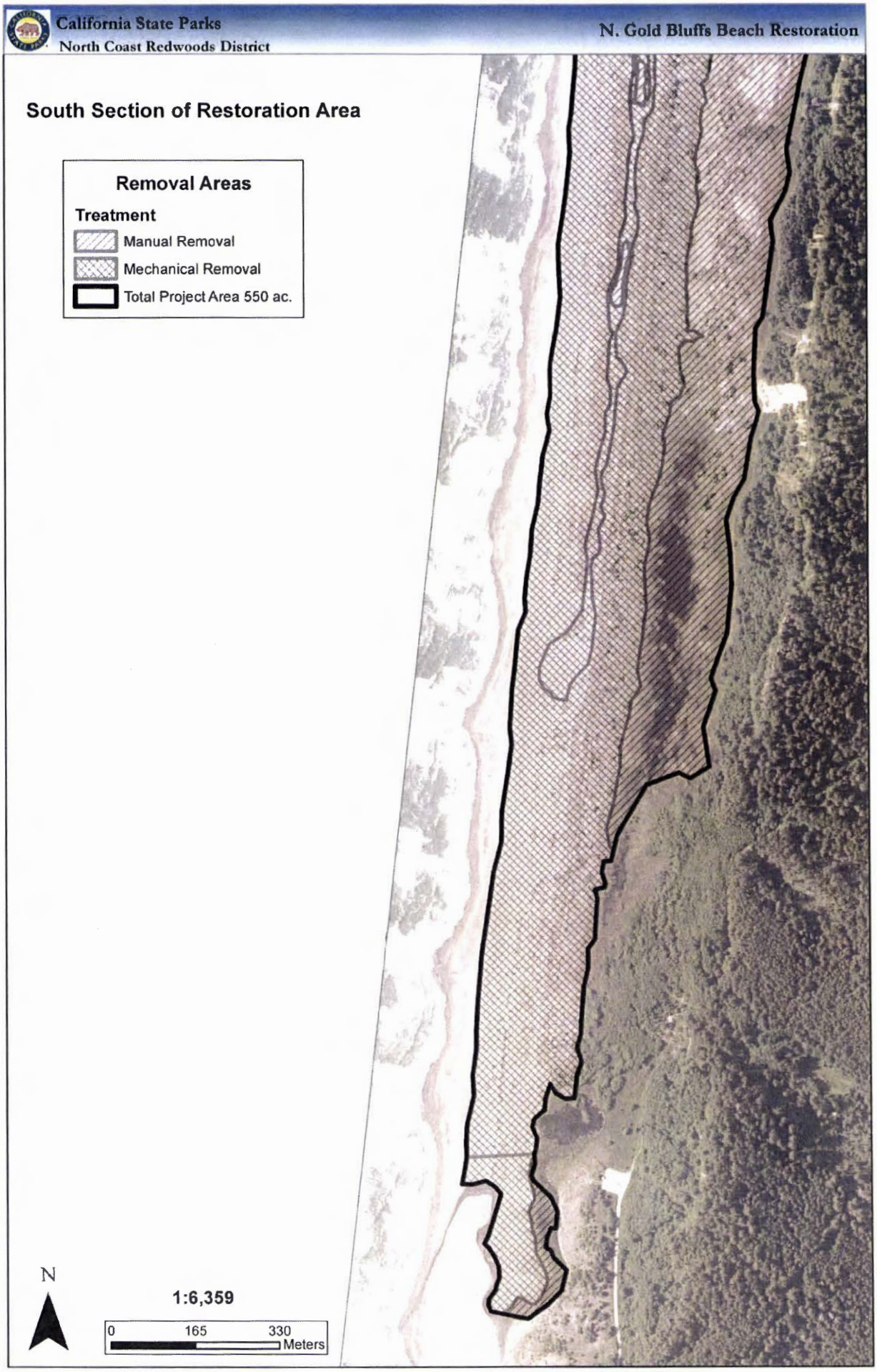
0
165
330
Meters


California State Parks
North Coast Redwoods District
N. Gold Bluffs Beach Restoration
South Section of Restoration Area
Removal Areas
Treatment
Manual Removal
Mechanical Removal
Total Project Area 550 ac.
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North Gold Bluffs Beach
Coastal Dune Restoration Plan
Prairie Creek Redwoods State Park

California State Parks

North Coast Redwoods District

August 31, 2012

EXHIBIT NO. 4
APPLICATION NO.
CALIF. DEPT. OF PARKS & RECREATION
PROPOSED RESTORATION PLAN (1 of 47)

Prepared by
Amber Transou, Staff Environmental Scientist. *California Department of Parks and Recreation, North Coast Redwoods District, Eureka CA.*

Acknowledgements
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Table of Contents

Tables

Figures

List of Acronyms

ACOE-Army Corps of Engineers
CCC-California Conservation Corps
CEQA-California Environmental Quality Act
CSP-California State Parks
DFG-California Department of Fish and Game
DPR-Department of Parks and Recreation
LiDAR- Light Detection and Ranging (a remote sensing system used to collect topographic data)
MND-Mitigated Negative Declaration
NCRD-North Coast Redwoods District
NOAA-National Oceanic and Atmospheric Administration
PCRSP-Prairie Creek Redwoods State Park
RNP-Redwood National Park
RNSP-Redwood National and State Parks
USFWS-United States Fish and Wildlife Service
WSP-Western Snowy Plover

1 INTRODUCTION

1.1 PROJECT SUMMARY

This project proposes restoration work in 222 ha (550 ac) of coastal dune habitat along the western edge of Prairie Creek Redwoods State Park (PCRSP; Figure 1). The primary goal of the project is to restore areas damaged by European beachgrass (*Ammophila arenaria*) infestation. The project proposes to restore natural dune processes by removing European beachgrass (beachgrass) and other invasive exotic plants, thus promoting revegetation by native dune vegetation and restoration of sand movement. These efforts will increase the amount of suitable habitat for the federally threatened western snowy plover (*Charadrius nivosus nivosus*) as well as other native dune-adapted plants and animals.

The project will involve an integrated approach to beachgrass control with treatment methods determined by site conditions (i.e. type and degree of exotic species invasion, proximity to sensitive resources, etc.).

1.2 PROJECT LOCATION

Prairie Creek Redwoods State Park is located at the northern half of the North Coast Redwoods District (NCRD), about 80 km (50 miles) north of Eureka, CA and 80 km (50 miles) south of the Oregon border (Figure 1). The 5,565 ha (14,000 ac) park is one of three state parks which, together with Redwood National Park (RNP), comprise Redwood National and State Parks (RNSP). Gold Bluffs Beach extends eight miles north-south along the western edge of PCRSP. A gravel road runs parallel to the shoreline from Espa Lagoon to Home Creek. From Home Creek, the California Coastal Trail continues to the northern extent of the project area at Carruthers Cove and beyond. Davison Road, off Hwy 101, provides access to Gold Bluffs Beach, approximately six miles from the Hwy 101/Davison Road intersection. Access is also provided by several park trails.

The project area consists of 222 ha (550 ac) of coastal beach and dune habitat in the northwest section of the Park (Figure 2), extending from Home Creek north to Carruthers Cove. Essentially, the project area consists of the northern section of Gold Bluffs Beach. The western edge of the project area is delineated by the Pacific Ocean, while the eastern edge is determined by a change in the vegetation from dunes to wetlands composed of slough sedge and willows and/or Sitka spruce and shore pine forest. The project area is spread across 6 sections (Township 12N, Range 1E, Section 4, 9,16,21,28 and Township 13N, Range 1E, Section 33) of the USGS 1:24,000, Fern Canyon, CA, quadrangle.

1.3 NEED FOR PROJECT

European beachgrass is known to alter dune morphology (Schlinger et al. 1977, Danin et al. 1998, Wiedemann 1998), sand movement and native plant community composition (Breckon and Barbour 1974, Boyd 1992), decrease invertebrate abundance and diversity (Slobodchikoff and Doyen 1977, Webb et al. 2000), and negatively impact native pollinators (Nyoka 2004).

Two vegetation types, native dunegrass and sand verbena-beach bursage, listed as special status communities by CNDDB have the potential to benefit from the proposed restoration project. Remnants of these alliances occur at the site, including characteristic species pink sand verbena (*Abronia umbellata* ssp. *breviflora*, CNPS LIST 1B) and sand pea (*japonicus*, CNPS List 2); both are California species of special concern. Removal of European beachgrass will allow for the natural restoration of these vegetation types, and the ecosystem processes that are associated with them.

There is potential habitat for two rare annuals: beach layia (*Layia carnosa*, federally endangered) and dark-eyed gilia (*Gilia millefoliata*, CNPS list 1B). Although previous surveys have failed to detect beach layia at Gold Bluffs Beach, the Exotic Plant Management Biological Assessments for RNSP (2001/11) determined that, after Freshwater Spit, the best potential beach layia habitat in RNSP is at the north end of Carruthers Cove. Where the exotic beachgrass was removed from Freshwater Spit, beach layia was found in subsequent surveys (L. Arguello, in Gizinski 2005). Beachgrass removal at Gold Bluffs Beach may provide the necessary dune habitat preferred by this endangered species.

European beachgrass also threatens the Pacific Coast population of western snowy plover (WSP) listed as threatened in 1993 (USFWS 1993). Loss and modification of habitat resulting from European beachgrass invasion, urban development, recreation activities, and predation exacerbated by human disturbance were found to be largely responsible for the decline of this species (USFWS 1993). Conservation of California shorebird populations and recovery of WSP requires removal of non-native beachgrass and other non-native invasive vegetation from existing and potential breeding sites (USFWS 2007, Hickey et al. 2003). Removal of European beachgrass from the project area is anticipated to result in the enhancement of breeding habitat for WSP, which has been identified as a recovery action in the Federal Recovery Plan for the Pacific Coast Population of the WSP (USFWS 2007).

Removal of European beachgrass and reestablishment of native dune processes and species composition is a resource management priority for the North Coast Redwoods District (Transou et al. in prep) and the RNP Exotic Plant Management Plan (1994).

