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| Staff Report: | 5/22/15 |
| Hearing Date: | 6/12/15 |

## STAFF REPORT: REGULAR CALENDAR

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| **Application No.:** | **1-14-0249** |
| **Applicant:** | **Humboldt Bay Harbor, Recreation, and Conservation District** |
| **Location:** | Within approximately 1,400 acres of tidal marsh habitats in Humboldt Bay, the Eel River estuary, and the Mad River estuary, Humboldt County. |
| **Project Description:** | Implement the Humboldt Bay Regional Spartina Eradication Plan over multiple years using specified mechanical and chemical methods to eradicate invasive *Spartina densiflora* (dense-flowered cordgrass) at a regional level. |
| **Staff Recommendation:** | Approval with conditions. |

## SUMMARY OF STAFF RECOMMENDATION

Commission staff recommends approval with special conditions of the proposed Humboldt Bay Regional Spartina Eradication Plan. The proposed Regional Plan is part of a larger effort to eradicate all invasive *Spartina* species on the West Coast, as described in Finding **IV-B**. A number of different methods for the eradication of *Spartina densiflora* (dense-flowered cordgrass) from specified marshlands in Humboldt Bay, the Eel River estuary, and the Mad River estuary are proposed under this CDP application (**Table 1**). The anticipated maximum acreages of primary treatment of each method in any given year are shown in **Table 2**. The

Applicant would develop site-specific plans for each of the proposed treatment areas in any given year.

The primary Coastal Act issues raised by the project include the proposed dredging (grinding, tilling, excavating, and disking) and filling (covering) methods to be used in the estuarine environment, and potential impacts to the biological productivity of coastal waters and human health from the proposed use of chemical control (application of the herbicide imazapyr sprayed manually onto the leaves of target cordgrass plants).

Staff believes that the proposed estuarine dredging and filling associated with the project is for restoration purposes, an allowable use enumerated in Coastal Act Section 30233(a), and there are no less environmentally damaging feasible alternatives available to further reduce or avoid the dredging/filling of estuarine habitats for restoration purposes. Staff further believes that the development as conditioned includes all feasible mitigation measures to minimize the environmental impacts of the proposed dredge and fill activities, and would maintain and enhance the biological productivity and quality of the estuarine environment consistent with Sections 30230, 30231, and 30233(a) of the Coastal Act.

Staff recommends **Special Condition 4** to require submittal of a site-specific *Spartina* removal plan for the proposed primary cordgrass removal work in each area consistent with (1) all terms and conditions of this CDP, and (2) the mitigation measures proposed in the adopted Final Programmatic Environmental Impact Report (FPEIR) prepared for the project (**Appendix B**), as supplemented by the conditions of this CDP. The plans, which would require the Executive Director's review and approval prior to commencement of primary cordgrass treatment, must include, among other things, a description of the specific measures that will assure the restoration of native tidal marsh plant species in the treatment area, and achievement of fully restored (to "maintenance" stage) marsh habitats within the treatment area within five years of implementation of primary treatment. Each site-specific cordgrass removal plan must also describe how the mitigation measures detailed in the FPEIR and special conditions of this CDP will be implemented at each location.

Staff also recommends **Special Condition 9** to require submittal of an Herbicide Management Plan prior to commencement of primary cordgrass treatment involving the use of imazapyr. The plan would ensure implementation of appropriate mitigation measures for chemical treatment methods, including appropriate buffer zones around herbicide use areas to avoid affecting sensitive receptors and non-target habitats. Staff believes that the proposed project as conditioned would be consistent with Section 30240(b) of the Coastal Act, as it would be sited and designed to prevent impacts that would significantly degrade surrounding park and recreation areas, and it also would maintain the biological productivity and the quality of coastal waters appropriate to maintain optimum populations of all species of marine organisms and for the protection of human health, consistent with Sections 30230 and 30231 of the Coastal Act.

Commission staff recommends **approval** of CDP application 1-14-0249, as conditioned. The motion to adopt the staff recommendation is on **page 4**.

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## APPENDICES



## EXHIBITS

# I. MOTION AND RESOLUTION

The staff recommends that the Commission adopt the following resolution:

**Motion:**

*I move that the Commission approve coastal development permit 1-14-0249 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. **Project Area Limits**. This permit authorizes development only on those lands proposed for development in the CDP application (listed in Appendix C of the May 22, 2015 staff report for CDP 1-14-0249). Expansion of the project area beyond the specified lands shall require an amendment to this coastal development permit.

2. **Water Board Approval**. PRIOR TO COMMENCEMENT OF DEVELOPMENT (PRIMARY TREATMENT OF *SPARTINA*) AT EACH SITE, the Applicant shall provide, for the review and approval of the Executive Director, a copy of a permit issued by the North Coast Regional Water Quality Control Board, or evidence that no permit is required for the treatment of *Spartina* at the site. The Applicant shall inform the Executive Director of any proposed changes to the project required by the Board. Such changes shall not be incorporated into the project until the Applicant obtains a Commission amendment to this coastal development permit, unless the Executive Director determines that no amendment is legally required.

3. **State Lands Commission Review**. PRIOR TO COMMENCEMENT OF DEVELOPMENT (PRIMARY TREATMENT OF *SPARTINA*) AT EACH SITE IN THE EEL RIVER OR MAD RIVER, the Applicant shall provide to the Executive Director a written determination from the State Lands Commission that for the treatment of *Spartina* at the site: (A) no State or public trust lands are involved in the development; or (B) State or public trust lands are involved in the development and all permits required by the State Lands Commission have been obtained; or (C) State or public trust lands may be involved in the development, but pending a final determination an agreement has been made with the State Lands Commission for the approved project as conditioned by the Commission to proceed without prejudice to that determination.

4. **Submittal of Site-Specific *Spartina* Removal Plans.**
   A. AT LEAST TWO WEEKS PRIOR TO COMMENCEMENT OF DEVELOPMENT (PRIMARY TREATMENT OF *SPARTINA*) AT EACH SITE, the Applicant shall submit, for the review and approval of the Executive Director, a site-specific *Spartina* Removal Plan for the proposed primary *Spartina* removal work in the area consistent with (1) all terms and conditions of Coastal Development Permit 1-14-0249, and (2) the mitigation measures in the adopted Final Programmatic Environmental Impact Report (FPEIR) prepared for the project (dated March 21, 2013), as supplemented by the conditions of this CDP. The plan shall include, at a minimum, the following components:

(i) A description of the treatment area location, size, access routes, and proposed primary and anticipated secondary methods for *Spartina* removal;

(ii) A site evaluation that describes the size and density of the *Spartina* infestation in the treatment area, vegetation composition, substrate characteristics, topography, tidal circulation and elevations, the presence of tidal channels on or adjacent to the site, site accessibility, the presence of sensitive resources, distances to the nearest aquaculture operations and residential areas, public access use in and around the area, and other factors relevant to the proposed primary treatment method;

(iii) Analyses and, as applicable, survey results, completed by a qualified biologist using agency-approved protocols, for sensitive fish, birds, plants, and other sensitive species consistent with the relevant mitigation measures proposed in the FPEIR;

(iv) In cases where ground disturbance methods or imazapyr application are proposed, a preliminary assessment of sediment contamination in and around treatment areas and access routes consistent with the relevant mitigation measures proposed in the FPEIR;

(v) Any necessary approvals from the Regional Water Quality Control Board, the North Coast Unified Air Quality Management District, and other agencies as applicable for the proposed site-specific treatment activities;

(vi) Plans consistent with the mitigation measures in the FPEIR for all of the following, as applicable: (a) the posting of educational signage, (b) noise monitoring, (c) bird nesting habitat protection, (d) rare plant protection, (e) eelgrass avoidance, (f) erosion and sediment control, (g) hazardous materials spill prevention and containment, (h) worker health and safety, (i) herbicide drift management developed consistent with the requirements of **Special Condition 9**; and (j) public access protection;

(vii) A protocol for the inadvertent discovery of artifacts or archaeological deposits developed consistent with the requirements of **Special Condition 8**;

(viii) A description of the specific mitigation measures proposed to avoid or minimize impacts to visual, biological, and cultural resources, water quality, surrounding mudflats, ESHA, and park and recreation areas, and public access from the proposed *Spartina* removal activities, including demonstrating consistency with all relevant mitigation measures from the FPEIR and the special conditions of this coastal development permit;

(ix) A site plan depicting the primary treatment area, designated ingress/egress routes, staging/stockpiling areas, buffer areas (from channels, nesting bird habitat, sensitive plants, etc., as applicable), and locations of relevant mitigation measures (e.g., educational signage, locations to be staked for rare plant protection, locations for erosion and sediment control devices, etc.);

(x) A schedule for timing of work, including timing of mitigation measure implementation, and an analysis of how the proposed timing of work minimizes impacts on public access (e.g., avoiding peak use periods) and coastal resources;

(xi) Applicable acreage calculations demonstrating compliance with **Special Condition 5**;

(xii) A description of the specific implementation of performance standards that will assure achievement of the restoration goals and objectives set forth in the Humboldt Bay Regional *Spartina* Eradication Plan (H.T. Harvey & Assoc. 2012) including, but not limited to (a) the restoration of native tidal marsh plant species in the treatment area to a level of coverage and diversity similar to surrounding natural marshlands, and (b) achievement of fully restored (to "maintenance" stage) marsh habitats within the treatment area within five years of implementation of primary treatment;

(xiii) A monitoring plan that includes provisions for (a) monitoring the treatment area for a minimum of five years post implementation of primary treatment; (b) photo-documenting the restoration/recovery of the treatment area; and (c) performing quantitative sampling in the treatment area to track native plant recovery and *Spartina* presence/cover in the area throughout the monitoring period. The monitoring plan should include a schedule of proposed monitoring activities; and

(xiv) A reporting plan that includes provisions for submittal to the Executive Director of (a) an "as built" report demonstrating that the initial restoration work has been completed in accordance with the approved site-specific *Spartina* removal plan within 30 days of completion of primary treatment; (b) annual reports of monitoring results by December 31st each year for the duration of the required monitoring period, beginning the first year after submittal of the "as-built" assessment. Each annual report shall include a "Performance Evaluation" section where information and results from the monitoring are used to evaluate the status of the restoration project and to recommend follow-up treatment methods as well as any necessary revegetation; and (c) a final monitoring report the end of the five-year reporting period. The final report must be prepared in conjunction with a qualified biologist. The report must evaluate whether the restoration site conforms to the goals, objectives, and performance standards set forth in the approved final site-specific *Spartina* removal plan.

B. If the final report indicates that the site-specific *Spartina* removal project has been unsuccessful, in part or in whole, based on the approved performance standards, the permittee shall submit a revised or supplemental plan to compensate for those portions of the original plan that did not meet the approved performance standards. The revised plan shall be processed as an amendment to this coastal development permit, unless the Executive Director determines that no amendment is legally required.

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

**5. Limitations and Restrictions on Primary Treatment Methods**. The maximum total acreage authorized to receive primary treatment (all methods) in any given calendar year shall not exceed 722 acres and not more than 415 acres in Humboldt Bay (HB), 300 acres in the Eel River (ER), and 7 acres in the Mad River (MR) as proposed. In addition, in any

given year in which primary treatment is proposed, the total maximum acreages of primary treatment of each method shall not exceed the following as proposed:

A. For Marsh Master® or other amphibious tracked heavy equipment: 118 acres for HB, 118 acres for ER, and 0 acres for MR;

B. For handheld grinding and tilling tools: 200 acres for HB, 200 acres for ER, and 7 acres for MR;

C. For manual excavation: 10 acres for HB, 10 acres for ER, and 7 acres for MR;

D. For covering: 5 acres each for HB, ER, and MR. In addition, for specific treatment areas that are visible from public vantage points, covering shall be limited to a maximum of 0.5-acre each in HB, ER, and MR.

E. For imazapyr application: 200 acres for HB, 200 acres for ER, and 7 acres for MR. In addition, no site shall be treated with imazapyr more than three times during any five year period.

**6. Length of Development Authorization**. Development authorized by this permit is valid for five (5) years from the date of Commission approval (until June 12, 2020). One request for an additional five-year period of development authorization may be accepted, reviewed, and approved by the Executive Director for a maximum total of ten (10) years of development authorization (until June 12, 2025), provided that the request would not substantively alter the project description and/or require modifications of conditions due to new information or technology or other changed circumstances. The request for an additional five-year period of development authorization shall be made prior to June 12, 2020. If the request for an additional five-year period would substantively alter the project description and/or require modifications of conditions due to new information or technology or other changed circumstances, an amendment to this permit will be necessary. All *Spartina* removal operations proposed after June 12, 2025, or after 2020 if no additional five-year period of authorization has been granted by the Executive Director or amendment has been obtained, shall require a new coastal development permit.

**7. Implementation of Best Management Practices and Mitigation Measures**. All *Spartina* removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the adopted Final Programmatic Environmental Impact Report prepared for the project (dated March 21, 2013) to ensure minimization of impacts to sensitive species and habitats within and around the project area and protection of water quality, worker and public health and safety, and public access.

**8. Protection of Archaeological Resources.** The authorized development shall implement the cultural resources mitigation measures specified in the adopted final programmatic EIR for the project (measures CR-1, CR-2, and CR-3), as modified/supplemented by the following additional measures recommended by the Tribal Historic Preservation Officer (THPO) for the Blue Lake Rancheria:

A. The Applicant shall develop, in consultation with the THPOs for the three Wiyot area tribes (Wiyot Tribe, Blue Lake Rancheria, and Bear River Band of Rohnerville Rancheria), a detailed protocol for the inadvertent discovery of artifacts or cultural deposits. The protocol shall be developed prior to implementation of primary

treatment in any given area and shall be included in the site-specific removal plan for that area required pursuant to **Special Condition 4**. The development of the protocol shall include formal record searches for the area of expected disturbance. The protocol shall include requirements to cease all *Spartina* removal activities if cultural resources are inadvertently discovered and immediately notify the three Wiyot Tribe THPOs. Workers involved in *Spartina* removal activities shall be familiar with and agree to abide by the protocol.

B. If historic or prehistoric cultural resources (such as chipped or ground stone, historic debris, building foundations, or bone, or human remains) are discovered during the course of the project, all *Spartina* removal activities shall cease and shall not recommence except as provided in subsection (C) hereof, and a qualified cultural resource specialist shall analyze the significance of the find. If human remains are discovered, the three Wiyot Tribe THPOs and the County Coroner must also be notified immediately.

C. A Permittee seeking to recommence *Spartina* removal activities following discovery of cultural deposits shall submit an archaeological plan for the review and approval of the Executive Director, prepared in consultation with the three Wiyot Tribe THPOs. If the tribes object to chemical treatment in areas where Native American remains are discovered, then such chemical treatment shall not be used. If the Executive Director approves the Archaeological Plan and determines that the Archaeological Plan's recommended changes to the proposed development or mitigation measures are *de minimis* in nature and scope, *Spartina* removal activities may recommence after this determination is made by the Executive Director. If the Executive Director approves the Archaeological Plan but determines that the changes therein are not *de minimis*, *Spartina* removal activities may not recommence until after an amendment to this permit is approved by the Commission.

**9. Best Management Practices for Herbicide Use.**

A. AT LEAST TWO WEEKS PRIOR TO COMMENCEMENT OF DEVELOPMENT (PRIMARY TREATMENT OF *SPARTINA*) USING HERBICIDE AT ANY SITE, the Applicant shall submit, for the review and approval of the Executive Director, an Herbicide Management Plan. The plan shall be prepared and submitted in conjunction with the Site-Specific Spartina Removal Plan required by **Special Condition 4**. The plan shall demonstrate the following:

(i) Consistency with all applicable mitigation measures in the adopted Final Programmatic Environmental Impact Report prepared for the project (dated March 21, 2013), including, but not limited to, Mitigation Measures BIO-4, WQ-1, WQ-2, WQ-3, HHM-1, HHM-2, HHM-3, HHM-4, HHM-5, LU-1, and LU-3;

(ii) Herbicides shall not be applied unless the predicted chance of rain is less than 40 percent for the Redwood Coast segment of the National Weather Service's forecast for Northwestern California;

(iii) Herbicides shall only be applied during low and outgoing tides to ensure that treated plants remain above tidal inundation levels for a minimum of several hours;

(iv) Herbicide use shall not occur when winds are in excess of 10 miles per hour, or when inversion conditions exist, or when wind could carry spray drift into surrounding inhabited areas;

(v) Herbicide application shall be coordinated with the County Agricultural Commissioner to identify nearby sensitive areas and/or areas that have non-target vegetation, including farmlands and park and recreation areas, that could be affected by the herbicide, and provide advanced notification to surrounding landowners; and

(vi) A minimum 250-foot buffer zone where herbicides shall not be applied shall be established around park and recreation areas adjacent to herbicide primary treatment areas to avoid significant adverse effects to surrounding sensitive receptors and non-target habitats;

B. The plan shall include, at a minimum, the following:

(i) A description of the type of equipment and application techniques to be used to reduce the amount of small droplets that could drift into adjacent areas;

(ii) Provisions for posting warning/notification signs at and/or near any public trails, boat launches, and other potential points of access to herbicide application sites a minimum of one week prior to treatment;

(iii) A site plan depicting the primary treatment area, designated ingress/egress routes, buffer areas (from channels, nesting bird habitat, sensitive plants, eelgrass, aquaculture site, etc. as applicable), locations of relevant mitigation measures (e.g., educational signage, locations to be staked for rare plant protection, locations for erosion and sediment control devices, etc.); and

(iv) A schedule for timing of work, including timing of mitigation measure implementation, and an analysis of how the proposed timing of work minimizes impacts on public access (e.g., avoiding peak use periods) and coastal resources.

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

# IV. FINDINGS AND DECLARATIONS

The Commission hereby finds and declares as follows:

## A. PROJECT DESCRIPTION

The Humboldt Bay Harbor, Recreation, and Conservation District (hereafter "Applicant" or "District") proposes to coordinate and implement the Humboldt Bay Regional Spartina Eradication Plan[1] (hereafter "Regional Plan"). The plan provides a framework for eradicating invasive *Spartina densiflora* (dense-flowered cordgrass) at a regional level (**Exhibit 1**) using a coordinated strategic approach to augment current eradication efforts that are underway on

[1] H.T. Harvey & Associates 2012.

hundreds of acres of tidal marsh habitat within the Humboldt Bay National Wildlife Refuge. The Commission concurred with several Negative Determinations for *Spartina* eradication on the Refuge presented by the U.S. Fish and Wildlife Service between 2006 and 2010, including ND-049-06, ND-017-10, ND-025-10, and ND-041-10 (see photos in **Exhibit 3**) and on marshes owned by the City of Arcata (McDaniel Slough Wetland Enhancement Project permitted under CDP 1-06-036 and 1-06-036-A1[2]).

The proposed Regional Plan would be implemented over multiple years in tidal marshes, and, to a much lesser extent, mudflats of Humboldt Bay, the Eel River estuary, and the Mad River estuary[3] (see **Exhibit 2** and **Appendix C** for a list of the project area lands covered under this permit). Although the Regional Plan was developed for the eradication of all cordgrass region-wide, this CDP authorizes cordgrass removal only on those specific lands where the District has submitted adequate evidence of its permission to use the property consistent with Section 30601.5 of the Coastal Act (see Finding **IV-E** below).

