

Invasive Spartina Control Plan

For

Coyote Creek & Mowry Slough Area Alameda County

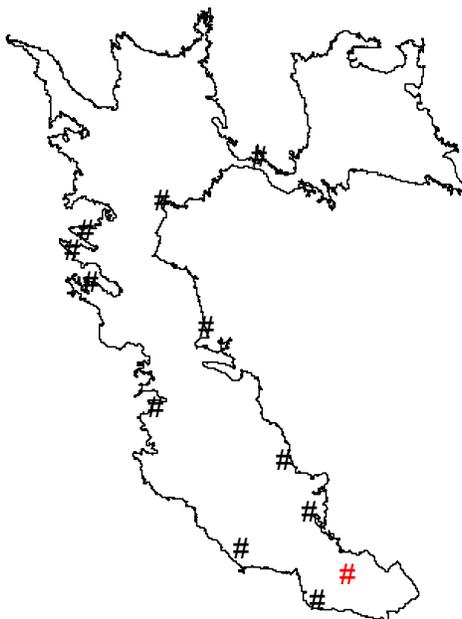
Including:

Coyote Creek & Mowry Slough

Dumbarton/Audubon Marsh

Newark Slough

La Riviere Marsh



TSN: ISP-2004-5

2004 Control Season

Table of Contents

Table of Contents	2
Introduction.....	2
Project Partners	3
General Information.....	3
Site Description.....	3
Infestation Description.....	4
Ecological Threat and Reason for Prioritization.....	4
Endangered Species Issues	4
Treatment Plan	6
Management Objectives and Efficacy Criteria.....	6
Treatment Method(s)	7
2004 Treatment Strategy.....	7
Access and Timing.....	8
Equipment and Materials	8
Personnel and Contract Requirements	8
Site Safety and Spill Prevention	8
Permitting and Environmental Compliance.....	8
Required Permits and Authorizations	8
Mitigation and Conservation Measures	9
Compliance Monitoring and Reporting	9
Research.....	9
Quality Assurance and Control.....	9
Attachment 1. Site Maps and Photographs.....	10
Attachment 2. Work Program	12
Attachment 3. Environmental Compliance.....	13
Attachment 4. Site Safety and Spill Prevention.....	14
Attachment 5. Research Plan	15

Introduction

This is a plan for control of non-native, invasive *Spartina* on a stretch of South Bay shoreline between Coyote Creek and Newark Slough. The plan was prepared by consultants of the San Francisco Estuary Invasive *Spartina* Project (ISP), in collaboration with the Project Partners listed below. The plan includes background and site information, site-specific goals, treatment strategy, and a description of potential impacts of treatment. The plan also specifies actions or practices (“mitigations”) necessary to implement the plan with the least possible adverse environmental impact, in compliance with the ISP’s Environmental Impact Report (EIR) and all applicable regulatory requirements. The plan will be implemented by the Project Partners, with assistance from the ISP, beginning in late summer of 2004.

This control plan was developed based on the concepts of “Integrated Vegetation Management,” whereby a broad range of site-specific factors were considered to determine the optimal combination of treatment methods (manual, mechanical, and

chemical) and strategies for use at the site. The control plan may be modified over time as new scientific information becomes available, and based on site-specific conditions.

Project Partners

Property Owner:

US Fish & Wildlife Service, San Francisco Don Edwards National Wildlife Refuge
(Joy Albertson (510) 792-0222 x31)

DENWR owns and/or manages nearby properties that have been invaded by non-native *Spartina*. They also own and manage many thousands of un-invaded tidal marsh, and tens-of-thousands of acres of currently diked areas (salt ponds) that are slated for restoration to tidal marsh in the coming decades – all of which are at risk of future invasion. The DENWR has implemented a control program on their properties over the last several years.

Other Partners:

Santa Clara Valley Water District (Lisa Porchella (o)408.265.2407 x2741],
(c)408.497.0480)

SCVWD has developed a *Spartina* Control Program to help identify and eradicate non-native *Spartina* infestations occurring within their jurisdiction. SCVWD has helped the ISP and other partners in the past with access and coordination, and will be a continuing partner in control efforts in this area.

General Information

Site Description

The area to be treated under this plan encompasses approximately 1,500 acres of marshlands of the San Francisco Don Edwards National Wildlife Refuge that lie between Coyote Creek and the Dumbarton Bridge.. This land is owned and managed by the US Fish and Wildlife Service, Don Edwards National Wildlife Refuge. The site is surrounded entirely by marsh and salt ponds, and there is very little public access, except for a portion of the Bay Trail along part of Newark Slough.

Based on site access, endangered species, and other site-specific factors, the ISP and the USFWS have delineated the following sub-areas:

Sub-Area 5a. Coyote Creek & Mowry Slough. Included in this area are Coyote Creek itself, Mowry Slough, and the bayfront from Calaveras Point north to the outlet of Newark Slough (see **Attachment 1: Site Maps and Photos**). The marshes in this area range from thin strips of *Spartina* and pickleweed marshes between mudflats and salt pond levees, to wide, high-marsh pickleweed habitat along the banks of the larger sloughs

Sub-Area 5b. Dumbarton/Audubon Marshes. This Sub-Area is located to the south of the Dumbarton Bridge and includes the areas known as Hetch-Hetchy Marsh, Railroad Marsh, Barge Canal and Plummer Creek as well as the Dumbarton and Audubon Marshes. This Sub-Area encompasses some 753 acres of marshland which contain open marsh plains, eroding marsh

edges, stream channels and other habitats. An abandoned rail line bisects the larger portion of this Sub-Area.

Sub-Area 5c. Newark Slough. This Sub-Area encompasses that area of Newark Slough that runs from roughly Jarvis Landing and Marsh Road upstream to the outlet of the Slough into the Bay at the confluence with Plummer Creek. The area consists of a wide levee-bound channel in the upstream portion and above Plummer Creek traverses more open marsh habitat. The total estimated acreage of this Sub-Area is 190 acres.

Sub-Area 5d. La Riviere Marsh/Mayhews Landing. This Sub-area lies to the east of Marshlands Road near the headquarters of the DENWR. Together, these marshes encompass 153 acres of restored marshland habitat.

Infestation Description

Sub-Area 5a. Coyote Creek & Mowry Slough. *Spartina alterniflora*/hybrids are dispersed amongst wide high marsh pickleweed habitat and along the channel sides of Newark and Mowry Sloughs and Coyote Creek. An estimate of total net acres of *Spartina alterniflora*/hybrids within this area is roughly 0.15 acres.

Sub-Area 5b. Dumbarton/Audubon Marsh: This area of marsh contains roughly 8 acres of *Spartina* within a restored and remnant marsh habitat.