1.4 GOALS AND OBJECTIVES

The restoration project outlined in this plan proposes to restore a portion of the coastal dune system of PCRSP, an area that has been impacted by European beachgrass invasion over a period of rapid beach accretion. While a broad goal of the project is to restore the natural ecosystem processes that existed prior to invasion by European beachgrass (including restoration of sand movement), this project specifically aims to replace the current European beachgrass-dominated landscape with one that is characteristic of non-invaded areas. Although a variety of vegetation types occur within the project area (Section 2.1.2) this project focuses on restoring the open sand and dune mat believed to have dominated the areas now invaded by European beachgrass. Removal of European beachgrass from the project area is expected to result in restoration of physical processes, including increased sand movement, which could lead to changes in the distribution of the other vegetation types in the project area, many of which are believed to be a least partially attributed to sand stabilization by European beachgrass.

The following objectives have been identified:

- Reduce cover of European beachgrass to less than 5% within 5 years following initial treatment of an area.
- Increase cover of native dune mat species and open sand to within 30% of the cover found in non-invaded reference areas in the Park within 5 years following initial treatment.
- Maintain or increase extent of habitat for native species occurring in the project area, including those considered sensitive, within 5 years following initial treatment.

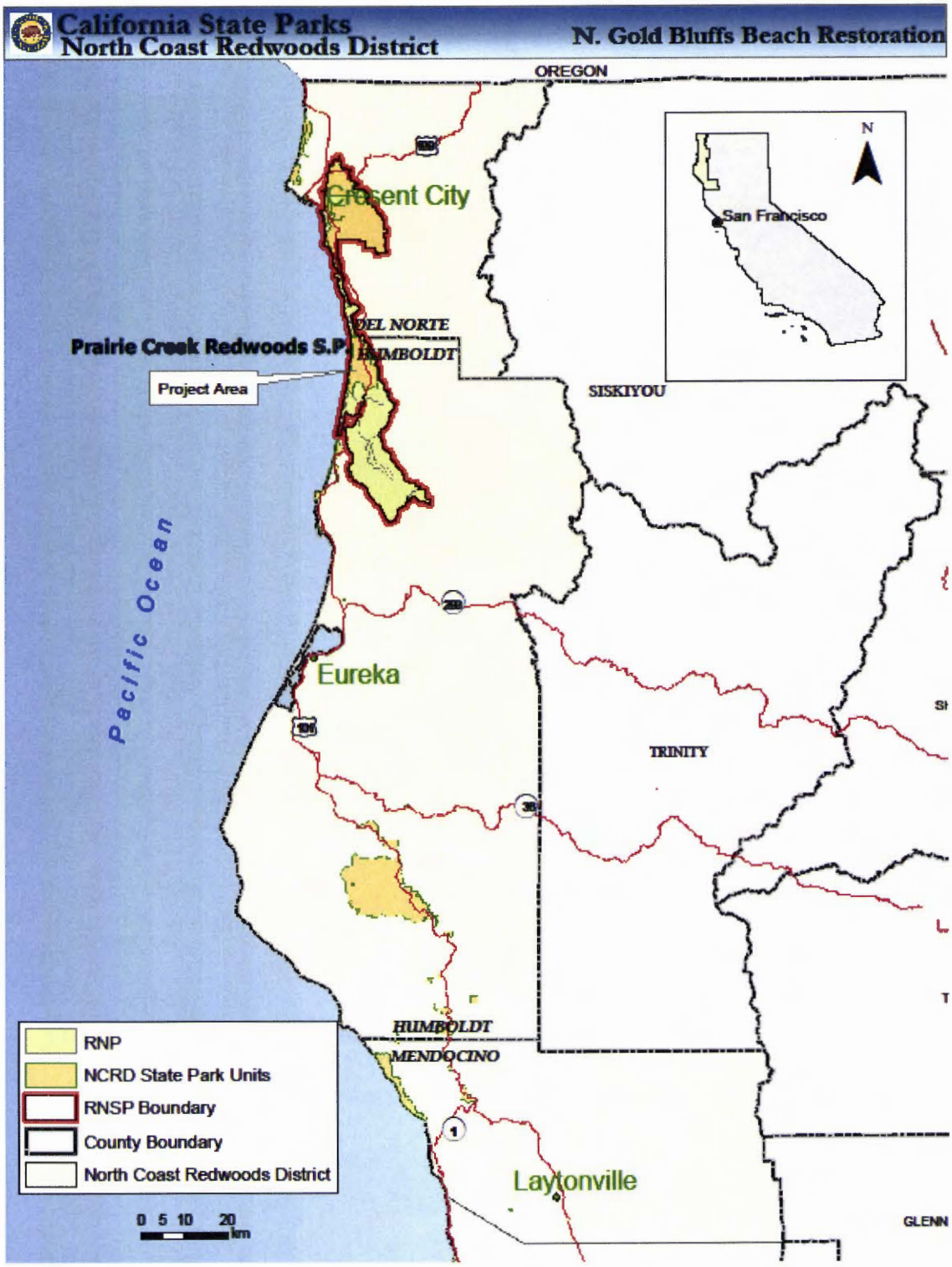


Figure 1. Regional location of project area.

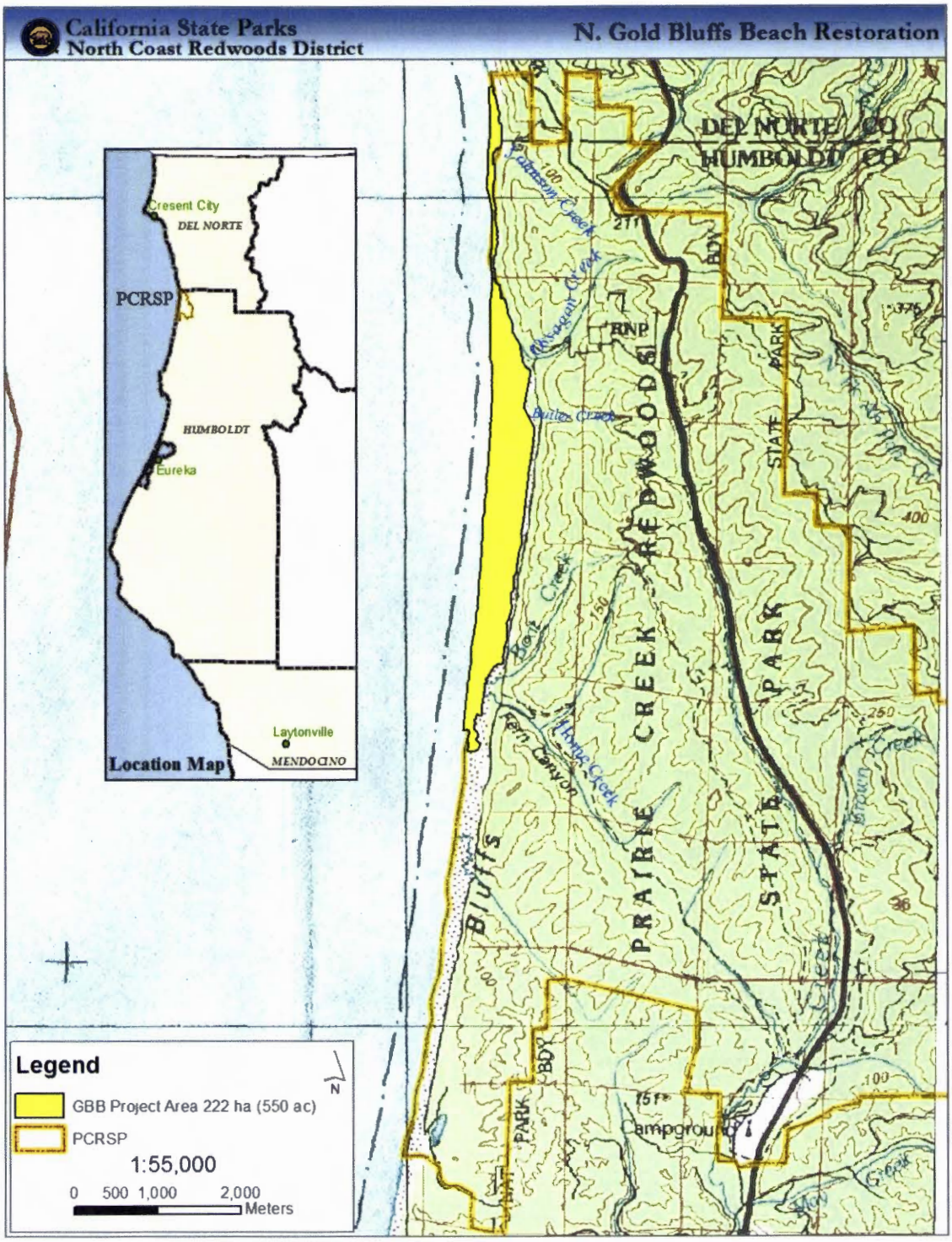


Figure 2. Project area location within Prairie Creek Redwoods State Park .

2 EXISTING ENVIRONMENT

2.1 NATURAL RESOURCES

2.1.1 PHYSICAL ENVIRONMENT

TOPOGRAPHY, GEOLOGY AND DUNE MORPHOLOGY

Along the west side of the Prairie Creek watershed is a ridge of low mountains locally known as West Ridge, which terminate near the ocean in a series of bluffs, from 30 to 120 m (100 to 400 ft) in height. These are the Gold Bluffs, for which the beach at their terminus is named. The bluffs are composed of the Franciscan Formation; an assemblage of poorly consolidated sandstone and siltstone rocks (Vaughn 2006). The area is backed by the Prairie Creek Formation, which is exposed continuously from about one mile south of Espa Lagoon, to about six miles to the north (Vaughn 2006).

Gold Bluffs Beach has increased substantially in width (accretion or progradation) since its initial description by European Americans during of the 1850's (Vaughn 2006). Historically, waves broke on the bluffs, but the beach has since widened, creating the dune system present today. Park workers report that Ossagon Rocks, sea stacks at the north end of the beach, received daily wave attack as recently as 1980 (Gizinski 2005). Today, the most seaward of the Ossagon Rocks is about 180 m (600 ft) from the swash zone. The maximum width at the north end of the beach today is about 640 m (2,100 ft), although up to about 60 m (200 ft) of the observed width may be related to retreat of the bluff since about 1850, before the beach built out (National Park Service, unpublished data in Gizinski 2005). Factors contributing to the formation of the beach and dunes in this system include the predominant southward littoral ocean drift, northwesterly winds, sand deposition from the Klamath River, and the orientation of the shoreline. The dunes found in the project area extend north and south and are composed of colluvium that has eroded from the bluffs, alluvium from creeks draining into the ocean, and beach deposits.

