

REPORT

***Feral Animal Management
Program***

**University of California, Berkeley
Richmond Field Station
Richmond, California**

January 2004

BBL[®]
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

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Executive Summary

On September 4, 2003, the United States Army Corps of Engineers (USACE) issued a NWP 38 (File # 28135S) to University of California, Berkeley (UC Berkeley) for remediation and restoration of wetland areas within Western Stege Marsh. Western Stege Marsh is a portion of the Richmond Field Station (RFS) property owned by UC Berkeley (Figure 1). Remediation and restoration activities are being conducted in compliance with the requirements of the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, Order Number 01-102. As a condition of the Nationwide Permit 38 ([NWP 38], File # 28135S), UC Berkeley is submitting this report to detail a program that will address potential impacts of predation on the California Clapper Rail (*Rallus longirostris obsoletus* [CCR]) that may occur in the project area (Figure 2).

Major habitat types in the project area consist of coastal scrub and marsh habitats, as defined by the California Natural Diversity Database (CNNDDB). Figure 3 presents the location of existing habitat types in Western Stege Marsh prior to implementation of remedial activities authorized under the NWP 38. Figures 4 and 5 present habitat types as designed by remediation and restoration Alternatives 1 and 2, respectively, upon completion of restoration activities. Alternatives 1 and 2 are fully described in the Biological Assessment ([BA]; BBL, 2003a) submitted to USACE, along with a copy to the United States Fish and Wildlife Service (USFWS), in July 2003. Marsh habitat designed to exist within the project area following completion of restoration activities consists of high marsh, low marsh, tidal mudflat, and open-water slough habitats. The total area of marsh habitat within the project area is currently approximately 9.4 acres.

Restoration plans for the project area call for vegetative dominance in each habitat type (e.g., high marsh) to remain similar to that which existed prior to remediation and restoration activities. Following completion of restoration activities, between 4.07 (Alternative 1) and 2.55 (Alternative 2) acres of marsh habitat will be created, in addition to the existing 9.4 acres. Additionally, ecotone areas will be created to allow for a gradual transition between marsh and upland habitats. During restoration activities, UC Berkeley will implement a marsh restoration plan and invasive/exotic species control program in the project area and surrounding areas, in compliance with conditions of the NWP 38. Revegetation and invasive/exotic species control programs will be designed to increase vegetative diversity and reduce the presence of invasive/exotic species in the project area.

On September 17, 2002, USACE issued a NWP 38 for work within Subunit 2A. Under the NWP 38, excavation and remediation of the upland portion of Subunit 1 was completed by Zeneca Inc.'s contractor, along with a portion of Subunit 2A in the fall of 2002. Due to the work schedule restrictions placed by USFWS to limit disturbance of CCR, it was not possible to complete the full extent of work authorized under the permit. UC Berkeley submitted a request for modification to the NWP 38 (BBL, 2003b) to the USACE, along with a copy to the USFWS, in order to allow completion of remediation activities in the remaining authorized area and two additional areas within Western Stege Marsh.

USACE and USFWS reviewed a BA submitted by UC Berkeley (BBL, 2003a) following the request for modification of the NWP 38. Following review, USFWS issued a Biological Opinion (BO) regarding the impact of remediation and restoration work on CCR, and USACE issued a NWP 38 (File # 28135S) on September 4, 2003 to UC Berkeley for remediation and restoration of wetland areas within Western Stege Marsh. The NWP 38 stated that remediation and restoration activities must be implemented as described in the request for modification to the previous NWP 38 and the BA. Additionally, terms and conditions imposed in the USFWS BO must also be implemented. The USFWS terms and conditions were as follows:

- UC Berkeley must develop a management plan for non-native plant species within the Stege Marsh area under UC Berkeley's jurisdiction; and

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- UC Berkeley must develop a plan to manage feral animals on the RFS.

A separate invasive/exotic species control program has been developed by UC Berkeley and will be submitted in compliance with the conditions of the NWP 38.

The feral animal management program (the Program) is designed to reduce the impact of predation on CCR by feral animals in Western Stege Marsh. Feral animals targeted by the Program will include those wild, undomesticated animals that may potentially prey on CCR. The primary feral animals that have been observed on the RFS and may prey on CCR include feral cats, rats, raccoons, skunks, and red fox. The Program will include the following three aspects:

- Provide CCR with refugia by creating gradually sloping ecotone edges between marsh and upland habitats that will be dominated by tall (i.e., 3 to 4 feet) herbaceous native species interspersed with small shrubs;
- Actively manage feral predators in and around the northern boundary of Western Stege Marsh through various methods, including food source reduction, shelter reduction, and trapping and removal; and
- Institute an educational program for the RFS and surrounding community that describes the feral animal management program and its relation to CCR conservation. Educational outreach will also include components to address the dangers that domestic pets pose to CCR in the Western Stege Marsh.

Implementation of the Program will be staggered to accommodate logistic matters associated with coordinating the Program, authoring materials, and to accommodate restrictions placed on remediation activities by the NWP 38 due to CCR breeding season and proximity to potential breeding habitat. The Program will be implemented during the same time period as the restoration monitoring program as outlined in the BA.

1. Introduction

On September 4, 2003, the United States Army Corps of Engineers (USACE) issued a Nationwide Permit 38 ([NWP 38], File # 28135S) to the University of California, Berkeley (UC Berkeley) for remediation and restoration of wetland areas within Western Stege Marsh. Western Stege Marsh is a portion of the Richmond Field Station (RFS) property owned by UC Berkeley and is located at 1301 South 46th Street, Richmond, Contra Costa County, California. The location of the RFS is shown on Figure 1. Remediation and restoration activities are being conducted in compliance with the requirements of the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, Order Number 01-102. This report presents a feral animal management program (the Program) that UC Berkeley is required to implement on the RFS as a condition of the NWP 38. Feral animals targeted by the Program will include those wild, undomesticated animals that may potentially prey on California Clapper Rail (*Rallus longirostris obsoletus* [CCR]). This report was prepared by Blasland, Bouck & Lee, Inc. (BBL) in coordination with URS Corporation (URS) on behalf of UC Berkeley to address potential impacts of predation on the CCR that may occur in Western Stege Marsh and the adjacent upland areas. Western Stege Marsh and the adjacent upland areas are part of the project area covered under the NWP 38. The project area is shown on Figure 2, and a full description of the project area boundaries is presented in Section 1.2.1.