Sub-Area 5c. Newark Slough: Only 1 net acre of non-native *Spartina* has infested this section of the Site. Treatment in this area will be along the channel banks within the levee system.

Sub-Area 5d. La Riviere Marsh: A total of 25 acres of non-native *Spartina* infest this large restored marsh complex.

Ecological Threat and Reason for Prioritization

The area encompassed by this plan is on the southeastern-most portion of San Francisco Bay. This area is relatively free of non-native invasive *Spartina*, and as such, is in danger of being further colonized by *S. alterniflora*/hybrids due to the proximity of large stands of *S. alterniflora*/hybrids acting as propagule sources (Alameda Flood Control Channel, Bair/Greco Island Complex). The area included within this plan contains large sections of marshland suitable for the endangered California Clapper Rail and Salt Marsh Harvest Mouse that would be threatened with the unabated expansion of *S. alterniflora*/hybrids within these marshes.

The project partners on this site have been working closely with the ISP to survey and document the extent of the *S. alterniflora*/hybrid infestation in the area, and will continue to provide assistance in any control effort conducted there. The existence of good working relationships with these stakeholders enables the efficient mobilization of resources in the area aimed at control of the *S. alterniflora*/hybrids

Endangered Species Issues

The ISP PEIS/R identified 43 sensitive species of plants and animals that could occur within the waters and adjacent lands of the San Francisco Estuary (PEIS/R Appendix F). Of these 43 species, 12 were determined to be at sufficient risk of direct, indirect, or

cumulative adverse impacts to require site-specific evaluation and potential mitigation* . The conditions at this site were evaluated to determine the potential presence of these 12 species, and it was concluded that California clapper rail (CLRA), salt marsh harvest mouse (SMHM), and harbor seal are or may be present within the proposed treatment area; no other special status species are expected to be present at this site. Potential impacts and required mitigations for these species are summarized below. Additional impacts and mitigation information is included in **Attachment 3: Environmental Compliance**.

California clapper rail. Surveys for CLRA have been conducted for this site at several different times in the past. It is well known and henceforth assumed that the areas within the scope of this plan provide nesting and foraging habitat for CLRAs. Unless otherwise authorized by the U.S. FWS, control activities on this site must not occur during clapper rail nesting season (February 1 to September 1), and all Best Management Practices and mitigations identified in the ISP EIS/R must be implemented.

This site is located on the southern end of San Francisco Bay, and in the heart of CLRA habitat. There is relatively little non-native, invasive *Spartina* yet established in this portion of the estuary, though environmental conditions and suitable habitat for invasion are abundant. The continued unabated expansion of the *Spartina alterniflora*/hybrids within this area of native *S. foliosa* meadows threatens some of the last intact marshlands in the south bay with significant degradation. Areas to be treated to control *Spartina alterniflora*/hybrids within this area are dispersed throughout a wide area, and each is relatively small in area. They currently exist scattered throughout a much larger native *S. foliosa* matrix. All control work done on the infested areas of the marsh would leave undisturbed large, adjacent areas for refuge for any CLRA affected by treatment. Additionally, treatment via herbicide will allow the structural component of the invasive *Spartina* intact long enough for any CLRA inhabiting invasive clonal 'islands' within the larger native matrix time to relocate to adjacent suitable habitat.

Mitigations will follow protocols identified in the ISP's PEIS/R and in the USFWS' Programmatic Biological Opinion Conservation measures as follows. Additional mitigations on site are identified in **Attachment 3: Environmental Compliance**.

- Perform work only during Sept 1 thru Feb 1 to avoid CLRA breeding season (BIO-5.1;CM-18)
- For work within the Clapper Rail breeding season, call counts will be performed in the early spring according to FWS protocols (CM-18)
- Provide CLRA Field biologist supervision (BIO-5.1)
- Assure that field personnel are trained in general CLRA biology and CLRA identification and call detection (BIO-5.1)
- Report any CLRA activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.1)

Salt marsh harvest mouse. There is suitable SMHM habitat throughout the proposed treatment areas, and SMHM presence will be assumed for all operations. Appropriate

* Potentially affected species include soft bird's-beak, salt marsh harvest mouse, harbor seals, California black and clapper rails, salt marsh common yellowthroat, some tidal marsh song sparrow subspecies, western snowy plovers, California least terns, Chinook salmon, steelhead, and Sacramento splittail

mitigations will be employed for all impacts identified in the PEIS/R and USFWS BO Conservation Measures.

- Use shortest possible access route through any pickleweed habitat. Flag areas of repeated access (BIO-4.1;CM-15)
- Use protective mats or other covering over pickleweed in areas or repeated access (BIO-4.1;CM-15)

Harbor seal. There are several haul-out sites for resident harbor seals within the geographic area of this site. The area proposed for *Spartina* treatment under this plan lies at the southern end of the Estuary, and at the southern end of known and suitable harbor seal habitat and haul out sites. The continued expansion of non-native, invasive *Spartina* in the area threatens to invade the areas harbor seals use for haul-outs. Treatment activities within these areas should the non-native, invasive *Spartina* become established will result in unnecessary disturbance of these sites, and possible abandonment of the sites by seals.

Harbor seals are extremely wary and will flush from haul-out sites when approached by humans on foot, by boat or by other means from as close as 300 meters. There are currently no *Spartina alterniflora*/hybrid clones adjacent to harbor seal haul-out sites within the geographic scope of this plan. All treatment areas within the geographic scope of this Plan are outside of the 300-meter buffer indicated above. Nevertheless, the following mitigations will be employed during treatment activities as per the ISP's PEISR/S and the FWS' Programmatic Biological Opinion Conservation Measures (Please refer to **Attachment 3: Environmental Compliance**:

- Minimize vehicle and foot access to marsh within 1000 feet of haul out sites (BIO-4.2)
- Avoid approaching haul out sites within 2000 feet (or any distance that elicits vigilance behavior) when pups are present (BIO-4.2)
- Follow ISP spill prevention plan or equivalent (BIO-42; CM-17)

Treatment Plan

Management Objectives and Efficacy Criteria

2004 Season: This site has only limited amounts of establishing *Spartina alterniflora*/hybrids within its boundaries. Therefore, for the 2004 Treatment Season, the goal would be to treat, at least once, all existing clones of *S. alterniflora*/hybrids found there.

2005 Season: For the 2005 Season, all areas treated during the 2004 season would be monitored for resprouting plants and re-treated, and all of those areas remaining uncontrolled after the 2004 treatment season would be treated.

2006 Season: In conjunction with both the USFWS, DENWR and SCVWD the ISAP would implement a monitoring and maintenance plan that would aim to identify all resprouting or newly establishing non-native, invasive *Spartina*, and target those areas for immediate control.