Gold Bluffs Beach dune formations consist of a primary foredune, nearshore dune hummocks, deflation plains, dune swales and further stabilized back dunes (Figure 3, based on Pickart and Sawyer 1998). The primary foredune is a ridge of sand that runs parallel to the beach and is positioned above the mean high tide line. Primary foredunes along the North Coast are generally believed to have been gently sloping and fairly low in elevation. Sand accumulation resulting from establishment of European beachgrass has created a foredune in the project area that is, at times, steeply sloped and likely higher in elevation than would be the case in the absence of European beachgrass. Nearshore dune hummocks in the project area are oriented so that they are parallel to the prevailing northwest winds. Seasonal wetlands occupy the low-lying areas between dunes in the foredune complex, and in some areas, succession of these wetland areas has resulted in stabilized dune swales. The primary foredune, dune hummocks, deflation basins, and dune swales make up the nearshore system. A historic foredune marks the transition from nearshore dunes to more stabilized back dunes. Most of the dunes are stabilized, at least in part, as a result of European

beachgrass colonization. However, the northern extent of the project area, where previous beachgrass removal has occurred, contains more dynamic dunes with native dune vegetation and little European beachgrass.

CLIMATE

Coastal Humboldt and Del Norte County winters are cool and wet while summers are generally characterized by fog, mild temperatures and low precipitation. The average low temperature for winter is 2.2°C (36°F) with a few days below 0°C (32°F) each year (North Coast Redwoods District 2001). Summer highs are generally between 12.7°C – 18.3°C (55° F - 65° F), seldom exceeding 23.8°C (75° F) (North Coast Redwoods District 2001). Most precipitation occurs from October through April with 152-203 centimeters (60-80 inches) total annual rainfall each year (North Coast Redwoods District 2001). Prevailing winds are generally from the north and northwest.

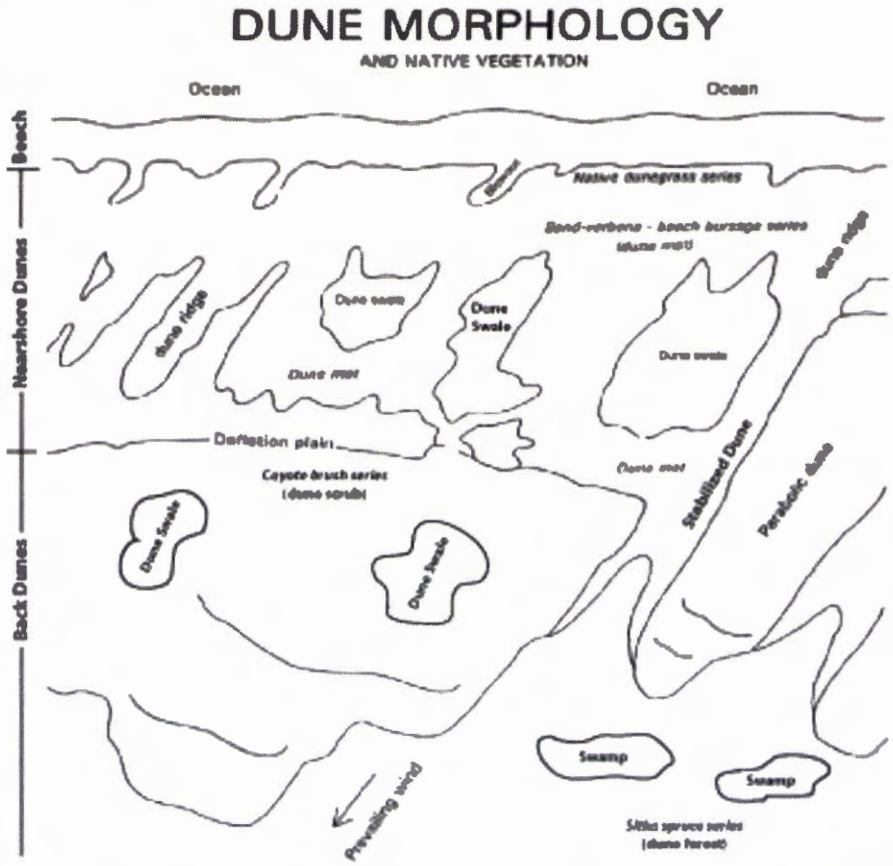


Figure 3. Dune morphology adapted from "Ecology and Restoration of Northern California Coastal Dunes (Pickart and Sawyer 1998)

HYDROLOGY

Five creeks meet, or have the potential to meet, the ocean along this stretch of coast during certain times of year: Home, Boat, Butler, Ossagon and Johnson. Near the mouth of Ossagon Creek, an estuarine lagoon connects to the linear deflation basin, or

swale, oriented parallel to the coastline (to date this lagoon has not breached to the ocean). This deflation basin lies between the primary foredune and the back dune complex and extends north-south through much of the project area. This wetland system currently transitions from estuarine to palustrine near the mouth of Ossagon Creek (Lovelace 2012). During high-flow events this basin receives overland flow from Ossagon Creek and the estuarine lagoon associated with the mouth of this watercourse (Lovelace 2012). During summer months the lagoon may dry up completely.

2.1.2 Biological Resources

VEGETATION

The project area is comprised of upland and wetland habitats that currently support four vegetation communities characterized by dominant vegetation (Figure 4). These communities/alliances include the European beachgrass alliance, Native dunegrass alliance, Sand verbena-beach bursage alliance or "dune mat" alliance (Pickart and Sawyer 1998, Sawyer and Keeler-Wolf 1995), and Sedge alliance(Sawyer and Keeler-Wolf 1995). See Appendix A for a detail description of these vegetation alliances and other alliances common in North Coast dunes. Overall, the project area is dominated by European beachgrass, though pockets of native vegetation persist, primarily in the remaining open sand areas.

- **European beachgrass** is native to Europe and North Africa and was first introduced to the California coast in 1869 (Barbour 1970). Following subsequent introductions, transplants and rapid natural spread of the introduced populations, European beachgrass now occurs on sandy coastal dunes from British Columbia south to San Diego County, California (Breckon and Barbour 1974, Barbour and Johnson 1977). Because of this non-native beachgrass invasion along the coasts of California, Oregon, and Washington, native foredune grasslands have been vastly reduced (Wiedemann and Pickart 1996, Pickart 1997). The upper beach and foredune along much of northern California's coast were formerly dominated by American dunegrass (*Elymus mollis* ssp. *mollis;* formally *Leymus mollis* ssp. *mollis*)(Barbour and Johnson 1977) a native plant that is now scarce in invaded dune systems throughout the region, including at PCRSP. European beachgrass also replaces other native vegetation (Barbour et al. 1976, Boyd 1992, Pickart and Sawyer 1998).). Barbour et al. (1976) found that European beachgrass had a larger effect on dune vegetation than any other dominant beach species. European beachgrass reproduces primarily by vegetative growth of rhizomes although it is also capable of spreading to new areas through dispersal of rhizome fragments (Wallen 1980). European beachgrass is also able to spread through establishment by seedlings, which typically germinate in the spring from seeds released the previous summer/fall.

  European beachgrass is found throughout the project area, and at a finer scale, the below mentioned alliances are interspersed among the sea of European beachgrass. Along the eastern edge of this alliance (Figure 4) is a recently-stabilized, historic foredune which supports the early stages of a developing coastal forest composed primarily of Sitka spruce (*Picea sitchensis*), Califronia Wax Myrtle (*Morella californica*), Red alder (*Alnus rubra*), and coyote bush

(*Baccharis pilularis*) (Lovelace 2012). This area marks a transition from the current nearshore dunes to the back dune wetland/upland matrix. Within this matrix the upland areas are dominated by European beachgrass and are interspersed with vernal grass *(Anthoxanthum odoratum),* Hedgehog dogtail (*Cynosurus echinatus)*, sand dune bluegrass (*Poa douglasii)*, dune knotweed (*Polygonum paronychia)*, cud weed (*Pseudognaphalium stramineum)*, pearly everlasting (*Anaphalis margaritacea)*, beach strawberry (*Fragaria chiloensis), early hair grass* (*Aira praecox)*, sheep sorrel (*Rumex acetosella*), Sitka spruce and coyote bush (Lovelace 2012).

- Isolated patches of the **native dunegrass** alliance occur along the entire coastal margin of the Park (this vegetation is not shown on figure 4. as occurrences are patchily distributed and small in size). The sole or dominant vegetation associated with this alliance is *Elymus mollis* ssp. *mollis*. European beachgrass infestation appears to have increased markedly in this sector of the dunes since 2001. Heavy grazing by elk on the remaining patches of native dunegrass has been noted (Gizinski et al. 2005).
- The **sand verbena- beach bursage alliance** or "dune mat" at Gold Bluffs Beach is not well developed. Surveys of the vegetation were conducted in 2003 by Nyoka, with special emphasis on distribution of beachgrass and rare plants. The dominant species are beach strawberry, yellow sand verbena, beach morning glory (*Calystegia soldanella*), beach evening primrose (*Camissonia cheiranthifolia*), and dune knotweed. Sea rocket (*Cakile maritima*), American glehnia (*Glehnia littoralis* ssp. *leiocarpa*, CNPS list 4), and beach bursage (*Ambrosia chamissonis*) are commonly found along the dune strand. Notably absent are dune buckwheat (*Eriogonum latifolium*) and dune goldenrod (*Solidago spathulata* ssp. *spathulata*), species which are dominant components in other local dune systems. The open sand found in the upper dune strand provides habitat for two rare plant species, pink sand verbena and sand pea (CNPS list 2).
- The **sedge alliance** is found in seasonally inundated swales dominated by herbaceous vegetation; including: slough sedge (*Carex obnupta), Brewer's Rush (Juncus brewerii), Springbank colver (Trifolium wormskjoldii),* and Silverweed (*Potentilla anserina* ssp. *pacificaa)* (Pickart 1998, Sawyer and Keeler-Wolf 1995). In addition to slough sedge *and* Brewer's rush, the wetland portions of the wetland/upland mosaic contain varying amounts of pennyroyal (*Mentha pulegium)*, smooth cat's-ear (*Hypochaeris glabra),* creeping bentgrass *(Agrostis stolonifera)*, American loosestrife (*Veronica americana)*, nutsedge (*Cyperus eragrostis)*, salt grass (*Distichlis spicata)*, and creeping buttercup *(Ranunculus repens)*. Pink sand verbena is especially abundant in the seasonally flooded swale at the mouth to Ossagon Creek, where it is co-dominant with sea rocket (Nyoka 2003).

