STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION

NORTH COAST DISTRICT OFFICE
710 E STREET • SUITE 200
EUREKA, CA 95501-1865
VOICE (707) 445-7833
FACSIMILE (707) 445-7877

MAILING ADDRESS:
P. O. BOX 4908
EUREKA, CA 95502-4908

RECORD PACKET COPY

W 19a

Staff: Tiffany S. Tauber
Staff Report: June 19, 2001
Hearing Date: July 11, 2001
Commission Action:

STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.: **1-99-075**

APPLICANT: **California Department of Fish and Game**

PROJECT LOCATION: Eel River Wildlife Area, off of Table Bluff Road, north of the mouth of Eel River, approximately five miles west of the community of Loleta, Humboldt County (APNs 308-041-03, -04, -05; 308-061-01; 308-091-01, -02; 308-101-01; 308-111-01; 308-161-02)

PROJECT DESCRIPTION: Enhance existing wetlands by: (1) raising and widening 3,400 linear feet of existing levee from 5-feet-high to 10-feet-high and increasing the width by approximately 20 feet, (2) realigning 300 of the 3,400 feet of levee, (3) replacing two existing and installing one new 24-inch-diameter water control structures, and (4) creating 2.1 acres of freshwater wetland from an area of upland pasture.

GENERAL PLAN DESIGNATION: Agriculture Exclusive

ZONING DESIGNATION: Agriculture Exclusive

LOCAL APPROVALS RECEIVED: None Required

OTHER APPROVALS REQUIRED: Army Corps of Engineers

SUBSTANTIVE FILE DOCUMENTS: (1) Humboldt County LCP; (2) Coastal Development Permit No. 1-87-09; (3) Coastal Development Permit No. 1-88-119

SUMMARY OF STAFF RECOMMENDATION:

Staff recommends approval with special conditions of the proposed wetland restoration project. The project would restore freshwater wetland habitat within a managed wetland complex at the Eel River Wildlife Area, located in the Eel River bottoms north of the Eel River mouth and south of Humboldt Bay on Table Bluff Road. The proposed project involves diking and filling within wetlands including: 1) raising and widening 3,400 linear feet of existing levee from 5-feet-high to 10-feet-high and increasing the width by approximately 20 feet, (2) removing and relocating 300 of the 3,400 feet of levee, (3) installing three water control structures, and (4) creating 2.1 acres of freshwater wetland from an area of upland pasture. The project is an allowable use for dredging and filling of wetlands because it is solely for a restoration purpose intended to enhance wetland habitat values at the site consistent with Coastal Act Section 30233(a)(7).

The proposed project is intended to benefit the environment by restoring freshwater wetland habitat values and maintaining wetland habitat diversity at the wildlife area. The proposed project is intended to benefit the environment by enhancing wetland habitat values. However, to ensure that the proposed project does not result in unintended significant adverse impacts to coastal resources and actually enhances wetland habitat values consistent with the resource protection provisions of Section 30233 and 30240, the Commission attaches Special Condition Nos. 1-6. These recommended conditions require that: (1) a final revised restoration monitoring plan be submitted for review and approval by the Executive Director to ensure that the goals and objectives of the restoration project are met, (2) a monitoring plan for the mitigation site be submitted for the review and approval by the Executive Director to ensure the goals and objectives of the mitigation site are met, (3) the mitigation at the Eel River Wildlife Area be constructed as proposed, (4) no excavated material or other construction related debris be placed in coastal waters or wetlands and that all excess material be removed and disposed of in an approved location, (5) construction activities occur between July 15th and November 15th to prevent conflicts with the primary wildlife breeding season at the site, and (6) the applicant obtain appropriate project approval from the U.S. Army Corps of Engineers.

As conditioned, staff has determined that the proposed development would be consistent with the Chapter 3 policies of the Coastal Act.

STAFF NOTES:

1. Standard of Review

The proposed project is located in the Commission's retained jurisdiction. Humboldt County has a certified LCP, but the site is within an area 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.

2. Commission's Concurrent Review of Application No. 1-00-025

At the July 11, 2001 meeting, the Commission will also be reviewing a similar and related wetland enhancement project proposed by the Department of Fish and Game at the Fay Slough Wildlife Area (Item No. W 19b, 1-00-025). The two projects are under separate coastal development permit applications, but are related by the fact that mitigation for wetland fill proposed at the Fay Slough Wildlife Area would occur at the Eel River Wildlife Area.

I. MOTION, STAFF RECOMMENDATION AND RESOLUTION:

The staff recommends that the Commission adopt the following resolution:

Motion:

I move that the Commission approve Coastal Development Permit No. 1-99-075 pursuant to the staff recommendation.

STAFF RECOMMENDATION OF APPROVAL:

Staff recommends a **YES** vote. 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 TO APPROVE THE PERMIT:

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:** See Attachment A.

III. **SPECIAL CONDITIONS:**

1. Restoration Monitoring Program

A. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall submit, for review and written approval of the Executive Director, a final revised monitoring program that substantially conforms with the monitoring program submitted to the Commission entitled "Eel River Wildlife Area Monitoring Plan" prepared by Terri Weist of the Department of Fish and Game and attached as Exhibit No. 7, except that it shall be revised to include the following:

1. Performance standards that will assure achievement of levels of bird usage and wetland vegetation cover at the project site to levels that are greater than pre-project levels of bird usage and wetland vegetation cover at the project site. The monitoring goals and objectives shall include but not be limited to the following standards: (a) increases in waterfowl use, (b) increases in shorebird use, (c) increases in wading bird use, and (d) increases in emergent wetland vegetation cover.

2. Provisions for monitoring at least the following attributes: (a) waterfowl use of the wildlife area, (b) shorebird feeding and resting use, (c) wading bird use, and (d) emergent wetland vegetation around the perimeter of the freshwater pond for five years using methods such as: transects, photo plots, and bird counts.

3. Ecological performance criteria shall relate logically to the restoration goals enumerated in (a) above. Where there is sufficient information to provide a strong scientific rationale, the performance criteria may be absolute (e.g., specified number of bird-hours of use per unit time or specified vegetative cover). Where absolute performance criteria cannot reasonably be formulated, clear relative performance criteria shall be specified. Relative criteria are those that require a comparison of the restoration site with reference sites. In the case of relative performance criteria, the rationale for the selection of reference sites, the comparison procedure, and the basis for judging differences to be significant shall be specified. If a comparison (e.g., restoration variate's value to an absolute standard or to a reference value) requires a statistical test, the test shall be described, including the desired magnitude of difference to be detected, the desired statistical power of the test, and the alpha level at which the test will be conducted. The design of the sampling program shall relate logically to the performance criteria and chosen methods of comparison. The sampling program shall be described in sufficient detail to enable an independent scientist to duplicate it. Frequency of monitoring and sampling shall be specified for each variable to be monitored. Sample sizes shall be specified and their rationale explained. Based on the magnitude of difference to be detected, the desired statistical power, the chosen alpha

level, and an estimate of the appropriate sampling variability, the necessary sample size will be estimated.

4. Provisions for submittal within 30 days of completion of the initial enhancement work of (1) "as built" plans demonstrating that the initial enhancement work has been completed in accordance with the approved enhancement program, and (2) an assessment of the initial biological and ecological status of the "as built" enhancements. The assessment shall include an analysis of the attributes that will be monitored pursuant to the program, with a description of the methods for making that evaluation.

5. Provisions for monitoring and remediation of the restoration site in accordance with the approved final restoration program and the approved final monitoring program for a period of five years.

6. Provisions for submission of annual reports of monitoring results to the Executive Director by a particular date each year for the duration of the required monitoring period, beginning the first year after submission of the "as-built" assessment. Each report shall include copies of all previous reports as appendices. Each report shall also include a "Performance Evaluation" section where information and results from the monitoring program are used to evaluate the status of the wetland enhancement project in relation to the performance standards.

7. Provisions for submission of a final monitoring report to the Executive Director at the end of the five-year reporting period. The final report must be prepared in conjunction with a qualified wetlands biologist. The report must evaluate whether the enhancement site conforms with the goals, objectives, and performance standards set forth in the approved final enhancement program. The report must address all of the monitoring data collected over the five-year period.

B. If the final report indicates that the enhancement project has been unsuccessful, in part, or in whole, based on the approved performance standards, the applicant shall submit a revised or supplemental enhancement program to compensate for those portions of the original program which did not meet the approved performance standards. The revised enhancement program 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 monitor and remediate the wetland enhancement site in accordance with the approved monitoring program. Any proposed changes from the approved monitoring program shall be reported to the Executive Director. No changes to the approved monitoring program shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines no amendment is legally required.

2. Mitigation Monitoring Program

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT,** the applicant shall submit for review and written approval of the Executive Director, a final detailed monitoring program designed by a qualified wetland biologist for monitoring of the wetland mitigation site. The monitoring program shall at a minimum include the following:

1. Performance standards that will assure achievement of levels of bird usage and wetland vegetation cover at the mitigation site that are greater than pre-project levels of bird usage and wetland vegetation cover at the project site. The mitigation monitoring goals and objectives shall include but not be limited to the following standards: (a) increases in waterfowl use, (b) increases in shorebird use, (c) increases in wading bird use, and (d) increases in emergent wetland vegetation cover.

2. Provisions for monitoring at least the following attributes: (a) waterfowl use of the wildlife area, (b) shorebird feeding and resting use, (c) wading bird use, and (d) increases in emergent wetland vegetation around the perimeter of the mitigation site for five years using methods such as: transects, photo plots, and bird counts.

3. Ecological performance criteria shall relate logically to the mitigation goals enumerated in (a) above. Where there is sufficient information to provide a strong scientific rationale, the performance criteria may be absolute (e.g., specified number of bird-hours of use per unit time or specified vegetative cover). Where absolute performance criteria cannot reasonably be formulated, clear relative performance criteria shall be specified. Relative criteria are those that require a comparison of the restoration site with reference sites. In the case of relative performance criteria, the rationale for the selection of reference sites, the comparison procedure, and the basis for judging differences to be significant shall be specified. If a comparison (e.g., mitigation variate's value to an absolute standard or to a reference value) requires a statistical test, the test shall be described, including the desired magnitude of difference to be detected, the desired statistical power of the test, and the alpha level at which the test will be conducted. The design of the sampling program shall relate logically to the performance criteria and chosen methods of comparison. The sampling program shall be described in sufficient detail to enable an independent scientist to duplicate it. Frequency of monitoring and sampling shall be specified for each variable to be monitored. Sample sizes shall be specified and their rationale explained. Based on the magnitude of difference to be detected, the desired statistical power, the chosen alpha level, and an estimate of the appropriate sampling variability, the necessary sample size will be estimated.

4. Provisions for submittal within 30 days of completion of the initial mitigation work of (1) "as built" plans demonstrating that the initial enhancement work has been completed in accordance with the approved enhancement program, and (2) an

assessment of the initial biological and ecological status of the "as built" enhancements. The assessment shall include an analysis of the attributes that will be monitored pursuant to the program, with a description of the methods for making that evaluation.

5. Provisions for monitoring and remediation of the mitigation site in accordance with the approved final mitigation program and the approved final monitoring program for a period of five years.

6. Provisions for submission of annual reports of monitoring results to the Executive Director by a particular date each year for the duration of the required monitoring period, beginning the first year after submission of the "as-built" assessment. Each report shall include copies of all previous reports as appendices. Each report shall also include a "Performance Evaluation" section where information and results from the monitoring program are used to evaluate the status of the wetland mitigation site in relation to the performance standards.

7. Provisions for submission of a final monitoring report to the Executive Director at the end of the five-year reporting period. The final report must be prepared in conjunction with a qualified wetlands biologist. The report must evaluate whether the enhancement site conforms with the goals, objectives, and performance standards set forth in the approved final mitigation program. The report must address all of the monitoring data collected over the five-year period.