A number of different methods for cordgrass eradication are proposed under this CDP application (**Table 1**). The anticipated maximum acreages of primary treatment of each method in any given year are shown in **Table 2**. The proposed maximum total acreage to receive primary treatment in a single year is approximately 722 acres and not more than 415 acres in Humboldt Bay, 300 acres in the Eel River Delta, and 7 acres in the Mad River estuary. Sites proposed for treatment in any given year would be prioritized according to the site priority criteria specified in the Regional Plan (e.g., cordgrass-infested areas adjacent to non-infested salt marsh habitats would rank high for treatment priority). Primary treatment activities generally would be conducted during the spring and summer months, when the weather is usually drier and the tides are more favorable for marsh accessibility.

The Applicant proposes to develop site-specific plans for each proposed treatment area in any given year. Each plan would describe, among other things, the treatment approach for the site, treatment coordination, site access, and revegetation (potential for natural recovery versus need for replanting). The Applicant does not propose to install or improve any roads to access cordgrass removal areas. Sites would be accessed by boat or using existing roads and dikes. The recommended treatment approach for each site would be based on a site-specific evaluation that considers tidal elevations, site accessibility, vegetation composition, the size and density of the cordgrass infestation, type of substrate present, the presence of sensitive resources, and other factors. The treatment approach for any given site potentially would include a combination of techniques and may vary according to treatment stage.

At any one treatment site, two years of focused treatment are anticipated to be required to kill established cordgrass stands and allow for recruitment from the native seed bank, with treatment intensity higher in the first year (primary treatment) than the second year (secondary treatment). After the proposed secondary treatment (to treat resprouts and/or seedings) is implemented at any given site, restored marshes would be maintained through monitoring and spot treatments

[2] See http://documents.coastal.ca.gov/reports/2007/6/F12b-6-2007.pdf approved June 15, 2007 and http://documents.coastal.ca.gov/reports/2009/8/Th7a-8-2009.pdf approved August 13, 2009.

[3] The extent of tidal marsh is approximately 900 acres in Humboldt Bay, approximately 640 acres in the Eel River estuary, and approximately 7 acres in the Mad River estuary.

(maintenance treatment) as needed. If warranted, active revegetation measures would be undertaken, though it is expected that at most sites the native salt marsh plant community will recover naturally.[4]

**Table 1. Proposed methods for the Humboldt Bay Regional Invasive Spartina Eradication Project.**

| Method | Description | Tools & Equipment |
|---|---|---|
| Mow | Cut above-ground stems, leaves, and stalks | Corded weed-eaters, handheld gas-powered brush-cutters, and amphibious equipment (for dense infestations) |
| Grind | Grind rhizomes below soil surface 3-6 inches | Handheld metal-blade brush-cutters |
| Till | Macerate rhizomes below soil surface | Handheld rototillers |
| Excavate | Complete removal of plant, including rhizomes | Shovels, digging bars, pulaskis, bags, wheelbarrows, hand carts, sleds, backhoes (limited to areas with dikes or roads near marsh), or amphibious excavating equipment |
| Disk | Cutting/shredding the plant, including the root system | Amphibious equipment fitted with disk attachment |
| Crush | Crush above-ground plant material, leaving a thatch that may smother plants and inhibit resprouts and seedlings | Tracked amphibious vehicles outfitted with various crushing devices, including rollers |
| Flame | Heat/flame passed over the plant until it wilts (may be used to kill seedlings in areas undergoing secondary treatment) | Handheld propane torch or tractor-mounted flaming devices |
| Cover | Cover above-ground plant material to smother plants, restrict photosynthesis, and exhaust energy reserves. Covering also is used for on-site stockpiles to kill plants following excavation | Clear polyethylene plastic in areas of dry ground; black plastic, geotextile fabric, landscaping fabric, spikes, or stakes used as anchors |
| Herbicide | Application of impazapyr, sprayed manually onto the leaves of targeted plants | Backpack spray equipment, spray trucks, ATVs or tracked vehicles, amphibious equipment, airboats. |

[4] This expectation is based on the results of cordgrass eradication efforts on the Humboldt Bay National Wildlife Refuge.

**Table 2. Approximate annual maximum acreages of primary treatment by treatment method for the Humboldt Bay Regional Invasive Spartina Eradication Project.**

| Treatment Method | Proposed Maximum Acreages of Primary Treatment of Each Proposed Method in Any Given Year | | |
|---|---|---|---|
| | Humboldt Bay | Eel River Estuary | Mad River Estuary |
| Mow, till, disk, and/or crush using Marsh Master® (amphibious tracked heavy equipment) | 118 | 118 | 0 |
| Grind and/or till using handheld brush-cutters, rototillers, or weed-eaters | 200 | 200 | 7 |
| Excavate using shovels, pulaskis, and associated tools | 10 | 10 | 7 |
| Cover | 5 | 5 | 5 |
| Herbicide[5] | 200 | 200 | 7 |
| **Total proposed maximum primary treatment acreages in any given year** | **415** | **300** | **7** |

As part of the project description proposed under this CDP, the Applicant proposes to implement all of the various mitigation measures identified in the final programmatic environmental impact report prepared for the project (listed in **Appendix B**).

## B. Background and Purpose of Project

Dense-flowered cordgrass (*Spartina densiflora*) is one of four species of nonnative invasive cordgrasses growing on the West Coast (from British Columbia to San Francisco Bay). *Spartina densiflora* is the only species of *Spartina* that occurs in the project region (unlike, for example, San Francisco Bay, where both native and nonnative invasive species of *Spartina* occur, as well as invasive hybrids). The species is native to South America and was first introduced to the region in late 1800s via ship ballast. Approximately 90% of the salt marsh habitat within the Regional Plan area, totaling approximately 1,671 acres, has been invaded by *Spartina densiflora*, with evidence that the invasion is still progressing.[6] This acreage includes approximately 250 acres on federal lands (Humboldt Bay National Wildlife Refuge) and 1,400 acres on non-federal lands (the proposed project area under this CDP). Approximately 247 acres (~14%) of the total regional infestation area either have been restored to date or are currently undergoing restoration (cordgrass removal) or have restoration efforts planned by a managing agency.[7] As noted above, the Commission concurred with several Negative Determinations for cordgrass eradication on the Refuge presented by the U.S. Fish and Wildlife Service (FWS) between 2006 and 2010. The

[5] In addition to the maximum acreages presented in the table, no site would be treated with imazapyr more than three times during any five-year period. Furthermore, the Applicant proposes to use imazapyr only in cases where the use of chemical treatment would both (1) substantially reduce treatment costs, and (2) result in a greater likelihood of successfully controlling *Spartina*.

[6] http://www.fws.gov/refuge/Humboldt_Bay/wildlife_and_habitat/SpartinaManagement.html

[7] Grazul and Rowland 2011.

FWS has over the past 10 years succeeded in eradicating dense-flowered cordgrass from approximately 78% of the federal lands within Humboldt Bay using the same suite of methods proposed under this CDP application.

According to the FWS:[8]

> *Invasive dense-flowered cordgrass (Spartina densiflora) has infested an estimated 90% of salt marshes in Humboldt Bay and the adjacent Eel and Mad River estuaries. Cordgrass is most abundant at low to mid-marsh elevations, where it has displaced native pickleweed. It has also been documented as spreading in the high elevation marsh, where it threatens a diverse native plant community that includes the salt marsh plants Humboldt Bay Owl's Clover and Point Reyes Bird's Beak, both ranked as rare, threatened, or endangered by the California Native Plant Society. Although it was previously thought that Spartina densiflora invaded only existing marsh vegetation, it is now also colonizing intertidal mudlfats, where it displaces important feeding habitat for migratory shorebirds.*

The FWS describes several significant impacts of invasive cordgrass on the tidal marsh habitats of the region:[9]

- The species outcompetes indigenous plants, displacing a rare and diverse native plant community that includes several state-listed rare, threatened, and endangered plant species, including (but not limited to) Humboldt Bay owl's-clover (*Castilleja ambigua* var. *humboldtiensis*), Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*), and western sand spurry (*Spergularia canadensis* var. *occidentale*).
- Cordgrass invasions can lead to alterations of the tidal creek system and can alter carbon cycling.
- The invasion on mudflats results in a habitat conversion to vegetated marsh, eliminating important foraging habitat for shorebirds.
- *Spartina*-dominated marshes alter habitat for other animals, including rodents, crustaceans, and gastropods, by increasing stem and root density.
- The dense cordgrass stands have an adverse effect on many species of fish and shellfish, including local populations of coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*O. tshawytscha*), and steelhead trout (*O. mykiss*), as well as Dungeness crab (*Cancer magister*), which are the basis for an important fishery. As the dense masses of cordgrass create meadows above the mudflats, the species only have access to the higher habitat during the highest tides.
- *Spartina* stands alter invertebrate assemblages. Although cordgrass plants are taller than most of the native tidal marsh plant species and offer more refuge from high tides, they are structurally less complex than native vegetation and reduce the opportunity for diversity of invertebrate consumer strategies. The invaded marshes tend to support denser populations of both mosquitoes and the invasive snail (*Myosotella mytosis*), with greater

[8] http://www.fws.gov/refuge/Humboldt_Bay/wildlife_and_habitat/SpartinaManagement.html

[9] Ibid.

proportion of the native threatened snail *Littorina subrotundata* found in restored marshes.

- Recent research indicates that *Spartina densiflora* has a negative impact on estuarine productivity.[10]
- The presence of cordgrass in the region allows the invasive species to colonize other West Coast estuaries via ocean dispersal of seeds.

The proposed Regional Plan is part of a larger effort to eradicate all invasive *Spartina* species on the West Coast. The time-frame set for achieving coast-wide eradication is 2018.[11] As explained in the 2008 West Coast Governors' Agreement on Ocean Health (emphasis added):

> *The three states have, to varying degrees, identified and established levels of protection for coastal and marine habitats and species. However, the states have not conducted an identification exercise that focuses on contributions of key habitats to the health and sustainability of the larger ecosystem on a regional scale. Similarly, while each state has conducted a significant effort to eradicate various marine invasive species, there has not been a coordinated method of regional communication or eradication. Because of this, invasive species that are introduced or re-introduced by interstate vessel traffic and coast-wide ocean currents will persist despite removal efforts. It is therefore crucial that all three states work together to comprehensively eradicate species, such as nonnative cordgrasses, which are impacting rare habitats across the West Coast. For example, there is a substantial amount of information available about how to best eradicate non-native Spartina cordgrasses. Washington State has already succeeded in removing 85% of the invasive cordgrasses in Willapa Bay, once a heavily infested area. California has aggressive efforts to eradicate non-native cordgrasses in San Francisco Bay, but non-native cordgrasses have also been found in Humboldt Bay, and eradication efforts there would have to be significantly augmented to eliminate the transportation of seeds from Humboldt Bay to Oregon and Washington. Coast-wide eradication efforts could substantially reduce or eliminate Spartina and will provide lessons for eradicating other invasive species.*

The governors' agreement developed a *Spartina* eradication action coordination team work plan, which identified cordgrass eradication in the proposed project area as a high priority task. The Coastal Conservancy funded the development of the Humboldt Bay Regional Spartina Eradication Plan in 2008. H.T. Harvey & Associates completed the plan in 2012, and Coastal Conservancy certified the final programmatic EIR for the project in 2013. Baseline mapping of the distribution of *Spartina densiflora* in the Humboldt Bay region was completed in 2011.[12]

[10] Lagarde 2012.
[11] West Coast Governors' Agreement on Ocean Health. May 2008. See pages 42-52 (Priority Area 2) in http://www.westcoastoceans.org/media/wcga_actionplan_low-resolution.pdf
[12] Grazul and Rowland 2011.

## C. ENVIRONMENTAL SETTING

Humboldt Bay is the second largest natural bay in California and the largest estuary between San Francisco Bay and Coos Bay, Oregon. Humboldt Bay is approximately 14 miles long and over 4 miles across at its widest point, covering an area approximately 24 square miles in size at high water. The bay is a significant harbor for port-related commercial and industrial uses as well as valuable for its ecological, aesthetic, and recreational resources. The mouth of the bay has been stabilized by jetties for over 100 years. Two barrier beaches on both sides of the entrance, the North Spit (also known as Samoa Peninsula) and South Spit, shelter the estuary. Major tidal slough associated with the northern bay (Arcata Bay) are Mad River Slough (not to be confused with the Mad River estuary, described below) and McDaniel, Gannon, Freshwater, and Eureka sloughs. Other major tributaries with estuarine habitat include Jacoby Creek (also in Arcata Bay), Elk River (in Entrance Bay near Eureka), and Salmon Creek (in South Bay). Historically the bay supported up to 10,000 acres of tidal marsh habitats. Since the mid-1800s, the majority of the historic tidelands were diked or filled, and today, only 10% of the historic tidal marsh habitat remains.

The Eel River, the third largest river in California, enters the Pacific Ocean approximately 10 miles south of the Humboldt Bay harbor entrance. The floodplain of the Eel River extending from the river mouth up to 12 miles inland at the confluence of the Van Duzen River and the Eel River near Highway 101 is known as the Eel River Delta. The delta, which covers approximately 50 square miles, is a mostly flat, depositional region that once was comprised of an intricate network of sloughs, side channels, and open water. By 1940, thousands of acres of tidal marsh habitat in the Eel River Delta had been converted for farmland uses. Today, the estuarine habitats of the lower Eel amount to a fraction of their original size, though the estuary still is one of the largest and most important estuaries in the state. The Eel River estuary includes various tidal sloughs north of the river mouth, the river's embayment and channels from the mouth up to Fernbridge (several miles upstream from the mouth), and channels south of the river mouth, including the Salt River, Centerville Slough, and others.

The Mad River drains approximately 500 square miles of the Coast Ranges and empties into the Pacific Ocean north of Humboldt Bay. The mouth of the Mad River, currently emptying into the ocean west of the County Airport in McKinleyville, has shifted dynamically over time due to various influences (e.g., stream discharge and sediment load during large storms, wave attack, tidal currents, and anthropogenic changes).[13] The estuarine reach of the Mad River is much smaller than that of the Eel River.

The estuaries of Humboldt Bay, the Eel River, and the Mad River include a diverse array of habitats, including subtidal and deep water habitats, tidal channels and flats, intertidal mudflats, eelgrass beds, salt marsh, and brackish marsh. These habitats support an abundance of marine organisms and species associated with the marine environment, including many rare, threatened, and endangered species such as salmonids, green sturgeon (*Acipenser medirostris*), longfin smelt (*Spirinchus thaleichthys*), several rare plants discussed above, and numerous species of birds. Together the estuaries of the bay and the Eel and Mad rivers comprise the "Humboldt Bay Complex," a site designated of "international importance" by the Western Hemisphere Shorebird

[13] Stillwater Sciences 2010.

Reserve Network and designated "globally important" by the National Audubon Society. Many of the fish and invertebrate species that occur in the project area estuaries are commercially valuable species. In addition, Humboldt Bay supports a vibrant and growing aquaculture industry. The bay is the largest producer of oysters in the State and is the only approved California source for certified disease-free seedlings, which are shipped to farms in Canada, Washington, Oregon, and California

## D. STANDARD OF REVIEW

The proposed project is located in the Commission's retained jurisdiction within tidelands and submerged areas. Humboldt County, the City of Eureka, and the City of Arcata each have a certified local coastal program (LCP), but the project lands within areas shown on State Lands Commission maps over which the state retains a public trust interest. Therefore, the standard of review that the Commission must apply to the project is the Chapter 3 policies of the Coastal Act.

## E. APPLICANT'S PERMISSION TO USE THE PROPERTY

The proposed project area spans tidelands of Humboldt Bay, the Eel River, and the Mad River. Although they are subject to the public trust, the tidelands are under the management authority of different entities, including the Applicant, the City of Arcata, the City of Eureka, Humboldt County, the Coastal Conservancy, Humboldt State University, California Department of Fish and Wildlife, and the Wildlands Conservancy (see **Appendix C**). As required by Section 30601.5 of the Coastal Act, the Applicant has submitted evidence that (a) each land management authority has been notified of the project as proposed in the CDP application, and (b) each land management authority has been invited to join the CDP application as a co-applicant. Evidence has been submitted for each property involved in the proposed project where any form of development is proposed to occur. In addition, as also required by Section 30601.5, the Applicant has submitted evidence from each management authority giving the Applicant permission to undertake development on the property as conditioned by the Commission. **Special Condition 1** limits the proposed project to only those lands specified in the CDP application and requires an amendment to this CDP to expand the project area to other lands in the region.

## F. OTHER AGENCY APPROVALS

**Humboldt Bay Harbor, Recreation, and Conservation District.** The District was created by the State Legislature in 1970 to oversee development of the harbors and ports of Humboldt County for the benefit of the people. The District has permit jurisdiction over all tidelands and submerged lands within Humboldt Bay and administers sovereign tidelands and submerged lands over most of Humboldt Bay pursuant to a legislative grant. The District approved permit number 14-05 for the proposed project on December 18, 2014.

**California State Lands Commission.** The SLC has direct jurisdiction and authority over ungranted sovereign tidelands and submerged lands underlying the State's navigable waterways (ocean, bays, sloughs, lakes, and rivers) as well as over lands subject to the public trust. The project area includes lands within the SLC's jurisdiction. To ensure that the Applicant has the legal ability to undertake all aspects of the project on these public lands, the Commission

attaches **Special Condition 2**. This condition requires that the project be reviewed and where necessary approved by the SLC.

**North Coast Regional Water Quality Control Board.** The Regional Board has the authority to regulate the project under the Division 7 of the State Water Code (Porter-Cologne Water Quality Control Act). To ensure that the *Spartina* treatment at each site approved by the Board is consistent with the project as approved herein, the Commission attaches **Special Condition 3**. This condition requires that for each treatment site the Applicant provide a copy of a permit issued by the Board, or evidence that no permit is required. The Applicant must inform the Executive Director of any changes to the project required by the Board. Such changes shall not be incorporated into the project until the Applicant obtains an amendment to this CDP.

**U.S. Army Corps of Engineers.** The Corps has regulatory authority over projects involving diking, filling, and placement of structures in navigable waterways under Section 10 of the Rivers and Harbors Act (RHA) of 1899 as amended (*33 U.S.C. § 403 et seq.*) and projects involving filling or discharging of materials into waters and ocean waters under Section 404 of the Clean Water Act (CWA) of 1972 as amended (*33 U.S.C. § 1344 et seq.*). The Corps determined in an e-mail dated July 15, 2014 that the proposed project will not require a permit from the Corps pursuant to the RHA or CWA.

## G. ALLOWABLE USE FOR WETLAND DREDGE/FILL ACTIVITIES

Section 30230 of the Coastal Act states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 of the Coastal Act states:

> *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 30233 of the Coastal Act provides, in applicable part, as follows:

> *(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…*

...

The Commission has long considered grading, excavating, and other ground-disturbing activities in coastal wetlands and estuaries to be a form of dredging.[14] As such, several of the proposed methods of eradication, including grinding, tilling excavating, disking, and covering the marshlands (a form of "fill), must be evaluated for consistency with Section 30233. The above-cited Coastal Act policies set forth a number of different limitations on permissible dredge and fill in estuaries. For analysis purposes, the limitations can be grouped into four general categories or tests, which in combination must demonstrate that (1) the purpose of the filling, diking, or dredging is for one of the seven uses allowed under Section 30233(a); (2) there is no feasible less environmentally damaging alternative; (3) feasible mitigation measures have been provided to minimize adverse environmental effects; and (4) the biological productivity and functional capacity of the habitat shall be maintained and enhanced where feasible.