1.1 Report Organization

- The remainder of Section 1 presents the site description, consultation background, and Program overview;
- Section 2 details the feral animal management program; and
- Section 3 presents references used to generate this report.

1.2 Project Setting

The following sections describe the physical and ecological setting of the project area that is affected by remediation and restoration activities authorized under the NWP 38.

1.2.1 Physical Description and RWQCB Area Designations

The RFS is currently owned by the UC Regents for use by the UC Berkeley campus and is located at 1301 South 46th Street in Richmond, California (Figure 1). The RFS occupies approximately 162 acres and consists of approximately 90 acres of upland, industrial-zoned land used primarily for research and education, and approximately 72 acres of marsh and tidal mudflat. Of the 72 offshore acres, approximately 9.4 acres, located within the inner portion of Western Stege Marsh, are covered under the RWQCB order. The RFS is bounded by Meade Street off Interstate 580 to the north, by Meeker Slough/Regatta Boulevard to the west, and by South 46th Street to the east. The East Bay Regional Park District (EBRPD) Bay Trail transects the marsh portion of the RFS property known as Western Stege Marsh. Cherokee Simeon Ventures (CSV) owns the property (formerly owned by Zeneca Inc. [Zeneca]) to the east of the RFS boundary, where it is in the process of redevelopment.

The RFS and adjacent Zeneca properties are identified as the Meade Street Operable Unit (MSOU). The MSOU was subdivided into two operable units identified as Subunits 1 and 2. Subunit 1 encompasses the Zeneca

property and the eastern portion of Stege Marsh (Eastern Stege Marsh), and Subunit 2 encompasses the RFS property and the western portion of Stege Marsh (Western Stege Marsh). Subunit 2 was further divided into Subunits 2A and 2B. Subunit 2A includes the southeastern portion of the upland portion of the RFS and the eastern portion of Western Stege Marsh. Subunit 2B includes the remainder of the uplands and the western portion of Western Stege Marsh.

The project area is located in Subunit 2A and Subunit 2B (upland and marsh areas), and the adjacent area of Meeker Slough (Figure 2). The project area is bounded to the west by the western shore of Meeker Slough, to the north by the developed portion of the RFS, to the east by Subunit 1, and to the south by the EBRPD Bay Trail. The NWP 38 permits activities below 5 feet National Geographic Vertical Datum (NGVD) in Western Stege Marsh.

1.2.2 Ecological Setting

Natural areas of the RFS, Stege Marsh, and Meeker Slough consist of a variety of habitat types that support a number of vegetation series and associations. The major natural habitat types occurring at the RFS include coastal scrub (California Natural Diversity Database [CNDDDB] 32.000.00), native grasslands (CNDDDB 41.000.00), non-native grasslands (CNDDDB 42.000.00), meadows and seeps (CNDDDB 45.000.00), and muted tidal marsh (CNDDDB 52.000.00), tidal mudflats, and open slough channels. There are also several man-made landscaped habitats, such as herbaceous groundcovers and eucalyptus and other ornamental tree groves. Many habitats within the project area have been previously disturbed by human activities.

Major habitat types in the project area consist of coastal scrub and marsh habitats, as defined by the CNDDDB. Figure 3 presents the location of existing habitat types in Western Stege Marsh prior to implementation of remedial activities authorized under the NWP 38. Figures 4 and 5 present habitat types as designed by remediation and restoration Alternatives 1 and 2, respectively, upon completion of restoration activities. Alternatives 1 and 2 are fully described in the Biological Assessment ([BA]; BBL, 2003a) submitted to the USACE, along with a copy to the United States Fish and Wildlife Service (USFWS), in July 2003.

Marsh habitat designed to exist within the project area following completion of restoration activities consists of high marsh, low marsh, tidal mudflat, and open-water slough habitats. The total area of marsh habitat within the project area is currently approximately 9.4 acres. Following completion of restoration activities, between 4.07 (Alternative 1) and 2.55 (Alternative 2) acres of additional marsh habitat will be created. High marsh is currently dominated by emergent vegetation consisting primarily of *Distichlis spicata* (salt grass), with some *Scirpus robustus* (alkali bulrush), *Grindelia stricta angustifolia* (marsh gum plant), and *Jaumea carnosa* (jaumea). Middle marsh areas are currently dominated by *Salicornia virginica* (pickleweed). Low marsh is currently dominated by *Spartina foliosa* (Pacific cordgrass), which has been confirmed by genetic testing. Tidal mudflat is primarily devoid of vegetation and is associated with slough channels that run through the project area.

Marsh habitat is currently separated from coastal scrub habitat on the northern boundary by a concrete riprap berm approximately 10 feet wide. The EBRPD Bay Trail forms the southern boundary of the inner portion of marsh habitat. Both areas create an abrupt transition zone between marsh and upland and are heavily vegetated with a mixture of native and non-native vegetation. On the outboard side of the EBRPD Bay Trail, marsh habitat transitions from areas supporting pickleweed and cordgrass to tidal mudflats and open water habitats. Restoration plans for the project area include removal of the riprap berm on the northern boundary and subsequent creation of an ecotone between marsh and upland habitats.

Coastal scrub habitat is present on the northern portion of the project area in a backfill area known as the “bulb” and along a small berm area in the southern portion of the project area (the island). Dominant vegetation is *Baccharis pilularis* (coyote brush), with large populations of *Foeniculum vulgare* (fennel). Other species associated with coastal scrub habitat in the project area include *Cortderia seloana* (pampas grass), *Cytisus scoparius* (Scotch broom), *Heteromeles arbutifolia* (toyon), various cotoneaster species, *Hordeum brachyantherum* (meadow barley), *Raphanus sativus* (wild radish), *Carduus pycnocephalus* (Italian thistle), *Avena sp.* (wild oats), *Bromus diandrus* (ripgut brome), *Toxicodendron diversilobum* (poison oak), and several invasive/exotic grasses (URS, 2003). Under Alternative 1 restoration plans, the bulb area is designated to be regraded to allow for creation of middle marsh habitat. Coastal scrub habitat is retained on the bulb in restoration plans for Alternative 2.