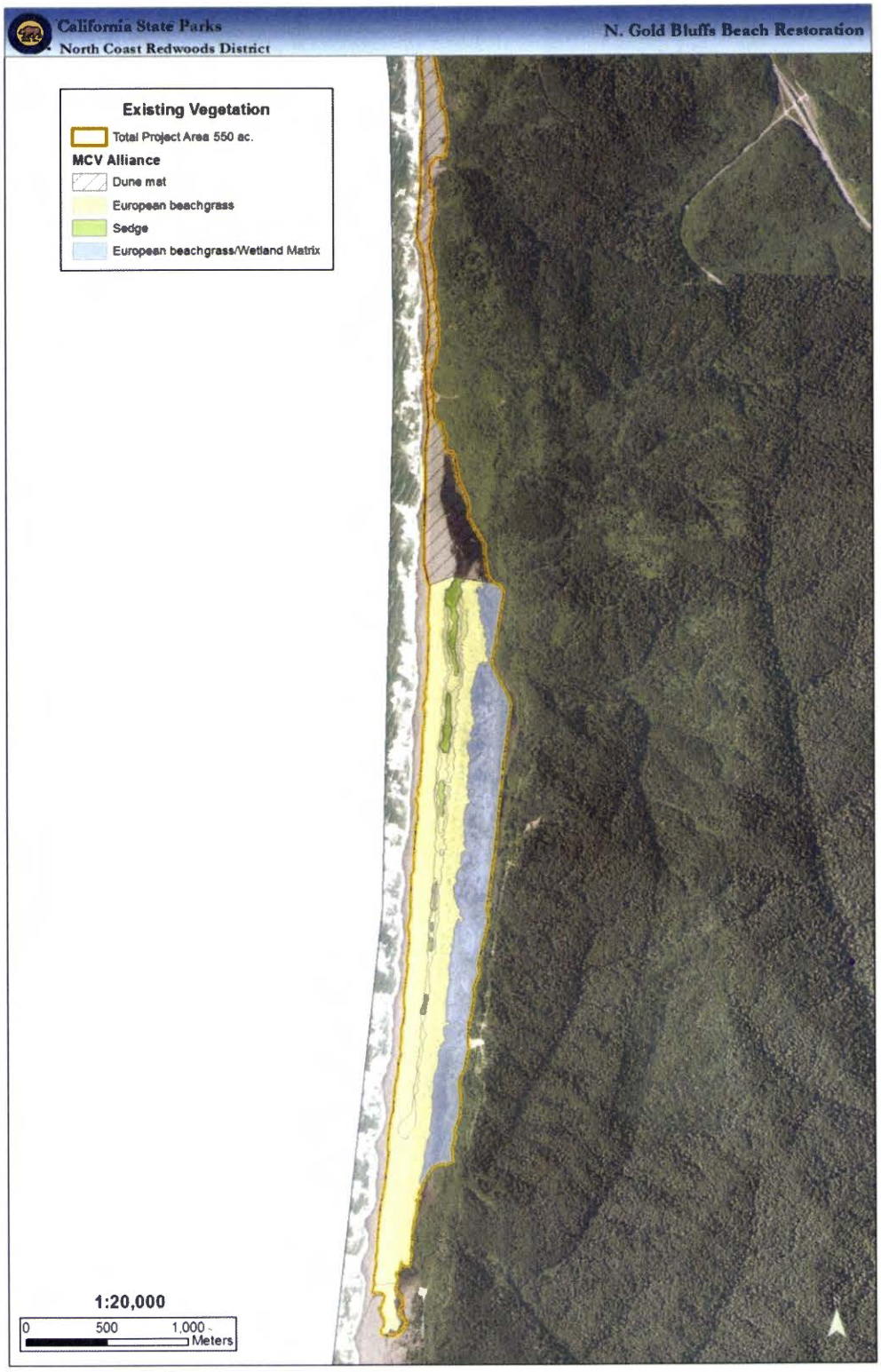


Figure 4. Existing vegetation within the project area

WILDLIFE

Mammals found in the project area include Roosevelt elk (*Cervus elaphus roosevelti*), black bear (*Ursus americanus*), coyote (*Canis latrans*), grey fox (*Urocyon cinereoargenteus*), mountain lion (*Puma concolor*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), black-tailed jackrabbit (*Lepus californicus*) and river otter (*Lutra canadensis*). Pinnipeds (seals and sea lions) such as the harbor seal (*Phoca vitulina*) can be found hauled-out on the beach, or more commonly in the surf. Many migrating and resident shorebirds, waterfowl, raptors, songbirds and some seabirds utilize the project area. Bird species found in the area include peregrine falcon (*Falco peregrinus*), osprey *(Pandion haliaetus*), common raven (*Corvus corax*), California brown pelicans (*Pelecanus occidentalis californicus*), sanderling (*Calidris alba*), and the western snowy plover. Coastal *cutthroat trout (Oncorhynchus clarki clarki),* Steelhead trout (*Oncorhynchus mykiss), Hybrid trout (crosses of cutthroat and steelhead),* Threespine stickleback (*Gasterosteus aculeatus*) and staghorn sculpin (*Leptocottus armatus*) have been found in one or more of the five creeks adjacent to the project area. The tidewater goby (*Eucyclogobius newberryi*) has the potential to occur in some locations in the park, but surveys in 2004 failed to detect gobies in any potentially suitable habitat within the project area (Johnson Creek and Ossagon Creek) (G. Goldsmith pers. comm. Aug 2012)

SPECIAL STATUS SPECIES

Several special status species are known to occur within the beach and dune habitat of PCRSP Table 1. Special status species are those species listed by the state or federal government as Endangered, Threatened, Candidate, or otherwise considered sensitive by section 15380 of the California Environmental Quality Act (CEQA). The special status species known to occur in the project area are discussed in Table 1 and avoidance measures are presented in 3.1.5.

2.2 CULTURAL RESOURCES

Gold Bluffs Beach is within the ancestral territory of the Coast Yurok, or Ner-'er-ner'. There are two large village sites adjacent to the project area and Gold Bluffs Beach was and still is the location of traditional gathering and fishing. Tribal members still fish for perch and smelt along Gold Bluff Beach. From the 1850s through the 1920s Euro-American settlers mined for gold along the beach. The Archaeological Research Program at California State University, Chico, conducted an archaeological survey of the entire project area under contract # C1037055. While there are a number of historical resources adjacent to the project area, no resources were observed within the area of potential effects (Dalton 2011). Pursuant to Departmental Notice 2007-05, State Parks is actively consulting with the Native California Indian descendants of Gold Bluffs Beach. The Yurok Tribe of California provided a monitor during the archaeological survey in July 2011 (Dalton 2011:31).

2.3 RECREATIONAL RESOURCES

Recreational activities in the Park include camping, fishing, picnicking, beach combing, wildlife viewing, kayaking/canoeing, hiking, and a visitor center with exhibits. Within the project area, there is a backcountry camp at Ossagon Creek and a day use area at Fern Canyon. The California Coastal Trail, Carruthers Cove Trail, Ossagon Trail, West Ridge Trail, and trails terminating at the Fern Canyon Trailhead provide hiking opportunities to the project area.

2.4 REGULATIONS

Permitted vehicles (commercial fisherpersons and Yurok tribal members) are currently allowed along the waveslope of Gold Bluffs Beach. Leashed dogs are permitted in designated areas, including the beach shoreline waveslope up to the high tide mark from the entrance station to Ossagon Rocks. Dogs must be on a leash no more than six feet long, and confined to a tent or vehicle at night, except for service animals. Pets are not allowed on trails. No overnight camping is allowed outside of the designated campgrounds; Gold Bluffs Beach Campground, Ossagon Backcountry Camp, and/or Miner's Ridge Backcountry Camp.

2.5 ADJACENT LAND USES

PCRSP is bordered to the west by the Pacific Ocean and otherwise surrounded by Redwood National Park, one of four parks that make up RNSP. Together, these parks include approximately 42,500 ha (135,000 ac) of cooperatively managed and contiguous land in Del Norte and Humboldt counties. Further to the east is timberland managed by Green Diamond Resource Company, a privately owned forest products company.

Table 1. Sensitive flora and fauna found within the project area (CNDDB 2012).

Species	Status	Habitat	Comments
Beach pea *Lathyrus japonicus*	CNPS-2	Beaches, open dunes (driftwood)	Known to occur, habitat present in project area. Blooming period May-Aug.
Oregon coast indian paintbrush *Castilleja affinis* ssp. *litoralis*	CNPS-2	Dunes, sandy scrub	Known to occur, habitat present in project area. Blooming period Jun.
Pink sandverbena *Abronia umbellata* ssp. *breviflora*	CNPS-1B	Beaches, open dunes along immediate coast	Known to occur, habitat present in project area. Blooming period Jun-Oct.
Northern red-legged frog *Rana aurora*	CSC	Humid forests, woodlands, grasslands, and streamside in NW California.	Known to occur, habitat present in project area.
Western snowy plover *Charadrius nivosus nivosus*	FT, CSC	Sandy beaches, salt pond levees & shores of large alkali lakes; needs sandy, gravelly or friable soils for nesting	Known to occur, habitat present in project area. Breeding habitat present.
Bald eagle *Haliaeetus leucocephalus*	CE, CP	Nesting and wintering – ocean shores, lake margins and rivers.	Known to occur, however primary habitat not present in project area.
Peregrine falcon *Falco peregrinus*	CP	Nesting – near wetlands, lakes, rivers; on cliffs, banks, mounds and human-made structures.	Known to occur, however primary habitat not present in project area.

FE – Federally Endangered, FT – Federally Threatened, FD – Federally Delisted, FC – Federally Candidate, CE – CA Endangered, CT – CA Threatened, CC – CA Candidate, CP – CA Protected, CSC – CA Species of Special Concern. CNPS 1B and 2 – Taxa considered by the California Native Plant Society to be rare , threatened, or endangered in California.