Treatment Method(s)

Treatment methods within each Sub-Area will be determined by site conditions and access issues.

Method	Acres
Sub-Area 5a	
• Application of glyphosate (Aquamaster) herbicide by:	
○ Backpack Sprayer and Boat-Mounted spray apparatus	.15
Sub-Area 5b	
• Application of glyphosate (Aquamaster) herbicide by:	
○ Backpack Sprayer and Boat-Mounted spray apparatus	8
Sub-Area 5c	
• Application of glyphosate (Aquamaster) herbicide by:	
○ Truck Mounted Sprayer	1
Sub-Area 5d	
• Application of glyphosate (Aquamaster) herbicide by:	
○ Truck Mounted Sprayer and Boat-Mounted spray apparatus	25
Total Spartina Acres Treated	34.15

During subsequent years, these methods will be refined and the most efficacious method will ultimately be used to treat the entire site.

2004 Treatment Strategy

Sub-Area 5a: Following the end of the CLRA breeding season (August 31st), crews would access the site via levees along Plummer Creek to gain access to the bayfront marsh between Newark Slough and Mowry Slough. Staff equipped with backpack sprayers would access the clones within this stretch of marsh on foot to treat the plants. These crews could also use a conventional spray truck equipped with retractable hose to treat those clones within the radius of the hose system (from 150' to 250'). This operation would continue south along the levee and then east along the north side of Mowry Slough, treating the mapped clones within this area.

Clones within the bay edge marshlands extending from Mowry Slough to Calaveras Point would be treated with the methods outlined above. It may be necessary given the time involved in traveling from site to site to schedule these trips on separate days depending upon the amount of time required to complete each phase.

The Coyote Creek portion of this site requires access via boat. Equipped with materials to refill backpack sprayers (herbicide, water, surfactant, dye), the boats would ferry personnel to the scattered clonal locations along the creek for treatment.

Sub-Areas 5b-5d: These sites will rely heavily on the use of levee-based spray trucks to do treatment work within the marsh. Where appropriate, backpack sprayers or boat mounted spray apparatus may be used. Treatment in these areas will also be initiated following the end of CLRA breeding season.

Access and Timing

The treatment areas are to be accessed via the adjacent levees and by boat navigating up the channels. No access roads or ramps will need to be constructed. The SCVWD and DENWR have granted access to the sites through their properties. If necessary, written permissions will be obtained for access to the sites during the treatment periods.

Treatment of the area is planned for after clapper rail nesting season, which ends on August 31. All treatment methods must be implemented on a low tide. A detailed treatment schedule is included as **Attachment 2: Work Program**.

Equipment and Materials

A general description of the equipment and materials needed for each treatment method follows. Details and costs are included in **Attachment 2: Work Program**.

Herbicide Application

Application of herbicide on this site would be via conventional backpack sprayer and, where appropriate, a conventional spray trucks, boat mounted spray apparatus, lightweight, amphibious tracked vehicles using glyphosate herbicide, Agridex or LI-700 (surfactants), and Blazon (colorant). Additional materials may include boats to ferry personnel to treatment sites along Coyote creek, public notification flags for trails, and spill cleanup materials. See **Attachment 2: Work Program** for details.

Personnel and Contract Requirements

See **Attachment 2: Work Program** for personnel and contract budget details.

Site Safety and Spill Prevention

A Site Safety and Spill Prevention Plan has been developed for this site, and will be implemented (see **Attachment 4: Site Safety & Spill Prevention**).

Permitting and Environmental Compliance

Required Permits and Authorizations

The following federal, state, and regional authorizations are required to implement the proposed work. Copies of these authorizations are included in **Attachment 3: Environmental Compliance**, and any permit requirements have been incorporated into the Site Specific Project Mitigation Table in that attachment.

<i>Permit/Action</i>	<i>Agency</i>	<i>Required for work at this site</i>	<i>Status</i>
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CWA Section 404	ACOE	Not Required	
RHA Section 10	ACOE	Not Required	
Endangered species consultation	USFWS	Yes	Programmatic B.O. issued 8/29/03. Site-specific B.O. pending.
NPDES Permit	SWRCB/ RWQCB	Yes	ISP filed NOI with SWRCB Pending WQ Monitoring Plan to RWQCB
Section 401 WQC	RWQCB	Not Required	
BCDC permit	BCDC	Not Required	
FPS Notification	CDFG	Yes	Notification to be submitted.
Streambed Alteration Agreement	CDFG	Not Required	

Mitigation and Conservation Measures

Pursuant to the ISP Programmatic EIS/R, the project has been evaluated to determine potential site-specific impacts and necessary mitigation and conservation measures. This evaluation is attached as **Site-Specific Project Impact Evaluation** and **Site Specific Project Mitigation** checklists (**Attachment 3: Environmental Compliance**). All mitigations identified in the Site Specific Project Mitigation checklist will be implemented and verified by the ISP Field Supervisor.

Compliance Monitoring and Reporting

The Project will comply with all applicable regulations and permits and will submit reports according to the requirements of the agencies. Monitoring for compliance with the statewide NPDES permit will be completed according to the Water Quality Monitoring Plan developed by the ISP. Portions of the WQMP applicable to this site are attached.

All data collected from this project will be reviewed by the ISP Monitoring and Data Assessment Team, and data and reports will be available on the ISP website (www.spartina.org).

Research

There is no research associated with the ISP currently planned within this area.