The main hydrologic feature of the project area is Meeker Slough, which is approximately 40 to 50 feet wide in the project area. The bottom elevation of Meeker Slough in the project area ranges from approximately 0 to -1.0 foot NGVD (URS, 2003).

Restoration plans for the project area call for vegetative dominance in each habitat type (e.g., high marsh) to remain similar to that which existed prior to remediation and restoration activities. Additionally, ecotone areas will be created to allow for a gradual transition between marsh and upland habitats. During restoration activities, UC Berkeley will implement a marsh restoration plan and invasive/exotic vegetation management program in the project area and surrounding areas in compliance with conditions of the NWP 38. Revegetation and invasive/exotic vegetation management programs will be designed to increase vegetative diversity and reduce the presence of invasive/exotic species in the project area.

1.3 Consultation Background

Phase 1 of the multiphase remediation program for the RFS was performed from September through December 2002 and included work in marsh and upland portions of Subunit 2A. The adjacent property (former Zeneca site) also performed remedial work for the upland portion of Subunit 1 from September through December 2002. In preparation for this work, wetland areas were delineated, and Levine Fricke (LFR), on behalf of Zeneca submitted a Joint Aquatic Resource Permit Application (JARPA) on September 11, 2001, for Subunit 1 and 2A on behalf of Zeneca. Based on additional characterization of the marsh by UC Berkeley, a modified excavation boundary was established. A revision to the work area and the addition of UC Berkeley as a co-permittee were requested in a supplemental report provided to the USACE and the USFWS (URS, 2002). Zeneca and UC Berkeley used the same construction contractor to perform the Phase 1 work. However, subsequent work at the RFS, including Western Stege Marsh, will be performed by UC Berkeley construction contractors. Eastern and Western Stege Marsh are now independent projects. Western Stege marsh is contained within the boundaries of the UC Berkeley project area.

Two meetings were held with David Wooten of the USFWS to discuss results of CCR surveys conducted during February 2002 by LFR and to discuss potential impacts of the remediation and restoration program on CCR. Following agreements reached to limit impact to CCR (i.e., work restricted outside of CCR habitat and a 150-foot buffer zone during breeding season), USACE issued a NWP 38 on September 17, 2002, for work within Subunit 2A. Under the Nationwide 38 permit, excavation and remediation of the upland portion of Subunit 1 was completed by Zeneca’s contractor, along with a portion of Subunit 2A in the fall of 2002. Due to the restricted work schedule, it was not possible to complete the full extent of work authorized under the permit.

In preparation for the second phase of work in 2003, URS performed additional CCR surveys on behalf of UC Berkeley in February 2003. BBL, on behalf of UC Berkeley, submitted a request for modification to the NWP

38 (BBL, 2003b) to the USACE, along with a copy to the USFWS, in order to allow completion of remediation activities in the remaining authorized area and two additional areas within Western Stege Marsh.

Approval of the Nationwide 38 permit modification request required a Biological Opinion (BO) from the USFWS. Therefore, UC Berkeley submitted a BA (BBL, 2003a) to assist the USFWS with preparation of the BO evaluating potential impacts of the proposed remedial activities on sensitive species and habitats. The BA presented information regarding the project area, remedial alternatives, potential impacts to CCR, and a proposed mitigation plan. Following the USACE's and USFWS's review of the BA, the USACE issued a NWP 38 (File # 28135S) on September 4, 2003, to UC Berkeley for remediation and restoration of wetland areas within Western Stege Marsh. The NWP 38 stated that remediation and restoration activities must be implemented as described in the request for modification to the previous NWP 38 (BBL, 2003b) and the BA (BBL, 2003a). Additionally, terms and conditions imposed in the USFWS BO must also be implemented. The USFWS terms and conditions were as follows:

- UC Berkeley must develop a management plan for non-native plant species within the Stege Marsh area under UC Berkeley's jurisdiction; and
- UC Berkeley must develop a plan to manage feral animals in the vicinity of the project area.

A separate invasive/exotic species control program has been developed by UC Berkeley and will be submitted in compliance with the conditions of the NWP 38. This report details specifics of the feral animal control program that UC Berkeley will institute at the RFS. A Program overview is provided in Section 1.4, and a detailed description of the Program is provided in Section 2.0.

1.4 Program Overview

CCR adults, young, and eggs are susceptible to predation by a variety of different animals. Predators known to prey on CCR include feral and domestic cats (*Felis domesticus*), Norway rats (*Rattus norvegicus*), raccoons (*Procyon lotor*), and red foxes (*Vulpes fulva*) (Goals Project, 2000). The Program outlined in this report is designed to reduce the impact of predation on CCR by feral animals in Western Stege Marsh. Feral animals targeted by the Program will include those wild, undomesticated animals that may potentially prey on CCR. The primary feral animals that have been observed on the RFS and may prey on CCR include feral cats, rats, raccoons, skunks, and red foxes. The Program will include the following three aspects:

- Provide CCR with refugia habitat;
- Actively manage feral predators in and around the northern boundary of Western Stege Marsh; and
- Institute an educational program regarding feral animal management, including domestic cats, for the RFS and surrounding community.

Details regarding these three aspects of the Program are presented in Section 2.0.

2. Feral Animal Management Program Description

The feral animal management program is designed to help reduce the impact of feral animal predation on CCR in Western Stege Marsh. Implementation of such a program is required by the BO issued by the USFWS and is included as a condition of the NWP 38. The primary feral animals that may prey on CCR in Western Stege Marsh include feral cats, rats, raccoons, skunks, and red foxes. The Program is composed of three aspects: ecotonal refugia creation/enhancement, active feral population control, and educational outreach. These aspects are described in the following sections.

2.1 Ecotone Refugia Creation/Enhancement

The presence of ecotonal edge between marsh and upland habitats is an important physical attribute that influences CCR survival. During high tides, CCR are forced into ecotone edges adjacent to marsh habitat. Therefore, dense vegetation in these areas creates refugia for CCR from predators until tides recede. Ecotone areas between marsh and upland habitats that contain appropriate vegetation density and height may reduce the impact of predation upon CCR (Goals Project, 2000).