B. If the final report indicates that the mitigation project has been unsuccessful, in part, or in whole, based on the approved performance standards, the applicant shall submit a revised or supplemental enhancement program to compensate for those portions of the original program which did not meet the approved performance standards. The revised enhancement program 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 monitor and remediate the wetland mitigation site in accordance with the approved monitoring program. Any proposed changes from the approved monitoring program shall be reported to the Executive Director. No changes to the approved monitoring program shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines no amendment is legally required.

3. <u>On-Site Wetland Mitigation</u>

The permittee shall create and maintain at least 2.1 acres of freshwater wetland from upland pasture at the Eel River Wildlife Area to mitigate for the filling of 2.1 acres of freshwater wetland as proposed. This 2.1 acres of mitigation is in addition to the area of freshwater wetland

required to be created at the site by CDP No. 1-00-075 as mitigation for the wetland fill impacts associated with the Fay Slough Wildlife Area development authorized under CDP 1-00-075.

4. Construction Responsibilities and Debris Removal

The permittee shall comply with the following construction-related requirements:

(a) No construction materials, debris, or waste shall be placed or stored where it may be subject to entering waters of McNulty Slough or other slough channels;

(b) Any and all excess excavated material resulting from construction activities that is not utilized for the approved levee repair or other development approved pursuant to this authorization shall be removed and disposed of at a disposal site outside the coastal zone or placed within the coastal zone pursuant to a valid coastal development permit.

5. Timing of Construction

To avoid adverse impacts to wildlife during prime breeding season, all project construction shall occur between July 15th and November 15th.

6. Army Corps of Engineers Approval

PRIOR TO COMMENCEMENT OF CONSTRUCTION, the permittee shall provide to the Executive Director a copy of a permit issued by the Army Corps of Engineers, or letter of permission, or evidence that no permit or permission is required. The applicant shall inform the Executive Director of any changes to the project required by the Army Corps of Engineers. 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.

IV. FINDINGS AND DECLARATIONS

The Commission hereby finds and declares:

1. Site Description, Background & Project Description

The project site was historically tidal marsh, but was long ago converted to agricultural use by the construction of levees. In 1994, a primary exterior levee breached and returned tidal influence to approximately 300 acres of grazed seasonal wetlands. Subsequently, an interior levee breached and has converted a managed freshwater pond to brackish water. The Department of Fish and Game proposes to restore that pond to freshwater wetland habitat within the managed wetland complex at the Eel River Wildlife Area (ERWA). The proposed site, also

known as Ocean Ranch, is located in the Eel River bottoms north of the mouth of the Eel River and south of Humboldt Bay off of Table Bluff Road. The site is located at the foot of the south slope of Table Bluff, approximately five miles west of the community of Loleta. The 933-acre ranch was acquired by the Department of Fish and Game in 1986 and is comprised of grazing lands, freshwater ponds, saltwater marsh, slough areas, and sand dunes that extend to the shoreline to the west. The ERWA is separated from surrounding private agricultural lands by McNulty Slough along the eastern edge. The site contains an exterior primary dike along McNulty Slough and two interior secondary dikes that hold water in two freshwater ponds. There is also an existing access road that also functions as a dike along the western edge of one of the ponds, a vacant barn, and an area of upland pasture at the north end of the site. (Exhibit No.s 1-3)

According to information submitted by the applicant, over 250 species of birds have been recorded in the Eel River Delta. The ERWA provides habitat for brown pelicans, ducks, herons, egrets, back-crowned night herons, sandpipers and other shorebirds. Other birds that inhabit the ERWA include raptors such as kestrel, white-tailed kite, red-tailed hawk, and northern harrier. The ERWA also supports deer, coyote, bobcat, gray fox, raccoon, skunks, beaver, mink, and river otter. The western snowy plover, a federal threatened and state listed species of special concern, inhabits the ERWA, but the proposed project site is outside of the habitat for this species. No other rare, threatened or endangered species inhabit the project site.

The project site is comprised of a mixture of fresh, brackish and saltwater plant species including creeping bentgrass, bulrush, lupine, aster, salt rush, Pacific silverweed, saltgrass, perennial pickleweed, and clover. The upland pasture is dominated by velvet grass with perennial ryegrass, dock, buttercup, and white clover. A sensitive plant survey and mitigation plan for this project was completed in June 1999. The top of the secondary levee and road is compacted and gravelly with sparse vegetation cover and is comprised primarily of weedy species including Mediterranean barley, birdsfoot trefoil, rabbitfoot grass, brass buttons, and dock. A small population of Humboldt Bay owl's clover was found on the top of the main levee during the botanical survey. This species is federally listed as a species of special concern and is on List 1B of the California native Plant Society as endangered in a portion of its range. Seeds were collected in June 1999 from mature plants and replanted in February 2000 to an adjacent site that would not be impacted by the proposed project.

Background and Previous Commission Actions

The ERWA site was historically part of the extensive tidal marshes of Humboldt Bay, but was converted to agricultural use following the construction of a levee around this portion of Humboldt Bay around the turn of the 20th century. The site was farmed and grazed until 1986 when the area was acquired by the California Department of Fish and Game (DFG) with Proposition 19 Bond funds intended specifically for the acquisition, restoration, and management of coastal wetlands.

Diking and filling in the early part of the last century to promote agricultural, industrial, and urban land uses has resulted in substantial degradation of northern California coastal wetlands, including those around Humboldt Bay and the Eel River delta. This degradation has resulted in a significant reduction in wetland function and wildlife values.

Levees constructed in the late 1800's and early 1900's to create farmland effectively prevented tidal action from the area. Following acquisition of the land, the DFG received two coastal development permits to create and manage areas of freshwater habitat at the site to increase the habitat diversity of the area for wetland-associated wildlife. In 1987, the Commission approved an operation and maintenance plan for the then newly acquired ranch lands (CDP# 1-87-09). The operation and maintenance plan approved under CDP No. 1-87-09 included installation of a culvert and spillway, grading of the existing levee, and repairing a breach in the McNulty Slough levee. The project resulted in filling 6,000 square feet of grazed seasonal wetland which was mitigated at a 1:1 ratio by creating freshwater wetlands on site of the same size by excavating an upland area.

In 1989, the Commission approved further improvements proposed by the DFG that included construction of a 2,400-foot-long interior dike and improvements to the existing road (CDP #1-89-119). The interior dike approved by the Commission under CDP No. 1-89-119 is the dike that is proposed to be repaired and enlarged under this permit application. Construction of the interior cross dike involved filling approximately one acre of wetland which was, as proposed, mitigated at a ratio of 4:1 by the creation of four acres of new wetlands on the site. The previous dike construction and repair projects involving wetland fill were approved as fill for restoration purposes under Coastal Act Section 30233. The projects were constructed to create two separate perennial freshwater ponds that would retain winter rain water and runoff and be protected from salt water inundation, thereby creating and providing freshwater wetland habitat and increasing habitat diversity for water associated wildlife.

Project Description

The current application proposes improvements to the existing levees within the managed wetland complex at the Eel River Wildlife Area. The proposed project would restore the freshwater wetland habitat created in 1987 and 1989 under Coastal Development Permits No. 1-87-09 and 1-88-119.

In 1994, the primary exterior levee along McNulty Slough breached and returned tidal influence to approximately 300 acres of grazed seasonal wetlands. The tidal inundation converted the area to mudflat and saltmarsh habitat. The interior levees were not originally constructed to withstand tidal action and consequently, a breach of the southernmost interior levee occurred and has caused on-going saltwater intrusion into one of the adjacent freshwater ponds.

The DFG is proposing to reconstruct the southernmost interior levee to restore a portion of the previously created freshwater wetland habitat that has been lost to salt water inundation. Approximately 300 acres of the tidally inundated area would not be restored to freshwater

wetland, but instead left to be managed as saltwater habitat. The proposed levee improvements would maintain separation between the saltwater and freshwater habitats and allow for the continued diversity of habitat types at the wildlife area. The proposed project would increase the height of the levee to prevent saltwater intrusion at high tide and widen the levee to resist the erosive effects of daily tidal action. The project is expected to provide and maintain freshwater habitat for a variety of waterfowl species, wading birds, bitterns, loons and grebes, while at the same time continuing to provide for tidal habitats formed as a result of the breach in the primary exterior levee.

Detailed Description of Project Components

The DFG's primary goal at the ERWA is to provide a diversity of habitat for wildlife. Pursuant to this goal, the proposed project would repair and modify the secondary levees to maintain separation between saltwater and freshwater habitats. The proposed project includes: (1) raising 3,400 linear feet of existing levee from 5-feet-high to 10-feet-high and widening the base by approximately 20 feet, (2) removing and relocating 300 of the 3,400 feet of levee, (3) installing three 24-inch-diameter water control structures, and (4) creating 2.1 acres of freshwater wetlands. (Exhibit Nos. 3-6)

a. Improvements to Existing Interior Levee

Approximately 3, 400 linear feet of existing levee would be raised from five feet to ten feet in elevation to prevent salt water from toppling the levee and inundating the adjacent 100-acre freshwater pond. To support the increased height of the levee, the base width would be increased by approximately 20 feet. The top of the levee would be 12 feet wide and surfaced with gravel to facilitate vehicle access and maintenance. Increasing the width of the levee would result in approximately 2.1 acres of fill on the freshwater wetland side. The levee repair would be constructed using earthen material excavated from the upland pasture on the northern end of the ERWA. The excavation of the upland pasture would create an area of freshwater wetland equivalent to the amount of area to be filled as discussed below in section (d).

b. Removing and Relocating a Section of Interior Levee

Approximately 300 linear feet of a second 10-foot-high levee would be removed and reconstructed to align it with a higher ground contour slightly to the northeast of its existing location. Realignment of this levee would allow it to more effectively hold water in an existing 17-acre freshwater pond. This portion of the project would involve removing 780 cubic yards of material which would be used to reconstruct the levee in the new location. The width of this section of levee would also be increased and the wetland fill associated with this section of levee is included in the 2.1 acre wetland fill total.

c. Water Control Structures

Two water control structures would be replaced and one new water control structure would be installed in the levee holding the 100-acre freshwater pond. The water control structures consist

of a 24-inch-diameter culvert and a flashboard/riser system. These structures would be used to regulate water levels by removing or adding boards to maintain desirable wetland characteristics throughout the project area. The ability to manage the water levels at the site is important to ensure that water levels are adequate to provide optimal wetland habitat throughout the year. The water control structures allow water to be impounded for longer periods, making nesting and foraging habitat more available for waterfowl. The water control structures also allow the water to be drained if needed to control disease or to manage soil conditions for wetland vegetation.

d. Wetland Creation

A total of approximately 2.7 acres of upland pasture would be converted to freshwater wetland habitat to mitigate at a 1:1 ratio for the 2.7 acres of wetland fill impacts of both the Eel River Wildlife Area restoration work proposed under CDP Application No. 1-99-075 and the Fay Slough Wildlife area restoration work proposed under CDP Application No. 1-00-025 (Exhibit Nos. 5 & 6). The upland pasture would be excavated to an elevation level with the adjacent freshwater pond and to a depth of approximately three feet. The excavated material would be used for levee improvements and the excavated area would expand the existing 100-acre freshwater pond and provide increased habitat for water-associated wildlife including waterfowl, shorebirds, and wading birds.

e. Monitoring

The DFG has submitted a monitoring plan that sets forth performance standards and remedial measures to monitor the success of the proposed wetland enhancement project (Exhibit No. 7). The applicant proposes to monitor bird use, vegetation establishment, and pond development.

Twenty permanent photoplots would be established along the levees to document pond development and surrounding vegetation changes. Global Positioning Systems would be used to obtain pond acreage and levee dimensions. The applicant indicates that due to the relatively minor scale of the project, a large increase in wildlife abundance is not expected. However, it is likely that species richness would increase as a result of the project. Wildlife surveys would be conducted along the levees prior to project implementation and then biannually for five years. Surveys would be conducted in the spring (April-May) and the fall (October-November) to capture seasonal wildlife use of the project area and would be compared to pre-project data to determine a change in species abundance.