Plants on CNPS lists 1B and 2 are considered rare, endangered, and threatened plants pursuant to Section 15370 of the California Environmental Quality Act (CEQA). The plants on these lists meet the definition under the Native Plant Protection Act and/or the California Endangered Species Act of the Department of Fish and Game Code and are eligible for state listing.

3 IMPLEMENTATION PLAN

3.1 PROJECT IMPLEMENTATION

3.1.1 PROPOSED PROJECT

The proposed project is a combination of mechanical removal, flaming, and manual removal to remove European beachgrass and restore native habitat and dune processes. Based on an analysis of the potential treatments (Section 3.1.3), their impacts to sensitive resources, their past successes, and their costs, it has been determined that no reasonable alternatives to the proposed activity would better protect the existing resources and reduce or eliminate the detrimental effects to the habitat. No biological control for European beachgrass exists and herbicide application to control European beachgrass in the NCRD has met with unfavorable public opinion in recent years. Burning alone has been known to stimulate growth (Van Hook 1983) and over time has not proven to control beachgrass. Due to limits on production rates, as well as the extreme labor costs, manual removal will be utilized on a limited basis for initial treatment near sensitive resources. To promote the establishment of native flora and fauna post initial removal, all retreatments will utilize manual removal. Because of these factors, the District has selected the following approach:

Within the 107 ha (264 ac) nearshore dunes (Area A), initial beachgrass removal will be conducted utilizing an excavator and/or dozer (Figure 5) (Table 3-1). Mechanically extracted vegetation will be buried from where it was removed to a depth of approximately 2 m (6.6 ft). Hand removal, aided by shovels and spades, will be utilized in wetland habitats 73 ha (181 ac) (Area B&C) and within rare plant buffers. Area D (42 ha [105 ac]) was initially treated with heavy equipment between 2005-2008, and now has sparse European beachgrass remnants. This dune mat dominated upland-wetland mosaic will be retreated utilizing manual removal. Flaming will be used to treat exotic herbaceous vegetation, primarily exotic grasses (Appendix D). Retreatments in all areas will be by hand and pulled vegetation will be burned onsite in small piles.

Timing and frequency of initial and follow-up treatments will vary depending on site-specific factors including weather conditions and amount of European beachgrass regrowth and/or spread. No more than 61 ha (150 ac) of initial treatment will occur over a 2 year period to allow for timely treatment of resprouts and to promote native revegetation. After two years of treatment in an area the project manager will reevaluate what level of effort is still necessary to ensure successful restoration through adaptive management.

Table 2. Treatment area methods

Area	Pre Project Vegetation*	Post Project Vegetation	Initial Treatment Method	Ha (ac)
Foredune and Hummocks Area A	European beachgrass[1]	Sand verbena-beach bursage[2] and Native dunegrass[2]	Mechanical Removal (Heavy Equipment)	96 (236)
Deflation plain – Transition Zone Area A	European beachgrass[1]	Bare sand and Sand verbena-beach bursage[2]	Mechanical Removal (Heavy Equipment)	11 (28)
Dune Swales Area B	European beachgrass[1] Sedge[2]	Sedge[2]	Manual Removal (Hand/Flaming)	11 (26)
Back dune Wetland/Upland Mosaic Area C	European beachgrass[1], Sedge[2]	Native Wet Spp.	Manual Removal (Hand/Flaming)	63 (155)
Nearshore Wetland/Upland Mosaic Area D	Sand-verbena-beach bursage[2] with patchy E. beachgrass	Sand verbena-beach bursage[2] and Native dunegrass[2]	Manual Removal (Hand)	42 (105)

[1] Non-native vegetation alliance; [2] Native vegetation. Estimated area for habitats based on aerial photograph interpretation and field verification.

3.1.2 Removal Methods

MECHANICAL REMOVAL TECHNIQUES

- Mechanical removal will involve the use of a dozer and/or excavator to extract European beachgrass and other non-native plants. Where possible, beachgrass will be dug to a depth of 0.6 meters (2 ft) (Bossard et. al. 2000) and buried onsite where initially removed, approximately 2 m (6.6 ft) deep.
- Mechanical removal will be used for initial treatment only, and then only in nearshore uplands and the upper fringe of deflation plains (Area A).
- Mechanical removal of beachgrass will be conducted by NCRD staff and/ or contractors. NCRD Natural Resource staff will supervise all mechanical removal operations.

MANUAL REMOVAL TECHNIQUE

- Manual removal will involve hand pulling of plants and may include use of shovels or other hand tools. Where possible, beachgrass will be dug to a depth of 0.6 meters (2 ft) (Bossard et. al. 2000). Pulled beachgrass will be consolidated into brush piles that will be burned individually.
- Manual removal techniques may be used in and around all sensitive areas (e.g. wetlands) and species. Manual removal is also proposed throughout the entire project area for follow up removal of beachgrass.
- Manual removal of beachgrass will be conducted by NCRD staff, contractors such as the California Conservation Corps (CCC) or CalFire inmate crews and/or volunteers. NCRD Natural Resource staff will supervise all manual removal operations.

Figure 5. Removal areas and initial treatments

FLAMING

- Flaming involves the use of a small propane torch to either wilt or incinerate target plants.
- Flaming will be utilized on exotic herbaceous vegetation, primarily exotic grasses.
- This technique will target individual plants so that impacts to sensitive resources will be avoided or minimized.
- Flaming will be conducted by NCRD staff or contractors under the supervision of NCRD Natural Resource staff.

RETREATEMENTS

European beachgrass resprouts will be treated manually as needed until the restoration objective of 5% or less cover is achieved. Frequency of retreatment will be dependent upon beachgrass growth and funding availability. After two years of treatment in an area, the project manager will reevaluate what level of effort is still necessary to ensure successful restoration of the habitat.

3.1.3 Discussion of Other Treatment Methods

The following treatment methods or approaches were considered during planning of the proposed project:

1. No action-Failure to treat European beachgrass.
    a. Failure to treat European beachgrass is not preferred as it will allow further decline in sensitive plants, animals, and habitat types. European beachgrass will continue to invade the remaining patches of open sand if no actions are taken to reverse the current trend and natural dune processes will continue to degrade.
2. Manual control of European beachgrass only
    a. Manual control of European beachgrass has been successful although up to 16 retreatments may be required (8 times per year for 2 years at Lanphere-Christensen Dunes Preserve; Pickart and Sawyer 1998). Manual control methods may not be suitable in some areas with sensitive cultural resources if digging with shovels is required.
    b. Cost: $36,000 - $86,000/ha ($14,574 - $34,818/ac) (Lanphere-Christensen Dunes Preserve; Pickart and Sawyer 1998).
    c. This method alone is cost prohibitive and, as many retreatments will be necessary to meet restoration goals, this method is not preferred.
3. Chemical control of European beachgrass
    a. Herbicide applications have been preferred over manual methods for some projects due to their higher cost-efficiency.

b. This method is not preferred due to the availability of other logistically feasible options more acceptable to concerned public.

4. Salting
    a. Salting European beachgrass with rock salt may adversely affect desirable plant species and salting trials at Lanphere-Christensen Dunes Preserve were reported to be unsuccessful (Pickart and Sawyer 1998).
    b. This method is not preferred due to its inability to successfully remove beachgrass from an area.
5. Biological Control
    a. No insects or fungi have been approved by the USDA for control of European beachgrass in the United States.
    b. Grazing would not be effective at removing European beachgrass because of the plants ability to resprout from below-ground rhizomes.
6. Burning only
    a. Burning stimulates European beachgrass resprouting (Van Hook 1983).
    b. Post-burn monitoring of prescribed burn projects on the Oregon Dunes National Recreation Area indicates annual burning of beachgrass may not be practical as it generally takes 2 to 3 years, following a burn, for enough dead thatch to build up and provide conditions suitable for re-burning (USFS 1996).
    c. This method is not preferred because burning alone does not effectively control European beachgrass.

3.1.4 REVEGETATION

Given the availability of seed sources at the site and recolonization observed in the northern 42.5 ha (105 ac) previously treated using the methods proposed for this project, it is anticipated that most treated areas will be recolonized naturally by native dune species. Effectiveness monitoring (Section 3.2.1) will follow plant cover over time. If monitoring results show native plant cover does not fall within 30% of the cover in un-invaded reference areas within 5 years following treatment, active revegetation of the site will be initiated (funding dependent). Quantitative estimates of species cover collected during monitoring will guide revegetation plans. Relative abundance of individual species to be established as a result of active restoration should coincide with measured values of abundance and diversity. Given that success of revegetation efforts is largely a product of site-specific conditions (Barry 1987, Pickart 1990), multiple methods will likely be considered including direct seeding, transplanting of adults, and planting of seedlings (Pickart and Sawyer 1998).

SEED COLLECTION AND SEEDING

Collection of seeds will be conducted by CSP Natural Resource staff or by a local certified nursery under the direction of CSP Natural Resource staff. Seed will be collected at the seasonally appropriate time of the year, cleaned, and placed in cold storage in an airtight container until use (Pickart and Sawyer 1998). Seeds will be used within 2 years of the storage date. Seeds will be broadcast manually and then raked into the sand about 2.5 cm (1 in) deep (Newton 1989). Seeding will be done in the fall or winter.

TRANSPLANTING TECHNIQUE

Efforts to establish plants such as American dunegrass and beach strawberry will require transplanting of cuttings, divisions and/or whole plants (Pickart and Sawyer 1998). Plants will be collected as whole plants, cuttings, and or divisions from within the project area or nearby dunes. Collection of plant materials will be consistent with the NCRD genetic integrity policy (Appendix C). Planting will occur as soon after collection as possible. To ensure greater transplanting success, plants may be protected with garden netting and depending on precipitation at time of planting may require watering. Specific techniques regarding collection of cuttings, divisions, and plants are identified in Forys et al. 2008 and Pickart and Sawyer 1998.

3.1.5 Project Signage

Prior to heavy equipment use, temporary signs will be posted along the perimeter of the area to be treated. The signs will inform the public of the temporary area closure and will provide brief information about the nature of the project. A superintendent's order will be obtained for the temporary closure.