The restoration design in Alternative 1 and 2, as presented in the BA, call for creation of gradually sloping ecotone edges between the high marsh and upland habitats. Ecotonal edges will be created through removal of steep riprap areas, where appropriate (e.g., northern edge of Western Stege Marsh), and proper regrading of the project area following remediation. Removal of rip rap areas will reduce habitat available for predators such as rats. Ecotone edges should be dominated by tall (i.e., 3 to 4 feet) herbaceous native species, interspersed with small shrubs, to provide cover from predators for CCR during high tides. Ecotone areas should be monitored during the invasive/exotic species control program to create a diverse habitat and to prevent the dominance of non-native species that may decrease the value of these habitats for CCR use. The Program also plans to reduce perching areas near Western Stege Marsh that may attract large raptors (e.g., red-tailed hawk), which may prey upon CCR, by preventing the establishment of large woody growth in ecotone areas during the invasive/exotic species control plan and by removing the large eucalyptus tree at the edge of the marsh. Additionally, UC Berkeley is working with EBRPD to implement installation of a “no-climb” fence on the slope on the southern edge of Western Stege Marsh along the EBRPD trail to reduce accessibility of the ecotone area to feral predators, domestic animals, and human traffic that frequents the EBRPD trail.

2.2 Active Feral Predator Management

UC Berkeley will undertake steps to actively manage feral predators on the RFS. Feral predators targeted for active management include those wild, undomesticated animals that may potentially prey on CCR. Aspects of active control programs for each of the main feral predators expected to be present on the RFS are presented below.

Feral Cats

One of the largest feral predator problems on the RFS is the presence of up to 15 feral cats. Feral cats on the RFS and in the surrounding area may prey on CCR adults and young in transition areas between marsh and upland habitats during high tides. Abrupt transition areas, as they currently exist, between marsh and upland increase the likelihood of predation on adults and young during high tides. Creation of ecotone edges between the high marsh and upland habitats, as presented in Section 2.1, will help reduce the likelihood of predation by providing additional, accessible refugia for CCR. The following initial steps should be implemented to reduce use of the RFS by the current population of feral cats:

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- Reduce access to shelter areas underneath buildings on the RFS by sealing access points to prevent use; and
 - Implement an educational program for UC Berkeley employees and students to inform them that feeding feral cats on the RFS endangers CCR populations in Stege Marsh.

Long-term solutions for feral cat management on the RFS include reduction of food sources (i.e., rats and mice), reduction of shelter (i.e., beneath buildings), and trapping and removal. Reduction of rat and mouse populations on the RFS may be accomplished through trapping and removal, as discussed below. Reduction of shelter can be accomplished by sealing holes that allow access under RFS buildings. Trapping of feral cats will occur on the edges of the marsh and on the bulb in order to target those cats that may potentially use the marsh for foraging. UC Berkeley will work in coordination with local organizations, such as the Contra Costa Humane Society or the Feral Cat Foundation, to implement the trapping program and to provide advice relevant to removal of the trapped animals.

Rats and Mice

Rats on the RFS may prey on CCR eggs and young, while mice attract feral cats to the RFS, which may in turn prey on CCR adults and young. Rats and mice occur naturally on the RFS and in the surrounding area. Several steps that should be conducted to reduce rat and mouse populations on the RFS include:

- Reducing access to food sources, such as compost and garbage bins.
- Trapping and removing rats and mice on the RFS. Rats and mice will be trapped along the marsh edge at the RFS and in areas known to harbor large populations (e.g., garbage bins and compost piles).
- Removing rip rap areas along the northern edge of Western Stege Marsh, as they provide ample habitat that rats can use for shelter and foraging.

Skunks and Raccoons

Skunks and raccoons on the RFS and in the surrounding area may prey on CCR eggs. Long-term solutions, such as trapping and removal, are likely one of the few activities that would impact use of the RFS by these feral predators. Trapping of raccoons and skunks will occur on the RFS along edges of the marsh and on the bulb in order to target those animals that may potentially use the marsh for foraging. UC Berkeley will seek proper permits and California Department of Fish and Game (CDFG) guidance before conducting trapping and removal programs for these animals.

Red Foxes

Red foxes have been previously observed on the RFS. However, none have been noted recently. Red foxes, potentially present on the RFS and in the surrounding area, may prey on CCR eggs, adults, and young. Abrupt transition areas, as they currently exist, between marsh and upland habitats increase the likelihood of predation on adults and young during high tides. Creation of ecotone edges between the high marsh and upland, as presented in Section 2.1, will help reduce the likelihood of predation. Long-term solutions, such as trapping and removal of red foxes, are likely one of the few activities that would impact their use of the RFS. Red foxes, if trapped, can not be relocated in the state of California and must be destroyed. UC Berkeley will seek proper permits and CDFG guidance before conducting trapping and removal programs for these animals.

2.3 Educational Outreach

An educational outreach program will be initiated at the RFS and in the surrounding community to raise awareness of the issues associated with domestic cat and feral animal predation on CCR and to propose solutions to decrease predation. Educational materials should provide an overview of the Western Stege Marsh restoration program and its relation to CCR habitat and conservation. Materials should also outline the problems that feral predator populations pose for CCR conservation. Educational materials may take various forms, such as pamphlets for public distribution, signs posted in and around the RFS, and public discussions held by UC Berkeley or other interested parties. Additionally, the educational outreach program will provide information to and solicit help from surrounding land owners to help address CCR conservation issues.

Providing individuals on the RFS and in the surrounding community with information regarding the need for a feral animal management program will spread awareness of the Program and promote understanding of measures to be taken. Additionally, providing the surrounding community with information regarding the dangers that domestic animal populations (i.e., cats and dogs) may pose to CCR conservation will increase awareness and allow the larger community to undertake responsibility in preventing predation or disturbance by domestic pets. Furthermore, providing interested parties with solutions to CCR predator issues will help involve the larger community in the Program and increase the Program's chance for success. UC Berkeley will produce a short pamphlet regarding the Program for distribution to interested parties and will meet with EBRPD and the City of Richmond regarding installation of interpretive signs along public venues (e.g., EBRPD trail) adjacent to Western Stege Marsh. Additionally, UC Berkeley will work with local groups to organize meetings that provide information regarding the Program. UC Berkeley will also attend neighboring homeowner association meetings to disseminate information about and solicit help for the Program.