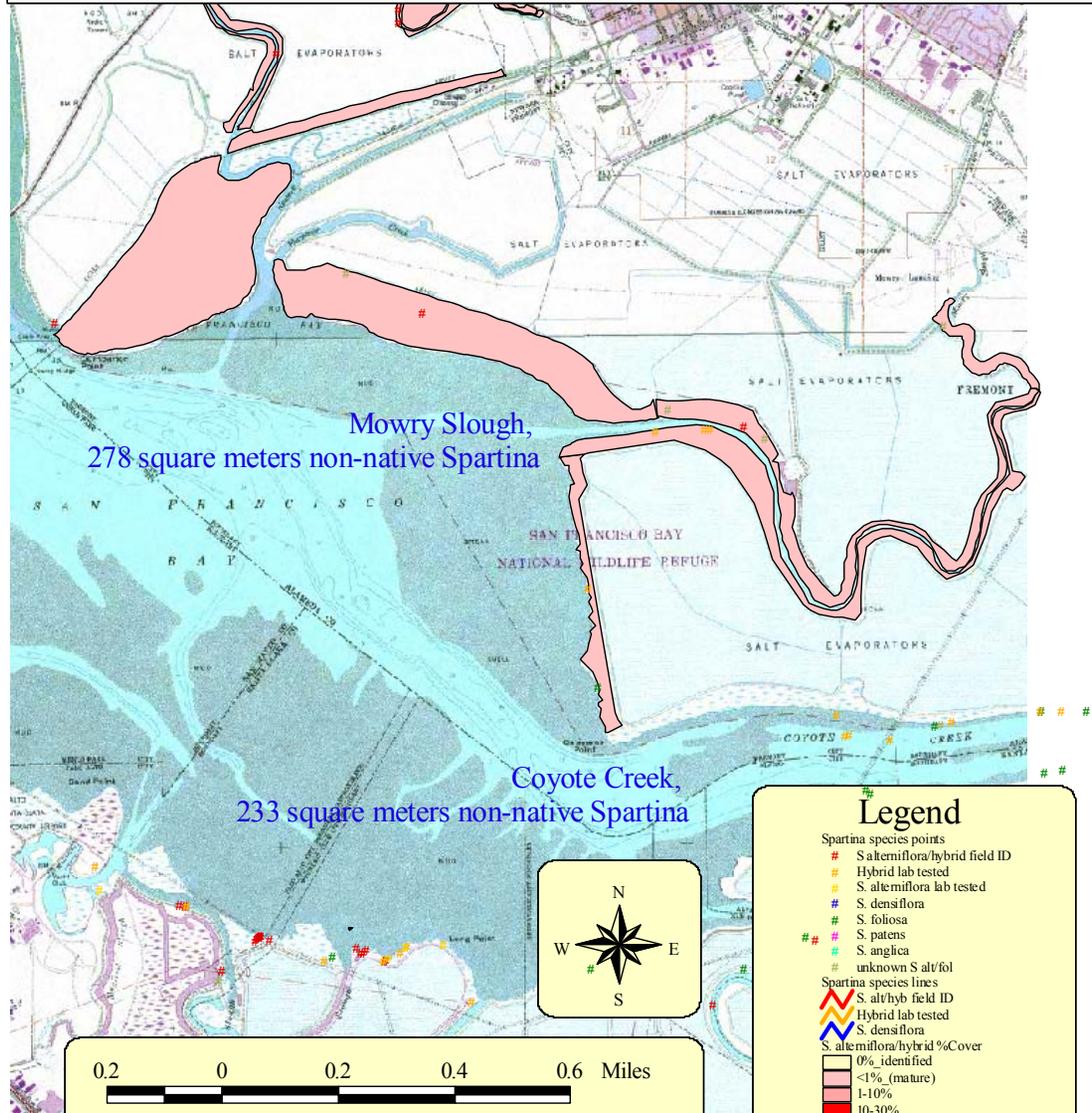
Quality Assurance and Control

QA/QC to be completed prior to project completion

Attachment 1. Site Maps and Photographs

5. Coyote Creek and Mowry Slough Area, Non-native Spartina Locations

Total non-native Spartina 511 square meters = 0.1 acres



Attachment 2. Work Program

Attachment 3. Environmental Compliance

Attachment 4. Site Safety and Spill Prevention

Attachment 5. Research Plan

SITE-SPECIFIC PROJECT IMPACT EVALUATION

Site Name: Coyote Creek & Mowry Slough Area, Alameda County

TSN: ISP-2004-5

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
GEO-1: Erosion or deposition of sediment at treatment site	NA/NE					NA/NE - Proposed activities are not ground disturbing and will not elevate erosion above ambient levels.	None
GEO-2: Erosion or topographic change of marsh and mudflat by vehicles used in eradication	NA/NE					NA/NE-No equipment will be working on marsh or mudflat surfaces	None
GEO-3: Remobilization of sand in cordgrass-stabilized estuarine beaches	NA/NE					NA/NE- Proposed activities will not take place within an estuarine beach.	None
GEO-4: Increased demand for sediment disposal and potential spread of invasive cordgrass via sediment disposal.	NA/NE					NA/NE- No dredging/sediment disposal proposed	None
GEO-5: Increased volume and velocity of tidal currents in channels due to the removal of invasive cordgrass.	A		None			No adverse impact (see EIS/R GEO-5 discussion). Site conditions consistent with those anticipated in the PEIS/R.	None

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
GEO-6: Increased depth and turbulence of tidewaters impounded in salt marsh pans.	NA/NE					NA/NE - Proposed activities will not take place within salt marsh pans.	None
WQ-1: Degradation of Water Quality due to Herbicide Application	A	All Sub-Areas	WQ-1			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation WQ-1). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-2: Degradation of Water Quality due to Herbicide Spills	A	All Sub-Areas	WQ-2			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation WQ-2). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-3: Degradation of Water Quality due to Fuel or Petroleum Spills	A	All Sub-Areas	WQ-3			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation WQ-3). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-4: Degradation of Water Quality due to Contaminant Remobilization	NA/NE					NA/NE - No dredging or other sediment-mobilizing activities proposed.	None
WQ-5: Water Quality Effects Resulting from Sediment Accretion	NA/NE					NA/NE – This impact only applies to EIS/R Alternative 3.	None
BIO-1.1: Effects on tidal marsh plant communities affected by salt-meadow cordgrass and English cordgrass.	NA/NE					NA/NE – Field surveys found no salt-meadow or English cordgrass at this site.	None

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
BIO-1.2: Effects on tidal marsh plant communities affected by Atlantic smooth cordgrass and its hybrids.	A	All Sub-Areas	BIO-1.2			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-1.2). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-1.3: Effects on tidal marsh plant communities affected by Chilean cordgrass.	NA/NE					NA/NE – Field surveys found no Chilean cordgrass at site.	None
BIO-1.4: Effects on submerged aquatic plant communities.	NA/NE					NA/NE – Field surveys found no eelgrass or other submerged aquatic plants at site.	None
BIO-2: Effects on special-status plants in tidal marshes.	NA/NE					NA/NE - Field surveys found no special-status plant species at site.	None
BIO-3: Effects on shorebirds and waterfowl.	A	All Sub-Areas	BIO-3			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-3). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-4.1: Effects on the salt marsh harvest mouse and tidal marsh shrew species.	A	All Sub-Areas	BIO-4.1			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-4.1). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-4.2: Effects on resident harbor seal colonies of San Francisco Bay.	A	All Sub-Areas	BIO-4.2			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-4.2). Site conditions consistent with those anticipated in the PEIS/R.	None