Although the project does not propose active planting of vegetation, pre-project vegetation would be sampled to document change in vegetation type following project completion. Vegetation transects would be established at the upland borrow and mitigation site. Each 30-meter transect would be comprised of 10, 1-square-meter quadrat plots and would be measured annually in August to document the establishment of wetland vegetation. The applicant proposes that the project goal of wetland enhancement would be considered successful when plot data show greater than 60% of wetland obligate/facultative or emergent wetland species are

established. The applicant proposes that if wetland vegetation is not established to the 60% level, habitat manipulation or augmentation through planting desired species may be warranted.

The applicant proposes to submit annual monitoring reports to the Executive Director for five years beginning the December following project completion. The final monitoring report would be submitted to the Executive Director on the fifth year anniversary date after commencement of the monitoring effort and would contain all the data collected over the five-year monitoring period accompanied by appropriate statistical analyses. The format would include an introduction, site plans, and study area, methods used and analyses performed and an evaluation of project goals.

2. Protection of the Wetland Environment

Section 30233 of the Coastal Act states that the diking, filling, or dredging of wetlands shall be permitted only when there is no feasible less environmentally damaging alternative, and only when feasible mitigation measures have been provided to minimize adverse environmental effects. Section 30233 also specifies that diking, filling, or dredging are allowed in wetlands only for limited uses.

The proposed project involves improvements to an existing levee that would result in the filling of approximately 2.1 acres of wetland. The levee improvements are required to reestablish freshwater habitat within a portion of the managed wetland complex and to maintain separation between saltwater habitat and freshwater habitat, thereby ensuring the continued maintenance of habitat diversity at the site.

Section 30233(a) provides as follows, in applicable part:

> (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:*
>
> *(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
>
> *(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
>
> *(3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded*

wetland is restored and maintained as a biologically productive wetland. The size of the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities, shall not exceed 25 percent of the degraded wetland.

(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.

(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(7) Restoration purposes.

(8) Nature study, aquaculture, or similar resource dependent activities.

(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 above policies set forth a number of different limitations on what types of projects may be allowed in coastal wetlands. For analysis purposes, the limitations applicable to the subject project can be grouped into four general categories or tests. These tests are:

1. The purpose of the filling, diking, or dredging is for one of the eight uses allowed under Section 30233;

2. that feasible mitigation measures have been provided to minimize adverse environmental effects;

3. that the project has no feasible less environmentally damaging alternative; and

4. that the biological productivity and functional capacity of the habitat shall be maintained and enhanced where feasible.

Allowable Use for Dredging and Filling of Coastal Waters

The first test set forth above is that any proposed filling, diking or dredging must be for an allowable purpose as specified under Section 30233 of the Coastal Act. One of the allowable

purposes for diking, filling, or dredging, under Section 30233(a)(7) is "restoration purposes." As discussed in detail above, the proposed project requires placement of fill to improve an existing levee as part of a wetland restoration project. The existing levee currently serves to provide some separation between an area of salt marsh habitat and a freshwater pond. However, the existing levee is not constructed to withstand tidal action and is not effective in preventing saltwater intrusion into the freshwater pond. The proposed levee improvements would allow it to withstand erosion forces from the adjacent tidal action and prevent saltwater from toppling the levee, thereby allowing the ponded area contained by the levee to be managed as a freshwater pond to reestablish and maintain the diversity of wetland habitats at the site that existed prior to the levee breaching and tidal inundation that has occurred since 1994.

The Commission finds wetland enhancement projects, where the sole purpose of the project is to improve wetland habitat values, to constitute "restoration purposes" pursuant to Section 30233(a)(7). For example, the Commission concurred with a consistency determination for a wetland enhancement project proposed by the U.S. Fish and Wildlife Service at the Humboldt Bay National Wildlife Refuge (CD-33-92). This project similarly involved dredging, diking, and filling of wetlands to create and enlarge shallow ponds and sloughs and replace water control structures and was approved as a "restoration purpose" under Section 30233(a)(7). Another similar wetland enhancement project approved by the Commission as a "restoration purpose" under Section 30233(a)(7) involved the excavation of six acres of Doran Park Marsh to create a new tidal pond wildfowl foraging area at the southeast end of Bodega Harbor, Sonoma County (CDP #1-93-04). More recently, the Commission approved a similar wetland enhancement project proposed by the Department of Fish and Game involving excavation of slough channels to create freshwater ponds at the Mad River Slough Wildlife Area adjacent to Humboldt Bay to the north of the subject site (CDP #1-99-063). Consistent with these Commission actions, the proposed project, solely intended to enhance wetland habitat values on the Fay Slough Wildlife Area, is considered a "restoration purpose" and is allowable under Section 30233.

This finding that the proposed diking and filling constitutes "restoration purposes" is based, in part, on the assumption that the proposed project will be successful in improving wetland habitat values. Should the project be unsuccessful at improving wetland habitat values and habitat diversity, or worse, if the proposed diking and filling impacts of the project actually result in long term degradation of the habitat, the proposed diking and filling would not actually be for "restoration purposes." To ensure that the project achieves the wetland enhancement objectives for which the project is intended, the Commission attaches Special Condition No. 1. Special Condition No. 1 requires the applicant to submit a final revised monitoring plan for review and approval by the Executive Director prior to the issuance of the coastal development permit. The monitoring plan is required to outline a method for measuring and documenting the improvements in habitat value and diversity at the site, including wildlife and plant species and abundance, over the course of five years following project completion. Furthermore, Special Condition No. 1 requires the monitoring plan to include provisions for remediation to ensure that the goals and objectives of the wetland enhancement project are met.

The Commission finds that as conditioned, the proposed dredging and filling in coastal wetlands for the proposed wetland enhancement project is fill for "restoration purposes," and therefore is an allowable use pursuant to Section 30233(a)(7) of the Coastal Act.

Adequate Mitigation Measures

The second test set forth by Section 30233 is that adequate mitigation must be provided for the adverse environmental impacts of an allowable filling and dredging project. Potential significant adverse impacts often associated with dredging or filling projects of this kind in coastal wetlands include: (1) the coverage of bottom habitat and the loss of wetland surface area and volume, (2) impacts to sensitive vegetation, (3) conversion of one type of wetland to another, (4) impacts to fish and wildlife habitat, and (5) water pollution in the form of sedimentation or debris entering coastal waters. Overall, the project would enhance wetland habitat values and would produce generally only beneficial environmental effects. However, the proposed project must be conditioned to ensure that potential significant adverse impacts are minimized.

i) <u>No Net Loss of Wetland Area</u>

A potential significant adverse impact which can result from the proposed filling in wetlands is the net loss of wetland surface area and volume. As discussed in the Project Description Finding, the proposed levee repair project would involve the placement of 2.1 acres of fill in seasonal freshwater wetlands to repair the levee and maintain separation between the salt marsh and the freshwater habitats. The applicant is separately required by CDP No. 1-00-025 to create an additional 0.52 acres of wetland habitat at this mitigation site to mitigate for the wetland fill impacts of restoration work authorized by CDP No. 1-00-025 at the Fay Slough Wildlife Area. Thus, the actual amount of wetland to be created at a 1:1 ration at the site is approximately 2.7 acres.

The wetland impacts associated with the proposed levee repair and reconstruction would be mitigated by creating freshwater wetland habitat by excavating an equal area of upland pasture. The uplands would be excavated on a shallow gradient to a level that would allow water to flow from the existing pond into the newly excavated site and would also act as a catchment basin to collect winter runoff from the adjacent hillside. The project would result in an expansion of the existing freshwater pond thereby increasing the area of surface water available for water-associated wildlife including shorebirds and wading birds. All of the excavated material would be used for reconstruction of the levees.

The applicant is proposing to mitigate for fill of wetlands by creating the same type of wetlands at a 1:1 ratio. The proposed fill would occur on the previously freshwater side of the managed pond that has recently been influenced by saltwater intrusion. The objective of the project is to restore this pond back to freshwater habitat which involves widening the levee and thus, filling a portion of the freshwater wetland pond. This fill would be offset by expanding the pond on the northern edge by excavating upland pasture to an elevation contiguous with the existing pond, thereby creating habitat similar to that lost to the fill.

The Commission has required a variety of mitigation ratios for developments that include wetland fill. Sometimes the ratios have been 4:1 or higher. The determination of what is an appropriate ratio is dependent on many factors, including such factors as the habitat values of the area filled, the relative difficulty in establishing the new habitat area, and the time lag between when the impacts to the existing habitat are sustained and when habitat values have been fully realized at the mitigation site.

The DFG indicates that while converting some upland pasture to wetlands to create the mitigation site is desirable, converting all of the upland to wetland is not regardless of the feasibility of doing so. The upland area itself provides valuable transition habitat from the wetlands below and contributes to the overall management goal of achieving habitat diversity at the wildlife area. Thus, excavating more than the proposed 1:1 ratio of upland pasture would convert additional upland habitat to wetland habitat, which would result in an adverse impact to a habitat of another type and further loss of habitat diversity that is important to the wildlife at the site. Another option to increase the mitigation area would be to expand the edges of the existing freshwater pond to create more wetland area. However, the DFG indicates that the riparian habitat around the edges of the pond are well established and to excavate along the edges would result in the removal of this riparian area which itself also provides valuable habitat.

Another limitation to expanding the mitigation area is the existing barn located on the upland pasture at the northern end of the ERWA between the entrance road and the freshwater pond. The barn has existed at the site since the DFG acquired the property and converted it from a ranch to a wildlife area. The DFG indicates that there are no plans to remove the barn in the near future to make more area for wetland creation. Thus, the physical structure present in the upland area presents a limitation to the amount of area that can be excavated to create new wetlands.

As noted above, the determination of what is an appropriate ratio is dependent on many factors, including the relative difficulty in establishing the new habitat area, and the time lag between when the impacts to the existing habitat are sustained and when habitat values have been fully realized at the mitigation site. In the northern coastal counties where the climate is significantly wetter than southern coastal counties, wetland vegetation grows relatively quickly and successfully when placed in the right environment. The relative abundance of seasonal freshwater wetlands along the north coast is evidence of the viability of this kind of habitat. The establishment of seasonal freshwater wetlands is less complex than mitigation projects attempting to establish salt marsh, eelgrass beds, or other more complex and limited habitat types. The proposed mitigation site would be contiguous with an existing freshwater pond which would increase the likelihood that the created wetland area would become rapidly inundated and vegetated with similar wetland species. This type of mitigation, that expands an area of existing wetland habitat, results in more successful establishment of habitat area and values relative to mitigation that involves creating a habitat where similar habitat does not currently exist. In addition, the wetter climate and the existing adjacent wetland habitat decreases the threat of exotic vegetation invading the site and resulting in a failure to achieve intended habitat values at the created wetland. Therefore, a higher mitigation ratio, (i.e. 2:1 or 4:1) that would otherwise

be required to accommodate for the potential failure of creating wetland habitat is not necessary in this case. Moreover, higher mitigation ratios are typically required to offset adverse wetland impacts that result from a time lag between the impact and the implementation of the mitigation. The time between when an impact occurs (i.e. wetland fill) and when mitigation is established results in a temporary loss of habitat that generally requires a greater mitigation ratio. However, in this case, because the mitigation site is the borrow area for the material used for the wetland restoration project (i.e. repairing the levee) there will not be a time lag between when the impact occurs and when the mitigation is implemented. Thus, a greater mitigation ratio for this type of temporary habitat loss is not warranted.

The Commission further finds that the proposed project would not result in a net loss of wetland habitat. Unlike development projects which involve the fill of wetlands for non-wetland uses, the objective of this proposed project is to restore freshwater wetland habitat and habitat diversity at the site, thereby enhancing the habitat values for wildlife utilizing the wildlife area. Accordingly, given the (1) increased rainfall in northern coastal counties; (2) existing habitat adjacent to the proposed mitigation site; (3) the lack of temporal losses associated with the proposed project; and (4) the fact that the wetland fill is occurring for wetland restoration rather than for non-wetland uses, the Commission finds the proposed project involving mitigation at a 1:1 ratio would not result in a net loss of wetlands and in addition, would enhance existing wetlands consistent with the wetland provisions of the Coastal Act.