2.4 Implementation Schedule

Implementation schedule for the three aspects of the Program vary due to logistic matters associated with the Program and with the overall remediation and restoration efforts. The following bullets outline scheduling for each aspect of the Program:

- Creation/enhancement of ecotone areas is dictated by remediation schedules. As remediation and final grading is completed in the project area, ecotone creation/enhancement will be addressed. However, it should be noted that, in accordance with the NWP 38, no major construction activities may occur within 200 feet of Western Stege Marsh from February 1st through September 1st to reduce occurrence of incidental take on CCR.
 - The invasive/exotic species control program, which will help create densely vegetated ecotones, will begin in the eastern portion of the project area during the first quarter of 2004 following completion of remediation and regrading activities in this area.
 - Planting of native vegetation will begin in the marsh and ecotone areas in the eastern portion of the project area during the first quarter of 2004 following completion of remediation and regrading activities in this area.
 - Removal of the large eucalyptus tree on the bulb will occur after September 1, 2004, when remediation activities in Western Stege Marsh may recommence.
 - UC Berkeley will meet with EBRPD to discuss installation of the “no-climb” fence along the EBRPD trail in the first or second quarter of 2004. If approved, installation of the fence will occur during completion of remedial activities in 2004/2005, in accordance with construction restraints placed by the NWP 38.
 - Removal of rip rap areas and creation of additional ecotone will occur in 2004/2005.

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- Active management of feral predators will begin in the second or third quarter of 2004. Prior to initiation of this aspect, UC Berkeley will contact local organizations, such as the Contra Costa Humane Society and the Feral Cat Foundation, to obtain support for the Program and CDFG to acquire necessary permits.
 - UC Berkeley will initiate communication with the City of Richmond and EBRPD in the second quarter of 2004 to negotiate installation of interpretive signs around the RFS. Additionally, UC Berkeley will begin planning group meetings to provide information regarding the Program. Meetings will be targeted towards RFS employees, students, and the surrounding community. UC Berkeley will also begin authoring a short pamphlet describing the Program for production and distribution in the second or third quarter of 2004.

UC Berkeley will continue implementation of the Program through conclusion of the restoration monitoring program for Western Stege Marsh, as outlined in the BA.

3. References

Blasland, Bouck & Lee, Inc. 2003a. *Richmond Field Station Remediation Project Biological Assessment Report*. July, 2003.

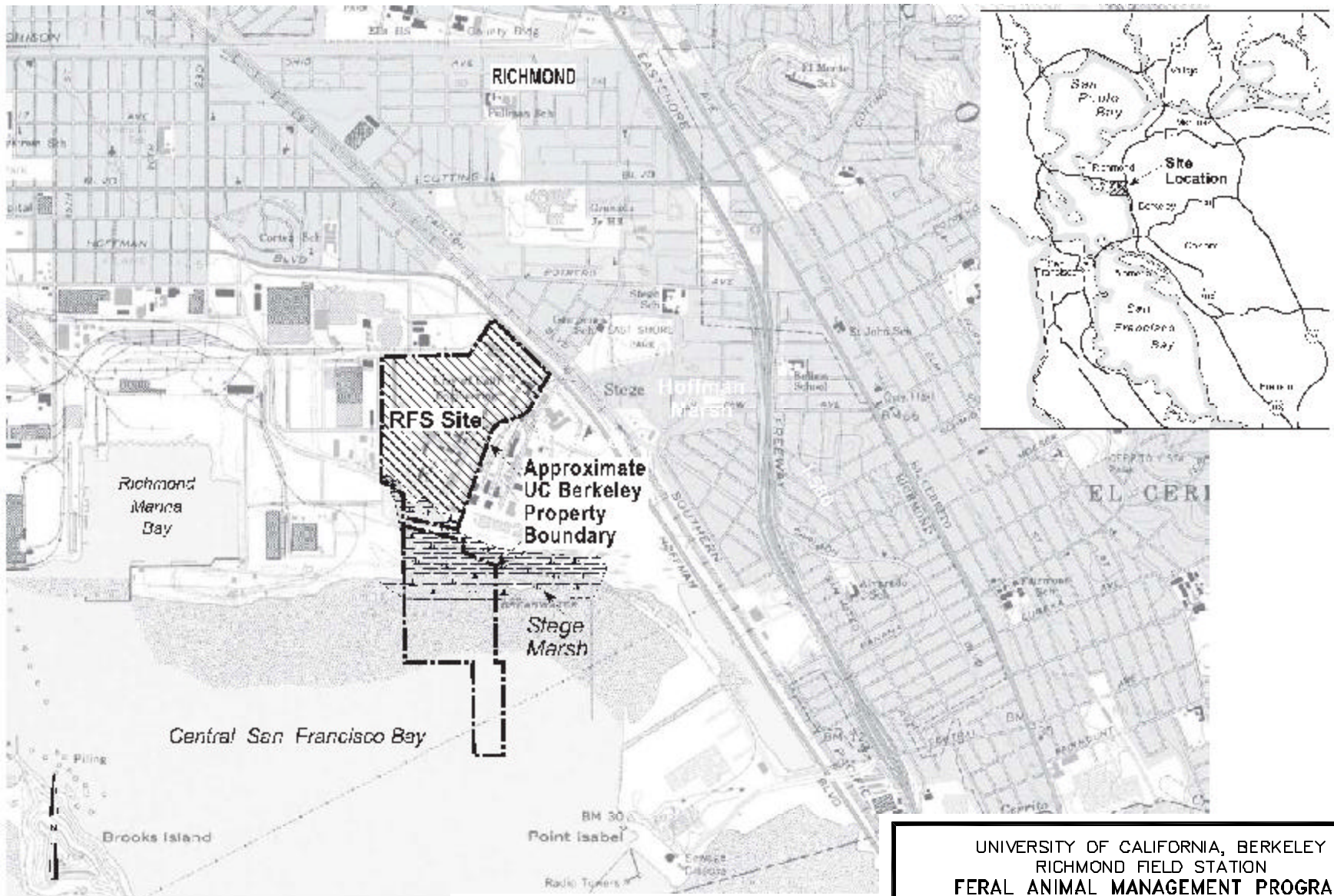
Blasland, Bouck & Lee, Inc. 2003b. *Nationwide Permit 38 Modification Request (ACOE File No. 26417S), Western Stege Marsh Remediation and Restoration Project at Richmond Field Station, Richmond, California*. July, 2003.

Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. Oakland, California: San Francisco Bay Regional Water Quality Control Board.

URS. 2002. Meade Street Operable Unit, Subunits 1 and 2A, U.S. Army Corps of Engineers File Number 26417S (June 5, 2002).

URS. 2003. *Richmond Field Station Remediation Project, Initial Study, California Environmental Quality Act*. May, 2003.

Figures



0 3000 feet

Map Scale: USGS, 7.5 min. Contour map, Richmond, California, 1980 revised

NOTE:
 MAP WAS PREPARED FROM A USGS TOPOGRAPHIC 7.5 MIN QUADRANGLE PROVIDED BY URS ON 7/8/03

UNIVERSITY OF CALIFORNIA, BERKELEY
 RICHMOND FIELD STATION
 FERAL ANIMAL MANAGEMENT PROGRAM

SITE LOCATION MAP

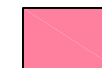


FIGURE
1

X: FIGURE 1 SITE LOC MAP.TFF
 L: OFF=REF
 P: PAGESET/PLT-AL
 1/14/04 IRV-80-JMS
 F:/BM/CAD/2004PROJ/24210.410/24210SL1.DWG



LEGEND:



ZENECA PROPERTY (SUBUNIT 1)



RICHMOND FIELD STATION PROPERTY (SUBUNIT 2 & OFFSHORE PROPERTY)

NOTE:

FIGURE PROVIDED BY URS CORPORATION.

UNIVERSITY OF CALIFORNIA, BERKELEY
RICHMOND FIELD STATION
FERAL ANIMAL MANAGEMENT PROGRAM

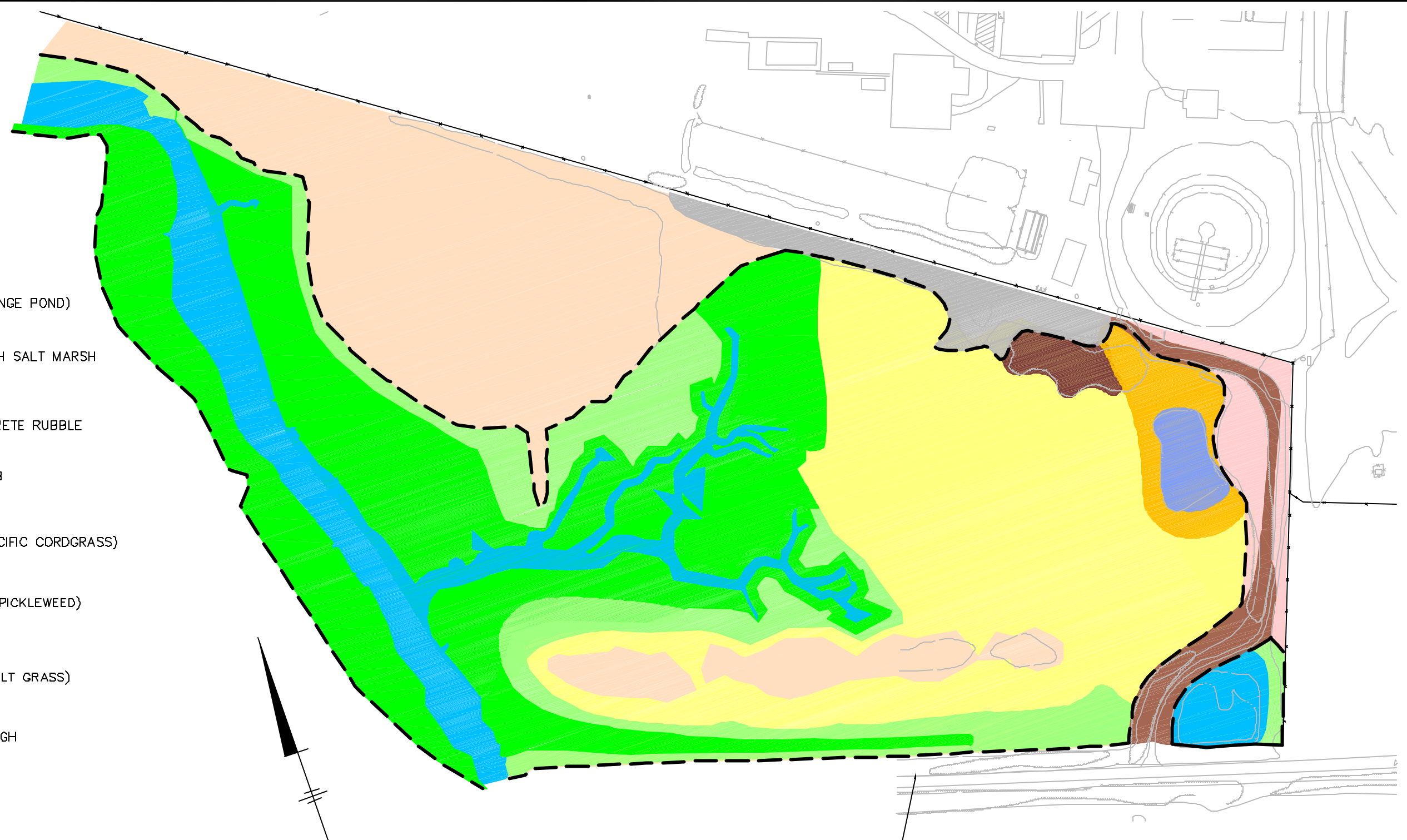
**SUBUNITS 2A AND 2B
LOCATIONS AND BOUNDARIES**