**Allowable use.** The first test set forth above is that any proposed filling or dredging in estuaries must be for an allowable purpose as specified under Section 30233 of the Coastal Act. The relevant category of use listed under Section 30233(a) that relates to the proposed project is subcategory (6), "restoration purposes." 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."[15] 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, historical ecosystem. The goal of the process is to emulate the structure, function, diversity, and dynamics of the specified ecosystem."[16] However, the term also applies to actions taken that result in the reestablishment of ecological processes, functions, and biotic/abiotic linkages and lead to a persistent, resilient system integrated within its landscape[17] that may not necessarily result in a return to historic locations or conditions within the subject area.

Implicit in all of these varying definitions and distinctions is the understanding that the restoration entails returning something to a prior state. Estuaries are extremely dynamic systems in which specific physical functions such as nutrient cycles, succession, water levels and flow patterns directly affect biological composition and productivity. Consequently "restoration," as contrasted with "enhancement," encompasses not only reestablishing certain prior conditions but also reestablishing the processes that create those conditions. In addition, most of the varying

[14] E.g., CDPs 1-06-036, 1-08-011, 1-08-012, 1-08-020, 1-09-020, 1-09-030, and 1-10-032.
[15] Merriam-Webster's Online Dictionary, http://www.merriam-webster.com/dictionary/restoration.
[16] "Definitions," *Society of Ecological Restoration News*, Society for Ecological Restoration; Fall, 1994
[17] *Position Paper on the Definition of Wetland Restoration*, Society of Wetland Scientists, August 6, 2000.

definitions of restoration imply that the reestablished conditions will persist to some degree, reflecting the homeostatic natural forces that formed and sustained the original conditions before being artificially altered or degraded. Moreover, finding that proposed dredging and filling constitutes "restoration purposes" must be based, in part, on evidence that the proposed project will be successful in improving habitat values. Should the project be unsuccessful at increasing and/or enhancing habitat values, or worse, if the proposed dredging and filling impacts of the project actually result in long term degradation of the habitat, the proposed project would not be for "restoration purposes."

In sum, to ensure that a proposed restoration project achieves its stated habitat enhancement objectives, and therefore can be recognized as being for "restoration purposes," the project must demonstrate that: (1) it either entails a return to or re-establishment of former habitat conditions, or it entails actions taken that will result in the reestablishment of landscape-integrated ecological processes and/or abiotic/biotic linkages associated with estuarine habitats; and (2) there is a reasonable likelihood that the identified improvements in habitat value and diversity will result; and (3) once re-established, it has been designed to provide the desired habitat characteristics in a self-sustaining, persistent fashion independent of the need for repeated maintenance or manipulation to uphold the habitat function.

As discussed above in Finding **IV-B**, the purpose of the proposed dredging and filling within estuaries of Humboldt Bay, the Eel River, and the Mad River is to restore the native tidal marsh habitats of the regional estuaries and restore estuarine functionality by removing invasive *Spartina*. The invasive cordgrass is native to South America, and while it has long been established in the Humboldt Bay region (it was first introduced to the region in late 1800s via ship ballast), there is evidence that the species is continuing to spread, both by becoming denser in marshes where it already exists and by invading new habitats where it hasn't been previously found, such as higher-elevation salt marsh and lower-elevation mudflat habitats. In high-elevation salt marshes, cordgrass invasions threaten to displace a great diversity of native plants and animals, including state-listed Humboldt Bay owl's clover, Point Reyes bird's-beak, and other species. Its invasion into mudflats could lead to the displacement of eelgrass beds, which provide essential fish habitat for a number of species, and valuable foraging habitat for resident and migratory populations of shorebirds and waterfowl. The goals of the project, as stated in the proposed Regional Plan, include instituting a regional eradication program to coordinate and implement efforts to eradicate invasive *Spartina*, restoring native plants to dominance in the tidal marshes of the region, and protecting the region's tidal marshes from future cordgrass invasions through prevention, early detection, and rapid response. The FWS, in its cordgrass eradication efforts on federal lands in the bay, has found that native plant recovery in restored marshes is successful within two years, often without the need for replanting.[18] In addition, the rare Humboldt Bay owl's clover responded dramatically and positively to restoration on federal Refuge lands in the bay, with the population in the restored marshlands increasing from approximately 3,000 individuals pre-restoration to over 99,000 five years post-restoration.

For all of the above reasons, the Commission finds that the proposed enhancements of tidal habitats entail a return to former habitat conditions as well as actions taken in converted or degraded natural estuaries that will result in the reestablishment of landscape-integrated

[18] Pickart 2008; 2012.

ecological processes, and there is a high likelihood that the identified improvements in habitat value and diversity will result. Furthermore, although repeated maintenance may be needed in restored areas until full regional eradication of the species is complete, only low-intensity spot treatments of resprouts, seedlings, and new colonizations are expected to be required intermittently in restored areas during the regional eradication program timeline, until full eradication of the species from the region is achieved. As the FWS has found, the viability of the *Spartina* seedbank in restored sites begins to diminish after two years, and there is evidence that seeds may primarily enter the bank at the site of seed production.[19] Thus, as the marshes recover native plants and exhaust the cordgrass seedbank, they are unlikely to require significant or intensive maintenance efforts to uphold habitat function. In addition, it has been demonstrated in Humboldt Bay that complete eradication is achievable, as occurred with the *Spartina alterniflora* invasion in Humboldt Bay discovered in the 1980s. After observing an increase in the size of the stand from 100 to almost 5,000 square feet over a three-year period, the California Department of Fish and Game (now CDFW) eradicated the stand by diking the area, cutting the grass, applying salt and covering it with black plastic. This timely intervention prevented a massive invasion of the mudflat habitats of the bay, such as has occurred in San Francisco Bay and Willapa Bay. While the *Spartina densiflora* infestation in the region is significantly larger than the *Spartina alterniflora* infestation that was successfully eradicated, the FWS has over the past 10 years succeeded in eradicating dense-flowered cordgrass from approximately 78% of the federal lands within Humboldt Bay over.[20] Therefore, the Commission finds that the proposed wetland dredging and filling activities in tidal marsh habitats of Humboldt Bay, the Eel River, and the Mad River are consistent with the definition of restoration and constitute filling and dredging for restoration purposes consistent with Section 30233(a)(6).

This finding that the proposed project is truly for restoration purposes is based in part on the assumption that the proposed project will be successful in restoring tidal habitats as proposed. 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 project would not maintain and enhance marine resources or the biological productivity and quality of coastal waters consistent with the mandates of Sections 30230 and 30231.

To ensure that the project area is restored to functional tidal habitat as proposed, the Commission attaches Special Conditions 4, 5, and 6. **Special Condition 4** requires the Applicant to submit a site-specific *Spartina* removal plan for the proposed primary cordgrass removal work in each area consistent with (1) all terms and conditions of Coastal Development Permit 1-14-0249, and (2) the mitigation measures proposed in the adopted Final Programmatic Environmental Impact Report (FPEIR) prepared for the project (dated March 21, 2013, **Appendix B**), as supplemented by the conditions of this CDP. The plan, which must be approved by the Executive Director prior to commencement of primary treatment of *Spartina* in each area, must include, among other things, a description of performance standards that will assure (a) the restoration of native tidal marsh plant species in the treatment area to a level of coverage and diversity similar to surrounding natural marshlands, and (b) achievement of fully restored (to "maintenance" stage)

[19] Pickart 2012.
[20] A. Pickart, pers. comm. (email) May 18, 2015.

marsh habitats within the treatment area within five years of implementation of primary treatment. Furthermore, Special Condition 4 requires that the site shall be monitored for achievement of these goals and remediation if the final report indicates that the site-specific *Spartina* removal project has been unsuccessful, in part or in whole, based on the approved performance standards.

To ensure that the project avoids significant cumulative impacts to the tidelands of Humboldt Bay and the Eel and Mad River estuaries associated with the proposed dredging and filling activities, **Special Condition 5** imposes limits and restrictions on maximum acreages authorized for primary treatment of cordgrass by treatment method in each region (Humboldt Bay, the Eel River, and the Mad River) in any given calendar year. Imposing limits on annual maximum acreages for each primary treatment method in each area ensures that the dredging and filling impacts of the project, which, as discussed above, will be short-term and implemented to increase and enhance habitat values, will not be cumulatively considerable in any of the three watersheds where project activities are proposed. The maximum acreages specified in the condition are based not only on practical considerations, such as anticipated availability of equipment and manpower to undertake the proposed activities, but also consideration of potential cumulative impacts related to erosion, turbidity, and other potential project impacts.

Furthermore, **Special Condition 6** limits the length of development authorization under this CDP to a period of five years from the date of Commission approval. One request for an additional five-year period of development authorization may be accepted, reviewed, and approved by the Executive Director for a maximum total of ten (10) years of development authorization, provided that the request would not substantively alter the project description and/or require modifications of conditions due to new information or technology or other changed circumstances. This condition ensures that the Commission will have the opportunity to reconsider the project activities at a later date, if full eradication is not achieved within the permit authorization timeframe. The future reconsideration of the project would have the benefit of being informed by the results of the regional eradication efforts authorized under this CDP.

Therefore, the Commission finds that the proposed project, as conditioned, is permissible under Section 30233(a)(6) for "restoration purposes" and implements the requirements of Section 30230 and 30231 that marine resources shall be maintained and enhanced.

**Alternatives.** The second test set forth by the Commission's dredge and fill policies is that the proposed project must have no less environmentally damaging feasible alternative. Coastal Act Section 30108 defines "feasible" as …c*apable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors*. In this case, alternatives to the proposed grinding, tilling, excavating, disking, and covering methods include (a) using methods that don't involve dredging or filling only (i.e., mowing, crushing, flaming, and herbicide), and (b) the no project alternative.

Using methods that don't involve dredging or filling. This alternative involves using only methods such as mowing, crushing, flaming, and herbicide use that involve no ground-disturbance or placement of material within the estuarine habitats. Foregoing the use of the grind, till, and excavation methods, which have shown to be the most effective and feasible for

eradicating the invasive species, would greatly increase the project time and cost and reduce its certainty of success. Mowing, while avoiding ground disturbance, is labor intensive (if using hand-held equipment), generates substantial wrack (which can lead to water quality impacts), and is not effective alone due to the need for repeated retreatments. The method is most appropriate for controlling the spread of the species (by removing flowering stalks before seeds develop and disperse) rather than eradicating it. Mowing also is effectively used in combination with other methods, such as tilling. The use of flaming is more of a selective tool and not practical for extensive stands. Flaming also is not effective when plants are older than approximately 6 weeks, and it has been shown to suppress native plant recovery, at least initially. Crushing, while relatively inexpensive and rapid, is only suitable for large dense stands due to its impacts to native plants. Chemical control (imazapyr) may be appropriate for areas where ground disturbance is unacceptable, but the use of the proposed broad-spectrum herbicide could impact native plants (so is recommended only for use in cordgrass stands with little to no native plant cover), and its use is not appropriate for areas with minimal tidal flushing. The efficacy of the method for use on top-mowed plants and seedlings has been demonstrated to be low.

The proposed use of methods involving ground-disturbance (dredging) in the estuaries have been tested in the region and proven suitable for a wide-range of field conditions. Native plant recovery following the use of the grind method has been shown to be good, and this method helps to reduce the *Spartina* seedbank. Excavation results in fewer resprouts than other methods, is relatively safe, and requires minimal training. Tilling, used in combination with an initial top-mow, is an effective method of relatively low labor-intensity, especially when done with a Marsh Master®. Covering, which in practice is generally used only on a small-scale, is relatively inexpensive, does not disrupt soil processes, and is an important method for use in small or remote infestations with limited tidal action.

In summary, the use of methods that involve no dredging or filling impacts across the hundreds of acres of diverse habitats proposed as the project area under this CDP application would be much less effective than the integrated management approach that combines a variety of mechanical and chemical control techniques that were developed and refined through the implementation of successful cordgrass eradication projects in Washington, Oregon, San Francisco Bay, and parts of the Humboldt Bay National Wildlife Refuge.[21] The proposed integrated management program incorporating the use of all of the methods proposed in combination and depending on site-specific considerations allows for flexibility, efficacy, and minimization of impacts. Therefore, the alternative of using methods that involve no dredging and filling is not a less environmentally damaging feasible alternative to the proposed development as conditioned.

No project alternative. The no project alternative means not implementing the Regional Plan throughout most of Humboldt Bay, the Eel River estuary, and the Mad River estuary. Public agencies have been conducting eradication and may continue their efforts on a smaller portion of these estuary lands. However, without the proposed project, these efforts are less coordinated, less efficient, more expensive (due to the need for retreatments if/when remaining cordgrass in the region repopulates treated areas), and the feasibility of restoration success is less certain. Under the no project alternative, there would be no establishment of treatment priorities among

[21] Pickart 2013.

sites, monitoring would be more opportunistic and less coordinated resulting in data that are less comparable, and eradication success would be more difficult to monitor. Without a commitment to regional eradication, remaining stands of cordgrass would likely, in the long-term, re-populate other, previously treated areas, both within estuaries along the Humboldt County coast as well as within other West Coast estuaries via ocean dispersal of seeds. Therefore, the no project option is not a less environmentally damaging feasible alternative than the proposed project as conditioned.

For the reasons discussed above, the Commission finds that there is no feasible less environmentally damaging alternative to the development as conditioned, as required by Section 30233(a).

**Feasible Mitigation Measures.** The third test set forth by Section 30233 is whether feasible mitigation measures have been provided to minimize adverse environmental impacts. The proposed development would be located in estuarine habitats of the bay and two rivers. Depending on the manner in which the proposed project is conducted, the significant adverse impacts of the dredging and filling aspects of the project may include impacts to (1) special-status fish species, (2) special-status birds, (3) special-status plants, (4) eelgrass, (5) marine mammals, (6) visual resources, and (7) water quality. The potential impacts and their mitigation are discussed below.

Mitigation measures to minimize impacts to fish. According to the CEQA document prepared for the project, special-status fish species, including coho and Chinook salmon, steelhead trout, tidewater goby (*Eucyclogobius newberryi*), and others, may be present in channels adjacent to *Spartina* control efforts during any time of the year. Impact BIO-1 of the final programmatic EIR (FPEIR) states in applicable part:

> *If present, fish could be indirectly impacted by erosion caused by mechanical methods, resulting in increased turbidity. Increased turbidity could affect fish by interfering with gill function, reproduction or behavior (e.g., feeding or predator avoidance). Additionally, potential direct impacts could occur if fish are struck, injured, or killed by heavy equipment operating within a channel…*

The FPEIR includes a mitigation measure (Mitigation Measure **BIO-1**) to ensure avoidance of "take" of fish species listed under the federal and/or state endangered special acts. The measure requires that on a project-specific basis, a habitat analysis will be completed to determine if special-status fish have the potential to occur. If special-status fish may be present, then only cordgrass control methods that minimize potential erosion impacts, such as top-mowing, crushing, chemical treatment, and covering, will be used within 15 feet of any aquatic habitat containing special-status fish species, so that a vegetative buffer will remain along the edge of the channel while the interior marsh behind the buffer is barren, thereby minimizing soil loss along the channel edge in areas where wave action could erode the soil and increase turbidity to the detriment of special-status fish in the channel. Additionally, amphibious vehicles will not contact the channel substrate where special status fish are present, and the vehicles will be operated in such a manner that they will avoid causing erosion into the channels.

To ensure that the project implements the proposed fish protection measures described above, the Commission attaches Special Condition 4. **Special Condition 4**, as discussed above, requires the Applicant to submit a site-specific *Spartina* removal plan for the proposed primary *Spartina* removal work in each area consistent with (1) all terms and conditions of Coastal Development Permit 1-14-0249, and (2) the mitigation measures proposed in the FPEIR, including the fish protection measure described above. The plan, which must be approved by the Executive Director prior to commencement of primary treatment of cordgrass in each area, specifically requires submittal of a fish habitat analysis and, if applicable, survey results to determine if fish species of concern may be present. Furthermore, subpart **(viii)** of the condition requires that the site-specific *Spartina* removal plan specifically describe the specific mitigation measures proposed to avoid or minimize impacts to sensitive fish consistent with the measures identified in Mitigation BIO-1 of the FPEIR. In addition, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the project's potential fish impacts consistent with Section 30233 of the Coastal Act.

Mitigation measures to minimize impacts to birds. According to the FPEIR, noise associated with the cordgrass control equipment and vehicles may temporarily impact sensitive bird species, including western yellow-billed cuckoo, northern harrier, short-eared owl, and others. Impact BIO-2 of the FPEIR states in applicable part:

> *Breeding special-status birds may be temporarily affected by noise caused by Spartina control equipment and vehicles. Disturbance due to noise will depend on many factors such as proximity to the noise, the levels of ambient noise, the nature of ambient noise, and the ability of birds to habituate to new noise. Control methods that create a potentially significant high level of noise are brushcutters, and methods that require airboats (e.g., amphibious vehicles). Without mitigation, noise impacts to birds could be potentially significant. In addition, northern harriers and short-eared owls may nest in the uplands adjacent to Spartina control areas, and their nests, which are located on the ground, could be directly impacted by Spartina control workers and equipment crossing these areas to reach Spartina. However, with implementation of the following mitigation measures impacts are less than significant.*

The FPEIR includes two mitigation measures to protect sensitive birds and their nesting habitat. Mitigation Measure **BIO-2** requires that on a project-specific basis, a habitat analysis will be completed to determine if special-status birds have the potential to occur. If the habitat targeted for cordgrass treatment has the potential to support sensitive birds, and if eradication is planned to occur when these birds may be breeding, then surveys will be done to establish that these species are absent prior to initiating treatment. The proposed mitigation measures further states:

> *Response of birds to noise varies by species as well as site specific factors including ambient noise levels, topography and vegetation. A limit of 60 dB*

> *reaching breeding songbirds has recently been advocated for by the California Department of Fish and Wildlife (see ICF Jones and Stokes 2009). For the purpose of this PEIR, if breeding birds are known or assumed present within close proximity to Spartina control activities then actions will be taken to ensure that ≤60 dB reaches the breeding area. Actions may include the use of sound measuring devices to determine the range of noise production and limit Spartina control methods accordingly (i.e., use quieter methods near breeding special-status birds).*

Proposed Mitigation Measure **BIO-3** requires avoidance of sensitive bird nesting habitat as follows:

> *The breeding season is March-August for northern harriers (Loughman and McLandress 1994) and March-July for short-eared owls (Gill 1977). If Spartina control activities are planned to occur during these periods (i.e., between March-August) then a qualified biologist will assess whether there is potential nesting habitat for northern harrier or short-eared owls. If there is potential habitat, it will be avoided or a qualified biologist will survey the potential habitat immediately prior to Spartina control work and if nests are found then a minimum 300 ft buffer zone will be delineated. The buffer zone will be avoided by Spartina control workers and equipment.*

Each site-specific cordgrass removal plan required by **Special Condition 4**, as discussed above, must incorporate all of these proposed measures. The condition requires analyses and surveys for special-status birds to be completed and the preparation and submittal of a bird nesting habitat protection plan for the Executive Director's review and approval prior to commencement of cordgrass treatment in each area in any given year. The plan must include the various protective measures described above as detailed in Mitigation Measure **BIO-2** of the FPEIR. In addition, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the project's potential impacts to birds, consistent with Section 30233.