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
BIO-4.3: Effects on the southern sea otter.	NA/NE					NA/NE – Outside of known range of southern sea otters.	None
BIO-5.1: Effects on California clapper rail.	A	All Sub-Areas	BIO-5.1 as modified by UFSWS BO			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-5.1). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-5.2: Effects on the California black rail.	NA/NE					NA/NE – Outside of known range black rails.	None
BIO-5.3: Effects on tidal marsh song sparrow subspecies and the salt marsh common yellowthroat.	A	All Sub-Areas	BIO-5.3 as modified by UFSWS BO			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-5.3). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-5.4: Effects on California least terns and western snowy plovers.	A	All Sub-Areas	BIO-5.4 as modified by UFSWS BO			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-5.4). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-5.5: Effects on raptors (birds of prey).	NA/NE					NA/NE-No aerial applications proposed for this site.	None
BIO-6.1: Effects on anadromous salmonids (winter-run and spring-run Chinook salmon, steelhead).	A	All Sub-Areas	BIO-6.1 as modified by UFSWS BO			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-6.1). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-6.2: Effects on delta smelt and Sacramento splittail.	NA/NE					NA/NE – Outside of known delta smelt and Sacramento splittail range.	None

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
BIO-6.3: Effects on the tidewater goby.	NA/NE					NA/NE – Outside of known range of tidewater goby.	None
BIO-6.4: Effects on estuarine fish populations of shallow submerged intertidal mudflats and channels.	A	All Sub-Areas	BIO-6.4 – minimize spraying			LTS/NLTAE with additional mitigation BIO-6.4(b) (Note: no mowing proposed accept in test plots because of unacceptable impacts to birds)	BIO-6.4(b) - R-11 will not be used adjacent to channel to minimize any potential adverse effects on estuarine fish.
BIO-7: Effects on California red-legged frog and San Francisco garter snake.	NA/NE					NA/NE – Outside of known range of California red-legged frog and San Francisco garter snake.	None
BIO-8: Effects of regional invasive cordgrass eradication on mosquito production.	NA/NE					NA/NE – Site activities will not create additional mosquito habitat.	None
BIO-9: Effects on tiger beetle species.	NA/NE					NA/NE- no potential tiger beetle habitat will be affected.	None
AQ-1: Dust Emissions.	A	All Sub-Areas	AQ-1			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation AQ-1). Site conditions consistent with those anticipated in the PEIS/R.	None
AQ-2: Smoke Emissions.	NA/NE					NA/NE – no burning proposed.	None
AQ-3: Herbicide Effects on Air Quality.	NA/NE					NA/NE-No aerial applications proposed	None
AQ-4: Ozone Precursor Emissions.	NA/NE					LTS/NLTAE without mitigation.	None

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
AQ-5: Carbon Monoxide (CO) Emissions.	NA/NE					LTS/NLTAE without mitigation.	None
N-1: Disturbance of Sensitive Receptors	NA/NE					NA/NE-No sensitive receptors within project site-area closed to public	None
HS-1: Worker Injury from Accidents Associated with Manual and Mechanical Cordgrass Treatment.	NA/NE					NA/NE-Methods not proposed for site.	None
HS-2: Worker Health Effects from Herbicide Application.	A	All Sub-Areas	HS-2			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation HS-2). Site conditions consistent with those anticipated in the PEIS/R.	None
HS-3: Health Effects to the Public from Herbicide Application.	A	All Sub-Areas	HS-3			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation HS-3). Site conditions consistent with those anticipated in the PEIS/R.	None
HS-4: Health effects to workers or the public from accidents associated with treatment.	A	All Sub-Areas	HS-4			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation HS-4). Site conditions consistent with those anticipated in the PEIS/R.	None
VIS-1: Alteration of Views from Removal of Non-native Cordgrass Infestations.	A	All Sub-Areas	VIS-1			SU - impacts addressed in EIS/R and CEQA findings. Site conditions consistent with those anticipated in the PEIS/R.	None

Impact*	Applicable to site	Sub-Area Included	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide				
VIS-2: Change in Views from Native Marsh, Mudflat, and Open Water to Non-native Cordgrass Meadows and Monocultures.	NA/NE					NA/NE- Applies only to PEIS/R Alternative 3 (No Action)	None
LU-1: Land Use Conflicts Between Herbicide Use and Sensitive Receptors	A					LTS/NLTAE - Limited to less than significant by HS, N and AQ mitigations.	None
LU-2: Land Use Conflicts from Mechanical and Burning Treatment Methods	NA/NE					NA/NE - Methods not proposed for site	None
CUL-1: Disturbance or Destruction of Cultural Resources from Access and Treatment.	A	All Sub-Areas	CUL-1b only			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation CUL-1). Site conditions consistent with those anticipated in the PEIS/R.	None
CUL-2: Loss of Cultural Resources from Erosion.	NA/NE					NA/NE- No erosion-producing activities proposed	None
CUM-1- Effects of wetland restoration projects on spread of non-native cordgrass	NA/NE					NA/NE- No restoration projects proposed on this site	None
CUM-2- Cumulative damage to marsh plain vegetation	NA/NE					NA/NE- No Mosquito Abatement Districts working on this site	None

SITE-SPECIFIC PROJECT MITIGATION

Site Name: Coyote Creek & Mowry Slough Area, Alameda County

TSN: ISP-2004-5

Impact	Applicable Mitigation &	Applicable	Herbicide	Implementation	Verification Signatures
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						<i>Implementing Entity</i>	<i>ISP Field Supervisor</i>
WQ-1: Degradation of Water Quality due to Herbicide Application	Apply herbicide directly to plant at low tide and according to label. (WQ-1;CM-3,4)	All Sub-Areas	X		During treatment		
WQ-2: Degradation of Water Quality due to Herbicide Spills	Apply under supervision of trained applicator (WQ-2;CM-3)	All Sub-Areas	X		During treatment		
	Implement spill and containment plan provided or approved by ISP (WQ-2; CM-3,17)	All Sub-Areas	X		During treatment		
WQ-3: Degradation of Water Quality due to Fuel or Petroleum Spills	Implement spill and containment plan provided or approved by ISP (WQ-3;CM-17)	All Sub-Areas	X		During treatment		
BIO-1.2: Effects on tidal marsh plant communities affected by Atlantic smooth cordgrass and its hybrids.	Minimize entry and re-entry into marsh , define access points (BIO-1.2;CM-1))	All Sub-Areas	X		During treatment		
	Avoid staging in high, dense vegetation such as gumplant or pickleweed (FWS GL)	All Sub-Areas	X		During treatment		
	Avoid herbicide application to non-target vegetation adjacent to treatment area (BIO-1.2;CM-3,4)	All Sub-Areas	X		During treatment		
BIO-3: Effects on shorebirds, waterfowl & marshland birds.	Avoid working within 1,000 feet of occupied mudflats during peak Pacific Flyway stopovers (BIO-3)	All Sub-Areas	X		During treatment		
	Occupy treatment area soon after high tide, before mudflats emerge (BIO-3)	All Sub All Sub-Areas	X		During treatment		
	Haze shorebirds to minimize potential direct contact with herbicide drift (BIO-3)	All Sub-Areas	X		During treatment		