FIGURE
2

LEGEND

- PAMPAS GRASS
0.2 ACRES
- WALKING PATH
0.25 ACRES
- SURFACE WATER (ORANGE POND)
0.1 ACRES
- DISTRESSED/DEAD HIGH SALT MARSH (SALT GRASS)
0.2 ACRES
- COYOTE BRUSH/CONCRETE RUBBLE
0.3 ACRES
- MIXED RUDERAL SCRUB
2.5 ACRES
- LOW SALT MARSH (PACIFIC CORDGRASS)
3 ACRES
- MIDDLE SALT MARSH (PICKLEWEED)
1.4 ACRES
- HIGH SALT MARSH (SALT GRASS)
3.7 ACRES
- SURFACE WATER/SLOUGH
1.1 ACRES
- ALKALI BULRUSH
0.1 ACRES
- FENCE LINE
- BOUNDARY BETWEEN UPLAND AND MARSH (~ 5' NGVD)



EBRPD Bay Trail



- NOTES:
- 1) SOME PORTIONS OF THE HIGH SALT MARSH (SALT GRASS) AREAS ALONG THE EBRPD BAY TRAIL ALSO CONTAIN INTERMITTENT PATCHES OF PICKLEWEED.
 - 2) 14 ACRES TOTAL WATER AND WETLANDS IN PROJECT AREA.
 - 3) BASE MAP SUPPLIED BY URS ON 7/9/03 AT A SCALE OF 1"=100'.

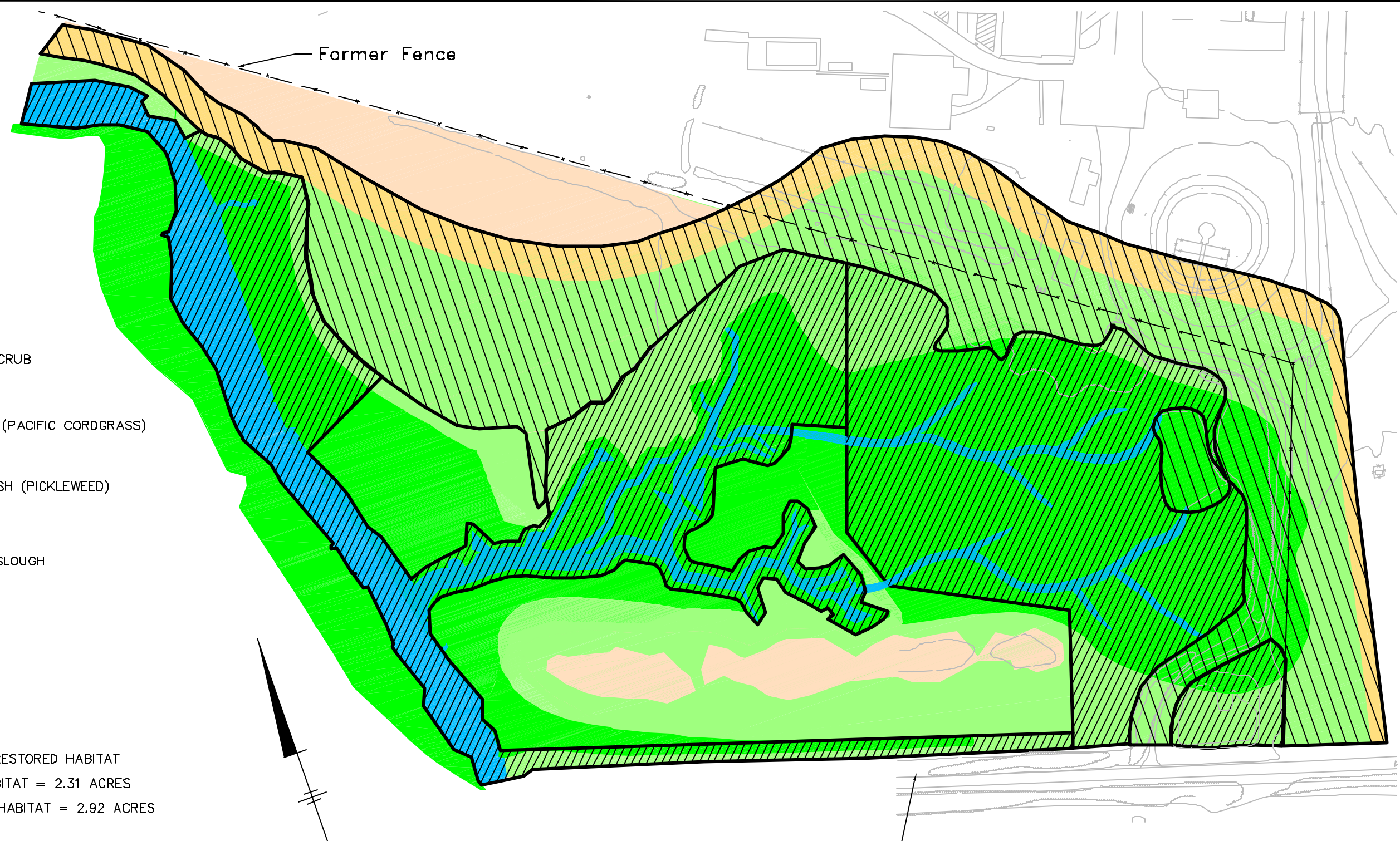
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FERAL ANIMAL MANAGEMENT PROGRAM

**WESTERN STEGE MARSH
PRE-CONSTRUCTION HABITATS**



FIGURE
3

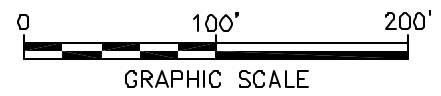
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P: PAGESET/PLT-BL
1/14/04 IRV-BD-JMS
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LEGEND

- MIXED RUDERAL SCRUB
- LOW SALT MARSH (PACIFIC CORDGRASS)
- MIDDLE SALT MARSH (PICKLEWEED)
- SURFACE WATER/SLOUGH
- ECOTONE
- FENCE LINE
- DISTURBED AND RESTORED HABITAT
LOW QUALITY HABITAT = 2.31 ACRES
MEDIUM QUALITY HABITAT = 2.92 ACRES
- CREATED WETLAND = 4.08 ACRES

TOTAL ACRES RESTORED AND CREATED = 9.31



EBRPD Bay Trail

- NOTES:
- 1) SOME PORTIONS OF THE HIGH SALT MARSH (SALT GRASS) AREAS ALONG THE EBRPD BAY TRAIL ALSO CONTAIN INTERMITTENT PATCHES OF PICKLEWEED.
 - 2) BASE MAP SUPPLIED BY URS ON 7/9/03 AT A SCALE OF 1"=100'.