Mitigation measure to minimize impacts to special-status plants. Several species of special-status plants, including Humboldt Bay owl's clover, Point Reyes bird's-beak, western sand spurry, and others, may occupy the same tidal marshes where cordgrass is growing. Impact BIO-3 of the FPEIR states in applicable part:

> *Impacts to special status plants from direct mechanical methods include accidental excavation, cutting, bruising, crushing, and mowing. Direct impacts from chemical methods include accidental contact with herbicides, resulting in disruption of plant metabolism and possible mortality. Indirect impacts from mechanical and chemical removal include compaction of soil, increasing erosion when soil is left exposed, exposing plants to greater light (if top mowing, for*

> *example) or to lesser light (if wrack and mulch cover special status plants). Indirect effects could also occur when direct mechanical or chemical methods result in harm but not mortality to special status plants. Injured plants must spend energy repairing structures, instead of growing, setting seeds or spreading propagules. Without mitigation, direct and indirect effects on special status plants could be potentially significant...*

The FPEIR includes Mitigation Measure **BIO-4**, which the District proposes to implement under this CDP application, to minimize the potential for impacts to rare plants. The measure requires that on a project-specific basis, a habitat analysis will be done to determine if special-status plant species have the potential to occur. If they could occur, then surveys will be done to establish that the species of concern are absent. If rare tidal marsh plants are present, then cordgrass control methods will be selected that avoid or minimize potential impacts. Staked locations of special-status plant populations or special-status plant habitat will be recorded, and field crews will be instructed to avoid and protect special-status plants. There will be no impacts to the endangered beach layia and Humboldt Bay wallflower, which occur in dune habitats where cordgrass does not grow, because the site-specific *Spartina* removal plan will select access routes where these plants do not occur. For two of the rare annual plants that occur in habitat that overlaps with cordgrass habitat, Humboldt Bay owl's clover and Point Reyes bird's beak, impacts will be minimized to the maximum extent feasible and restored sites will be monitored for the recovery of native plants. As discussed above, the *Spartina* eradication projects implemented on the federal lands in the bay have shown that there is an explosive increase in owl's clover and bird's beak populations in restored marshes (Pickart 2012; and see photos, **Exhibit 3**). For other annual special status plants such as western sand spurry, proposed Mitigation Measure BIO-4 requires avoidance by selecting only treatment methods that are highly selective such that the rare plants can be avoided. For perennial plants such as Lyngbye's sedge, a qualified botanist will stake out locations of special-status plants and provide training to control crews to ensure that they minimize impacts to these plants. If special-status plant populations or habitat occur near the high tide line, wrack and large deposits of mown cordgrass will be removed during the growing season. To avoid trampling of special status plant species, in areas where frequent access will occur, paths will be marked and used that avoid special-status plant species to the maximum extent possible.

To ensure that the project implements the proposed mitigation measures described above to minimize the potential impacts to rare plants, the Commission attaches Special Condition 4. As discussed above for fish, **Special Condition 4** requires preparation of a site-specific *Spartina* removal plan for primary *Spartina* removal work in any given area prior to commencement of primary treatment of cordgrass in each area. **Special Condition 4-A(iii)** requires botanical analyses and surveys to be completed, and the condition further requires the preparation and submittal of a rare plant protection plan for the Executive Director's review and approval if rare plants are located in the treatment target area. Furthermore, subpart **(viii)** of the condition requires that the site-specific *Spartina* removal plan specifically describe the specific mitigation measures proposed to avoid or minimize impacts to rare plant resources consistent with the mitigation measures proposed in Mitigation Measure BIO-4. In addition, **Special Condition 7** reiterates that all cordgrass removal activities must be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and

included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the project's special-status plant impacts consistent with Section 30233.

Mitigation measure to minimize impacts to eelgrass. When conducted in mudflats, all of the cordgrass removal methods have the potential to directly impact eelgrass. The project proposes to avoid eelgrass impacts through the implementation of Mitigation Measure **BIO-5**, which states that workers removing cordgrass in areas with the potential for eelgrass shall be trained, by a qualified biologist, to recognize eelgrass and the mudflats that contain potential habitat for eelgrass. Only methods that avoid physical disturbance to eelgrass, such as top mowing and excavation, shall be used in close proximity to eelgrass. The site-specific *Spartina* removal plan required by **Special Condition 4** requires that the site's proximity to eelgrass shall be considered in the determination of appropriate control methods for the site, and the plan must specifically describe the specific mitigation measures proposed to avoid eelgrass impacts consistent with the measures proposed in Mitigation Measure BIO-5. In addition, **Special Condition 7** reiterates that all cordgrass removal activities must be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the project's eelgrass impacts consistent with Section 30233.

Mitigation measure to minimize impacts to marine mammals. According to the FPEIR, marine mammals, particularly harbor seals (*Phoca vitulina*), are abundant in the project vicinity and potentially could be disturbed by noise generated from cordgrass control activities, although the sound produced will be short term and generally low. To reduce noise impacts near marine mammals, the project proposes to implement Mitigation Measure **BIO-6**, which requires that if marine mammals are present within 200 feet of cordgrass control operations, then specified methods that cause relatively high levels of noise (i.e., brushcutters, the Marsh Master®, and airboats) will not be used. Other methods that do not generate a relatively high level of noise will instead be used. This mitigation measure is required to be included in the site-specific *Spartina* removal plan required by **Special Condition 4**. In addition, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the project's potential impacts to marine mammals consistent with Section 30233.

Mitigation measure to minimize impacts to visual resources. The proposed use of covering involves placement of fill material in marshlands consisting of plastic covering staked in place on a temporary basis until treatment is complete, usually approximately six months. This method will be used in small densely infested stands, and does not involve ground disturbance. However, the method could have short-term impacts on visual resources if visible from public vantage points, because the covered areas would be out of character with the surrounding marsh areas

(this impact is discussed further in Finding **IV-J** below). Proposed Mitigation Measure **AV-2** imposes limits on the use of the proposed covering method, and these limits are incorporated in restrictions imposed in **Special Condition 5**. In any given area that is visible from a public vantage point, including public roads and other areas of relatively high public use, the mitigation measure restricts covering of marsh habitat to no more than 0.5-acre. The use of covering is further restricted to not exceed 5 acres in any given year in each region (Humboldt Bay and the Eel and Mad rivers). In addition, as previously described, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the potential visual resources impacts of the proposed fill (covering material) consistent with Section 30233.

Mitigation measure to minimize impacts to water quality. The water quality impacts considered in this section relate to potential impacts from the use of dredging/filling methods only. Finding **IV-H** below considers water quality impacts from the use of other proposed methods, including herbicide use.

The use of amphibious heavy equipment for grinding, tilling, disking, and excavation presents the risk of accidental spills of fuel and other petroleum projects. Impact WQ-3 of the FPEIR describes this risk, in part, as follows:

> *Spills of gasoline or other petroleum products required for operation of motorized equipment into or near open water could degrade water quality, with potential for toxicity or contaminant bioaccumulation. Gasoline or other petroleum products, such as oil and hydraulic fluids, required for operation of motorized equipment, could spill into or near open water. Large spill volumes could degrade water quality, with potentials for toxicity and contaminant bioaccumulation in marsh organisms…This impact to water quality is potentially significant, but would be localized to the general vicinity of the spill and temporary. Impacts related to spills generally can be reduced to less-than-significant levels by implementing specific mitigation measures and BMPs. With implementation of the following mitigation measure, this impact is less than significant.*

The FPEIR includes Mitigation Measures **WQ-3** and **HHM-2** to minimize fuel and petroleum spill risks. These measures require in part that fueling operations or storage of petroleum products shall be maintained off-site, and a spill prevention and management plan shall be developed and implemented to contain and clean up spills. Transport vessels and vehicles and other equipment shall not be serviced or fueled in the field except under emergency conditions; hand-held gas-powered equipment shall be fueled in the field using precautions to minimize or avoid fuel spills within the marsh. Only vegetable oil-based hydraulic fluid shall be used in heavy equipment and vehicles during cordgrass control efforts, and when feasible, biodiesel will be used instead of petroleum diesel in heavy equipment and vehicles. In addition, contractors and equipment operators on site during treatment activities will be required to have emergency spill cleanup kits immediately accessible. If fuel storage containers are utilized exceeding a single tank capacity of 660 gallons or cumulative storage greater than 1,320 gallons, a Hazardous

Materials Spill Prevention Control and Countermeasure Plan would be required and approved by the North Coast Regional Water Quality Control Board. These mitigation measures are required to be included in the site-specific *Spartina* removal plan required by **Special Condition 4**, and as discussed previously, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area.

Another water quality risk posed by the project relates to ground-disturbance in areas of possible contamination. Historically, numerous lumber mill, boat repair, and other industrial operations were located at various sites around Humboldt Bay, and it's possible that some of these sites now contain cordgrass proposed for removal as well as contain soils contaminated with hazardous chemicals, dioxins, heavy metals, polychlorinated biphenyls (PCBs), and/or petroleum hydrocarbons. Because of these legacy industrial uses on the bay, all of these contaminants are currently known to be present in the bay environment ("background levels"). Cordgrass removal involving grinding or excavating in areas where contaminants are present at higher levels than background levels could release contaminants into the aquatic environment, impacting water quality.

Not all contaminated sites around the bay currently are known or are identified in government databases such as the State Water Resources Control Board's Geo Tracker database. Thus, the project proposes, prior to initiating treatment at any given site, to perform a preliminary site assessment to determine the potential for contamination in sediments. As described in Mitigation Measures **WQ-4/HHM-6** in the FPEIR, the preliminary assessment will include review of existing site data and evaluation of historical site use and/or proximity to possible contaminant sources. If the preliminary assessment determines a potential for historic sediment contamination, an appropriate sediment sampling and analysis guide would be followed and implemented, or soil contamination would be assumed to be present. If contaminants are present or assumed to be present at levels higher than background levels (but below levels that might trigger site cleanup), either (1) treatment methods that do not disturb sediments will be used (e.g., top mowing or imazapyr application), or (2) an appropriate permit from the Regional Water Quality Control Board will be obtained prior to implementation of the site-specific project. If significant contamination that warrants site cleanup is identified, sampling information will be provided to the U.S. EPA or other appropriate authority. This mitigation measure is required to be included in the site-specific *Spartina* removal plan required by **Special Condition 4**. In addition, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to water quality and sensitive resources within and around the project area. In addition, both **Special Condition 2** and **subsection (v) of Special Condition 4-A** require that the Applicant obtain any necessary approvals from the Regional Water Quality Control Board (RWQCB) for each proposed site-specific cordgrass removal plan, which will further ensure that all appropriate water quality protection measures are implemented to minimize potential water quality impacts.

As described in Impact GS-1/WQ-5 in the FPEIR, certain soil-disturbing cordgrass control methods, including grinding, tilling, disking, and digging, could increase the potential for soil

erosion, especially in areas that are prone to wave action. To minimize the potential for these water quality impacts, the project proposes to implement Mitigation Measure **GS-1/WQ-5**. This measure states that no cordgrass control methods that directly impact the soil (i.e., grinding, tilling, disking, digging, and excavation) will be conducted in areas that are within 15 feet of a marsh edge that may be directly exposed to wave action. Other control methods may be used in these areas. This mitigation measure is only proposed to apply to marsh edges along Humboldt Bay proper, where wave action is relatively high; it does not apply in tributary sloughs/channels of the bay or in the Eel River or Mad River estuaries. Implementation of the mitigation measure as proposed is a requirement of the site-specific *Spartina* removal plan required by **Special Condition 4**, and a requirement of **Special Condition 7**. In addition, both **Special Condition 2** and **subsection (v) of Special Condition 4-A** require that the Applicant obtain any necessary approvals from the RWQCB for each proposed site-specific cordgrass removal plan, which will further ensure that all appropriate water quality protection measures are implemented to minimize potential water quality impacts.

Finally, temporary ground-disturbance associated with site ingress/egress, staging, stockpiling, and equipment storage areas could occur in areas outside and adjoining the treatment areas. These temporarily disturbed areas have the potential to impact water quality via erosion and sediment mobilization. To minimize this potential impact, the project proposes to implement Mitigation Measure **WQ-6** from the FPEIR, which states:

> *Designated ingress/egress routes shall be established at control sites to minimize temporarily disturbed areas. Where areas adjacent to staging and stockpile areas are erosion prone, the extent of staging and stockpile areas shall be minimized by flagging their boundaries. An erosion/sediment control plan (ESCP) shall be developed for erosion prone areas outside the treatment area where greater than ¼ acre of ground disturbance may occur as a result of ingress/egress, access roads, staging and stockpile areas. The ESCP shall be developed by a qualified professional and identify BMPs for controlling soil erosion and discharge of treatment-related contaminants. The ESCP shall be prepared prior to any treatment activities, and implemented during construction.*

This mitigation measure is required to be included in the site-specific *Spartina* removal plan required by **Special Condition 4**. In addition, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area. As previously discussed, both **Special Condition 2** and **subsection (v) of Special Condition 4-A** require that the Applicant obtain any necessary approvals from the RWQCB for each proposed site-specific cordgrass removal plan, which will further ensure that all appropriate water quality protection measures are implemented to minimize potential water quality impacts.

Therefore, the Commission finds that the project as conditioned provides feasible mitigation measures to minimize the project's water quality impacts consistent with Section 30233.

**Maintaining and Enhancing Functional Capacity.** The fourth general limitation set by Sections 30233 and 30231 is that any proposed dredging or filling in coastal wetlands must

maintain and enhance the biological productivity and functional capacity of the habitat, where feasible. Section 30233(c) states that the diking, filling, or dredging of wetlands shall maintain or enhance the functional capacity of the wetland. Sections 30230 and 30231 state that marine resources shall be maintained, enhanced, and where feasible, restored. Sections 30230 and 30231 also state that the biological productivity of coastal waters appropriate to maintain optimum populations of all species of marine organisms and to protect human health shall be maintained and, where feasible, restored.

As discussed in the above Findings, the conditions of the permit will ensure that the biological productivity and functional capacity of the estuarine habitats will be maintained and, where feasible, restored. Therefore, the Commission finds that the project, as conditioned, will maintain and enhance the biological productivity and functional capacity of the habitat maintain and restore optimum populations of marine organisms and protect human health consistent with the requirements of Sections 30230, 30231, and 30233 of the Coastal Act.

**Conclusion.** The estuarine dredging and filling associated with the project is for one of the allowable uses for dredging/filling enumerated in Coastal Act Section 30233(a). Furthermore, there are no less environmentally damaging feasible alternatives available to further reduce or avoid the dredging/filling of estuarine habitats for restoration purposes. Moreover, as proposed and conditioned, all feasible mitigation measures have been provided to minimize the environmental impacts of the proposed dredge and fill and maintain and enhance, where feasible, the biological productivity and quality of coastal waters. Therefore, the Commission finds the project to be consistent with Sections 30230, 30231, and 30233(a) of the Coastal Act.

## H. PROTECTION OF WATER QUALITY

Section 30230 of the Coastal Act states (emphasis added):

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 of the Coastal Act states (emphasis added):

> *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 (emphasis added):

> *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 spill that do occur.*

The water quality impacts considered in this Finding relate to potential impacts from the use of mowing, crushing, flaming, and herbicide methods. Finding **IV-G** above considers water quality impacts from the use of dredging/filling methods (grinding, tilling, excavating, disking, and covering).

**The use of herbicides in the marine environment**. The project proposes to use herbicide – specifically imazapyr – as one of the proposed methods for cordgrass eradication. Imazapyr has been used for cordgrass treatment in Humboldt Bay on a trial basis[22] and has been shown to be effective for control of *Spartina densiflora*, especially when combined with mechanical control methods such as mowing, as is proposed under this CDP application. The herbicide also has been used for several years in San Francisco Bay and elsewhere on the West Coast to eradicate invasive cordgrass.[23]

Imazapyr (sold under the trade name Habitat®) is a systemic aquatic herbicide approved by the U.S. Environmental Protection Agency and the State of California for use in sensitive estuarine environments. The herbicide is applied to the leaves of target plants, absorbed into the plant's circulatory system, and transported to the root system to kill the vegetation. The herbicide works to prevent the synthesis of three amino acids produced only by plants – not by animals – that are required for plant growth and maintenance. Treated *Spartina* typically show yellowing within a couple of weeks and gradual browning over the next month. The results of late summer applications may appear similar to the natural seasonal dieback of other perennial plants. The use of imazapyr for cordgrass control is a preferred method in San Francisco Bay because of its high effectiveness and minimal impacts.

As proposed, imazapyr will not be applied in any given year on more than 200 acres in Humboldt Bay (which represents approximately one-fifth of the mapped cordgrass), not more than 200 acres in the Eel River estuary (which represents approximately one-third of the mapped cordgrass), and not more than 7 acres in the Mad River estuary (representing the majority of the mapped cordgrass). In addition, no site will be treated with imazapyr more than three times during any five-year period. Furthermore, imazapyr will be used only as a last resort, including in cases where, compared to mechanical methods, the use of imazapyr both (1) substantially reduces treatment costs, and (2) has a greater likelihood of successfully controlling cordgrass.

As proposed, herbicide application must be performed by a Certified Applicator or under the supervision of a Certified Applicator. Herbicides may be applied using backpack sprayers or wick applicators while walking through the marsh or can be applied from spray equipment mounted on boats, trucks, or amphibious tracked vehicles.

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[22] A pilot study to determine the efficacy of cordgrass control using imazapyr was authorized under *de minimis* waiver number 1-11-021-W (see http://documents.coastal.ca.gov/reports/2011/7/Th15-7-2011.pdf).

[23] See http://www.spartina.org/referencemtrl.htm

According to the FPEIR prepared for the project (Impact HHM-3),

> *...The maximum proposed application rate of imazapyr for control of Spartina would not result in aquatic concentrations or terrestrial doses that exceed screening levels for toxicity to aquatic or terrestrial mammals, birds, invertebrates, or benthos, even under extremely conservative assumptions and risk scenarios (Patten 2003, Pless 2005). The more stringent screening levels for acute toxicity to endangered fish species could marginally exceed the highest modeled imazapyr concentrations in the leading edge of an incoming tide (ibid). The conditions and assumptions for these concentrations are extremely conservative and would be transient in a relatively small volume of water...*

In addition, the proposed surfactants (additional compounds in the herbicide mixture) include products composed primarily of soybean and/or vegetable oil, which will not present a significant hazard to the biological productivity of the marine environment, as any surfactants entering estuarine waters would float on the water surface, would be non-toxic, and would disperse rapidly with tidal and wind action.

Using various application methods, herbicide mixtures are proposed to be applied directly onto the foliage or stems of cordgrass during low tides when the sediment is exposed. The primary route by which herbicide solution may contact water is by overspray directly onto the water surface or by washing off plants due to tidal inundation or precipitation. Energetic tidal cycles and tidal currents effectively disperse imazapyr and surfactants and dilute them in microbially active suspended sediment. As proposed, the project will restrict cordgrass treatment activities to the non-rainy season, periods of low tides, and low wind conditions only, which will reduce the potential for herbicide contact with coastal waters. Herbicides will remain above tidal inundation levels for a minimum of several hours to several weeks (in higher marsh habitats that are tidally inundated on a relatively infrequent basis), which will maximize the absorption of the chemicals by target cordgrass plants. Imazapyr is photodegradable, and if applied and absorbed by target plants during daylight hours when tides are outgoing, poses little risk that significant amounts of chemical residue will come into contact with coastal waters.