To ensure that the proposed project does not result in a net loss of wetland area, the Commission attaches Special Condition No. 3 that requires the applicant to create at least 2.1 acres of seasonal freshwater wetland from the upland pasture at the northern end of the Eel River Wildlife Area as proposed, in addition to the area of wetland mitigation required pursuant to CDP No. 1-00-025. Special Condition No. 2 requires the applicant to submit a mitigation monitoring plan to ensure that the objectives of the proposed mitigation are met and that the on-site creation of freshwater wetlands is adequate to mitigate for the loss of freshwater wetlands at the site. To further ensure that the project does not result in the loss of wetland surface area or volume, the Commission attaches Special Condition No. 4 which requires any excavated material not utilized for project elements approved pursuant to CDP No. 1-99-075 to be disposed of to be placed on-site in an approved upland location rather than in wetland locations.

ii) Vegetation

A sensitive plant survey and mitigation plan for this project was completed in June 1999 and a small population of Humboldt Bay owl's clover was found on the top of the main levee during the botanical survey. This species is federally listed as a species of special concern and is on List 1B of the California Native Plant Society as endangered in a portion of its range. Seeds were collected in June 1999 from mature plants and replanted in February 2000 to an adjacent site that would not be impacted by the proposed project.

Placing material on the freshwater side of the levee to increase the footing would impact approximately 2.1 acres of wetland vegetation. However, as discussed above, an equal area of

freshwater wetlands would be created by excavating an area of upland pasture. The excavated area would be contiguous with the existing 100-acre freshwater pond. Although the project does not include planting wetland vegetation in the excavated area, it is anticipated that the wetland vegetation would establish rapidly and uniformly throughout the area as the excavated area becomes inundated with freshwater. The applicant proposes to monitor the site by establishing vegetation transects that would be surveyed annually to document the establishment of wetland vegetation. To ensure that wetland vegetation becomes established in the excavated area, the Commission attaches Special Condition No. 2 which requires the applicant to submit a final mitigation monitoring plan for review and approval by the Executive Director prior to issuance of the permit. Special Condition No. 2 requires the monitoring plan to include provisions to ensure that the mitigation site will be remediated within a year of a determination by the permittee or the Executive Director that monitoring results indicate that the site does not meet the goals, objectives, and performance standards identified in the approved final mitigation monitoring program.

iii) Fish and Wildlife

The proposed levee improvements would restore freshwater wetland habitat to a portion of the area that is currently affected by saltwater intrusion. Additionally, the project would maintain the diversity of wetland habitat types at the ERWA by improving the levee in a manner that would provide effective separation between saltwater habitat and freshwater habitat. The project is expected to provide and maintain freshwater habitat for a variety of waterfowl species, wading birds, bitterns, loons and grebes, while at the same time continuing to provide for tidal habitats formed as a result of the breach in the primary exterior levee.

To ensure that the project achieves the wetland enhancement objectives for which the project is intended and thereby mitigates for the loss of wetland habitat resulting from the proposed diking and filling in wetlands, the Commission attaches Special Condition Nos. 1 and 2. Special Condition No. 1 requires the applicant to submit a final monitoring plan for review and approval by the Executive Director prior to the issuance of the coastal development permit. The monitoring plan is required to outline a method for measuring and documenting the improvements in habitat value and diversity at the site, including wildlife and plant species and abundance, over the course of five years following project completion. Furthermore, Special Condition No. 1 requires the monitoring plan to include provisions for remediation to ensure that the goals and objectives of the wetland enhancement project are met. Special Condition No. 2 requires the applicant to submit a mitigation monitoring plan for measuring and documenting the objectives of the mitigation site including changes in bird use and vegetation cover.

In addition, to ensure that project construction activities do not interfere with the breeding season for some species present at the site, the Commission attaches Special Condition No. 5 to limit construction activities to occur only between July15th and November 15th as proposed by the Department of Fish and Game.

iv) Wetland Types

As discussed previously, the project site was historically part of the extensive tidal marshes of the Eel River estuary, but was converted to agricultural use following the construction of levees around this portion of McNulty Slough around the turn of the 20th century. The levees originally constructed to create farmland effectively prevented tidal action from the area.

Following acquisition of the area by the Department of Fish and Game, one of the primary objectives was to establish a diversity of wildlife habitats at the site. Portions of the wildlife area have been managed as freshwater wetlands and some portions have been managed as salt marsh. In 1994, the exterior levee breached and returned tidal action to approximately 300 acres of grazed seasonal wetlands which is now managed as salt marsh and mudflat habitat. The proposed levee improvements would increase the structural integrity of the interior levees to withstand the tidal action introduced by the breach in the exterior levee and would prevent saltwater intrusion into a portion of the former freshwater ponds. The proposed project does not result in a conversion of one wetland type to another, but rather would restore and maintain the diversity of wetland habitats that existed at the site prior to the breach in the levee. Therefore, the project would not result in a significant adverse impact from the conversion of wetland types.

v) Water Quality

Potential adverse impacts to coastal waters could occur in the form of sedimentation or debris from project excavation and fill being allowed to enter coastal waters. To ensure that adverse impacts to water quality do not occur, the Commission attaches Special Condition No. 4. Special Condition No. 4 requires that no construction materials, debris, or waste be placed or stored where it could be subject to entering the waters of McNulty Slough or other slough channels. In addition, Special Condition No. 4 requires that any excavated material not utilized for project elements be deposited in an approved upland location.

The Commission finds that the proposed wetland enhancement project is a permitted use under Section 30233 of the Coastal Act, and that as conditioned, all potential adverse impacts have been minimized to the maximum extent feasible.

Alternatives Analysis

The third test set forth by Section 30233 is that the proposed dredge or fill project must have no feasible less environmentally damaging alternative. The objective of the proposed project is to maintain the habitat diversity that has existed on the site by improving the levee that provides separation between an area of freshwater wetlands and tidal wetlands. In this case, the Commission has considered two possible alternatives to the proposed project including: (1) sheetpile or bulkhead wall to provide habitat separation and (2) the no project alternative.

Installing a Sheetpile or Bulkhead to Separate Habitat Types

A primary management objective at the ERWA is to provide a diversity of habitats for water associated wildlife. The purpose of the proposed project is to maintain habitat diversity by maintaining separation between freshwater and saltwater habitats by improving the structural integrity of the levee to prevent saltwater intrusion from compromising the habitat value of the freshwater wetland. The proposed improvements involve increasing the height of the levee from 5 feet to 10 feet which requires an increase in the width of the base of the levee by approximately 20 feet. Increasing the width of the levee as proposed would result in approximately 2.1 acres of wetland fill. An alternative to increasing the width of the levee to provide adequate separation between wetland habitats would be to install a narrower structure that would involve less area of wetland fill such as a sheetpile or bulkhead wall. The applicant indicates however, that a secondary objective of the levee widening is to provide a 12-foot-wide levee to accommodate vehicles for access and maintenance purposes, as the western edge of the levee that holds the freshwater pond is also the main access road to the area. Access to the levee is crucial for maintaining and operating the water control structures that will be used to manage water levels throughout the year to obtain optimal wetland habitat conditions. An alternative design, such as a sheetpile wall or bulkhead that may result in less wetland fill would not be of sufficient width to allow access across the site. Therefore, this alternative is not a less environmentally damaging feasible alternative.

No Project

As discussed previously, the subject site, and much of the bottomlands throughout the Eel River valley, were cut off from tidal action over 100 years ago by the construction of levees to drain the land for agricultural uses. In the late 1980's, the Department of Fish and Game acquired the land and constructed freshwater ponds for habitat purposes. A breach in the exterior levee has returned tidal action to a portion of the ponded areas, which the DFG now manages as salt marsh and mudflat habitat. The proposed project involves improving the structural integrity of the existing interior levees to prevent further intrusion of saltwater into the pond. The no project alternative would cause the interior levees to continue to erode from tidal action and continue to be toppled by saltwater at high tide causing the conversion of the formerly freshwater pond to salt marsh. This would result in a significant permanent reduction in perennial freshwater wetland habitat on the ERWA. Although the no project alternative would not diminish the total amount of wetland area, as formerly freshwater wetlands would permanently revert to saltwater wetlands, this alternative would not meet the applicant's primary management objective, which is to provide a diversity of wetland habitat types at the site.

Restoring the ERWA to tidal salt marsh may be preferable in terms of restoring pre-disturbance ecological conditions. However, restoring freshwater wetland habitat at the site to salt marsh would eliminate the habitat diversity at the site, which is also beneficial for maintaining the biological productivity of the area. The "no project" alternative therefore would not be any less environmentally damaging than the proposed project that would restore and maintain freshwater habitat while continuing to provide salt marsh habitat. Therefore, the no project alternative is not a less environmentally damaging feasible alternative, as it would not accomplish the project objective of providing habitat diversity at the ERWA.

(d) Maintenance and Enhancement of Wetland Habitat Values

The fourth general limitation set forth by Section 30233 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.

The project would not result in a net decrease in wetland area, as the proposed wetland fill associated with the levee improvements would be mitigated on site by creating an equal area of similar wetland habitat from upland pasture. Special Condition No. 3 requires the applicant to create the wetland mitigation area on site as proposed. To ensure that the overall project objectives are realized, Special Condition No. 1 requires the applicant to submit a revised monitoring program to monitor how habitat values change as a result of the project. The condition further requires the applicant to submit plans for remediation of the site within one year if monitoring determines that the project has not been successful in achieving the goals, objectives, and performance standards identified in the approved monitoring program. To ensure that the mitigation site at the ERWA is successful in providing habitat value greater than the wetlands proposed to be filled, the Commission attaches Special Condition No. 2. This condition requires the applicant to prepare and submit a monitoring plan for review and approval prior to issuance of the permit.

As discussed above in the section of this finding on mitigation, the conditions of the permit would ensure that the project would not have significant adverse impacts on existing wetland habitats or on the water quality of McNulty Slough. Therefore, the proposed project would maintain the diversity of wetland habitats at the site, thereby enhancing the biological productivity and functional capacity of the wetlands consistent with the requirements of Section 30233 of the Coastal Act.

Conclusion

The Commission thus finds that the project is an allowable use, that there is no feasible less environmentally damaging alternative, that feasible mitigation is required for potential impacts associated with the dredging and filling of coastal wetlands, and that biological productivity will be maintained or enhanced. Therefore, the Commission finds that the proposed development, as conditioned, is consistent with Section 30233 of the Coastal Act.

3. Restoration of Marine Resources and Coastal Wetlands Where Feasible

Coastal Act Section 30230 states as follows:

> *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.

Coastal Act Section 30231 states as follows:

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

Coastal Act sections 30230 and 30231 require in part, that marine resources and coastal wetlands be maintained, enhanced, and restored where feasible. These policies call for restoration of coastal wetlands and marine resources. Restoration in the strictest sense generally refers to the reestablishment of wetland functions and characteristics that existed prior to human disturbance. At the subject site, restoration in this sense would involve returning the site to tidal action and restoring salt marsh that existed historically until the site was diked off in the late 19th century and converted to agricultural use as opposed to reestablishing and maintaining the freshwater wetlands created by the Department of Fish and Game in the late 1980's.

According to information from the U.S. Fish and Wildlife Service (USFWS), in the Humboldt Bay and lower Eel River estuary region it is estimated that between 7,000 and 8,700 acres of salt marsh were present prior to human development. Since the mid-1800's, most of what was likely to have been historic salt marsh has been diked or filled and has been reduced to a total area of around 900 acres, a reduction of at least 87%. In general, restoring areas that have historically supported tidal salt marsh is preferable when the physical conditions of a site present such an opportunity. The USFWS for example, has indicated that restoration of salt marsh habitats around the Bay is a high priority, as salt marsh restoration is important for the protection, enhancement, and restoration of native fish, wildlife, and plant communities, some of which are dependent on salt marsh for their existence.