Impact	Applicable Mitigation & Conservation Measures	Applicable Sub-site	Herbicide	Implementation Timing	Verification Signatures		
					Implementing Entity	ISP Field Supervisor	
BIO-4.1: Effects on the salt marsh harvest mouse and tidal marsh shrew species.	Use shortest possible access route through any pickleweed habitat. Flag areas of repeated access (BIO-4.1;CM-15)	All Sub-Areas	X		During treatment		
	Use protective mats or other covering over pickleweed in areas or repeated access (BIO-4.1;CM-15)	All Sub-Areas	X		During treatment		
BIO-4.2:Effectson resident Harbor Seal colonies of San Francisco Bay	Minimize vehicle and foot access to marsh within 1000 feet of haul out sites (BIO-4.2)	All Sub-Areas	X		During treatment		
	Avoid approaching haul out sites within 2000 feet (or any distance that elicits vigilance behavior) when pups are present (BIO-4.2)	All Sub-Areas	X		During treatment		
	Follow ISP spill prevention plan or equivalent (BIO-4.2.;CM-17)	All Sub-Areas	X		During treatment		
BIO-5.1: Effects on California clapper rail.	Perform work only during Sept 1 thru Feb 1 to avoid CLRA breeding season (BIO-5.1; CM-18)	All Sub-Areas	X		During treatment		
	For work within the Clapper Rail breeding season, call counts will be performed in the early spring according to FWS protocols (CM-18)	All Sub-Areas	X		Pre treatment		
	Provide CLRA Field biologist supervision (BIO-5.1)	All Sub-Areas	X		During treatment		
	Assure that field personnel are trained in general CLRA biology and CLRA identification and call detection (BIO-5.1)	All Sub-Areas	X		Pretreatment and during treatment		

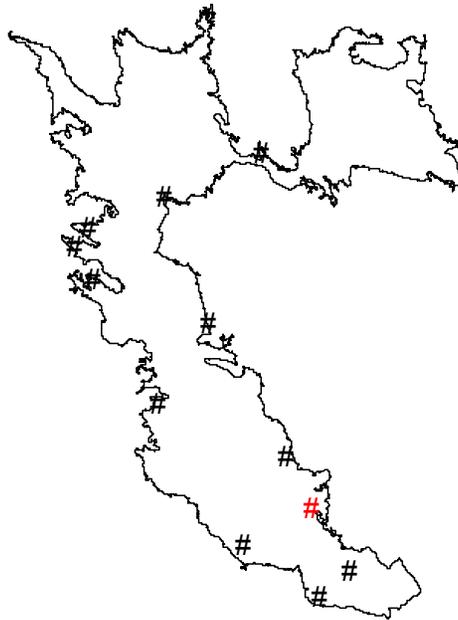
Impact	Applicable Mitigation & Conservation Measures	Applicable Sub-site	Herbicide		Implementation Timing	Verification Signatures	
						Implementing Entity	ISP Field Supervisor
	Report any CLRA activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.1)	All Sub-Areas	X		During and post treatment		
BIO-5.3: Effects on tidal marsh song sparrow subspecies and the salt marsh common yellowthroat.	Report any SMSS and SCYE activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.3)	All Sub-Areas	X		During and post treatment		
BIO-5.4: Effects on California least terns and western snowy plovers.	Survey access levees for nesting CALT and WSPL prior to entry (BIO-5.4;CM-20)	All Sub-Areas	X		Pre-treatment		
	Report any CALT and WSPL activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.4)	All Sub-Areas	X		During and post treatment		
	Ensure 500 foot buffer around nests for any helicopter activity (BIO-5.5)	All Sub-Areas	X		During treatment		
BIO-6.1: Effects on anadromous salmonids (winter-run and spring-run Chinook salmon, steelhead).	Minimize herbicide applications (BIO-6.1)	All Sub-Areas	X		During treatment		
BIO-6.4: Effects on estuarine fish populations of shallow submerged intertidal mudflats and channels.	Minimize spraying near channels (BIO-6.4)	All Sub-Areas	X		During treatment		
	Avoid use of alyphenol ethoxylate surfactants adjacent to channel to minimize any potential adverse affects on estuarine fish	All Sub-Areas	X		During treatment		
AQ-1: Dust emissions	Limit speeds on dirt roads to 15 miles per hour (AQ-1)	All Sub-Areas	X		During treatment		
N-1: Disturbance of Sensitive Receptors	Comply with all local noise ordinances (N-1)	All Sub-Areas	X		During treatment		

Impact	Applicable Mitigation & Conservation Measures	Applicable Sub-site	Herbicide		Implementation Timing	Verification Signatures	
						Implementing Entity	ISP Field Supervisor
HS-2: Worker Health Effects from Herbicide Application.	Follow handling and application procedures as identified on product label (HS-2;CM-3,4)	All Sub-Areas	X		During treatment		
HS-3: Health Effects to the Public from Herbicide Application.	Minimize drift according to ISP drift management plan (HS-3;CM-3,4)	All Sub-Areas	X		During treatment		
	Post appropriate signage (see attached signage requirements) a minimum of 24 hours pre-treatment (HS-3)	All Sub-Areas	X		Pre-treatment		
HS-4: Health effects to workers or the public from accidents associated with treatment.	Maintain ISP or approved equivalent Site Safety and Spill Prevention plan on site (HS-4Cm-3,4,17)	All Sub-Areas	X		During treatment		
VIS-1: Alteration of Views from Removal of Non-native Cordgrass Infestations.	Post appropriate signage according to ISP signage protocols (VIS-1)	All Sub-Areas	X		Pre-treatment, during treatment, post-treatment		
CUL-1: Disturbance or Destruction of Cultural Resources from Access and Treatment.	Report all discovered prehistoric or historic resources to the ISP Field Supervisor and a qualified archeologist or historic resources consultant and suspend all work at site until archaeological mitigation has taken place (CUL-1)	All Sub-Areas	X		Pre-treatment and during treatment		
CM-7: Invasive Species	Monitor cleared patches for recruitment of invasive plant species including perennial pepperweed until native vegetation has become dominant (CM-7)	All Sub-Areas	X		Post treatment		

Invasive Spartina Control Plan
For
Whale's Tail and the Old Alameda Creek Channel
Alameda County

Including:

- Northern Channel Bank
- Southern Channel Bank
- Central Channel Island
- Northern Whale's Tail Marsh
- Southern Whale's Tail Marsh
- Cargill Mitigation Marsh