For any herbicide residue that may be exposed to tidal waters or precipitation, imazapyr is highly soluble in water. According to the FPEIR,

> *...In water, imazapyr rapidly degrades via photolysis (Patten 2003, Pless 2005). A number of field studies demonstrated that imazapyr rapidly dissipated from water within several days and no detectable residues of imazapyr were found in either water or sediment within 2 months (Pless 2005). In estuarine systems, dilution of imazapyr with the incoming tides contributes to its rapid dissipation (Kegley 2008, Pless 2005). Aquatic degradation studies under laboratory conditions demonstrated rapid initial photolysis of imazapyr with reported half-lives ranging from 3 to 5 days (Durkin and Follansbee 2004)... Degradation rates in turbid and sediment-laden waters, common in estuarine environments and in the Management Area, are expected to be lower than those determined under laboratory conditions. Kegley (2008) also supports the conclusion that tidal*

> *flushing of sites where imazapyr is applied in estuarine settings will result in rapid dilution and degradation of the herbicide…*

Studies on the potential impacts of the use of imazapyr for cordgrass control in San Francisco Bay have found that imazapyr is not persistent in the estuarine environment and unlikely to degrade the water quality of the treatment area under normal application. The project proposes to implement Mitigation Measure **WQ-1** from the FPEIR to ensure proper management of herbicide control methods. This measure states that herbicides shall be applied directly to plants and at low or receding tide to minimize the potential application of herbicide directly on the water surface, as well as to ensure proper dry times before tidal inundation. Herbicides shall be applied by a certified applicator and in accordance with application guidelines and the manufacturer label. The Control Program shall obtain coverage under the statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States (SWRCB 2004). These measures are requirements of **Special Conditions 4** and **7**. In addition, **Special Condition 9** specifies BMPs for herbicide use and requires preparation of an herbicide management plan prior to initiation of primary herbicide treatment in any given area.

**Potential human health impacts from herbicide application**. Studies on the use of imazapyr for cordgrass control in San Francisco Bay have found that when used appropriately at the standard application rate, neither workers nor members of the public would be at any substantial risk from acute or longer-term exposure to imazapyr. Applications normally occur only once a year on a site, so there is no opportunity for long-term chronic exposures. Imazapyr is not a carcinogen, mutagen, teratogen, or endocrine disruptor, and at the highest application rate, an applicator would have to wear a contaminated glove for 50 hours to reach a level of concern.[24] Consequently, neither the EPA nor the State places any post-treatment restrictions on recreational use of adjacent surface waters for swimming, fishing, etc.[25]

Impact HHM-3 of the FPEIR states that accidental splashing of imazapyr could cause mild eye irritation, a potential impact that can be avoided by requiring workers handling herbicide to wear safety goggles. Proposed Mitigation Measure **HHM-3** requires that workers shall use appropriate health and safety procedures and equipment, and mixing and applying herbicides shall be restricted to certified or licensed herbicide applicators (this measure also is repeated in proposed Mitigation Measures **WQ-1**, **WQ-2**, and **LU-1**). **Special Condition 7** requires that all *Spartina* removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the CDP and included in the adopted FPEIR to ensure minimization of impacts to worker and public health and safety and coastal resources, including public access.

The impact analysis in the FPEIR concludes that workers and members of the general public are not expected to experience substantial risk from acute or longer-term exposure to imazapyr. While surfactants could be toxic to human health, the concentrations that would be applied for the proposed cordgrass removal activities are substantially lower than concentrations needed to

[24] http://www.spartina.org/referencemtrl/Final_imazapyr_brochure082906.pdf
[25] Ibid.

elicit adverse health effects, such as dermal irritation. Proposed colorants are reported by the manufacturer to be non-toxic and non-hazardous.

Drift of chemical spray has the potential to affect residents living in close proximity to the treatment areas, or recreational visitors to the area. According to the FPEIR,

> *…drift from ground application can extend up to approximately 250 ft, with herbicides concentrations diminishing as the drift gets farther from the source. Surfactants are only slightly toxic via the inhalation pathway (DAS 2004, Monsanto 2001, USEPA 1993). The U.S. EPA considers imazapyr moderately toxic if inhaled (WSDT 2006). Potential imazapyr exposure routes for the public include:*
>
> - *Inhalation of fine imazapyr spray droplets;*
> - *Dermal (skin) contact with airborne imazapyr or residues on vegetation, soil, sediments, or surface water;*
> - *Incidental ingestion of imazapyr in soil or sediments by inadvertently swallowing soil or sediment (e.g., by touching dirty hands to mouth or by placing dirty objects, such as toys, into the mouth); this exposure route is of greatest importance for children; and,*
> - *Ingestion of imazapyr by eating food containing imazapyr or residues, such as berries, garden vegetables, fish, or shellfish.*
>
> *People who use treated areas for recreation could come into direct contact with vegetation that has recently been sprayed, thus posing a minor risk of skin irritation. Individuals could be exposed to imazapyr and surfactants while playing, walking, swimming, or fishing at or near treatment sites. Surfactants are poorly absorbed through the skin (USEPA 1993), therefore dermal contact is not likely to cause significant health effects. Imazapyr has low acute dermal toxicity (WSDT 2006). People who consume plants or wildlife (including fish and shellfish) harvested near the spray area could be exposed to herbicides and surfactants if present in the plant or animal. However, imazapyr is minimally retained and rapidly eliminated in fish, birds, and mammals (USEPA Undated, WSDT 2006). Based on these characteristics, and the water solubility and degradation of herbicides, they are not expected to bioconcentrate in aquatic organisms, therefore, the potential use of herbicides poses minimal risk to humans via consumption of aquatic organisms...*

Based on the discussion above, imazapyr and surfactants would have a low potential to cause adverse human health impacts. The project proposes to implement Mitigation Measure **HHM-4** from the FPEIR to further reduce the potential for human health impacts from exposure to chemical treatment. This measure requires in part that projects shall implement appropriate mitigation measures for chemical treatment methods related to timing of herbicide use, area of treatment, and public notification. The mitigation measure requires preparation of an herbicide management plan when herbicide use is proposed in the vicinity of "sensitive receptors" (e.g., schools, hospitals, and residential areas). The plan must provide for coordinating herbicide applications with the County Agricultural Commissioner to identify nearby sensitive areas and/or areas that have non-target vegetation, including farmlands and park and recreation areas, that could be affected by the herbicide, and provide advanced notification to surrounding landowners.

The plan must also provide for establishing appropriate buffer zones around herbicide use areas to avoid affecting sensitive receptors and non-target habitats, and it shall identify the type of equipment and application techniques to be used in order to reduce the amount of small droplets that could drift into adjacent areas. Herbicide shall not be applied when winds are in excess of 10 miles per hour, or when inversion conditions exist, or when wind could carry spray drift into surrounding inhabited areas. Signs shall be posted at and/or near any public trails, boat launches, and other potential points of access to herbicide application sites a minimum of one week prior to treatment. These requirements are to be included in the site-specific *Spartina* removal plan required by **Special Condition 4**. In addition **Special Condition 9** is imposed to require the preparation of an herbicide management plan in all cases when herbicide is proposed for primary treatment – not only when it is proposed in the vicinity of sensitive receptors. The plan required by Special Condition 9 shall include provisions for ensuring that the above-described measures are undertaken to protect adjacent park and recreation areas and nearby aquaculture sites, including establishment of a 250-foot buffer zone to avoid affecting surrounding sensitive receptors and non-target habitats in adjacent park and recreation areas and aquaculture sites. Furthermore, Mitigation Measure **LU-3** from the FPEIR proposes that if crops, including aquaculture crops such as oysters and clams, are growing in the vicinity of spraying, such that these crops would be more difficult to sell even if herbicides are undetectable, mechanical methods of treatment shall be selected.

To protect the health of workers implementing the chemical control methods for cordgrass eradication, the project proposes Mitigation Measure **HHM-5**, which requires that appropriate health and safety procedures and equipment shall be used to minimize risks associated with cordgrass treatment methods, including exposure to or spills of fuels, petroleum products, and lubricants. These procedures shall include the preparation of a health and safety plan, a spill contingency plan, and if threshold onsite storage values are exceeded, a Hazardous Materials Spill Prevention Control and Countermeasure Plan (see Mitigation Measure **HHM-2**). All of the above mitigation measures are required to be included in each site-specific *Spartina* removal plan as required by **Special Condition 4**, and, as previously discussed, **Special Condition 7** requires that all *Spartina* removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the CDP and included in the adopted FPEIR to ensure minimization of impacts to worker and public health and safety.

**Minimizing the potential for impacts to rare tidal marsh plants**. Imazapyr is a broad-spectrum herbicide, meaning it kills all types of plants, not just the target plant. As such, if used in areas adjacent to sensitive salt marsh habitat that supports rare plant populations, there is risk of herbicide drift affecting rare salt marsh plant populations. The project proposes to temporarily cover with fabric special-status plants located in salt marshes adjacent to *Spartina* removal areas where herbicide will be sprayed, or to temporarily install spray-drift barriers made of plastic or geo-textile (aprons or tall silt fences). If accidental exposure to spray drift occurs, affected plants would be thoroughly washed with silt-clay suspensions to remove the herbicide from the plant material before it adversely affects the plant. This mitigation measure is required to be included in each site-specific *Spartina* removal plan as required by **Special Condition 4**.

In addition, if herbicides were accidentally spilled due to inappropriate on-site mixing or improper storage of the chemical, the spill could impact non-target native plants. To minimize

the risk of accidental spills, the project proposes to implement Mitigation Measure **WQ-2** from the FPEIR. This mitigation measure states that herbicides shall be applied by or under the direct supervision of trained, certified or licensed applicators, and the same standard shall apply to the preparation of herbicide mixtures. Storage of herbicides and surfactants on or near project sites shall be allowed only in accordance with a spill prevention and containment plan approved by the North Coast Regional Water Quality Control Board (RWQCB). On-site mixing and filling operations shall be confined to areas appropriately bermed or otherwise protected to minimize spread or dispersion of spilled herbicide or surfactants into surface waters. This mitigation measure is intended to be carried out in conjunction with proposed Mitigation Measure **HHM-2**, which states that Contractors and equipment operators on site during treatment activities will be required to have emergency spill cleanup kits immediately accessible. If fuel storage containers are utilized exceeding a single tank capacity of 660 gallons or cumulative storage greater than 1,320 gallons, a Hazardous Materials Spill Prevention Control and Countermeasure Plan (HMSPCCP) will be required and shall be approved by the RWQCD. The HMSPCCP regulations are not applicable for chemicals other than petroleum products; therefore, the contractor shall prepare a spill prevention and response plan for the specific chemicals utilized during treatment activities. Again, these mitigation measures are required to be included in each site-specific *Spartina* removal plan as required by **Special Condition 4** and also are required by **Special Condition 7**.

**Minimizing the risk of accidental spills.** Some of the proposed methods involve the use of gas- or propane-powered equipment such as brushcutters, flaming devices, and amphibious tracked equipment (e.g., mowing, crushing, and flaming methods). The use of such equipment in the tidal environment poses the risk of an accidental spill or release of hazardous fluids. As described in the above Finding, The FPEIR includes Mitigation Measure **WQ-3** to minimize fuel and petroleum spill risks. This measure requires that fueling operations or storage of petroleum products shall be maintained off-site, and a spill prevention and management plan shall be developed and implemented to contain and clean up spills. Transport vessels and vehicles and other equipment shall not be serviced or fueled in the field except under emergency conditions; hand-held gas-powered equipment shall be fueled in the field using precautions to minimize or avoid fuel spills within the marsh. Only vegetable oil-based hydraulic fluid shall be used in heavy equipment and vehicles during *Spartina* control efforts, and when feasible, biodiesel will be used instead of petroleum diesel in heavy equipment and vehicles. This mitigation measure is required to be included in the site-specific *Spartina* removal plan required by **Special Condition 4** and also are required by **Special Condition 7**.

Therefore the Commission finds that the proposed project, as conditioned, will maintain the biological productivity and the quality of coastal waters appropriate to maintain optimum populations of all species of marine organisms and for the protection of human health, consistent with Sections 30230 and 30231 of the Coastal Act.

## I. 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 traditional territory of the Wiyot Tribe. The tribe is understood to have included three tribal divisions (Patawat, Wiki, and Wiyot), each associated with a water-related resource (the Mad River, Humboldt Bay, and the lower Eel River, respectively) and each speaking a common language (Selateluk). Settlements existed all around Humboldt Bay and along the banks of many of the streams and sloughs in the region. Of particular archaeological significance and sensitivity in the project area is Indian Island and the village of Tuluwat, in the middle of Humboldt Bay. These locations hold special significance and meaning to present-day Wiyot people. Today, representatives of the Wiyot Tribe are the Table Bluff Reservation Wiyot Tribe, the Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria.

Mechanical treatments that disturb the soils (grinding, tilling, disking and digging/excavating) could damage unknown historical or archaeological resources. These activities also could inadvertently damage human remains. To minimize these potential impacts, the project proposes Mitigation Measures **CR-1**, **CR-2**, and **CR-3** in the FPEIR, which state that site-specific planning will include consultation with the Wiyot Tribe to determine the potential for archaeological resources in the proposed project area. If there are indications that artifacts are likely to be found, the project proposes to avoid soil disturbing methods. In addition, if human remains are discovered, and if the County Coroner determines that the remains may be Native American, the coroner is to contact the California Native American Heritage Commission to notify the most likely descendants of the deceased. The descendants may, with permission of the landowner or representative, "inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods" (Public Resources Code Section 5097.98). The descendants must make their recommendations within 48 hours of being contacted by CNAHC. The landowner is to insure that the area within the immediate vicinity of the remains is not further disturbed or damaged until the landowner and the most likely descendants have "discussed and conferred" reasonable options. The mitigation measures also require that workers shall be made aware of the potential of uncovering artifacts or human remains and instructed to cease work should any artifacts or human remains be found, and to contact the CNAHC, National Crime Information Center, and/or County Coroner as appropriate. When treatment is permitted to recommence, areas identified as potentially having artifacts must be treated only with methods that do not disturb the soil, such as top mowing, crushing, and/or chemical treatment.

In addition to considering the mitigation measures proposed in the FPEIR, Commission staff referred the project to the Tribal Historic Preservation Officers (THPOs) of the Wiyot Tribe, Blue Lake Rancheria, and Bear River Band of the Rohnerville Rancheria for comment. The Blue Lake Rancheria THPO recommended additional reasonable mitigation measures to protect archaeological resources. The THPO recommendations, along with the proposed mitigation measures described above, are required pursuant to Special Conditions 4 and 8.

**Special Condition 4** requires preparation of a site-specific *Spartina* removal plan for proposed *Spartina* removal activities at each proposed site in any given year. The plan must be submitted to the Executive Director for review and approval prior to commencement of primary *Spartina* removal activities. The plan must include, among other requirements, the development of a protocol for the inadvertent discovery of archaeological resources consistent with the requirements of Special Condition 8. **Special Condition 8** requires that the authorized development shall implement the cultural resources mitigation measures specified in the FPEIR (measures **CR-1**, **CR-2**, and **CR-3**), as modified/supplemented by the additional measures recommended by the Blue Lake Rancheria THPO specified in the condition. These additional measures include a requirement that the Applicant consult not just with the Wiyot Tribe in the development of a detailed protocol for the inadvertent discovery of cultural resources, but also with the THPOs for the Blue Lake Rancheria and Bear River Band of Rohnerville Rancheria. The protocol shall be developed prior to implementation of primary treatment in any given area and shall be included in the site-specific removal plan for that area required pursuant to Special Condition 4. The development of the protocol shall include formal record searches for the area of expected disturbance and requirements to cease all cordgrass removal activities if cultural resources are discovered and immediately notify the three Wiyot Tribe THPOs. Workers involved in cordgrass removal activities shall be familiar with and agree to abide by the protocol. The condition further requires that if historic or prehistoric cultural resources are discovered during the course of the project, all construction shall cease and shall not recommence except as provided in subsection (C) of the condition, and a qualified cultural resource specialist shall analyze the significance of the find. If human remains are discovered, the three Wiyot Tribe THPOs and the County Coroner must also be notified immediately. **Subsection (C) of Special Condition 8** requires that an archaeological plan be prepared and submitted to the Executive Director for review and approval prior to recommencement of cordgrass removal activities following the discovery of cultural deposits. The plan must be prepared in consultation with the three Wiyot Tribe THPOs and will ensure that if the tribes object to chemical treatment in areas where Native American remains are discovered, such chemical treatment shall not be used.

With the reasonable mitigation measures described above, the Commission finds that the proposed project as conditioned will not result in significant adverse impacts to archaeological resources and is consistent with Coastal Act Section 30244.

## J. VISUAL RESOURCES

Section 30251 of the Coastal Act states, in applicable part:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas…*

As proposed, the maximum total acreage to receive primary treatment in any given year is approximately 415 acres in Humboldt Bay, 300 acres in the Eel River Delta, and 7 acres in the Mad River estuary. The proposed treatment methods could have short-term adverse effects on

scenic vistas by creating brown, bare, or covered areas that appear out of character with surrounding marsh areas. The intensity of the visual impact depends on the extent of the treated area. In all cases however, visual impacts will be temporary and relatively short-term. The natural marsh vegetation is expected to reestablish to normal appearance within one to two years of treatment.

The project proposes to mitigate the project's visual impacts by implementing Mitigation Measures AV-1 and AV-2 from the FPEIR. Mitigation Measure **AV-1** requires the posting of educational signs in areas where public use is high. The signs will explain the invasive cordgrass's ecological impacts, and describe the project activities and their short-term impacts. This measure is intended to increase public understanding of the project, which in turn is expected to improve the public's reaction to the temporary visual resources impact. **Special Condition 4**, discussed above, requires that the site-specific *Spartina* removal plan required by the condition include a plan for the proposed educational sign posting. Mitigation Measure **AV-2** imposes limits on the use of the proposed covering method, and these limits are incorporated in restrictions imposed in **Special Condition 5**. In any given area that is visible from a public vantage point, including public roads and other areas of relatively high public use, the mitigation measure restricts covering of marsh habitat to no more than 0.5-acre. The use of covering is further restricted to not exceed 5 acres in any given year in each region (Humboldt Bay and the Eel and Mad rivers).

The project as proposed will not involve any significant alterations of natural landforms, as the marsh habitats proposed for cordgrass removal are relatively flat, and the proposed eradication activities will not result in a substantial change in marsh elevation or topography.

For all the reasons discussed above, the Commission finds that the project as conditioned is consistent with Section 30251 of the Coastal Act.

## K. HAZARDS

Section 30253 of the Coastal Act states in applicable part (emphasis added):

> *New development shall do all of the following:*
>
> *(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
>
> *(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*
>
> ...

**Minimizing flood risks**. The proposed cordgrass removal activities must be evaluated for their effects on marsh elevations, and whether any resulting changes in marsh elevations from cordgrass removal would increase the risk of flooding in surrounding areas, including consideration of increased flooding that may be expected as sea-level rises over the coming decades. Humboldt Bay is experiencing the greatest rate of relative sea-level rise in the State

(due to active land subsidence), with up to 0.9 feet of rise expected by 2030, 1.9 feet by 2050, and 5.3 feet by 2100.[26]

Studies conducted by the FWS[27] have found that some cordgrass removal techniques result in decreases in marsh elevations. However, the studies also found that marsh elevations in treated areas fully recovered elevation losses within 1.5 years post-treatment.

In some areas of the world, cordgrass species have been introduced or left in place to trap sediment and raise marsh elevations as a buffer against tidal inundation. According to the FWS:[28]

> *While Spartina densiflora does trap more sediment than many native marsh species, it cannot trap sediment rapidly enough to significantly improve the ability of our marshes to keep up with sea level rise. Spartina alterniflora, a close relative of S. densiflora, is much more effective at trapping sediment and raising mudflat or marsh elevations, and has been introduced in China and other locations to reclaim land and protect against flooding (Wan et al. 2009)…*

Thus, the Commission finds that the project as proposed will not increase the risk of flooding of surrounding areas, including sea-level rise-related flooding, consistent with Section 30253(a) of the Coastal Act.