Coastal Act sections 30230 and 30231 call for the restoration of coastal wetlands and marine resources "where feasible." These policies also call for the maintenance of the biological productivity of coastal waters, wetlands, and estuaries. As discussed above in the Alternatives Analysis section under the Section 30233 analysis, restoring the ERWA to tidal salt marsh may be preferable in terms of restoring pre-disturbance ecological conditions and restoration of tidal action and salt marsh is largely feasible at the site. However, the Commission has previously approved coastal development permits (CDP Nos. 1-87-09 & 1-88-119) that involve improvements for providing freshwater habitat at the site, including construction of the interior levee that is the subject of this permit. The project does not involve creating more areas of freshwater wetland, or further converting one wetland type to another. Rather, the proposed project would maintain the freshwater pond at the site while continuing to provide adjacent salt

marsh habitat that has been created as a result in the McNulty Slough dike. Restoring freshwater wetland habitat at the site to salt marsh would eliminate the habitat diversity that has existed for some time at the site. The DFG indicates that the diversity of species utilizing the wildlife area increased with the establishment of freshwater habitat adjacent to saltwater habitat. Providing a diversity of wetland habitats at the site is beneficial for maintaining the biological productivity of the area. Therefore, the Commission finds that the proposed levee improvement project that does not involve restoring the site to salt marsh is consistent with Coastal Act Sections 30231 and 30230 because the proposed project would maintain and increase the biological productivity of the coastal wetlands.

There has been recent local debate among agency and public interests involved in wetland management and regulation in the Humboldt Bay and the Eel River valley areas regarding the value of salt marsh versus freshwater wetland restoration and the best approach to managing and restoring wetlands around Humboldt Bay and Eel River. These lands are frequently looked to for mitigation and restoration opportunities and several restoration projects have been proposed or are anticipated on these lands. These diked former tidelands are largely unimproved, low areas, with the ability to support a variety of wetland habitats including, in some areas, salt marsh. Many questions are raised when considering restoration opportunities of these lands including feasibility, compatibility with agriculture and other surrounding land uses, potential for invasion of exotic species, proper management of restored areas, and the value of different wetland habitats for fish and wildlife species in and around the bay.

Freshwater wetlands are often proposed on these grazed seasonal wetlands instead of tidal wetlands, even though other opportunities for freshwater habitat restoration or enhancement may exist in nearby areas and opportunities for salt marsh restoration are extremely limited. Salt marsh creation is very difficult to accomplish in higher areas away from the Bay and the Eel River that could not be subjected to tidal influence simply by opening a tide gate or removing a levee. Because of these questions, the Commission recognizes the increasing need for a coordinated approach to restoration opportunities around the bay and the Eel River estuary. The Commission finds that the most effective approach to this question over the value and need for salt marsh and freshwater restoration around the bay would be to create a forum in which agency and public interests could work together to prepare a long-term, regional planning document that addresses the opportunities, choices, constraints, management challenges, and funding sources available for future restoration and enhancement of these coastal resources.

One example of the implementation of such a regional planning approach to wetland restoration is the San Francisco Bay Area Wetlands Ecosystem Goals Project (Project). The Project was created for agency and public interests involved in wetland management and regulation in the San Francisco Bay area to develop regional wetland goals that would represent a shared vision of what is needed to ensure the health of Bay area wetlands. The product of the Project is a document entitled "*Baylands Ecosystem Habitat Goals*" (Goals) that were developed by more than 100 scientists from local, state, and federal agencies, private consulting firms, and universities. Development of the Goals was co-sponsored by nine state and federal agencies, including the National Marine Fisheries Service, San Francisco Bay Conservation and

Development Commission, San Francisco Bay Regional Water Quality Control board, State Coastal Conservancy, State Department of Fish and Game, State Department of Water Resources, State Resources Agency, U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service. Additional participants included the San Francisco Bay Joint Venture, the San Francisco Estuary Project, and the San Francisco Estuary Institute. The Goals prepared by Project efforts are used to identify needs for sustaining diverse and healthy communities of fish and wildlife resources in the San Francisco Bay area. The Project was started to provide a basis to guide a regional wetland planning process for public and private interests seeking to preserve, enhance, and restore the ecological integrity of wetland communities resulting in a regional wetland management plan based on wetland goals, and recommendations on how to coordinate such projects.

Project participants selected key species and habitats and then assembled qualitative and quantitative data to prepare habitat recommendations that were then incorporated into the Goals document. The Goals are presented at three levels of specificity including region, subregion, and segment. The Goals pertain primarily to the region's baylands, which include mudflats, existing tidal marsh, tidal marsh channels, and seasonal and other wetlands within diked historical tidal marshlands, similar to lands surrounding Humboldt Bay and the Eel River valley. Although there are many regional differences between San Francisco Bay and the Humboldt Bay/Eel River valley area such as surrounding land uses and development pressures, the efforts for regional planning for wetland restoration around San Francisco Bay can be used as a model for planning efforts around the Humboldt Bay/Eel River valley area. The Commission supports the initiation of a similar regional planning process in coordination with other interested agencies involved in regulation and management of wetlands to address long-term restoration opportunities around Humboldt Bay and the Eel River valley area.

4. Public Access

Coastal Act Section 30210 requires in applicable part that maximum public access and recreational opportunities be provided when consistent with public safety, private property rights, and natural resource protection. 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 adequate access exists nearby. Section 30211 requires that development not interfere with the public's right to access gained by use or legislative authorization. In applying these sections of the Coastal Act, 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.

The Eel River Wildlife Area is open to the public year-round for permitted uses such as bird watching, hunting (pursuant to applicable seasons and regulations), nature study, and similar outdoor activities. Activities that are not compatible with wildlife, such as off-road vehicle riding, are not allowed at the site. The proposed project does not involve any changes or

additional restrictions to existing public access at the site, or to the shoreline. The project would not result in the need for additional parking as sufficient parking exists to accommodate the current level of public use and public use is not anticipated to significantly increase as a result of the proposed project.

Therefore, the Commission finds that the proposed project would not have an 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.

5. Agricultural Resources

The Coastal Act sets forth policies that relate to the protection of agricultural land and limit the conversion of agricultural lands to non-agricultural uses. Sections 30241 and 30242 address methods to be undertaken to maintain the maximum amount of prime agricultural land in production and to minimize conflicts between agricultural and urban land uses.

Prior to the DFG's acquisition of the site in 1986, the site was historically used for cattle grazing, dairy farming, and livestock production. The site is composed primarily of Bayside soils which are heavy bay formed clays with extremely poor drainage and are identified as having some of the poorest drainage in the county. These soils are not identified as prime agricultural soils.

According to the Humboldt County certified LCP, the subject site is planned and zoned Agriculture Exclusive. However, the site is within the Commission's retained jurisdiction and therefore, the standard of review is the Coastal Act rather than the LCP. The proposed project involves improvements to existing levees to maintain wildlife habitat and would not result in the introduction of a new use at the site that would otherwise be incompatible with surrounding agricultural uses. Because the site is already managed for fish and wildlife habitat rather than for agriculture, the proposed project does not constitute a conversion of agricultural land. In addition, the DFG currently leases 200 acres of the ERWA for grazing. The proposed project is located outside of this lease agreement area and consequently, no agricultural uses would be affected.

Therefore, the Commission finds that the proposed project does not constitute a conversion of agricultural lands and is consistent with Sections 30241 and 30242 of the Coastal Act.

6. U.S. Army Corps of Engineers Approval

The project requires review and approval by the U.S. Army Corps of Engineers. Pursuant to the Federal Coastal Zone Management Act, any permit issued by a federal agency for activities that affect the coastal zone must be consistent with the coastal zone management program for that state. Under agreements between the Coastal Commission and the U.S. Army Corps of Engineers, the Corps will not issue a permit until the Coastal Commission approves a federal consistency certification for the project or approves a permit. To ensure that the project ultimately approved by the Corps is the same as the project authorized herein, the Commission attaches Special Condition No. 6 which requires the permittee to submit to the Executive

Director evidence of U.S. Army Corps of Engineers approval of the project prior to the commencement of work.

7. California Environmental Quality Act

Section 13096 of the Commission's administrative regulations requires Commission approval of a coastal development permit application to be supported by findings showing that the application, as modified by any conditions of approval, is consistent with any applicable requirement of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are 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 found consistent with the policies of the Coastal Act. Mitigation measures which will minimize or avoid all significant adverse environmental impact have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity would 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 and to conform to CEQA.

Exhibits:

1. Regional Location
2. Site Location
3. Site Plan
4. Project Plans
5. Mitigation Site
6. Mitigation Plan
7. Proposed Monitoring Plan

ATTACHMENT A

Standard Conditions:

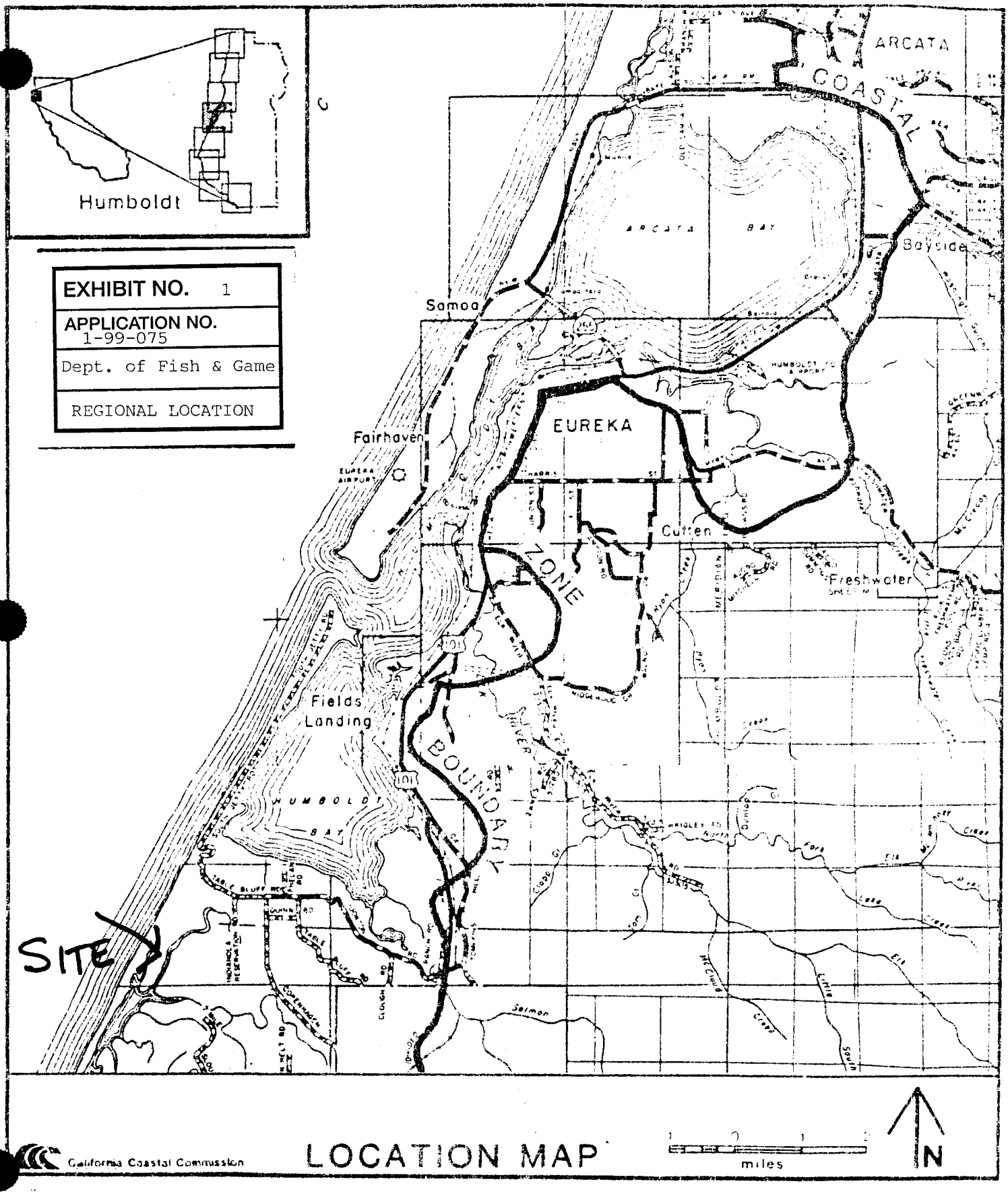
1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

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 period 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.