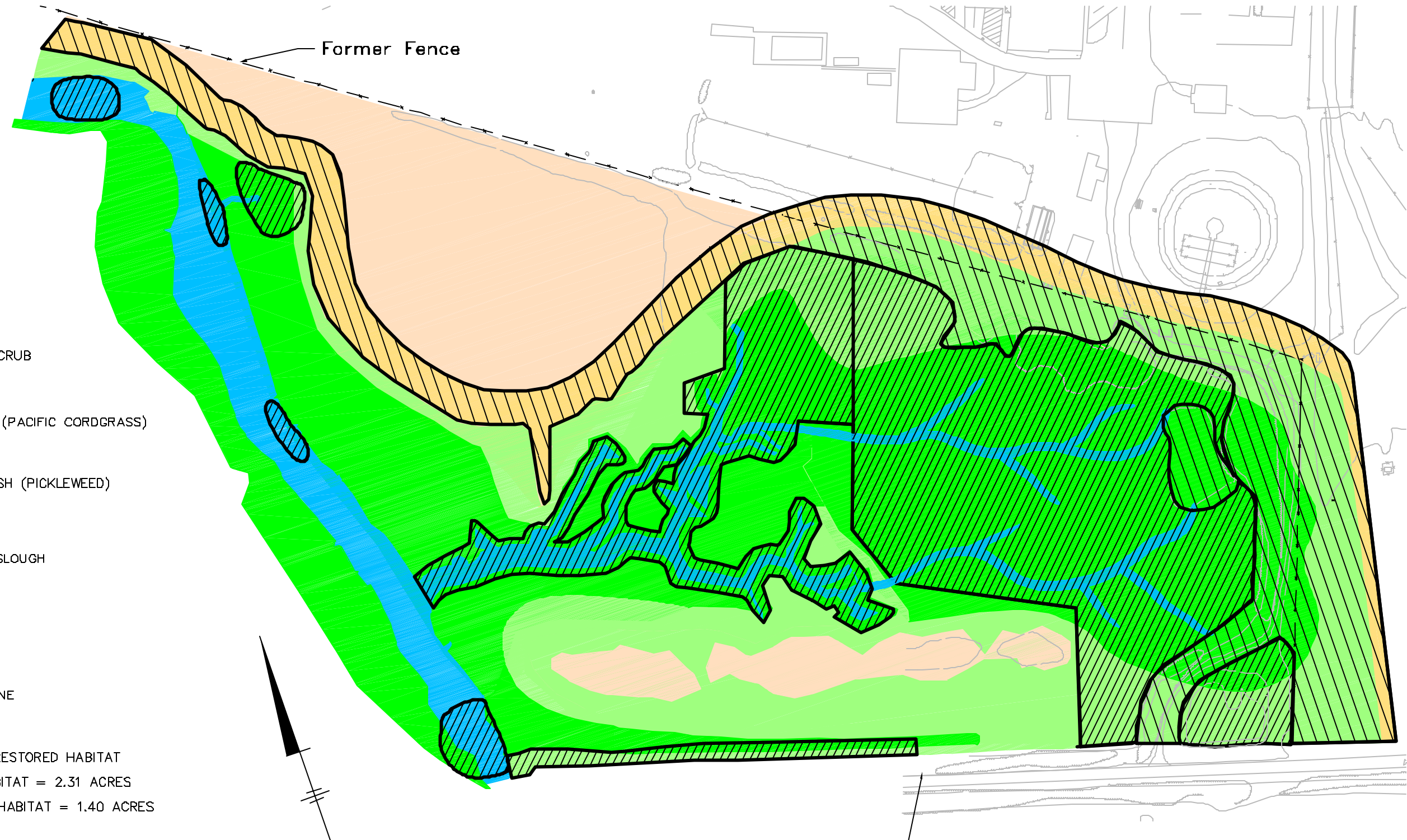
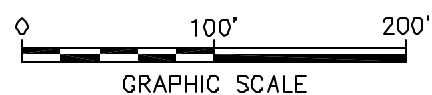
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ALTERNATIVE 1 CONCEPTUAL RESTORATION PLAN	
	FIGURE 4

L: OFF-REF
 P: PAGESET/PLT-BL
 1/14/04 IRV-BD-JMS
 F:/EM/CAD/2D04PROJ/2421D.410/2421 DCG3.DWG

LEGEND

-  MIXED RUDERAL SCRUB
-  LOW SALT MARSH (PACIFIC CORDGRASS)
-  MIDDLE SALT MARSH (PICKLEWEED)
-  SURFACE WATER/SLOUGH
-  ECOTONE
-  FORMER FENCE LINE
-  DISTURBED AND RESTORED HABITAT
LOW QUALITY HABITAT = 2.31 ACRES
MEDIUM QUALITY HABITAT = 1.40 ACRES
-  CREATED WETLAND = 2.55 ACRES

TOTAL ACRES RESTORED AND CREATED = 6.26



NOTES:

- 1) SOME PORTIONS OF THE HIGH SALT MARSH (SALT GRASS) AREAS ALONG THE EBRPD BAY TRAIL ALSO CONTAIN INTERMITTENT PATCHES OF PICKLEWEED.
- 2) BASE MAP SUPPLIED BY URS ON 7/9/03 AT A SCALE OF 1"=100'.

UNIVERSITY OF CALIFORNIA, BERKELEY RICHMOND FIELD STATION FERAL ANIMAL MANAGEMENT PROGRAM	
ALTERNATIVE 2 CONCEPTUAL RESTORATION PLAN	
 <small>BBL® BLASLAND, BOUCK & LEE, INC. ENGINEERS, SCIENTISTS, ECONOMISTS</small>	FIGURE 5