3.1.6 Avoidance Measures for Sensitive Resources

The project is designed to minimize impacts that will adversely affect sensitive species that may be present within or adjacent to the project area. The following avoidance measures will be implemented to avoid or minimize potential adverse impacts to sensitive resources:

WETLANDS

1. Wetland delineation following ACOE 1987 methods and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Regions (Version 2.0)* (USACE 2010) will be completed prior to conducting restoration activities.
2. No wetlands will be actively filled although the extent of current wetland habitat is likely to fluctuate over time as sand movement is restored to the project area.
3. A 5 m (16.5 ft) equipment exclusion zone (EEZ) will be maintained around all ACOE delineated wetlands.

WESTERN SNOWY PLOVER

1. Mechanical removal will be conducted between 15 September and March 01, outside of the WSP breeding season.
2. Prior to commencing operations each day, access routes and work areas will be surveyed for the presence of WSP by a USFWS permitted WSP surveyors. A NCRD Natural Resource staff member will remain on site during implementation of treatments to monitor for WSP. Restoration work may only be conducted in areas monitored for WSP. Monitoring guidelines are described in Appendix E.
3. A spatial buffer zone will be maintained between WSP and restoration activities; 100 m (330 ft) during mechanical removal efforts and 50 m (164 ft) during manual removal efforts. If the monitor determines that operations are resulting in a behavioral disturbance to WSP then operations will be moved far enough away to eliminate the disturbance.
4. Trash at the work site will be contained in predator-proof containers and transported off site at the end of each workday. Lunch and breaks will be taken at the work site to prevent workers from disturbing WSP. No dogs or other pets will accompany workers to the work site.
5. Vehicles accessing the project area will be limited to 10 mph, or the minimal speed required to prevent getting stuck in sand. Vehicles will remain on the wet sand or upon approved access routes until reaching the treatment area. There will be no night driving or driving during periods of diminished visibility.

CULTURAL RESOURCES

1. In the event that previously undocumented cultural resources (including but not limited to dark soil containing shellfish, bone, flaked stone, groundstone, or deposits of historic trash) are encountered during project construction by anyone, the state representative will temporarily halt at that specific location and direct contractors to other project-related tasks. A DPR-qualified archaeologist will record and evaluate the find and work with state representative to implement avoidance, preservation, or recovery measures as appropriate prior to any work resuming at that specific location.
2. If the DPR-qualified archaeologist determines that the find(s) are significant, a qualified historian, archaeologist, and/or Native American representative (if appropriate) will monitor all subsurface work including trenching, grading, and excavations in that area.
3. In the event that human remains or burial artifacts were discovered, work would cease immediately in the area of the find and the project manager/site supervisor would notify the appropriate DPR personnel. Any human remains and/or funerary objects would be left in place or returned to the point of discovery and covered with soil. The DPR Sector Superintendent (or authorized representative) would notify the County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (or

Tribal Representative).

4. If the coroner or tribal representative determines the remains represent Native American interment, the NAHC in Sacramento and/or tribe would be consulted to identify the most likely descendants and appropriate disposition of the remains. Work would not resume in the area of the find until proper disposition is complete (PRC §5097.98).
5. If it is determined the find indicates a sacred or religious site, the site would be avoided to the maximum extent possible. Formal consultation with the State Historic Preservation Officer and review by the Native American Heritage Commission/Tribal Representatives would also occur as necessary to define additional site mitigation or future restrictions.

3.1.7 Safety Protocol and Site Logistics

Every workday will begin with the lead person discussing safety issues for that day. All workers will be advised of high-risk areas and scenarios and provided safety guidelines.

PROJECT HANDBOOK

A project handbook will be kept on-site during work hours, throughout the duration of the project. The lead person for each workday will be responsible for the handbook. This handbook will contain all safety measures and plans for the project area, important contact information pertaining to both possible emergencies and general project contacts, permits, and monitoring forms. The following documents will be included in the handbook:

- Copy of California Environmental Quality Act Clearance
- Copy of Coastal Development Permit and Conditions
- List of Emergency Contacts
- Location of nearest hospital or medical facility
- Hazardous Material Spill Contingency Plan
- Copy of Concurrence Letter from USWFS
- List of sensitive species and their identification characteristics

WEATHER

Workers should avoid being on site during storm events that pose risk from high surf, wind, and flooding. Weather and surf conditions will be checked daily, prior to operations, to determine if work can safely commence.

EARTHQUAKES AND TSUNAMI

A NOAA weather radio will be on site to alert workers of tsunami risks. If a notable earthquake is felt while working on site, all workers will leave the project site immediately, seek high ground, and wait for guidance from the NOAA weather radio.

TOOL SAFETY

Project workers tasked with operating any tools will be instructed in the safe operation of those tools. Safety precautions include wearing the appropriate protective equipment, maintaining a safe distance from others, and using caution when doing activities that could result in back injuries.

HAZARDOUS MATERIALS

Risk of hazardous material spills will be minimized to the extent possible. In the event hazardous substances are released into the ground or water, a hazardous material plan will be available to ensure adequate and safe cleanup.

No maintenance or fueling activities will be permitted within 30 m (100 ft) of a stream, the ocean, or a wetland. Equipment will be cleaned and repaired (other than emergency repairs) outside the Park boundaries. All contaminated water, sludge, spill residue, or other hazardous compounds will be disposed outside Park boundaries at a lawfully permitted or authorized designation.

All equipment will be inspected for leaks immediately prior to the start of restoration, and regularly inspected thereafter until equipment is removed from the Park. Leaks that develop will be repaired immediately in the field or work will be suspended until repairs can be made.

In the event of any spill or release of any chemical in any physical form on or immediately adjacent to the project area during implementation, work will be halted or moved to a nearby location, and the site supervisor will immediately notify the appropriate CSP staff (e.g., project manager or supervisor). Appropriate agencies will be notified in the event of spillage of amounts greater than ½ gallon. Hazardous materials, if present, will be contained and removed from the site prior to resumption of work. All contaminants will be handled following established CSP procedures and in compliance with all local, state, and federal regulations and guidelines regarding the handling and disposal of hazardous materials.

3.2 PROJECT MONITORING, REPORTING AND ADAPTIVE MANAGEMENT

3.2.1 EFFECTIVENESS MONITORING

Effectiveness monitoring will provide information evaluating the outcome of proposed restoration activities. This monitoring will be conducted at all areas where restoration activities have been implemented. The monitoring objectives are:

- Detect changes in plant community composition and species cover over time
- Track locations of sensitive fauna and flora
- Provide feedback for adaptive management to determine whether further action is necessary and if so, what

VEGETATION MONITORING

Vegetation Sampling Objectives:

- Restoration objective: Reduce cover of European beachgrass to less than 5% within 5 years following initial treatment.

  Sampling objective: Be 95% certain that beachgrass cover and density estimates are within 5% of the estimated true value.

- Restoration objective: Increase cover of native dune mat species to within 30% of the cover found in un-invaded reference areas in the Park within 5 years following initial treatment.

  Sampling objective: Be 95% certain that estimates of native species cover are within 5% of the estimated true value.

Vegetation Sampling Design and Methods

Monitoring will be conducted prior to implementing restoration actions (in order to establish baseline conditions) and will be repeated at least once every two years until five years following the last restoration treatment. Monitoring shall be conducted at the same stage of the growing season during each measurement event to ensure meaningful comparison of data (i.e. cover can change dramatically over the course of a growing season, Elzinga et al. 1998). Monitoring will be conducted in the spring or summer before plants die or go dormant.

At least three macroplots will be randomly positioned within a selected region deemed to be "representative" of the treated areas. Once an area representative of the target population has been identified, macroplot position will be determined randomly using GIS software or by a random compass bearing and distance. This placement should reduce observer bias toward exact positioning of the macroplot and allow inferences to be made about the representative area, not just the macroplot (Elzinga et al. 1998). At least ten transects will be sampled using quadrats at regular intervals along each baseline. Macroplot size, transect length and number and quadrat shape and size will be determined following pilot sampling of the area. Sampling will begin at a random

start point along the south side of each transect. Within each plot, the following variables will be estimated (cover estimates are for aerial cover and follow cover classes established by Bailey and Poulton 1968):

- Percent cover of each vascular plant species present
- Percent cover of European beachgrass
- Percent cover of:
    - plant litter/thatch
    - sand
    - shell/cobble
    - wood
- Number of European beachgrass culms
    - For density measurements, plants are included if any part of the plant boundary is touching the quadrat/plot boundary along two adjacent sides of a plot, and considered out if any portion of the plant boundary is touching the other two sides of the plot. This provides an accurate estimate of density and is the recommended approach for reducing boundary bias (Elzinga et al. 1998).

SENSITIVE SPECIES MONITORING

Sensitive plant Surveys

Surveys for sensitive plants will be conducted annually, prior to project implementation following CDFG protocol (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/Protocols_for_Surveying_and_Evaluating_Impacts.pdf).

Western Snowy Plover Surveys

The NCRD and RNP staff conduct surveys for WSP at PCRSP twice monthly during the breeding season (March through August) and once a month outside the breeding season (September through February). If WSP are observed during the breeding season, surveys are conducted every 3-4 days to determine reproductive status.

GEOLOGY MONITORING

The following geological monitoring addresses eolian aspects of post-treatment monitoring at Prairie Creek Redwoods State Park within the context of full scale treatment.

Coastal Processes

Light Detection and Ranging (LiDAR) data obtained in 2011 will provide baseline data to characterize the current site topography. Geomorphic change will be analyzed using before treatment and after treatment LIDAR to compare geomorphic change as post treatment LiDAR becomes available.

Climate Change

We do not propose any climatological studies specific to this project. However, it is recommended that future monitoring reports make reference to regional (temperature or precipitation that might affect vegetation) and/or global studies (e.g., sea level) relevant to the physical element being addressed

Photographs

As they come available, comparative oblique or stereo air photos and ground level photos should be incorporated into narrative reports discussing physical changes at the beach.

OTHER MONITORING

Meander surveys

Meander surveys will be conducted at least once each year (until five years following the last restoration treatment) to assess the overall site conditions. The meander surveys will supplement sample plot data, and will involve walking random routes throughout the restoration area to identify problems such as significant plant mortality, occurrence of invasive species, etc.

Photo monitoring

To assist with monitoring changes in plant cover and record general site conditions, photo points will be established throughout the project area. Representative photographs of the restoration areas from established locations will be taken annually to facilitate a yearly comparison. Photo point locations will be relocated using plot stakes and/or a GPS and written location descriptions where appropriate.