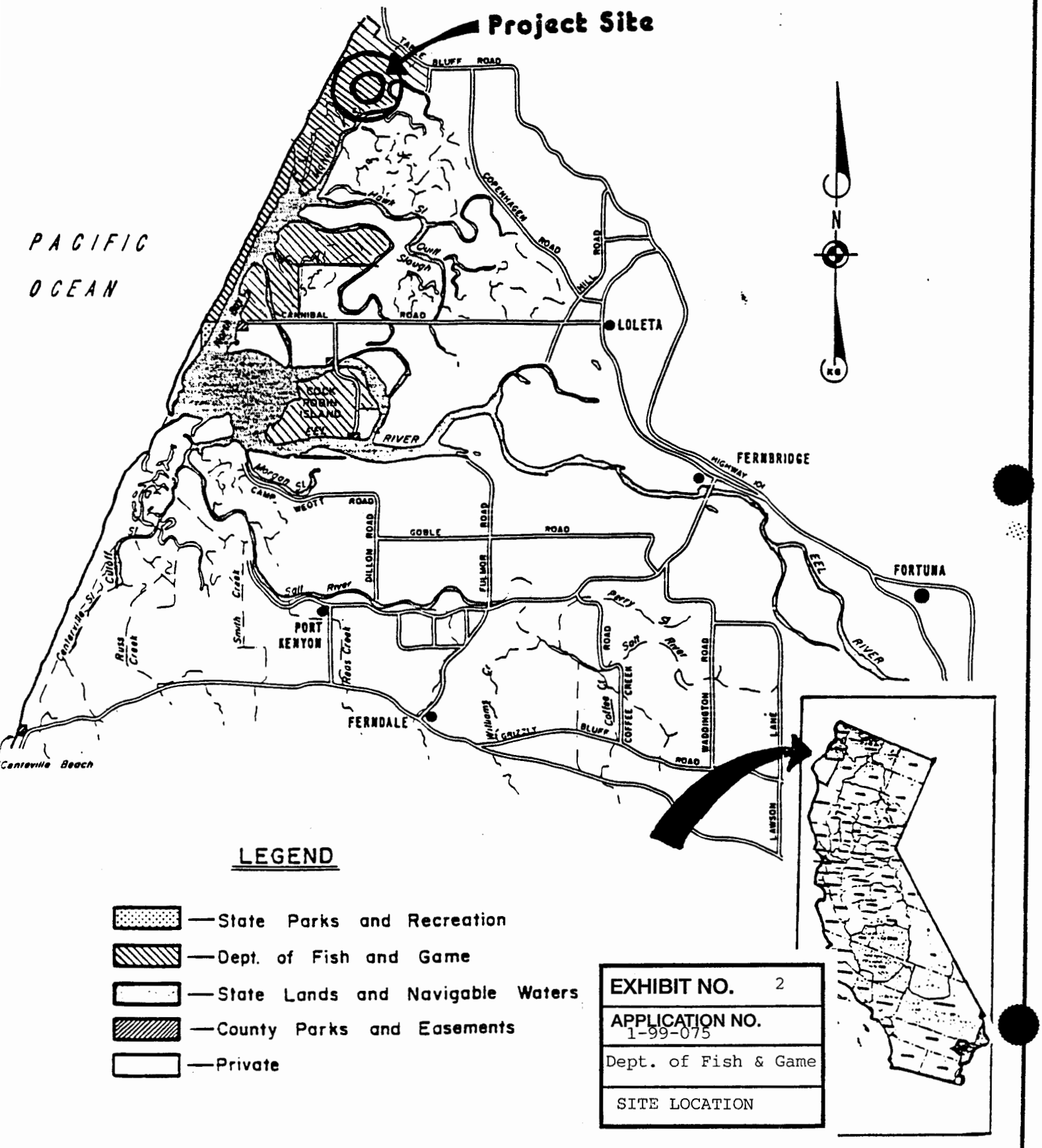


County of Humboldt

Sheet 4 of 8

VICINITY MAP

LAND OWNERSHIP—DELTA AREA



LEGEND

- —State Parks and Recreation
- —Dept. of Fish and Game
- —State Lands and Navigable Waters
- —County Parks and Easements
- —Private

EXHIBIT NO.	2
APPLICATION NO.	1-99-075
Dept. of Fish & Game	
SITE LOCATION	

EEL RIVER WILDLIFE AREA
WETLAND ENHANCEMENT PROJECT

EXHIBIT NO. 3
APPLICATION NO. 1-99-075
Dept. of Fish & Game
SITE PLAN

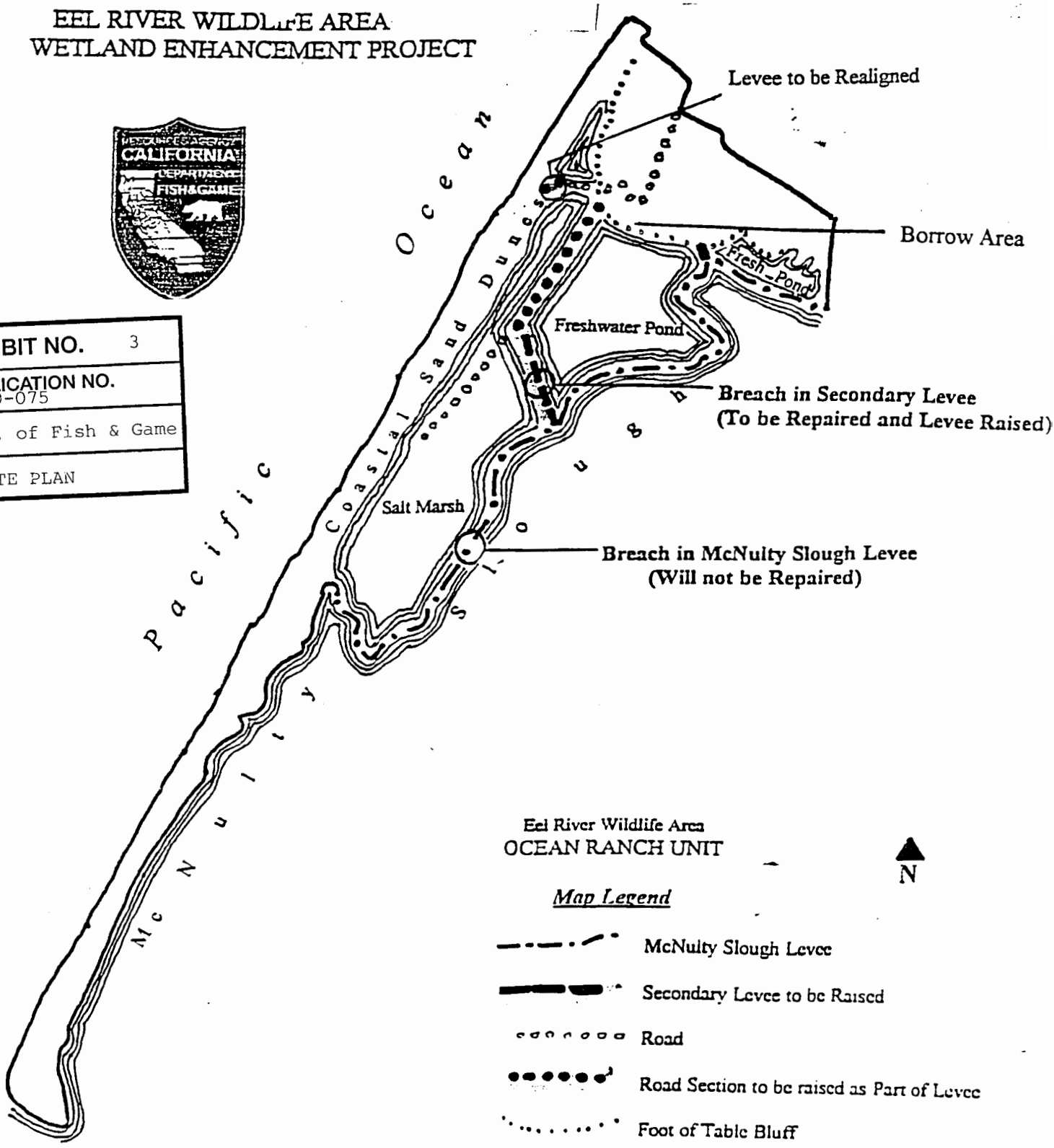
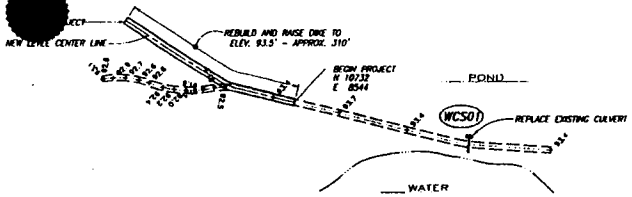


Fig. 1. Eel River Wildlife Area Levee Reconstruction Project. "Secondary levee to be raised", "levee to be realigned" and "road section to be raised" are also the wildlife survey routes.



WATER CONTROL STRUCTURES								
	INSTALLATION				FABRICATION			
STRUCTURE	H *	/	PIPE SIZE	CONTROL TYPE	PIPE ** LENGTH	I.E.	T.E.	L.E.
WC-01	4'	1	24"	FB	30'	88.5'	92.5'	93.4'
WC-02	4'	1	24"	FB	60'	86.5'	90.5'	96.0'
WC-03	4'	1	24"	FB	60'	86.5'	90.5'	96.0'

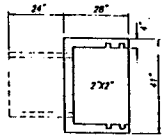
NOTE:

FB = FLASHBOARD
G = GATE (WATERMAN C-10 XX GATE)
I.E. = INVERT ELEVATION
L.E. = ADJACENT LEVEE ELEVATION
T.E. = TOP ELEVATION

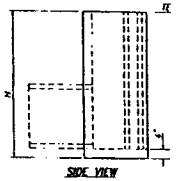
/ NUMBER OF PRECAST STRUCTURES AT THIS LOCATION

* WHERE H IS GREATER THAN 48", 2 FOOT PRECAST EXTENSIONS SHALL BE PROVIDED.

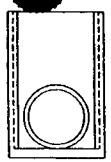
** ALL PIPE LENGTHS SHALL BE VERIFIED BY ENGINEER PRIOR TO PURCHASE.