**Minimizing erosion risks**. The erosion effects of soil-disturbing cordgrass control methods are likely to be more significant in areas that are prone to wave action. In these areas, wave action could exacerbate erosion by carrying loose soils away and potentially eroding intact marsh soils that lack vegetation due to treatment activities. To minimize the potential for erosion, the project proposes to implement Mitigation Measure **GS-1/WQ-5** from the FPEIR. As described in Finding **IV-G** above, this measure states that cordgrass control methods that directly impact the soil (i.e., grinding, tilling, disking, digging and excavation) shall not be conducted within 15 feet of a salt marsh edge that is directly exposed to wave action. Other control methods may be used in these areas instead. This mitigation measure only applies to salt marsh edges along Humboldt Bay proper where wave action is relatively high. Implementation of the mitigation measure as proposed is a requirement of the site-specific *Spartina* removal plan required by **Special Condition 4**. Thus, the Commission finds that the project as conditioned will not contribute significantly to erosion consistent with Section 30253(b) of the Coastal Act.

Therefore, the Commission finds that the project as conditioned will minimize risks to life and property in areas of flood hazard and will neither create nor contribute significantly to erosion of the surrounding area consistent with the applicable sections of Section 30253 of the Coastal Act.

## L. AIR QUALITY

Section 30253 of the Coastal Act states in applicable part (emphasis added):

[26] Northern Hydrology & Associates 2015.
[27] E.g., Pickart 2011.
[28] http://www.fws.gov/refuge/Humboldt_Bay/wildlife_and_habitat/SpartinaManagement.html

*New development shall do all of the following:*

…

*(c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development…*

…

According to information included in the FPEIR, the primary air quality issues associated with the proposed project are the potential for a temporary increase in dust emissions from ground treatment methods such as gas-powered brushcutters, mowers, grinders, tractors (used for disking, tilling, crushing), bobcats (used for excavating and digging), and smoke emissions associated with burning cordgrass wrack or flaming of seedlings. Finely mulching the cordgrass wrack is preferred over burning and is expected to be used much more frequently than burning, especially when a residential area is near the site, or if the site is near commercial aquaculture operations. However, at times cordgrass wrack piles may be burned onsite, and burn piles will range from approximately 3-5 feet tall and 4-5 feet wide.

The primary source of airborne dust generated by the proposed project will be travel on unpaved access roads to the treatment sites. Dust generation is expected to be localized and will not result in significant emissions impacts. The project proposes to implement Mitigation Measure **AQ-1** from the FPEIR as a precautionary measure and BMP. This proposed measure is a requirement of the site-specific *Spartina* removal plan required by **Special Condition 4**. The condition requires that each site-specific cordgrass removal plan must include BMPs for dust control that are consistent with long-term air quality objectives identified by the regional air quality management districts.

Burning as proposed will be subject to regulation by the North Coast Unified Air Quality Management District (NCUAQMD) and local fire agencies to minimize impacts both to local and regional air quality. The project proposes to implement Mitigation Measure **AQ-2** from the FPEIR, which requires notification of and coordination with the NCUAQMD and local fire agencies prior to initiating burning activities. The coordinating agencies may require burn permits and smoke management plans on a project specific basis. **Subsection A(v) of Special Condition 4** requires that the Applicant obtain any necessary approvals from the NCUAQMD for each proposed site-specific cordgrass removal plan, which will ensure that the project is consistent with requirements imposed by the air pollution control district consistent with Section 30253(c) of the Coastal Act.

## M. ADJACENT PARKS AND RECREATION AREAS

Section 30240(b) of the Coastal Act states:

…

*Development in areas adjacent to environmentally sensitive habitat areas and park 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.*

Within Humboldt Bay, lands with cordgrass coverage greater than 26% are generally within, adjacent to, or in the vicinity of public (including federal, state, county, and city) park and recreation lands. In the Eel River estuary, public park and recreation areas owned and managed by the State overlay cordgrass-infested areas along North Bay, Hawks Slough, McNulty Slough, and the Salt River. In the Mad River estuary, cordgrass-infested areas are not within or adjacent to public lands, but public land is found near School Road and downstream of the river. In some areas throughout the project area, cordgrass infestations are located adjacent to environmentally sensitive bird nesting habitat areas.

**Impacts to adjacent environmentally sensitive bird nesting habitat areas**. As described above, noise associated with the cordgrass control equipment and vehicles may temporarily impact sensitive bird species in and around the project area, including in adjacent forested areas and/or adjacent park and recreation areas. The Humboldt Bay region, which is located on the Pacific Flyway, is visited by tens of thousands of migratory birds annually, including many rare, threatened, and endangered species and many breed in riparian areas and other habitats on public and private lands all around the bay and rivers. Thus, excessive noise caused by the project across hundreds of acres of marshlands annually over multiple years during the bird breeding season has the potential to impact environmentally sensitive nesting bird habitat in areas adjacent to the project area. To avoid the potential for the project to significantly degrade adjacent ESHA, **Special Condition 4**, as discussed above, requires that on a project-specific basis, a habitat analysis must be done by a qualified biologist to determine if special-status birds have the potential to occur in or around the project area. If breeding birds are known or assumed present within close proximity to cordgrass control areas, then noise monitoring will be undertaken as specified in Mitigation Measure **BIO-2** in the FPEIR to ensure that noise levels don't exceed ≤60 dB in surrounding breeding areas. In addition, **Special Condition 7** requires that all cordgrass removal activities shall be undertaken consistent with the limitations, restrictions, protection measures, and protocols detailed in the coastal development permit and included in the FPEIR to ensure minimization of impacts to sensitive species and habitats within and around the project area.

**Herbicide drift**. Drift of chemical spray could potentially affect vegetation in adjacent park and recreation areas. Drift from ground application can extend up to approximately 250 feet, with herbicide concentrations diminishing as the drift gets farther from the source. According to the FPEIR, imazapyr is minimally retained and rapidly eliminated in fish, birds, and mammals. But as a broad-spectrum herbicide, drift of imazapyr into adjacent park and recreation areas could impact and degrade vegetation and habitats in those areas. As discussed above in Finding **IV-H**, the project proposes to implement Mitigation Measure **HHM-4** from the FPEIR, which requires in part that projects shall implement appropriate mitigation measures for chemical treatment methods related to timing of herbicide use, area of treatment, and public notification. The mitigation measure requires preparation of an herbicide management plan when herbicide use is proposed in the vicinity of "sensitive receptors" (e.g., schools, hospitals, and residential areas). The plan must provide for coordinating herbicide applications with the County Agricultural Commissioner to identify nearby sensitive areas and/or areas that have non-target vegetation,

including farmlands and park and recreation areas, that could be affected by the herbicide, and provide advanced notification to surrounding landowners. The plan must also provide for establishing appropriate buffer zones around herbicide use areas to avoid affecting sensitive receptors and non-target habitats, and it shall identify the type of equipment and application techniques to be used in order to reduce the amount of small droplets that could drift into adjacent areas. Herbicide shall not be applied when winds are in excess of 10 miles per hour, or when inversion conditions exist, or when wind could carry spray drift into surrounding inhabited areas. Signs shall be posted at and/or near any public trails, boat launches, and other potential points of access to herbicide application sites a minimum of one week prior to treatment. These requirements are to be included in the site-specific *Spartina* removal plan required by **Special Condition 4**. In addition **Special Condition 9** is imposed to require the preparation of an herbicide management plan in all cases when herbicide is proposed for primary treatment – not only when it is proposed in the vicinity of sensitive receptors. The plan required by Special Condition 9 shall include provisions for ensuring that the above-described measures are undertaken to protect adjacent park and recreation areas, including establishment of a 250-foot buffer zone to avoid affecting surrounding sensitive receptors and non-target habitats within adjacent park and recreation areas.

Therefore the Commission finds that the proposed project as conditioned will be sited and designed to prevent impacts which would significantly degrade adjacent park and recreation areas, and will be compatible with the continuance of those recreation areas, consistent with Section 30240(b).

## N. PUBLIC ACCESS

Section 30210 of the Coastal Act requires that maximum public access shall be provided consistent with public safety needs and the need to protect natural resource areas from overuse. Section 30212 of the Coastal Act 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 where adequate access exists nearby. Section 30211 of the Coastal Act requires that development not interfere with the public's right to access gained by use or legislative authorization. Section 30214 of the Coastal Act 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 is also limited by the need to show that any denial of a permit application based on these sections 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.

Some of the proposed project methods, such as the use of amphibious heavy equipment, sharp hand-held brushcutters and rototillers, and herbicide, have the potential to impact public access users. Most of the proposed treatment areas are in tidal marshes that are not accessed by the general public. However, some treatment areas, such as PALCO Marsh and Bracut Marsh, may have trails or adjacent upland areas where public access could be affected. The project proposes to avoid potential interference with public access by implementing Mitigation Measures **LU-1** through **LU-5** of the FPEIR. These measures require in part that (1) herbicides shall only be applied by certified applicators; (2) educational signs and notices shall be posted in areas where

public use is high and access limited during posted treatment periods; public notice shall be posted at the entrances of public lands, at trailheads, and on the websites of agencies responsible for the public lands; and (3) *Spartina* removal activities shall avoid peak public use periods (e.g., by waterfowl hunters). These proposed measures are required to be included in the site-specific cordgrass removal plan required by **Special Condition 4**. In addition, the duration that any particular public access area might be affected by the project is limited.

Therefore, the Commission finds that the proposed project does not have any significant adverse effect on public access, and that the project as proposed without new public access is consistent with the requirements of Coastal Act Sections 30210, 30211, and 30212.

## O. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The California State Coastal Conservancy served as the lead agency for the project for CEQA purposes. The Conservancy prepared a final programmatic environmental impact report for the project on March 21, 2013.

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. The findings address and respond to all public comments regarding potential significant adverse environmental effects of the project that were received 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

Application file for CDP Application No. 1-14-0249

Application files for the following CDPs and Negative Determinations: CDP 1-06-036, 1-06-036-A1, 1-08-011, 1-08-012, 1-08-020, 1-09-020, 1-09-030, 1-10-032, 1-11-021-W, ND-049-06, ND-017-10, ND-025-10, and ND-041-10

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U.S. Fish & Wildlife Service webpage: http://www.fws.gov/refuge/Humboldt_Bay/wildlife_and_habitat/SpartinaManagement.html

West Coast Governors' Agreement on Ocean Health. May 2008. http://www.westcoastoceans.org/media/wcga_actionplan_low-resolution.pdf

County of Humboldt, City of Eureka, and City of Arcata Local Coastal Programs (LCPs)

## APPENDIX B
## Mitigation Measures in the Adopted Final Programmatic EIR Proposed Under CDP Application No. 1-14-0249

| | |
|---|---|
| **Aesthetic & Visual Resources** | |
| AV-1 | **Post Educational Signs**. Educational signs shall be posted in areas where public use is high. The signs will explain *Spartina*'s ecological impacts and describe the project. Increased public understanding of the project will improve the public's reaction to the temporary adverse change to the scenic marsh vista. |
| AV-2 | **Limit covering**. In any given area that is visible from a public vantage point, including roads, highways and other areas of relatively high public use, covering shall be limited to 0.5 acres. |
| **Air Quality** | |
| AQ-1 | **Dust Control**. Apply dust control measures where treatment methods may produce visible dust clouds and where sensitive receptors (i.e., houses, schools, hospitals) are located within 500 ft of the treatment site. The following dust control measures shall be included:<br>• Suspend activities when winds are too great to prevent visible dust clouds from affecting sensitive receptors; and<br>• Limit traffic speeds on any dirt access roads to 15 mi per hour. |
| AQ-2 | **Smoke and Ash Emissions**. The Management Area is within NCUAQMD Smoke Management Zones 1 and 2. Therefore, for prescribed burns, notification of and coordination with NCUAQMD and a local fire agency shall happen well in advance, prior to initiating the burn. Depending upon the quantity of material to be burned, the District APCO may request that a burn authorization number be obtained prior to ignition. On a project specific basis, a burn permit may be required with NCUAQMD to address potential issues with smoke and as a component of a smoke management plan, if deemed necessary. Additional notification to the local fire agency and/or department may also be required as deemed appropriate by the APCO. The following shall be conducted as a part of this mitigation measure:<br>• Initiate consultation with the District APCO by calling (707) 443-3093 (or the current phone number) to determine if the following would be required for the site specific project:<br>• Burn authorization number,<br>• Burn permit, and/or<br>• Smoke management plan, as well as<br>• Consultation with additional agencies such as the local fire agency and/or department.<br>• If the treatment is occurring within the jurisdiction of a local fire agency and/or department, initiate consultation well in advance, prior to the initiating the burn. |
| **Biological Resources** | |

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| BIO-1 | **Minimize Effects of Mechanical *Spartina* Removal Methods to Special Status Fish Species**. On a project specific basis, a habitat analysis shall be done to determine if special status fish species have the potential to occur. If they could occur, then surveys may be done to establish that these species are absent, using protocols approved by USFWS or NMFS. If such surveys are not conducted, then the species will be assumed present. If special status fish species are present, then *Spartina* control methods will be selected that minimize potential impacts. To minimize erosion effects, control methods that are most likely to cause erosion (i.e., grinding, tilling, disking and digging/ excavating) will not occur within 15 ft of any aquatic habitat containing special status fish species, but this distance could be increased depending on site specific conditions, such as soil stability and bank slopes. Additionally, amphibious vehicles will not contact the channel substrate where special status fish species are present and the vehicles will be operated in such a manner that they avoid causing erosion into the channels. Furthermore, no flooding will be conducted in areas where special status fish species are present. Treatments that do not involve ground disturbance, such as top mowing, crushing, chemical treatment and covering will be the only methods used in close proximity (e.g., within 15 ft) to special status fish species. This mitigation measure is intended to avoid take as defined by the ESA and California ESA. |
| BIO-2 | **Minimize Noise Effects**. Breeding special status birds could be present based on habitat and time of year. The breeding season is generally October through mid-August. On a project specific basis, a habitat analysis shall be done to determine if special status bird species have the potential to occur. If the habitat would support special status birds, and if eradication is planned to occur when these birds may be breeding, then surveys will be done to establish that these species are absent, using protocols approved by USFWS. If such surveys are not conducted, then the species will be assumed present. Response of birds to noise varies by species as well as site specific factors including ambient noise levels, topography and vegetation. A limit of 60 dB reaching breeding songbirds has recently been advocated for the by the California Department of Fish and Wildlife (see ICF Jones and Stokes 2009). For the purpose of this PEIR, if breeding birds are known or assumed present within close proximity to Spartina control activities than actions will be taken to ensure that ≤60 dB reaches the breeding area. Actions may include the use of sound measuring devices to determine the range of noise production and limit Spartina control methods accordingly (i.e., use quieter methods near breeding special-status birds). |
| BIO-3 | **Avoid Northern Harrier and Short-Eared Owl Nests**. The breeding season is March-August for northern harriers (Loughman and McLandress 1994) and March-July for short-eared owls (Gill 1977). If *Spartina* control activities are planned to occur during these periods (i.e., between March-August) then a qualified biologist will assess whether there is potential nesting habitat for northern harrier or short-eared owls. If there is potential habitat, it will be avoided or a qualified biologist will survey the potential habitat immediately prior to *Spartina* control work and if nests are found then a minimum 300 ft buffer zone will be delineated. The buffer zone will be avoided by *Spartina* control workers and equipment. |

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| BIO-4 | **Minimize Impacts to Special Status Plant Species**. On a site specific basis, a habitat analysis shall be done to determine if special status plant species have the potential to occur. If they could occur, then surveys may be done to establish that these species are absent, using protocols approved by CDFW. If such surveys are not conducted, then the species will be assumed present. If special status plant species are present, then *Spartina* control methods will be selected that avoid or minimize potential impacts. Staked locations of special status plant populations or special status plant habitat shall be recorded, and field crews on foot or in vehicles shall be instructed to avoid and protect special status plant populations or plant habitat. Impact to the endangered dune plants beach layia and Humboldt Bay wallflower will be avoided by selecting access routes that do not contain these plants. For Humboldt Bay owl's clover and Point Reyes bird's beak, avoidance is determined not to be necessary because temporary effects during *Spartina* control are mitigated by the explosive increase in population that has been demonstrated after *Spartina* control (Pickart 2012). For other annual special status plants such as Western sand spurrey, avoidance shall occur by using only treatment methods that are highly selective; for example heavy equipment will not be operated where these plants or their habitat occur. For perennial plants such as Lyngbye's sedge, a qualified botanist shall stake out locations of special status plants and provide training to control crews to ensure that they minimize impacts to these plants. If special status plant populations or habitat occur near the high tide line, wrack and large deposits of mown *Spartina* shall be removed during the growing season. Special status plant populations shall be covered with fabric adjacent to areas sprayed with herbicide, or spray-drift barriers made of plastic or geo textile (aprons or tall silt fences) shall be installed. If accidental exposure to spray drift occurs, affected plants shall be thoroughly washed with silt-clay suspensions. To avoid trampling of special status plant species, in areas where frequent access will occur, paths shall be marked and used that avoid special status plant species to the maximum extent possible. |
| BIO-5 | **Avoid Impacts to Eelgrass**. Workers removing *Spartina* in areas with the potential for eelgrass shall be trained to recognize eelgrass and the mudflats that are habitat for eelgrass. Training shall be conducted by a qualified biologist. Only methods that avoid physical disturbance to eelgrass plants shall be used in close proximity to eelgrass, such as top mowing and excavation. With this mitigation measure, there will be no impact to eelgrass. |
| BIO-6 | **Reduce Noise near Marine Mammals**. If marine mammals are present within 200 ft of *Spartina* control operations, then methods which cause relatively high levels of noise (i.e., brushcutters, the Marsh Master and airboats) shall not be used. Other methods which do not generate a relatively high level of noise can be used. |
| **Cultural Resources** | |
| CR-1 | **Worker Awareness**. Workers shall be made aware of the potential of uncovering artifacts or human remains, and instructed to cease work should any artifacts or human remains be found, and to contact the California Native American Heritage Commission (CNAHC), National Crime Information Center and/or County Coroner as appropriate. When treatment is allowed to begin again, areas identified as potentially having artifacts will be treated with methods that do not disturb the soil, such as top mowing, crushing and chemical treatment. |
| CR-2 | **Site Specific Planning for Artifacts**. Site specific planning will include a consultation with the Wiyot Tribe to determine the likelihood that artifacts are present. If there are indications that artifacts are likely to be found, soil disturbing methods shall be avoided. |