**TSN: ISP-2004-13
2004 Control Season**

Table of Contents

Project Partners	30
California Department of Fish and Game (John Krause (415) 454-8050)	30
Cargill Corporation (Barbara Ransom)	30
General Information	31
Site Description	31
Infestation Description	32
Ecological Threat and Reason for Prioritization	33
Endangered Species Issues	33
Treatment Plan	35
Management Objectives and Efficacy Criteria	35
Treatment Method(s)	37
2004 Treatment Strategy	38
Access and Timing	40
Equipment and Materials	41
Herbicide Application	41
Personnel and Contract Requirements	42
Site Safety and Spill Prevention	42
Permitting and Environmental Compliance	42
Required Permits and Authorizations	42
Mitigation and Conservation Measures	43
Compliance Monitoring and Reporting	43
Attachment 1. Site Maps and Photographs	45
Attachment 2. Work Program	46
Attachment 3. Environmental Compliance	47
Attachment 4. Site Safety and Spill Prevention	48
Attachment 5. Research Plan	49

Introduction

This is a plan for control of non-native, invasive *Spartina* for the area commonly referred to as “Whale’s Tail”; an area that for the purposes of this plan includes the old Alameda Creek Channel, the northern and southern marshes at the Channel’s outlet as well as the area to the south of the main channel referred to as the Cargill Mitigation Marsh. The plan was prepared by consultants of the San Francisco Estuary Invasive *Spartina* Project (ISP), in collaboration with the Project Partners listed below. The plan includes background and site information, site-specific goals, treatment strategy, and a description of potential impacts of treatment. The plan also specifies actions or practices (“mitigations”) necessary to implement the plan with the least possible adverse environmental impact, in compliance with the ISP’s Environmental Impact Report (EIR)

and all applicable regulatory requirements. The plan will be implemented by the Project Partners, with assistance from the ISP, beginning in late summer of 2004.

This control plan was developed based on the concepts of "Integrated Vegetation Management," whereby a broad range of site-specific factors were considered to determine the optimal combination of treatment methods (manual, mechanical, and chemical) and strategies for use at the site. The control plan may be modified over time as new scientific information becomes available, and based on site-specific conditions.

Project Partners

Property Owners:

Alameda County Flood Control District (*Saul Ferdan (510) 385-2520*)

The ACFCD wants to remove NN *Spartina* from the main channel to maintain channel capacity for flood protection. They have an ongoing maintenance program, but have been unable to effectively control NN *Spartina* due to the rapid rate of expansion of established populations, invasion pressure from nearby sites, limited funding and staff, and endangered species issues. The ACFCD is committed to provide staff, equipment, and money to the project (see Project Budget). The ACFCD currently owns and maintains those areas between the levees of the main Channel of Old Alameda Creek, including Sub-Areas 13a, b, and c.

California Department of Fish and Game (*John Krause (415) 454-8050*)

The CDFG is actively working in the Whale's Tail area to restore large tracts of diked salt ponds to tidal influence. The Eden Landing Ecological Reserve restoration project (Baumberg tract) encompasses some 775 acres of potential salt marsh habitat directly adjacent to infested stands of NN *Spartina*. The CDFG is concerned with the potential effects of adjacent uncontrolled infestations of NN *Spartina*, and the capacity of these invasives to undermine the habitat diversity envisioned in the Eden Landing restoration plan. The CDFG has been actively working to pursue efficient methods of controlling NN *Spartina* on their lands within the Whale's Tail Complex, and coordination of CDFG efforts with the efforts of the ACFCD will greatly help to further this goal. The CDFG is also limited in resources available to commit to controlling NN *Spartina* in the area, but will provide access and staff when available for control efforts on their properties. CDFG currently owns Sub-Areas 13d and e, and is seeking ways of developing effective control strategies for those areas. CDFG will also take over management from Cargill Corp. of Sub-Area 13f following the completion of the Performance Criteria associated with this mitigation site.

Cargill Corporation (*Barbara Ransom*)

Cargill Corporation owns the 49 acre Cargill Mitigation Marsh area, a restored former solar salt production evaporator pond located east of the Southern Whale's

Tail Marsh and south of the Old Alameda Creek Channel. This area was constructed in 1995 as a mitigation site for ongoing Cargill Corp. salt production operations and was restored to full tidal action in 1998. Performance Criteria for the site indicate that NN *Spartina* was to be monitored and controlled within the site during the 10 year development phase of the project. Currently, the area is heavily infested with clones of hybrid NN *Spartina* and functions as an active seed source for the entire Whale's Tail Complex.

General Information

Site Description

The Whale's Tail Complex is a large complex encompassing many different *Spartina* invaded and susceptible habitats. The total acreage of the area under consideration is 576 acres, with roughly 92 net acres of *Spartina* within the Complex. This area includes remnant marshland patches that predate salt production based alterations to the site, channelized flood control structures, restored salt pond marshland, small, sinuous channels, high marsh flats, mudflats, eroding scarp, sandy and shell beach, small depositional deltas and other habitats. This area lies to the south of the San Mateo Bridge east of Union City.

The areas included within this Complex are entirely restricted from public access and are managed by CDFG as wildlife habitat (Sub-Areas 13 d-f), and by ACFCD as flood control structures (Sub-Areas 13a-c) (See Sub-Area descriptions below). On the northern sides of the main Channel, former diked salt ponds are undergoing restoration activities to convert them to tidally influenced marshlands. To the south of the main Channel, Cargill Corporation maintains active salt-producing evaporation ponds as part of its salt-producing business practice.

For the purposes of this project, the Whale's Tail Complex has been divided into six sub-areas (13a through 13f), based on endangered species issues, infestation size and density, and treatment logistics. These sub-areas are:

Sub-Area 13a – Northern Bank of Old Alameda Creek Channel: The northern levee of the Old Alameda Creek Channel, which runs roughly 4 miles from the “20-tide Gates” flood control structure upstream near Union City, downstream to the mouth of the Creek.

Sub-Area 13b – Central Island of Old Alameda Creek Channel: The central island of Old Alameda Creek also runs from the “20-Tide Gates” area near Union City, and continues to the outlet of the Creek into the Bay. The island is roughly 50 meters wide throughout its length, bounded on the north and south sides by borrow ditches which drain the Channel. The area is roughly 80 acres in total.

Sub-Area 13c – Southern Bank of Old Alameda Creek Channel: The southern bank of the Channel is very similar to the northern bank in size and is presented separately due to access issues only.

Sub-Area 13d – Northern Whale's Tail Marsh: Northern Whales Tail marsh is a wide expanse of high to mid-marsh habitat bounded on the east by a low levee, on the west by the Bay, to the south by the Channel of Old Alameda Creek and to the north by the northern levees of Mt. Eden Creek. Within the marsh are scattered pans, pickleweed/ salt grass habitat, and sinuous second and third order channels. The bay-ward edge of the

marsh consists of an extensively complicated and undulating sand-shell beach/ eroding scarp/ clay and cobble complex that grades into wide mudflats extending westward.