TOP VIEW



SIDE VIEW



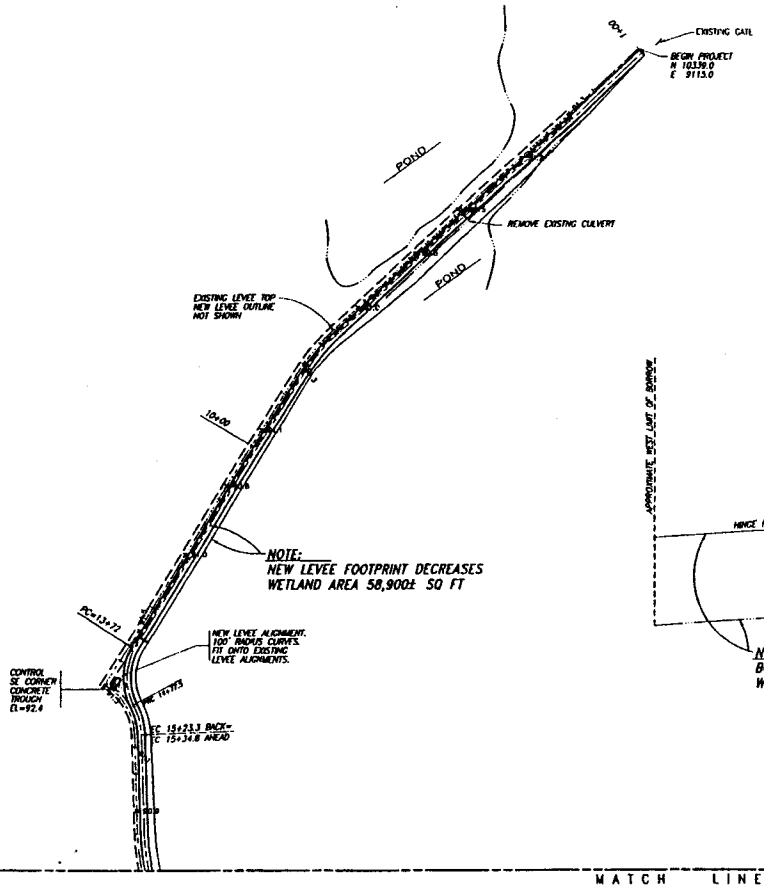
FRONT VIEW

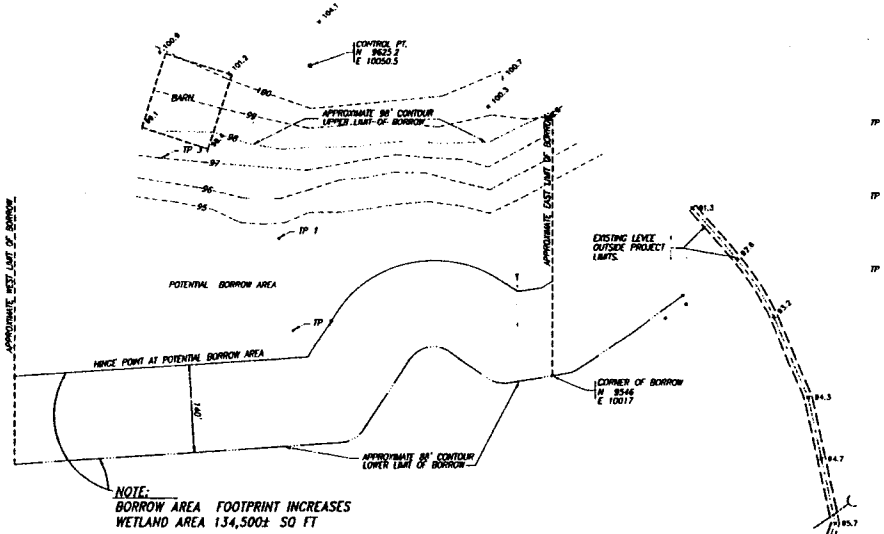
NOTE:
THE PREFABRICATED CONCRETE STRUCTURE SHOWN IS PRODUCED BY:

BRIGGS MFG.
WILLOWS, CA
530 934-2663

ACTUAL STRUCTURE MAY VARY SLIGHTLY FROM THAT SHOWN ON THIS DRAWING. ANY CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO PURCHASING STRUCTURES.

1/2 PREFABRICATED CONCRETE WATER CONTROL STRUCTURE
REF: NONE NOT TO SCALE





TEST PIT FIELD CLASSIFICATION

TP 1
0-0.5 TOP SOIL
0.5-3 LEAN, SANDY CLAY SLIGHTLY MOIST, DARK COLOR
3-7 CLEAN FINE SAND, MOIST, TAN COLOR
SAND IS SLIGHTLY CONSOLIDATED

TP 2
0-0.5 TOP SOIL
0.5-3 LEAN, SANDY CLAY, SLIGHTLY MOIST, DARK COLOR
3-4 CLEAN SAND, MOIST, BROWN COLOR
4-5 CLEAN SAND, VERY MOIST, GREY COLOR

TP 3
0-0.5 TOPSOIL
0.5-3 LEAN, SANDY CLAY, SLIGHTLY MOIST, DARK COLOR
3-5 CLEAN SAND, MOIST
5-6 SANDY CLAY, VERY MOIST, TAN AND BROWN COLOR

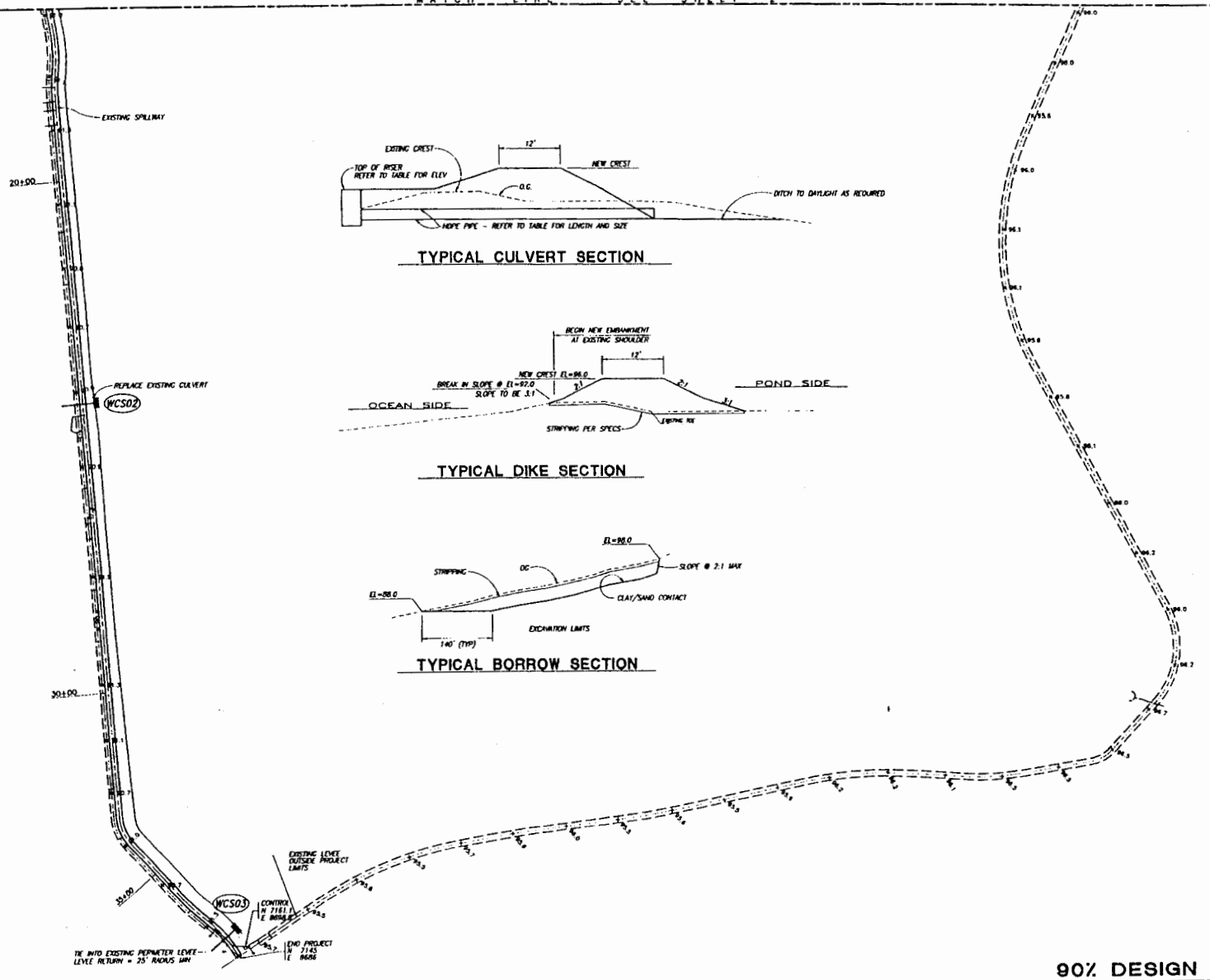
MATCH LINE SEE SHEET 3

90% DESIGN

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE
PROJECT NO. C
EE
PLA
DATE: 02-16-99
SHEET NO 2 OF 3
APPROVE

EXHIBIT NO. 4
APPLICATION NO. 1-99-075
Dept. of Fish & Game
PROJECT PLANS (Page 1 of 2)