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| CR-3 | **Site Specific Planning for Human Remains**. If, during site specific planning, indications are that human remains are likely to be found (e.g., based on literature or communications with representatives from a Tribe), soil disturbing methods shall not be used until the remains are located and properly removed. If the coroner determines that the remains may be Native American, the coroner will contact CNAHC. CNAHC staff will notify the most likely descendants of the deceased. The descendants may, with permission of the land owner or representative, "inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods" (Public Resources Code Section 5097.98). The descendants must make their recommendations within 48 h of being contacted by CNAHC. The land owner will insure that the area within the immediate vicinity of the remains is not further disturbed or damaged until the land owner and the most likely descendants have "discussed and conferred" reasonable options. |
| **Geology/Soils** | |
| GS-1/ WQ-5 | **Erosion Control**. *Spartina* control methods which directly impact the soil (i.e., grinding, tilling, disking, digging and excavation) shall not be conducted on salt marsh areas that are within 15 ft of a salt marsh edge that is directly exposed to wave action. Other control methods can be used in these areas. This mitigation measure only applies to salt marsh edges along Humboldt Bay proper where wave action is relatively high, not attached sloughs/channels nor the Eel River or Mad River estuaries. Future research may reveal that control methods that directly impact the soil do not result in a significant level of erosion and that this mitigation is not necessary. |
| **Hazards/Hazardous Materials** | |
| HHM-1 | **Worker Injury from Accidents Associated with Manual and Mechanical Non-native *Spartina* Treatment**. A health and safety plan shall be developed to identify and educate workers engaged in *Spartina* removal activities. Appropriate safety procedures and equipment, including hearing, eye, hand and foot protection, and proper attire, shall be used by workers to minimize risks associated with manual and mechanical treatment methods. Workers shall receive safety training appropriate to their responsibilities prior to engaging in treatment activities. |
| HHM-2 | **Accidents Associated with Release of Chemicals and Motor Fuel**. Contractors and equipment operators on site during treatment activities will be required to have emergency spill cleanup kits immediately accessible. If fuel storage containers are utilized exceeding a single tank capacity of 660 gallons or cumulative storage greater than 1,320 gallons, a Hazardous Materials Spill Prevention Control and Countermeasure Plan (HMSPCCP) would be required and approved by the NCRWQCD. The HMSPCCP regulations are not applicable for chemicals other than petroleum products; therefore, the contractor shall prepare a spill prevention and response plan for the specific chemicals utilized during treatment activities. This mitigation is intended to be carried-out in conjunction with Mitigation WQ-2. |
| HHM-3 | **Worker Health Effects from Herbicide Application**. Appropriate health and safety procedures and equipment, as described on the herbicide or surfactant label, including PPE as required, shall be used by workers to minimize risks associated with chemical treatment methods. Mixing and applying herbicides shall be restricted to certified or licensed herbicide applicators. |

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| HHM-4 | **Avoid Health Effects to the Public and Environment from Herbicide Application**. For areas targeted for application of herbicides that are within 500 ft of human sensitive receptors (i.e., houses, schools, hospitals), prepare and implement an herbicide drift management plan to reduce the possibility of chemical drift into populated areas. The Plan shall include the elements listed below. To minimize risks to the public, mitigation measures for chemical treatment methods related to timing of herbicide use, area of treatment, and public notification, shall be implemented by entities engaging in treatment activities as identified below:<br>• Coordinate herbicide applications with the County Agricultural Commissioner. Identify nearby sensitive areas (e.g., houses, schools, hospitals) and/or areas that have non-target vegetation that could be affected by the herbicide and provide advanced notification.<br>• Establish buffer zones to avoid affecting sensitive receptors.<br>• Identify the type of equipment and application techniques to be used in order to reduce the amount of small droplets that could drift into adjacent areas. Consult with herbicide manufacturer for proper application instructions and warnings.<br>• Herbicide shall not be applied when winds are below 3 mile per hour or in excess of 10 mi per hour or when inversion conditions exist (consistent with Supplemental California Manufacturer Labeling), or when wind could carry spray drift into inhabited areas. This condition shall be strictly enforced by the implementing entity. Herbicide applications should not be conducted when surface-based inversions are present. Refer to Section 4.7, Air Quality, for discussion on inversions. The site-specific work plan should identify how meteorological conditions would be obtained.<br>• Signs shall be posted at and/or near any public trails, boat launches, or other potential points of access to herbicide application sites a minimum of one week prior to treatment.<br>• Application of herbicides shall be avoided near areas where the public is likely to contact water or vegetation.<br>• At least one week prior to application, signs informing the public of impending herbicide treatment shall be posted at prominent locations within a conservative 500-foot radius of treatment sites where sensitive receptors could be affected. Schools and hospitals within 500 ft of any treatment site shall be separately noticed at least one week prior to the application.<br>• No surfactants containing nonylphenol ethoxylate will be used. |
| HHM-5 | **Health Effects to Workers, the Public and the Environment Due to Accidents Associated with Chemical Spartina Treatment**. Appropriate health and safety procedures and equipment shall be used to minimize risks associated with *Spartina* treatment methods, including exposure to or spills of fuels, petroleum products, and lubricants. These shall include the preparation of a health and safety plan, a spill contingency plan, and if threshold onsite storage values are exceeded, an HMSPCCP (see mitigation measure HHM-2 and the mitigation measures in Water Quality Section). |
| **Hydrology/Water Quality** | |
| WQ-1 | **Managed Herbicide Control**. Herbicides shall be applied directly to plants and at low or receding tide to minimize the potential application of herbicide directly on the water surface, as well as to ensure proper dry times before tidal inundation. Herbicides shall be applied by a certified applicator and in accordance with application guidelines and the manufacturer label. The Control Program shall obtain coverage under the statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States (SWRCB 2004). The specific measures that will be required are not known at this time. |

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| WQ-2 | **Minimize Herbicide Spill Risks**. Herbicides shall be applied by or under the direct supervision of trained, certified or licensed applicators. Herbicide mixtures shall be prepared by, or under the direct supervision of trained, certified or licensed applicators. Storage of herbicides and surfactants on or near project sites shall be allowed only in accordance with a spill prevention and containment plan approved by the NCRWQCD; on-site mixing and filling operations shall be confined to areas appropriately bermed or otherwise protected to minimize spread or dispersion of spilled herbicide or surfactants into surface waters. This mitigation is intended to be carried out in conjunction with Mitigation HMM-2. |
| WQ-3 | **Minimize Fuel and Petroleum Spill Risks**. Fueling operations or storage of petroleum products shall be maintained off-site, and a spill prevention and management plan shall be developed and implemented to contain and clean up spills. Transport vessels and vehicles, and other equipment (e.g., mowers) shall not be serviced or fueled in the field except under emergency conditions; hand-held gas-powered equipment shall be fueled in the field using precautions to minimize or avoid fuel spills within the marsh. For example, gas cans will be placed on an oil drip pan with a PIG® Oil-Only Mat Pad placed on top to prevent oil/gas contamination. Only vegetable oil-based hydraulic fluid will be used in heavy equipment and vehicles during Spartina control efforts. When feasible, biodiesel will be used instead of petroleum diesel in heavy equipment and vehicles during *Spartina* control efforts. Other, specific BMPs shall be specified as appropriate to comply with the Basin Plan and the other applicable Water Quality Certifications and/or NPDES requirements. This mitigation is intended to be carried out in conjunction with Mitigation HHM-2 in order to reduce potential impacts to less than significant level. |
| WQ-4/ HHM-6 | **Assess Existing Contamination**. For projects where ground disturbance methods (such as digging or excavation) or imazapyr application are considered, a preliminary assessment shall be performed to determine the potential for contamination in sediments prior to initiating treatment. The preliminary assessment shall include (1) review of existing site data and (2) evaluation of historical site use and/or proximity to possible contaminant sources. If the preliminary assessment finds a potential for historic sediment contamination, an appropriate sediment sampling and analysis guide shall be followed and implemented, or soil contamination shall be assumed to be present. If contaminants with a known potential for synergistic effects with imazapyr are present or assumed to be present at levels higher than background levels, that would result in synergistic effects, an alternative treatment method (that shall not disturb sediment or apply imazapyr) will be implemented, such as repeated top-mowing, or the specific project shall apply to the Regional Water Board for site-specific WDR. If contaminants are present or assumed to be present at levels higher than background levels (but below levels that might trigger site cleanup), and these contaminants raise concerns for potential impacts from ground disturbance but not from synergistic effects due to imazapyr application, treatment methods that shall not disturb sediment (e.g., top mowing or imazapyr application) shall be used, or the specific project shall apply to the Regional Water Board for site-specific WDR. If significant contamination that warrants site cleanup is identified, sampling information shall be provided to the U.S. EPA or other appropriate authority. |
| WQ-5 | **Erosion Control**. See GS-1 above |
| WQ-6 | **Designate Ingress/Egress Routes**. Designated ingress/egress routes shall be established at control sites to minimize temporarily disturbed areas. Where areas adjacent to staging and stockpile areas are erosion prone, the extent of staging and stockpile areas shall be minimized by flagging their boundaries. An erosion/sediment control plan (ESCP) shall be developed for erosion prone areas outside the treatment area where greater than ¼ acre of ground disturbance may occur as a result of ingress/egress, access roads, staging and stockpile areas. The ESCP shall be developed by a qualified professional and identify BMPs for controlling soil erosion and discharge of treatment-related contaminants. The ESCP shall be prepared prior to any treatment activities, and implemented during construction. |

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| WQ-7 | **Removal of Wrack**. During site specific planning, tidal circulation will be visually assessed. In areas with relatively low tidal circulation, it will either be assumed that DO levels are depressed or monitoring will be conducted to determine if DO levels are depressed. In treatment areas located within or adjacent to waters known or expected to have depressed DO, if wrack is generated during the treatment process, the wrack shall be removed from the treatment area subject to tidal inundation or mulched finely and left in place. |
| WQ-8 | NOT APPLICABLE since flooding is not one of the primary treatment methods authorized under this CDP application. |
| **Land Use** | |
| LU-1 | **Use Certified Herbicide Applicators**. Herbicides will only be applied by certified applicators. |
| LU-2 | **Compliance Monitors**. Applicators shall be assigned a compliance monitor who observes that spray does not reach agricultural fields. |
| LU-3 | **Mechanical Methods near Agriculture**. If crops (including aquaculture crops such as oysters and clams) are growing in the vicinity of spraying, such that these crops would be more difficult to sell even if herbicides are undetectable, mechanical methods of treatment shall be selected. |
| LU-4 | **Posting Notices and Limiting Access**. Public safety shall be ensured by posting notices and limiting access during treatment periods. Public notice shall be posted at the entrances of public lands, at trailheads, and on the websites of agencies responsible for the public lands, such as HBNWR. If members of the public access lands during treatment, the field supervisor shall have the authority to ask them to leave for their safety. |
| LU-5 | **Do not treat *Spartina* during peak public use periods**. Although public use is minimal in the salt marshes where *Spartina* primarily occurs, there is some use, particularly by waterfowl hunters. *Spartina* treatment will not occur in waterfowl hunting areas during periods of time when hunters are active. If other peak periods of public use are identified in *Spartina* infested areas then control efforts will also avoid these time periods. |
| **Noise** | |
| N-1 | **Use Relatively Quiet Brushcutters**. All brushcutters shall be new and quieter models, with noise not exceeding 90 dB. |
| N-2 | **Selective Use of the Marsh Master**. Avoid treatment that uses the Marsh Master, if residential receptors are within 800 ft. |
| N-3 | **Limit Hours of Operation**. Within 3,200 ft of homes, hours of operation shall be within times that residents would be the least disturbed, as in during work and school hours, and avoiding early morning or early evening. |

## APPENDIX C
## List of Lands Covered Under CDP Application No. 1-14-0249

Unless an amendment is obtained pursuant to Special Condition 1 of CDP 1-14-0249 to expand the project area, cordgrass eradication activities are authorized only on the following lands (owned by the City of Arcata, City of Eureka, California Department of Fish and Wildlife, Humboldt State University, Humboldt County, Wiyot Tribe, The Wildlands Conservancy, and the California State Coastal Conservancy):

| APN | NAME | ADDRESS |
|---|---|---|
| 50104205 | ARCATA CITY OF CR PL | ATTN: DAN HAUSER |
| 50324111 | ARCATA CITY OF PL | TIDELANDS |
| 50324110 | ARCATA CITY OF PL | SANITARY LAND FILL |
| 50324113 | ARCATA CITY OF PL | CORP YARD |
| 50321105 | ARCATA CITY OF PL | CORP YARD |
| 50104303 | ARCATA CITY OF PL | NATURAL RESOURCE PRESERVATIO |
| 50323213 | ARCATA COMMUNITY DEVELOPMENT PL | 736 F ST |
| 50323204 | ARCATA COMMUNITY DEVELOPMENT PL | 736 F ST |
| 30816102 | CALIFORNIA STATE OF | PUBLIC LAND |
| 31004202 | CALIFORNIA STATE OF DEPT OF F & G PL | EEL RIVER WILDLIFE AREA EXP #1 |
| 31004201 | CALIFORNIA STATE OF DEPT OF F & G PL | EEL RIVER WILDLIFE AREA EXP #1 |
| 30816101 | CALIFORNIA STATE OF DEPT OF F & G PL | BEACH PROPERTY |
| 31003101 | CALIFORNIA STATE OF DEPT OF F & G PL | BEACH PROPERTY |
| 31002103 | CALIFORNIA STATE OF DEPT OF F & G PL | EEL RIVER WILDLIFE AREA EXP #1 |
| 31002104 | CALIFORNIA STATE OF DEPT OF F & G PL | EEL RIVER WILDLIFE AREA EXP #1 |
| 30801201 | CALIFORNIA STATE OF LC PL | LAND COMMISSION |
| 31004301 | CALIFORNIA STATE OF PL | FISH & GAME |
| 30805101 | CALIFORNIA STATE OF PL | FISH & GAME |
| 30810101 | CALIFORNIA STATE OF PL | FISH & GAME |
| 30809101 | CALIFORNIA STATE OF PL | FISH & GAME |
| 30809102 | CALIFORNIA STATE OF PL | FISH & GAME |
| 30811101 | CALIFORNIA STATE OF PL | FISH & GAME |
| 31003304 | CALIFORNIA STATE OF PL | EEL RIVER WILDLIFE AREA EXP |
| 30801202 | CALIFORNIA STATE OF PL | C/O WILDLIFE CONS. BOARD |
| 30519101 | CALIFORNIA STATE OF PL | C/O WILDLIFE CONS. BOARD |
| 30515101 | CALIFORNIA STATE OF PL | C/O WILDLIFE CONS. BOARD |
| 50601105 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50602107 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50603105 | CALIFORNIA STATE OF PL | WILDLIFE CONSERVATION |
| 50604102 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50621102 | CALIFORNIA STATE OF PL | HUMBOLDT STATE COLLEGE |
| 30803204 | CALIFORNIA STATE OF PL | C/O WILDLIFE CONS. BOARD |
| 30802101 | CALIFORNIA STATE OF PL | C/O WILDLIFE CONS. BOARD |

| APN | NAME | ADDRESS |
|---|---|---|
| 50124120 | CALIFORNIA STATE OF PL | DEPT OF FISH & GAME |
| 50124118 | CALIFORNIA STATE OF PL | DEPT OF FISH & GAME |
| 50124119 | CALIFORNIA STATE OF PL | DEPT OF FISH & GAME |
| 50124112 | CALIFORNIA STATE OF PL | EUREKA POCKET MARSHES |
| 30503111 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50620102 | CALIFORNIA STATE OF PL | CALIF STATE UNIV & COLLEGES |
| 50621114 | CALIFORNIA STATE OF PL | CALIF STATE UNIV & COLLEGES |
| 50124126 | CALIFORNIA STATE OF PL | DEPT OF FISH & GAME |
| 50606108 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50611219 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 01710209 | CALIFORNIA STATE OF PL | MID-CITY RANCH |
| 40227101 | CALIFORNIA STATE OF PL | MID-CITY RANCH |
| 50324101 | CALIFORNIA STATE OF PL | C/O DEPT OF PARKS & REC-N COA |
| 50601106 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50601107 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 50324116 | CALIFORNIA STATE OF PL | C/O DEPT OF PARKS & REC-N COA |
| 50602108 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- CDFW |
| 40217110 | CALIFORNIA STATE OF PL | C/O ACCOUNTS PAYABLE- DCDFW |
| 50605101 | CALIFORNIA STATE UNIVERSITIES TR PL | 1 HARPST ST |
| 10001113 | CALIFORNIA THE STATE OF PL | - |
| 50601108 | CITY OF ARCATA PL | 736 F ST |
| 50601104 | CITY OF ARCATA PL | 736 F ST |
| 01932112 | CITY OF EUREKA ,PL | ATTN HARVEY M ROSE |
| 01932105 | CITY OF EUREKA ,PL | ATTN HARVEY M ROSE |
| 30218136 | EUREKA CITY OF CR | 531 K ST |
| 01933101 | EUREKA CITY OF CR | 531 K ST |
| 01933109 | EUREKA CITY OF CR | 531 K ST |
| 40506104 | EUREKA CITY OF PL | HUMBOLDT BAY |
| 40506106 | EUREKA CITY OF PL | HUMBOLDT BAY |
| 40504107 | EUREKA CITY OF PL | HUMBOLDT BAY |
| 00223111 | EUREKA CITY OF PL | WATERFRONT |
| 00223112 | EUREKA CITY OF PL | WATERFRONT |
| 00618113 | EUREKA CITY OF PL | VACANT LAND |
| 00703103 | EUREKA CITY OF PL | - |
| 00705106 | EUREKA CITY OF PL | - |
| 00704103 | EUREKA CITY OF PL | - |
| 00706105 | EUREKA CITY OF PL | - |
| 00706106 | EUREKA CITY OF PL | - |
| 00707114 | EUREKA CITY OF PL | - |
| 30218140 | EUREKA CITY OF PL | 531 K STREET |

| APN | NAME | ADDRESS |
|---|---|---|
| 40501107 | EUREKA CITY OF PL | TIDELAND |
| 40501105 | EUREKA CITY OF PL | INDIAN ISLAND |
| 40501106 | EUREKA CITY OF PL | INDIAN ISLAND |
| 01933108 | EUREKA CITY OF PL | - |
| 30217101 | EUREKA CITY OF PL | WETLAND WASTEWATER TRT |
| 30218131 | EUREKA CITY OF PL | WASTE WATER TRT PROJECT |
| 30218102 | EUREKA CITY OF PL | WASTE WATER TRT PROJECT |
| 40503208 | EUREKA CITY OF PL | HUMBOLDT BAY |
| 40503207 | EUREKA CITY OF PL | DABY ISLAND |
| 40504106 | EUREKA CITY OF PL | HUMBOLDT BAY |
| 40114104 | EUREKA CITY OF PL | SAMOA AIRPORT |
| 40501104 | EUREKA CITY OF PL | INDIAN ISLAND |
| 40501111 | EUREKA CITY OF PL | VACANT LAND |
| 00223110 | EUREKA CITY OF PL | LEASED TO SHELL OIL CO |
| 00617111 | EUREKA CITY OF PL | VACANT |
| 00219113 | EUREKA CITY OF REDEVELOPMENT PL | SEWAGE TREATMENT PLANT |
| 30620142 | HUMBOLDT BAY HARBOR DIST | FIELDS LANDING PONDS |
| 40103141 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40503109 | HUMBOLDT BAY HARBOR DIST PL | WOODLEY ISLAND TIDELANDS |
| 40503107 | HUMBOLDT BAY HARBOR DIST PL | WOODLEY ISLAND |
| 30218138 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 30710102 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 30711103 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 01430102 | HUMBOLDT BAY HARBOR DIST PL | TIDAL BASIN |
| 40102104 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40103126 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40103125 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40101126 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40101114 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40102113 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 40102122 | HUMBOLDT BAY HARBOR DIST PL | PO BX 1030 |
| 10001101 | HUMBOLDT COUNTY OF | PARK WEOTT |
| 10001109 | HUMBOLDT COUNTY OF PL | BOAT LAUNCHING |
| 10006118 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006117 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006116 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006115 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006114 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006113 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006112 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |

| APN | NAME | ADDRESS |
|---|---|---|
| 10006111 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006110 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006109 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006108 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10006107 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10007107 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10007106 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10007105 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10007104 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 10007103 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 50634115 | HUMBOLDT COUNTY OF PL | BEACH |
| 01710211 | HUMBOLDT COUNTY OF PL | MURRAY FIELD AIRPORT |
| 01715103 | HUMBOLDT COUNTY OF PL | DEPT OF PUBLIC WORKS |
| 01715104 | HUMBOLDT COUNTY OF PL | C/O AUDITOR-CONTROLLER |
| 40501102 | TABLE BLUFF RESERVATION-WIYOT TR. | 1000 WIYOT DR |
| 40501110 | TABLE BLUFF RESERVATION-WIYOT TR. | 1000 WIYOT DRIVE |
| 10012105 | WILDLANDS CONSERVANCY THE CR | C/O DAVID MEYERS |