3.2.2 Project Reporting

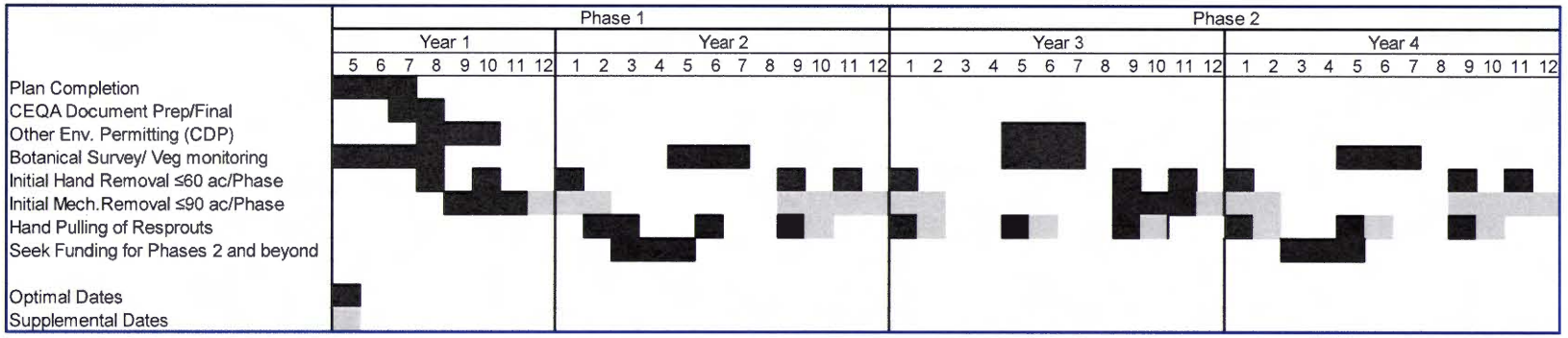
CSP will annually review the terms and conditions of applicable permits and ensure that the restoration project remains in compliance with those terms. A progress report will be prepared annually that summarizes restoration actions for that year, reports monitoring and survey results and describes management actions that need to be changed.

3.2.3 Adaptive Management

Adaptive management will allow CSP staff to best achieve restoration goals by minimizing uncertainty associated with the proposed treatments and their impacts to natural resources. CSP staff will have the ability to adjust and improve habitat restoration techniques according to information gained from effectiveness monitoring and/or other changed conditions. Data obtained through effectiveness monitoring will be analyzed to determine if the goals and objectives of the restoration plan are being met. If the restoration actions are not producing the desired results, adjustments in the restoration techniques will be considered.

3.3 PROJECT TIMELINE

The following timeline is proposed for implementation of all phases of the restoration project. Modifications to implementation dates are anticipated (i.e. due to uncertainty regarding permitting and funding) and schedule should be revised whenever new information becomes available (i.e. through adaptive management) that warrants further revision. Calendar end date will be determined by implementation of Phase 3 and monitoring results (monitoring of an area may be conducted for up to 5 years following treatment). Phase 3 (and subsequent phases if needed) will be identical to Phase 2 unless adaptive management warrants revision.



4 PROJECT CONSIDERATIONS AND COMPLIANCE

4.1 CONFORMANCE WITH EXISTING MANAGEMENT PLANS

The restoration activities proposed in this plan are consistent with the Department's mission "To provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high quality outdoor recreation."

This project is in conformance with the draft Beach and Dunes Management Plan for the North Coast Redwoods District (Transou et al. in prep) and California State Park Natural Resource directives. Specifically, this project is guided by the concepts and principles of resource management as articulated in the DPR Resources Operation Manual (DOM): "Minimize negative human impacts on native plants, populations, communities, ecosystems, and the processes that sustain them while providing opportunities for the public to experience plants native to California; preserve and restore the natural abundance, diversity, dynamics, distributions, stand structure and species composition, and the communities and ecosystems in which they occur; and protect state and federally-listed threatened, endangered, rare, or otherwise sensitive species" (DOM 0310.1.1). Removal of European beachgrass will protect special status plants, create habitat for federally listed plants and restore the natural abundance, diversity and dynamics of the dune ecosystem. Further, CSP natural resource policies require that appropriate action be taken to maintain outstanding natural values by restoring damaged or altered natural resources through the removal of exotic species (DOM 0304.4). The goals of management of invasive exotic plants in the State Park System are to protect and restore the biological diversity of the California State Park ecosystems and reduce the costs of resource maintenance (0310.7 Exotic Plant Control). Removal of exotic plant species will be managed—up to and including eradication—if control is prudent and feasible and if the exotic species has a deleterious impact on biotic community composition, genetic integrity and aesthetic resources. The removal of a new invasive is the most effective method of controlling highly invasive species (0310.7).

4.2 REGULATORY CONFORMANCE AND PERMITTING

A mitigated negative declaration (MND) will be prepared to meet environmental compliance requirements under the California Environmental Quality Act (CEQA).

California Coastal Commission has permitting jurisdiction for activities in the project area. A Coastal Development Permit will be acquired to meet California Coastal Act requirements.

Applicable state and federal endangered species consultation will occur prior to project implementation.

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6 APPENDICES

APPENDIX A. VEGETATION COMMUNITIES

Coastal dunes along the north spit of Humboldt Bay and within Humboldt County support multiple vegetative communities that are separated into units called alliances, based upon dominant vegetation. The classification system described here primarily follows Sawyer and Keeler-Wolf (1995) and Pickart and Sawyer (1998). These vegetation alliances are either currently found within the project area and or were historically found within the project area.

NATIVE DUNEGRASS ALLIANCE

Generally restricted to the foredune, the Native dunegrass alliance has become widely reduced and displaced by European beachgrass (*Ammophila arenaria*). Once widespread north of Monterey, California, currently it is well represented only at the Humboldt Bay dunes and at Point Reyes, California (Pickart and Sawyer 1998). American dunegrass (*Elymus mollis* ssp. *mollis*) is the sole or dominant plant in the alliance. Other species associated with this alliance include beach bursage (*Ambrosia chamissonis*), beach morning glory (*Calystegia soldanella*), pink sand verbena, sea rocket (*Cakile edentula, C. maritima*), seashore bluegrass, and yellow sand verbena. Exotics such as European beachgrass and hottentot fig (*Carpobrotus edulis*) may be present but not dominant. Total vegetation cover is sparse, ranging from 25 to 75% (Pickart and Sawyer 1998).

SAND VERBENA-BEACH BURSAGE ALLIANCE

"Dune mat" is an informal term used to describe this alliance that is typically found throughout the nearshore dunes (Pickart and Sawyer 1998). Dune mat is dominated by low-growing, matted herbaceous and woody plants such as coast buckwheat (*Eriogonum latifolium*), coast goldenrod (*Solidago spathulata* ssp. *spathulata*), seashore bluegrass, beach pea, coastal sagewort (*Artemesia pycnocephala*), beach evening primrose (*Camissonia cheiranthifolia* ssp. *cheiranthifolia*), and yellow sand verbena which corresponds to the sand verbena – beach bursage alliance described by Sawyer and Keeler-Wolf (1995). Overall plant species diversity in this community is typically relatively high. Two phases have been further detailed by Duebendorfer (1989) as the seashore bluegrass-beach pea phase, and the beach sagewort phase. A third phase dominated by red fescue *(Festuca rubra*) has been described by Pickart (1987), but has not been quantitatively justified (Pickart and Sawyer 1998).

EUROPEAN BEACHGRASS ALLIANCE

The European beachgrass alliance is dominated by European beachgrass (Sawyer and Keeler-Wolf 1995), an introduced and invasive species that substantially alters the physical and biological conditions of the natural dune environment, leading to a loss of native vegetation (Pickart and Sawyer 1998). European beachgrass is one of the most widespread herbaceous communities in the local dunes and dominates much of the nearshore dunes and back dunes within the project area. Few species are found in association with this vegetation type, but native vegetation has been observed growing

in openings within, and on the periphery of European beachgrass. Shrubs such as coyote brush (*Baccharis pilularis*) and yellow bush lupine (*Lupinus arboreus*) may accompany European beachgrass in this alliance.

Yellow Bush Lupine Alliance

The Yellow bush lupine alliance, also described as Lupine scrub, is characterized by the dominance of the non-native shrub, yellow bush lupine. Like the European beachgrass alliance, it generally excludes local native plant species. Lupine occurs throughout the dune system primarily behind the foredune (Pickart and Sawyer, 1998). Associated species may include figwort (*Scrophularia californica*), European beachgrass, annual fescue (*Vulpia bromoides*), yarrow (*Achillea millefolium*), and ripgut grass (*Bromus diandrus*). Coyote brush and wax myrtle (*Myrica californica*) may also be present with less cover. Yellow bush lupine has the ability to fix atmospheric nitrogen in the soil. Increased nitrogen in nutrient poor habitats such as dunes has been shown to greatly increase the susceptibility of natural communities to invasion by weedy exotics and natives not normally adapted to the coastal dunes, thus facilitating dune stabilization.

Coyote Brush Alliance

Although yellow bush lupine and European beachgrass may be abundant, coyote brush is the dominant shrub in this alliance. Other species present may include; California blackberry (*Rubus ursinus*), California buckwheat (*Eriogonum fasciculatum*), poison oak (*Toxicodendron diversiloum*) and salal (*Gaultheria shallon*). Although the Coyote Brush alliance is dominated by native species it generally occurs within the foredune complex and on dunes previously stabilized by yellow bush lupine or European beachgrass (Pickart and Sawyer 1998). In some areas, it appears to be replacing the yellow bush lupine alliance (Pickart and Sawyer 1998).

Sedge Alliance

This alliance consists of bulrushes, rushes, sedges and/or spikerushes with sedge as the sole, dominant or important herb in ground canopy. The slough sedge (*Carex obnupta*) - salt rush (*Juncus leseurii*) association of this alliance is found within the project area in seasonally inundated deflation plains. Duebendorfer (1989) classified this association as "herbaceous dune hollows," characterized by low growing rushes, sedges, and other herbaceous plants up to four feet in height. In addition to the dominant slough sedge and salt rush, associated species include Pacific silverweed (*Potentilla anserina*), springbank clover (*Trifolium wormskjoldii*), and California blackberry (Duebendorfer 1992).