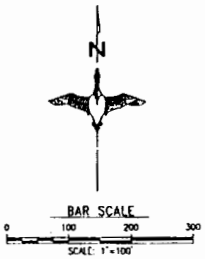
MATCH LINE SEE SHEET 2



TYPICAL CULVERT SECTION

TYPICAL DIKE SECTION

TYPICAL BORROW SECTION



90% DESIGN

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE

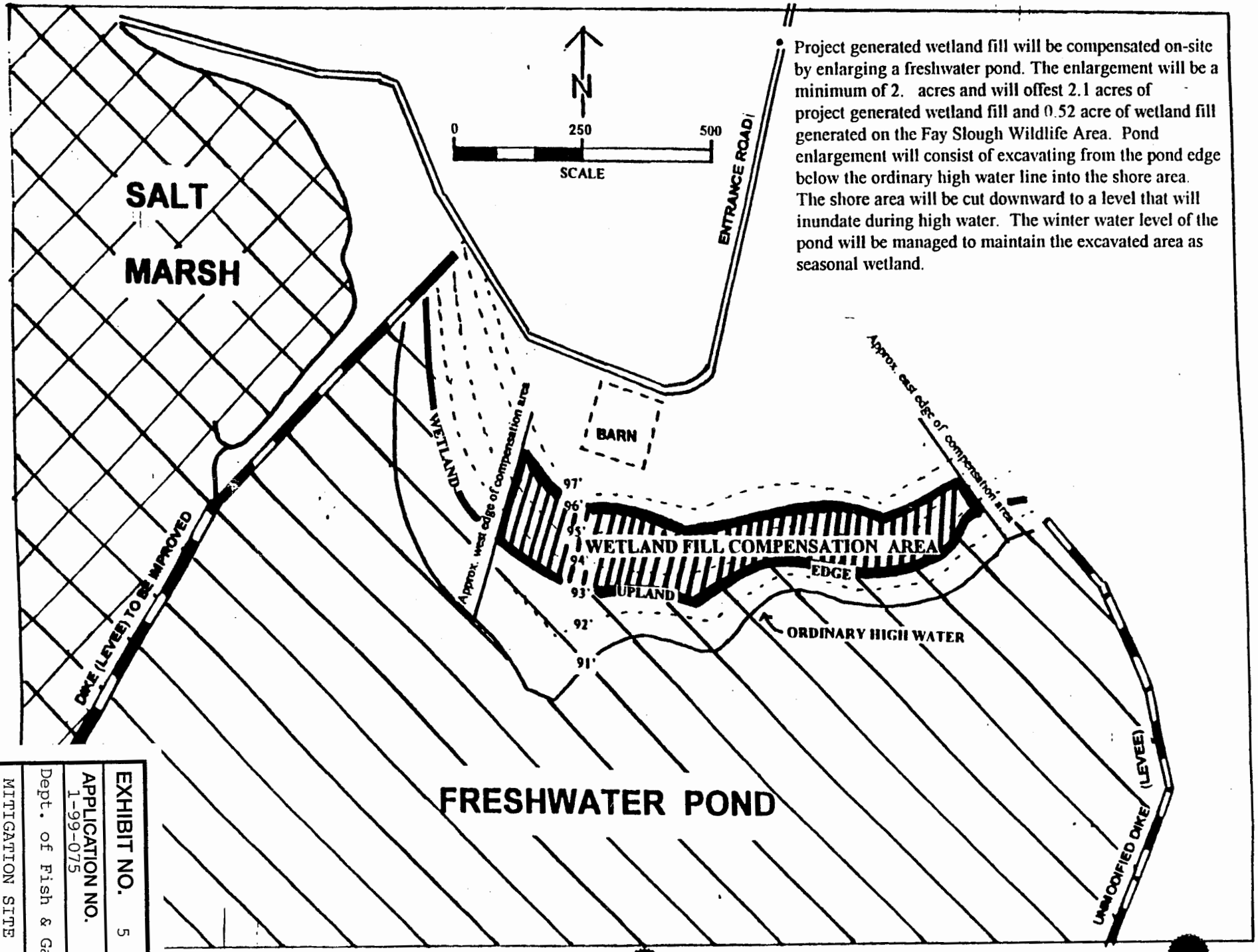
PROJECT NO. CA-0136-001

EEL RIVER W.A.
PLAN AND SECTIONS

DESIGNED BY: DWB
DRAWN BY: LEN
SURVEYED BY: BH
CHECKED BY: JPA

DATE: 02-16-99
SHEET NO. 3 OF 3
APPROVED BY

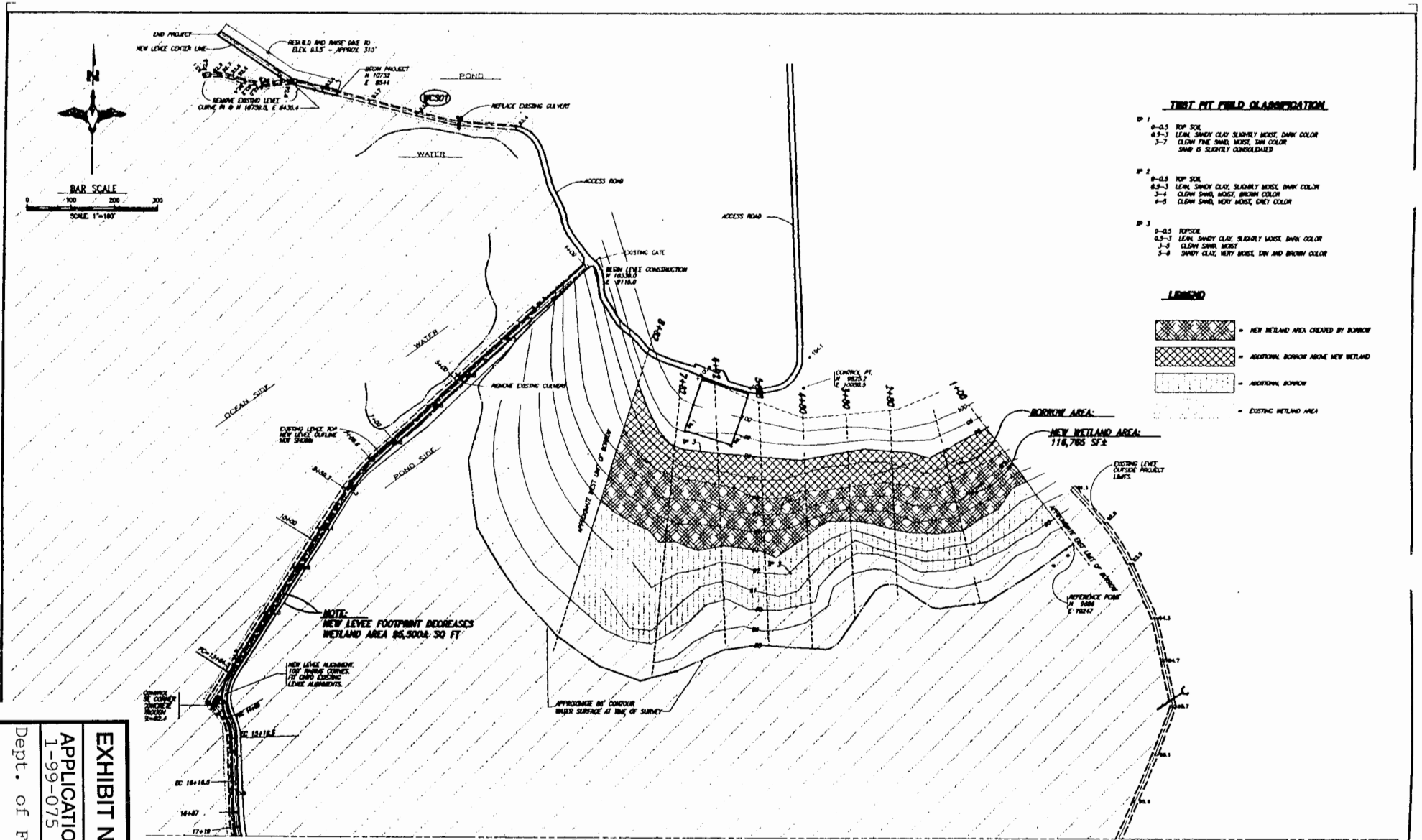
WETLAND FILL COMPENSATION PLAN



Project generated wetland fill will be compensated on-site by enlarging a freshwater pond. The enlargement will be a minimum of 2. acres and will offest 2.1 acres of project generated wetland fill and 0.52 acre of wetland fill generated on the Fay Slough Wildlife Area. Pond enlargement will consist of excavating from the pond edge below the ordinary high water line into the shore area. The shore area will be cut downward to a level that will inundate during high water. The winter water level of the pond will be managed to maintain the excavated area as seasonal wetland.

EXHIBIT NO. 5
APPLICATION NO. 1-99-075
Dept. of Fish & Game
MITIGATION SITE

PORTION OF THE EEL RIVER WILDLIFE AREA



PRELIMINARY

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE

PROJECT NO. CA-0138-001

EEL RIVER W.A.
PLAN OF NORTH HALF

DESIGNED BY: DSH
DRAWN BY: LSF/DSH
SURVEYED BY: BJ
CHECKED BY: JMF

DATE: 06-27-00
SHEET NO. 2 OF 7
APPROVED BY:
APPROVED BY:

Fig. 1

EXHIBIT NO. 6
APPLICATION NO. 1-99-075
Dept. of Fish & Game
MITIGATION PLAN

EEL RIVER WILDLIFE AREA
MONITORING PLAN

Project Proponent: California Department of Fish and Game

Project Manager: Terri Weist

Project Description

The objective of this project is to raise and realign levees that maintain freshwater ponds adjacent to the Eel River estuary (Fig. 1). Tidal action is eroding the current levee and will eventually compromise freshwater wetland habitat. Reconstruction of the existing levee involves increasing the height and width in order to hold water for the freshwater pond. One 24-inch culvert will be installed and two 24-inch culverts with water control gates will be replaced within the levee. Excavation of at least 2.7 acres on the north slope will convert upland habitat to an open water habitat. Water will be held in the pond via water control structures at the southern end. Implementation of this project will maintain and promote habitat diversity at the Eel River Wildlife Area (ERWA).

Current Environmental Condition

A sensitive plant survey and mitigation plan for this project was completed in June 1999 by Annie L. Eicher. This report described the vegetative conditions for the project site. The top of the secondary levee and road is compacted and gravelly with sparse vegetation cover. Plants are primarily weedy species including Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), birdsfoot trefoil (*Lotus corniculatus*), rabbitfoot grass (*Polypogon monspeliensis*), brass buttons (*Cotula coronopifolia*) and dock (*Rumex* spp.).

The vegetative characteristics surrounding the levee on the pond side is comprised of a mixture of fresh, brackish and saltwater species including creeping bentgrass (*Aster stolinifera*), bulrush (*Scirpus americana*), lupine (*Lupinus rivularis*, aster (*Aster chilensis*), salt rush (*Juncus lesueurii*), Pacific silverweed (*Potentilla anserina* ssp. *pacifica*), saltgrass (*Distichlis spicata*), perennial pickleweed (*Salicornia virginica*) and clover (*Trifolium wormskioldii*).

EXHIBIT NO. 7

APPLICATION NO. 1-99-075

Dept. of Fish & Game

PROPOSED MONITORING PLAN (Page 1 of 5)

The upland pasture was dominated by velvet grass (*Holcus lanatus*) with perennial ryegrass (*Lolium perenne*), dock (*Rumex* spp), buttercup (*Ranunculus orthorhynchus* var. *bloomeri*) and white clover (*Trifolium repens*).

One species of concern that was found during this botanical survey was the Humboldt Bay owl's cover (*Castilleja ambigua* ssp. *humboldtiensis*). This species is federally listed as a species of special concern and is on List 1B of the California Native Plant Society as endangered in a portion of its range. Mitigation was developed to reduce project-related impacts to this species. Seeds were collected in June 1999 from mature plants and replanted in February 2000 to an adjacent site that will not be impacted by the proposed project. The transplant site will be staked and contractors will be made aware of its existence and location in order to assure the site is protected.

Wildlife

Over 250 species of birds have been recorded in the Eel River Delta. Brown pelicans, ducks, herons, egrets, black-crowned night herons, sandpipers and other shorebirds are present on or near the project site. Other birds that inhabit the ERWA include raptors (kestrel, white-tailed kite, red-tailed hawk, northern harrier and others).

The ERWA hosts a variety of mammals including deer, coyote, bobcat, gray fox, racoon, skunks, beaver, mink, river otter etc.

Goals and Objectives

Levees constructed in the late 1800's and early 1900's to create farmland effectively prevented tidal action from the area. Freshwater habitat was created and increased the diversity of the area and wetland-associated wildlife. In 1994, the primary levee breeched creating tidal influence on approximately 300 acres. This area is now managed as mudflat and saltmarsh habitat. The internal levees need to be reinforced in order to withstand tidal action and maintain the freshwater wetland habitat, thereby increasing habitat diversity of the ERWA.

The newly created pond (Fig 2) will mitigate for wetland fill for both the levee construction for ERWA and for the Fay Slough Wildlife Area project (see the submitted monitoring plan for Fay Slough Wildlife Area). We expect the pond to provide habitat for water-associated birds such as waterfowl, shorebirds, wading birds etc.

Monitoring

Reinforcement of the internal dikes will prevent levee failure. The result of such action will provide a higher quality freshwater wetland habitat and consequently will contribute to the biological diversity at ERWA.

Twenty permanent photoplots will be established along the levees to document pond development and surrounding vegetative changes. Global Positioning Systems (GPS) will be used to obtain pond acreage and levee dimensions. The scale of this project is relatively small (i.e., 2.7 acre pond development) therefore, we don't expect to detect large increases in wildlife abundance. It is possible that species richness (e.g., the number of species present) may increase as a result of the project. Wildlife surveys will be conducted along the levees prior to project implementation and then biannually for five years (Fig.1). Surveys will be conducted in the spring (April-May) and the fall (October-November) to capture seasonal wildlife use of the project area. Annual wildlife surveys will be compared to pre-project data to see if the project affected species abundance.

Vegetation Monitoring

Although there will be no active planting of vegetation for this project, pre-project vegetation will be sampled to document change in vegetation following project implementation. Vegetation transects will be established at the upland site along or near the 97' contour line (borrow site) that will be excavated to create the pond (Fig. 2). Each 30-m transect will be comprised of 10, $1m^2$ quadrat plots. Transects will be surveyed annually in August (A. Eicher, pers. comm. and Pac. Estuarine Res. Lab. 1990).

Six cover classes will be used to estimate cover of wetland plant species (Pac. Estuarine Res. Lab. 1990) within each quadrat. Frequency histograms of cover classes

are readily compared with the Kolmogorov-Smirnov two-sample test (Pac. Estuarine Res. Lab. 1990). The project goal of wetland enhancement will be considered successful when plot data show $\geq$ 60% of wetland obligate/facultative or emergent wetland species are established.

Therefore, the criteria we will use to measure project success are the following:

- Pond establishment of at least 2.7 acres
- Increase in wetland vegetation (USFWS: ROIND wetland facultative, obligate facultative species) of 60% over baseline data.

Remedial Measures

If pond establishment is below expectations both in terms of holding water or in size, the adjacent levees will be examined for failure in structure. Should the cause be levee construction failure, the contractor will be called to rectify the situation. The levee then will be examined by a qualified engineer to certify its structural and operational integrity. Water control structures will also be examined and repaired if necessary.

If wetland vegetation is not established to the 60% level, habitat manipulation or augmentation through planting desired species may be warranted. Monitoring and reporting will continue until success criteria are met.

Reporting Schedule

Annual reports will be submitted to the Executive Director beginning 1December of 2002. The final monitoring report will be submitted to the Executive Director on the fifth year of the monitoring effort. The final report will contain all the data collected over the five year monitoring period accompanied by appropriate statistical analyses. The format will include an introduction, site plans and study area, methods used and analyses performed. A project evaluation of the project goals will be discussed.

Literature Cited

A. Eicher. 2000. Personal communication on project site. Wetland Ecologist for the County of Humboldt, Public Works.

Pacific Estuarine Research Laboratory. 1990. A manual for assessing restored and natural coastal wetlands with examples from southern California. Calif. Sea Grant Rept. No. T-CSGCP-021. La Jolla, California. 105 pp.