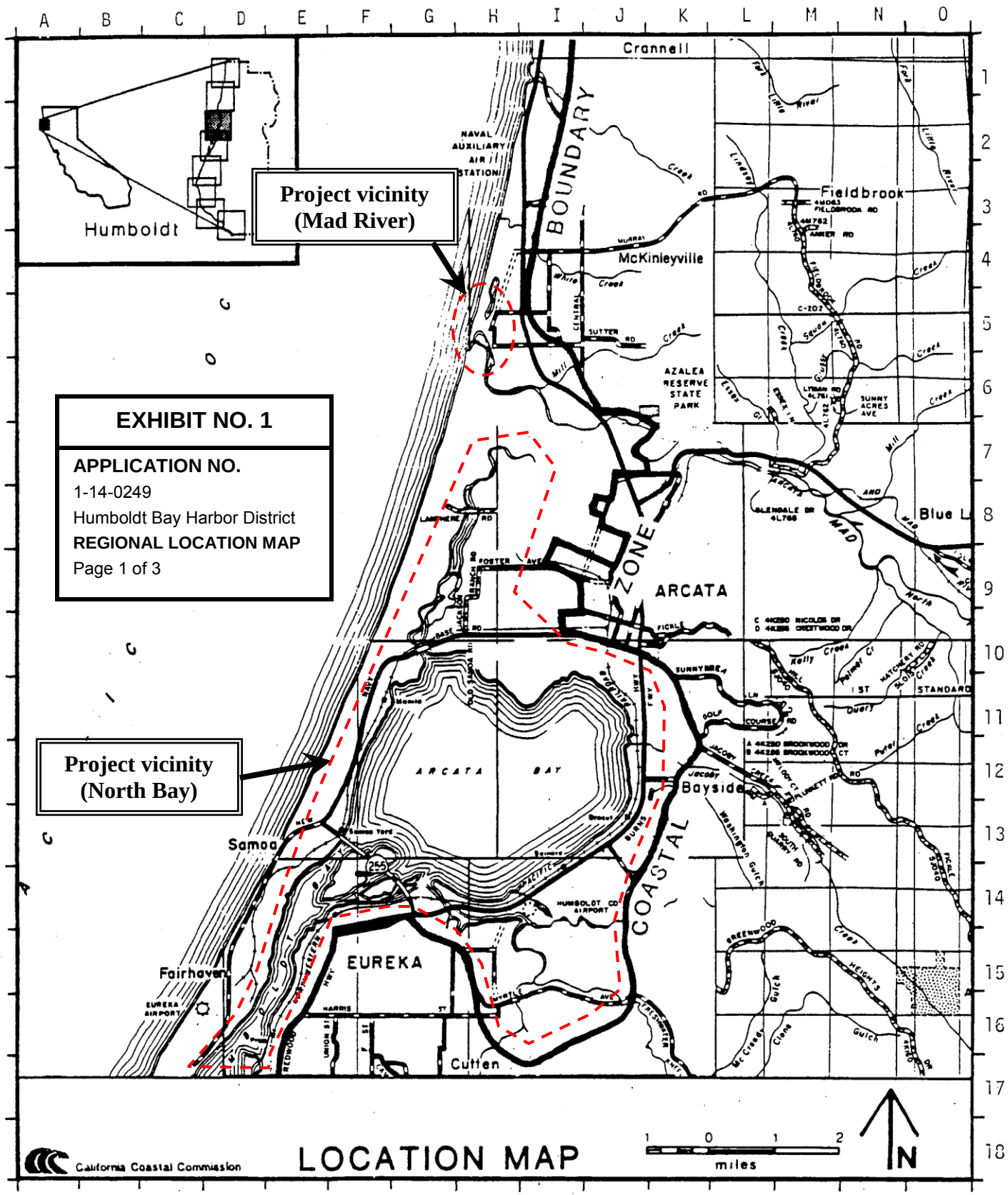
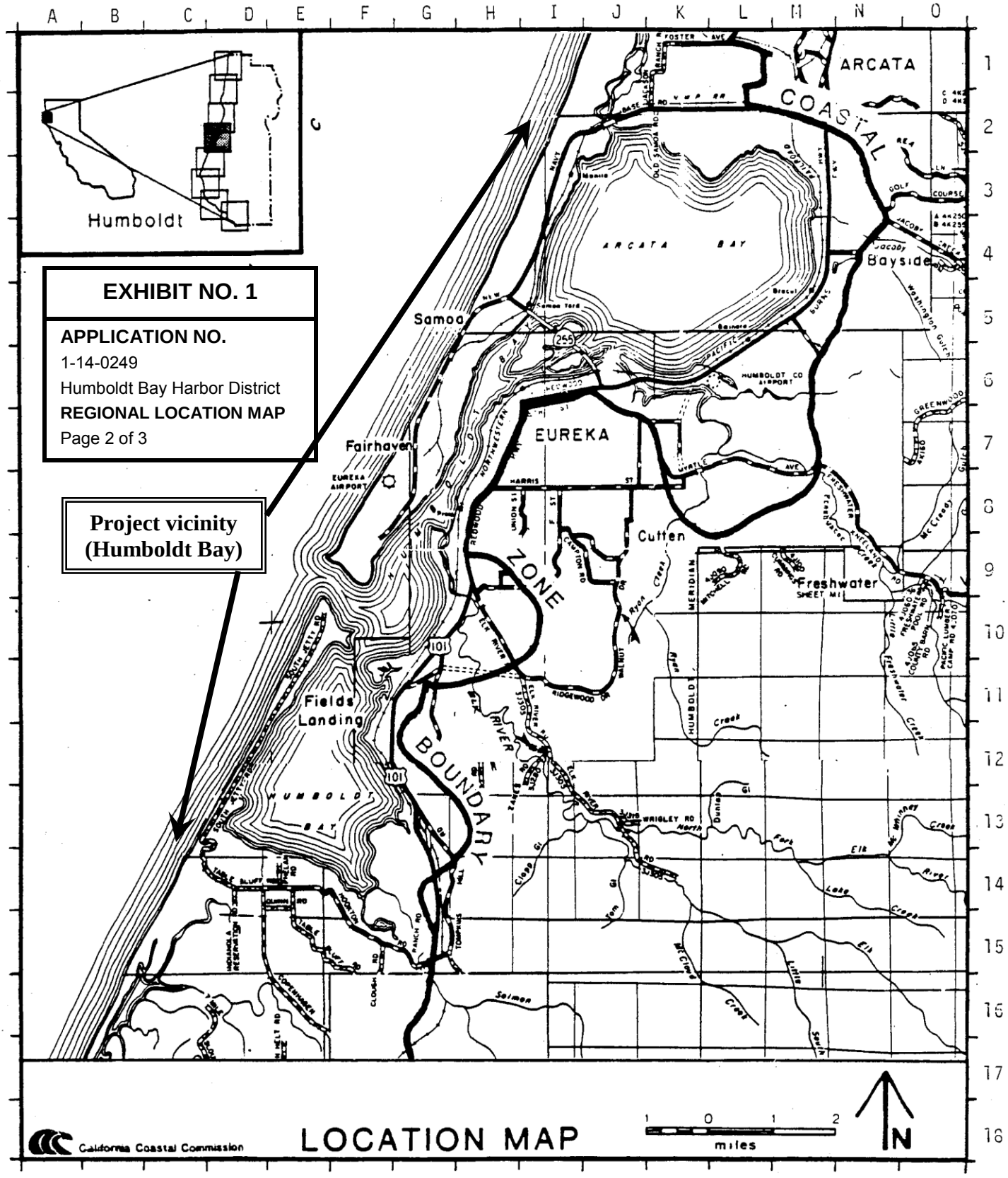



**EXHIBIT NO. 1**

**APPLICATION NO.**
1-14-0249
Humboldt Bay Harbor District
**REGIONAL LOCATION MAP**
Page 1 of 3

County of Humboldt




County of Humboldt

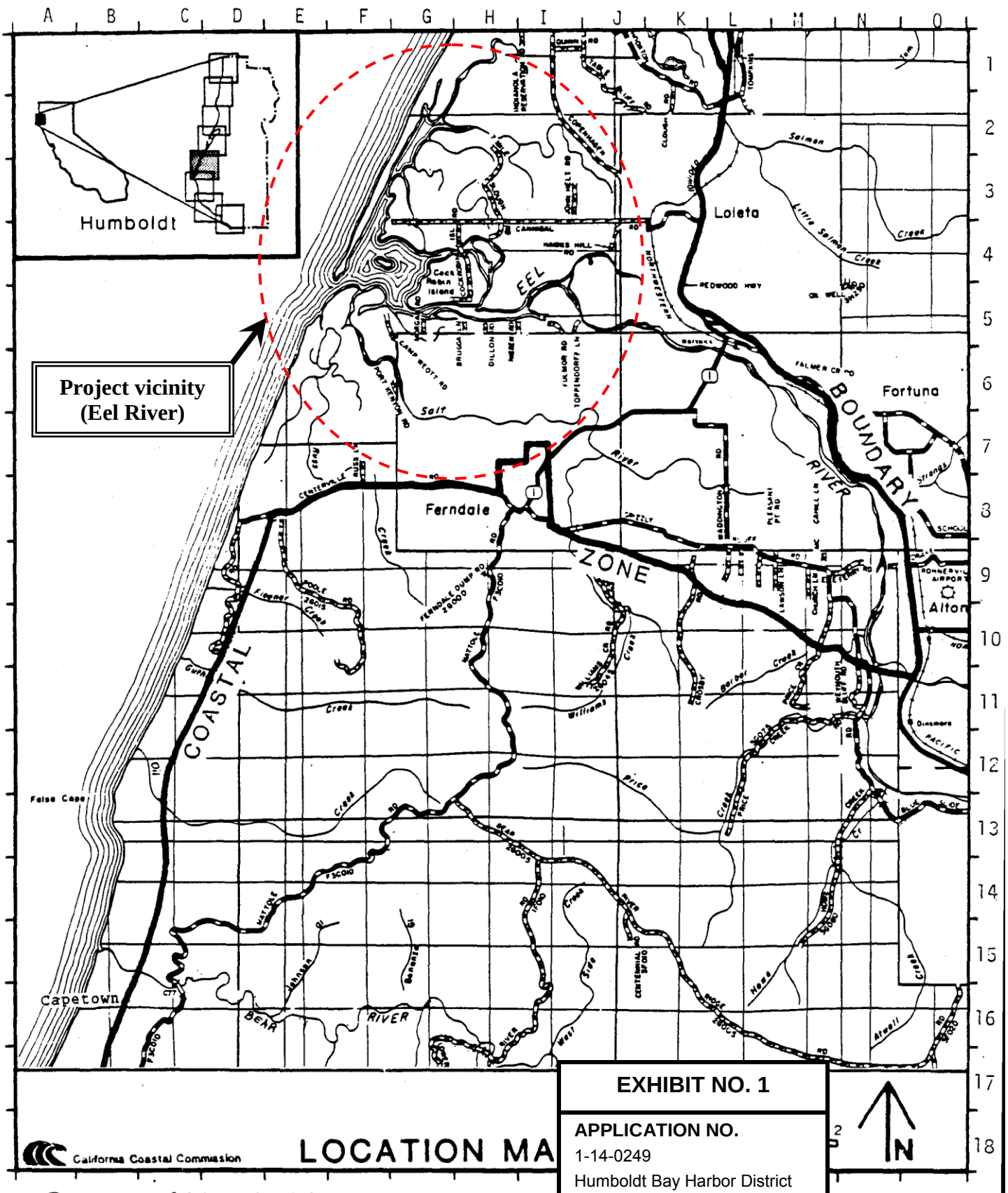



**EXHIBIT NO. 1**

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**REGIONAL LOCATION MAP**
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**Mapped cordgrass in the Mad River Estuary area**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%


*Mapping layer from Grazul and Rowland 2010 & 2011.*

**EXHIBIT N0. 2**
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**VICINITY MAPS**
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**Mapped cordgrass in the**
**Mad River Slough/Arcata area**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%


*Mapped cordgrass on federal lands is not depicted.

*Mapping layer from Grazul and Rowland 2010 & 2011.*

**EXHIBIT N0. 2**
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**VICINITY MAPS**
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**Mapped cordgrass in the North Bay/Eureka area**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%


*Mapped cordgrass on federal lands is not depicted.

*Mapping layer from Grazul and Rowland 2010 & 2011.*

**EXHIBIT N0. 2**
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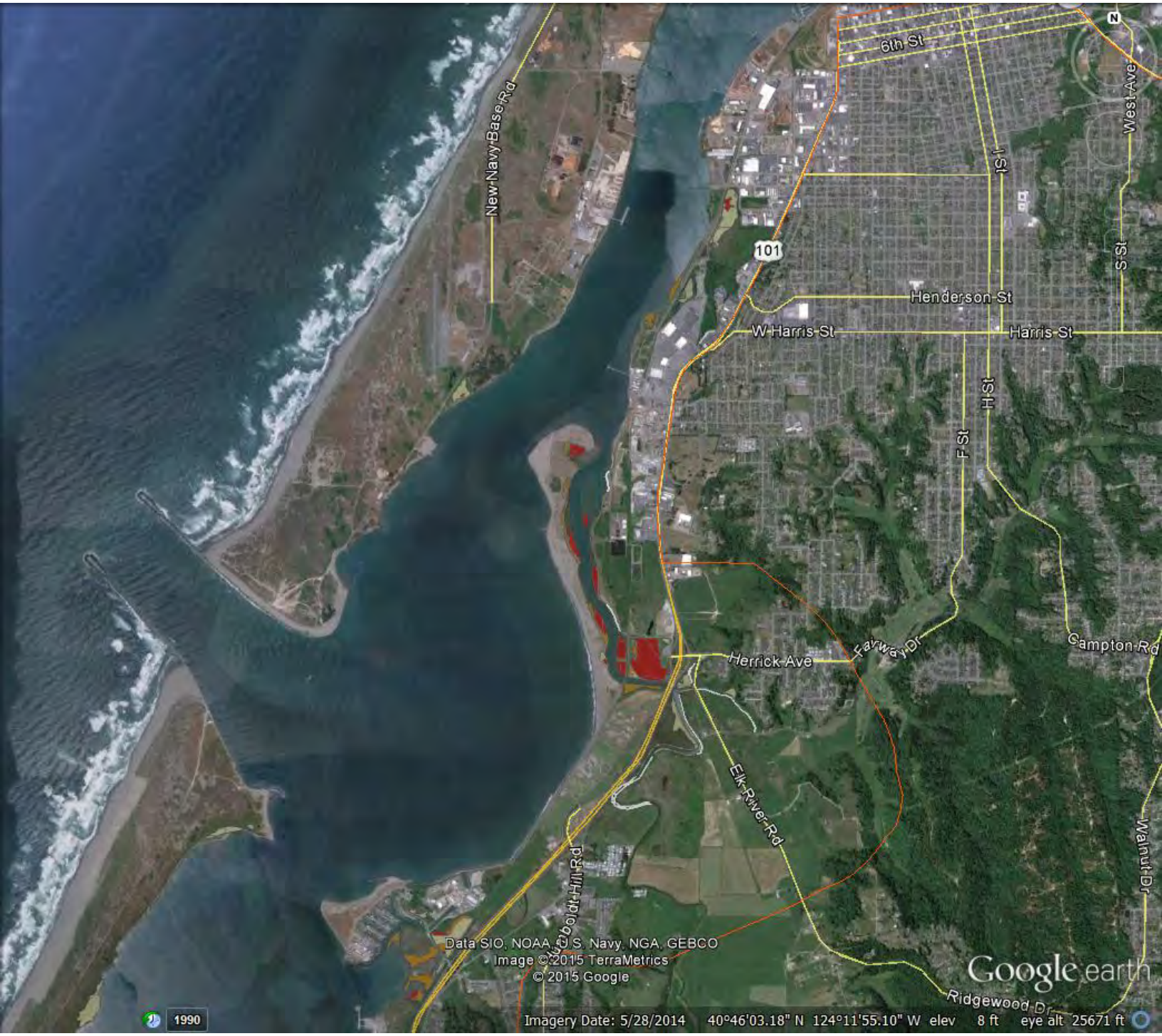
**Mapped cordgrass in the Entrance Bay/Eureka area**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%




*Mapped cordgrass on federal lands is not depicted.

*Mapping layer from Grazul and Rowland 2010 & 2011.*

**EXHIBIT N0. 2**
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**VICINITY MAPS**
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**Mapped cordgrass in the South Bay area**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%


*Mapped cordgrass on federal lands is not depicted.

*Mapping layer from Grazul and Rowland 2010 & 2011.*

**EXHIBIT N0. 2**
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**VICINITY MAPS**
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**Mapped cordgrass in the northern Eel River Estuary**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%


*Mapped cordgrass on federal lands is not depicted.

*Mapping layer from Grazul and Rowland 2010 & 2011.*

**EXHIBIT N0. 2**
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**Mapped cordgrass in the southern Eel River Estuary**

Cover classes:
Red = 61-100%
Brown = 26-60%
Pale green = 1-25%


*Mapping layer from Grazul and Rowland 2010 & 2011.*

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**VICINITY MAPS**
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**Photo 1.** Marsh Master "swimming" to a cordgrass treatment site on the Humboldt Bay National Wildlife Refuge. *Photo courtesy of the HBNWR.*


**Photo 2.** Marsh Master with rototiller attachment following a top mow on the Humboldt Bay National Wildlife Refuge. *Photo courtesy of the HBNWR.*

**EXHIBIT N0. 3**
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**PHOTOS OF SPARTINA ERADICATION**

**Photo 3.** Operator using a minitiller following a top mow at a cordgrass treatment site on the Humboldt Bay National Wildlife Refuge. *Photo courtesy of the HBNWR.*

**Photo 4.** Volunteers excavating cordgrass with shovels at a treatment site on the Humboldt Bay National Wildlife Refuge. *Photo courtesy of the HBNWR.*

**EXHIBIT N0. 3**
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**PHOTOS OF SPARTINA ERADICATION**

**Photo 5.** Restored salt marsh on the Humboldt Bay National Wildlife Refuge two years after primary treatment of cordgrass. *Photo courtesy of the HBNWR.*

**Photo 6.** Restored salt marsh habitat at the Jacoby Creek Unit of the Humboldt Bay National Wildlife Refuge, with rare plants (Humboldt Bay owl's clover) in the foreground, two years after primary treatment of cordgrass. *Photo courtesy of the HBNWR.*

**EXHIBIT N0. 3**
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Humboldt Bay Harbor District
**PHOTOS OF SPARTINA ERADICATION**