Hooker Willow Alliance

Frequently interspersed with the Sedge and Beach pine alliance, The Hooker willow alliance is dominated by hooker willow (*Salix hookeriana*) shrub (Pickart and Sawyer 1998). This alliance occasionally contains wax myrtle and Sitka spruce but to a lesser extent. Along with the Beach pine, this alliance has been described by Duebendorfer (1992) as woody dune hollows. Woody dune hollow wetlands occur in seasonally inundated deflation plains and are characterized by shrubs or trees up to 6 meters high (Pickart 1990). Salt rush and slough sedge are also dominant in the ground layer of this alliance.

Beach Pine Alliance

This alliance occurs on seasonally saturated dune swale wetlands, but also occurs on forested, stabilized dunes. Shore pine is a coastal race of *Pinus contorta*, and is the sole or dominant species of this alliance occurring along the coast to Alaska (Pickart and Sawyer 1998). Salt rush and slough sedge occur in the ground layer, along with dune goldenrod and bearberry (*Arctostaphylos uva-ursi*) in drier microsites (Pickart and Sawyer 1998).

Sitka Spruce Alliance

Typically, this alliance is dominated by Sitka spruce and occurs from sea level to 20 m (66 ft) (Sawyer and Keeler-Wolf 1995). Common on steep seaward slopes near the ocean and raised maritime terraces with perched water tables (Sawyer and Keeler-Wolf 1995). Grand fir (*Abies grandis*), red alder (*Alnus rubus*), redwood (*Sequoia sempervirens*), and western hemlock (*Tsuga heterophylla*) can be found intermixed in the canopy (Sawyer and Keeler-Wolf 1995). The ground cover is abundant, especially with ferns and shrubs sometimes present (Sawyer and Keeler-Wolf 1995).

Northern Coastal Scrub

Holland (1986) describes this alliance as a community of low, dense shrubs (0.5 to 2 m) with some grassy openings. Northern coastal scrub has been further divided into three types; the Northern coyote brush scrub, Northern salal scrub, and Northern silk tassel scrub (Holland 1986). A variety of scrub vegetation types have been described by Sawyer and Keeler-Wolf (1995). The vegetation alliance that correspond to Holland (1986) scrub community are the Coyote brush alliance, the Yellow bush lupine alliance, and or the Salal-black huckleberry alliance.

Red Alder Alliance

Found in seasonally flooded soils to permanently saturated soils, this alliance is found in both wetlands and upland habitat from sea level to 750 m (2,475 ft) (Sawyer and Keeler-Wolf 1995). This alliance can be found along streams, river banks, floodplains, mouths, and terraces (Sawyer and Keeler-Wolf 1995). Alluvial sites can sustain self-perpetuating stands of red alder (Sawyer and Keeler-Wolf 1995). The ground cover is continuous will candyflower (*Claytonia sibirica*), ferns, and salal (*Gaultheria shallon*) (Sawyer and Keeler-Wolf 1995).

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APPENDIX B. GENETIC GUIDELINES FOR REVEGETATION ON NCRD LANDS AND WITHIN CSP

Plant materials will originate from local sources where possible, and will be collected following guidelines outlined in the NCRD genetic integrity policy to ensure greatest success in seed and transplant survival (Pickart and Sawyer 1998).

California State Parks and Recreation Commission Statement of Policy

Policy 11.4

Preservation of Vegetative Entities

(Amended 5-4-94)

"In order to maintain the genetic integrity and diversity of native California plants, revegetation or transplant efforts in the State Parks System will be from local populations, unless shown by scientific analysis that these populations are not genetically distinct from populations being proposed for use. If local populations have been decimated, the closest, most genetically similar population(s) to that State Park System unit will be used."

District Policy:

Locality of Collection:

In order to maintain the genetic integrity and diversity of native California plants, all transplant and propagation in the North Coast Redwoods District will be from local populations (preferably from within the same stand). For the purpose of this policy, local is defined as being from the immediate project area (as close as possible, but generally less than one mile). Local populations will be considered decimated, and therefore not available for collection, only if there are not enough plants remaining to accomplish propagation and/or seed collection.

If the plant material or seed cannot be collected from local populations because: plants are not available or accessible; there is not enough time to collect and propagate material prior to the planting deadline; then collection can occur within the same CalWater Planning Watershed Unit, or park unit or seed zone provided the planting area is within an elevation of + or – 800 feet of the collection site.

Collection Diversity:

If available seed and propagation collection should come from a minimum of 10-15 different plants for larger projects to insure that sufficient genetic variability is obtained.

Emergencies:

In emergencies (large fires, emergency slope stability projects etc.) consideration of the use of commercial stock will be given provided that the stock meets the location and elevation constrains outlined above

APPENDIX C. WESTERN SNOWY PLOVER MONITORING REQUIREMENTS

Training requirements necessary for conducting Western Snowy Plover surveys and other activities (from Appendix J, pages J-2 – J-3, Western Snowy Plover Pacific Coast Population Recovery Plan, USFWS 2007)

Training and Qualifications

Prospective snowy plover surveyors should have good vision, the ability to spend several hours in the sun, and the ability to walk long distances in loose sand. In addition, the U.S. Fish and Wildlife Service have developed minimum training requirements for western snowy plover survey, management, and research activities. Five activity levels are recognized:

Level 1: Winter surveys, or surveys outside known nesting areas.

Level 2: Breeding season surveys and censuses.

Level 3: Erecting exclosures around nests.

Level 4: Breeding season studies or surveys that include handling eggs.

Level 5: Banding and color marking adults or chicks.

While activity levels 1 through 5 are increasingly intrusive, they are not strictly sequential. For example, a field worker may receive training and be certified at level 3, but cannot participate in level 1 or 2 activities without training specific to those levels.

No Section 10(a)(1)(A) permit is required for Level 1 activities, but training is encouraged. Level 2, 3, 4, and 5 activities require a Section 10(a)(1)(A) permit from the U.S. Fish and Wildlife Service. Field workers must be certified at the appropriate activity level to qualify for a permit, or to work independently under the holder of an existing permit.

Classroom instruction (or equivalent field instruction) will be made available for those involved with snowy plover surveys, management, and research (recovery task 1.1.5). At least 4 hours of instruction are required, on topics including:

1. Biology, ecology, and behavior of snowy plovers;

2. Identification of adult plovers, their young, and their eggs;

3. Threats to plovers and their habitats;

4. Survey objectives, protocols, and techniques;

5. Regulations governing the salvage of carcasses or eggs;

6. Special conditions of the existing Recovery Permit;

7. Other activities (for example: banding, determining incubation stage, erecting exclosures).

In addition, field instruction is required for activity levels 2, 3, 4, or 5. Instruction should take place under the direct supervision of a 10(a)(1)(A) permit holder. Activities for field training include:

1. Locating, identifying, and monitoring nests (levels 2, 4, and 5);
2. Handling eggs and capturing and handling adults or chicks (levels 4 and 5);
3. Erecting exclosures around nests (level 3).
4. Specifics on the target activity for which a permit has been issued;
5. Practical field exercises;
6. Field review of appropriate classroom topics.

Previous experience with snowy plovers, piping plovers, or other closely-related species will not substitute for the training described above. Further detail on obtaining permits, or becoming certified to work under an existing permit, is available through these offices.

CALIFORNIA

U.S. Fish and Wildlife Service
Sacramento Fish and
Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825
(916) 414-6600

U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003
(805) 644-1766

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011
(760) 431-9440
U.S. Fish and Wildlife Service
Coastal California Fish and Wildlife
Office
1125 16th Street, Room 209
Arcata, California 95521-5582
(707) 822-7201

OREGON

U.S. Fish and Wildlife Service
Newport Fish and Wildlife Office
2127 S.E. OSU Drive
Newport, Oregon 97365-5258
(541) 867-4550

U.S. Fish and Wildlife Service
Oregon State Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
(503)231-617

Appendix D. Fire Risk and Complexity Analysis

FIRE RISK ANALYSIS
North Gold Bluffs Beach
08-27-12
Prepared by Lathrop Leonard
Forester I

Introduction: Propane torches will be used to control exotic herbaceous vegetation (primarily exotic grasses) in the dunes of Gold Bluffs Beach. Green flaming and/or black flaming maybe used. Green flaming calls for applying enough heat to cause the plants to wilt and die. Black flaming involves applying enough heat to incinerate the vegetation or destroy the cambium layer.

Methods: A propane torch connected to a LP cylinder will be used to apply heat to exotic herbaceous vegetation. To prevent creating a fire which carries from plant to plant the following precautions will be used:

1. Flaming will only be used from November through March.
2. Either a wetting rain must have fallen within the previous three days or it must be foggy.
3. Each day of flaming will start in an area of very sparse vegetation to confirm that fire does not appear to want to spread from plant to plant.
4. No flaming will occur at wind speeds above 5 mph mid-flame.
5. Flaming will be conducted with a member of the North Coast Redwoods District Burn Team. Basic fire tools will be available.

Fire behavior: Fire behavior will be limited to flame coming from torch and burning of herbaceous vegetation in the flame. If herbaceous vegetation is consumed outside of contact with the propane torch, flaming will be stopped as this is an indication fuels are too dry.

Topography: The dunes where the work is to occur are generally flat.

Fuels: Fuels consists of herbaceous vegetation. Currently, areas that have fairly continuous herbaceous vegetation occur in wetland habitats (Area D). Much of this vegetation is exotic.

Spot Fire: Probability is low due to high fuel moistures and low winds speeds allowed in the methods.

Structures and improvements: The risk of structure loss is very low due to time of year, high fuel moistures and the fact that there are no structures within the project area.

Fire weather: Fire weather at the burn location is generally fairly predictable. The burn area is exposed to direct sunlight and winds which blow off the Pacific Ocean. Flaming will only occur during times of high live and dead fuel moisture and low wind speeds.

Potential for re-ignition: Potential for re-ignition is low due to high live and dead fuel moistures required. Crews should not leave area for one-half hour after last flaming.

Unusual hazards: Caution must be used when transporting and using a propane torch. Bottles must be secured in compliance with applicable regulations. Care must be used to insure equipment is in good working order and no propane leakage is occurring.

In summary: There is very little risk involved in conducting this work provided methods and precautions outlined above are followed. Pile burning of European beachgrass will be conducted under the existing North Coast Unified Air Quality Management District (NCUAQM) permit #1668833567 and the associated NCRD Smoke Management Plan. A NCUAQM authorization number will be obtained prior to any pile burning.