Sub-Area 13e – Southern Whale's Tail Marsh: The Southern Whale's Tail Sub-Area is situated south of the Channel of Old Alameda Creek, bounded on the east by a levee separating this site from the Cargill Mitigation Site and the west by the bay. The marsh tapers to the south as the eastern and western boundaries meet at rip-rap lining a bay-edge levee extending southward. This area is very similar to the Northern Whales Tail Marsh site, with a few exceptions.

There are two main channels that drain the adjacent Cargill mitigation site that flow through the Southern Whale's Tail Marsh. The first, in the northern portion of the Marsh is the smaller of the two, roughly four to six meters across at its mouth. This channel drains from the northern section of the adjacent Cargill Mitigation Marsh through a small levee breach spanned by a footbridge. A larger channel parallels the eastern levee from its origin in a wide breach of roughly 10m in the levee separating Southern Whales Tail from the Cargill Mitigation Marsh. No bridge spans this breach. The channel runs to a small delta into the bay at the southern end of the marsh.

Sub-Area 13f – Cargill Mitigation Marsh: This Sub-Area is a 49-acre former solar salt production evaporator restoration site opened to muted tidal action in 1995, and full tidal action in 1998. It is bounded on the north by the levees of the Old Alameda Creek Channel, on the west by the Southern Whale's Tail Marsh Site, and to the east and south by active salt producing salt ponds. The entirety of the Site is surrounded by levees, with two breach points on the western levee which drains the Site into the Southern Whale's Tail area.

Infestation Description

Sub-Area 13a – Northern Bank of Old Alameda Creek: Along this expanse there is an estimated 16 acres of suitable fringe marsh habitat open for potential colonization by *Spartina* hybrids, consisting of a 5-15 meter wide grade from higher marsh Pickleweed/Salt grass upper portion to a lower *S. foliosa*/ mudflat portion. Currently, less than 20% of the available area is colonized by *Spartina* hybrids. The infestation currently consists mostly of disjunct clones scattered along the bank of the levee, with a few areas where several clonal patches have coalesced.

Sub-Area 13b – Central Island of Old Alameda Creek Channel: with less than 16 acres of the island infested with non-native *Spartina*. The infestation consists of several large, coalesced clones near the mouth of the Channel, with scattered clones lining the north and south banks of the island. Near the mouth of the Channel, the clones exist amongst a matrix of Pickleweed and *S. foliosa*, and have begun to move out into the lower marsh mudflats.

Sub-Area 13c – Southern Bank of Old Alameda Creek Channel: Distribution of clonal populations of non-native *Spartina* is similar to the Northern Bank. It is presented as a distinct site due to access issues only.

Sub-Area 13d – Northern Whale's Tail Marsh: Non-native *Spartina* is extensively infesting the bayward edge of the marsh taking advantage of and accelerating the marsh-edge scarp erosional process, while simultaneously prograding *Spartina*-suitable marsh habitat onto the mudflats bay-ward. Many of these

clones are large coalesced complexes hugging the eroding edge of the marsh, as well as establishing at various distances away from the high marsh edge. The *Spartina* also extends east into the interior of the marsh from the bay edge in scattered and irregular patches and wide stands. Within the central portion of the marsh, the *Spartina* infestation is establishing along the edges of channels, at the periphery of the many shallow pans, and in disjunct locations within the wide open stands of pickleweed high marsh throughout the area. There is an estimated 200 acres in the Northern Whale's Tail Marsh, with an estimated 20 net acres of *Spartina*.

Sub-Area 13e – Southern Whale's Tail Marsh: The *Spartina* infesting this Sub-Area is similar to the distribution within the Northern Whales Tail Marsh, except that the presence of the two large channels in this marsh has allowed the *Spartina* to establish farther into the interior of the marsh using the channels as distribution pathways for propagules. It is estimated that there is roughly 37 net acres of *Spartina* on this site, out of 185 total acres of Marsh.

Sub-Area 13f – Cargill Mitigation Marsh: Since the opening of this area to full tidal action, the marsh has become infested with large, coalescing clones of *Spartina*. On the eastern portion of the site these clones have coalesced into meadows. There is roughly 19 net acres of *Spartina* within this marsh.

Ecological Threat and Reason for Prioritization

The *Spartina* invasion at this site is considered an extremely high environmental threat for a number of reasons, including the following:

1. It is one of the largest and oldest infestations of *S. alterniflora*/hybrids in San Francisco Bay (see attached photographs). Propagules and seed from this site are spreading, and will continue to spread, to uninfested marshes and mudflats throughout the Estuary.
2. The site is directly adjacent to many thousands of acres of proposed restoration sites, especially the Baumberg and Eden Landing areas, and will provide insurmountable invasion pressure on those sites once they are opened to tidal influence.
3. The continued expansion of the *S. alterniflora*/hybrid populations within the Old Alameda Creek Channel threatens to increase sedimentation rates such that the flood mitigating purpose of the channel may be compromised.

The ISP might not typically prioritize an infested area of this magnitude (density and expanse) for full treatment during the first season because the Program's strategy generally calls for addressing smaller or outlying areas first. However, because of this site's close proximity to important proposed restoration sites and because the ACFCD is on hand and anxious to partner with the ISP to initiate work, the site's priority was elevated.

Endangered Species Issues

The ISP PEIS/R identified 43 sensitive species of plants and animals that could occur within the waters and adjacent lands of the San Francisco Estuary (PEIS/R Appendix F). Of these 43 species, 12 were determined to be at sufficient risk of direct, indirect, or

cumulative adverse impacts to require site-specific evaluation and potential mitigation* . The conditions at this site were evaluated to determine the potential presence of these 12 species, and it was concluded that California clapper rail (CLRA) and salt marsh harvest mouse (SMHM) are or may be present within the proposed treatment area; no other special status species are expected to be present at this site. Potential impacts and required mitigations for these species are summarized below. Additional impacts and mitigation information is included in **Attachment 3: Environmental Compliance**.

California clapper rail. Surveys for clapper rail were conducted for this site during late February and early March 2004 by biologists of the USFWS and CDFG. Clapper rails were detected along the entirety of the main channel (*Sub-Areas 13a-13c*), within the Southern Whale's Tail Marsh (*Sub-Area 13e*), and within the Cargill Mitigation Marsh (*Sub-Area 13f*). No CACR were detected within the Northern Whale's Tail Marsh (*Sub-Area 13d*). Unless otherwise authorized by the USFWS, control activities will only occur outside of the clapper rail nesting season (September 1 through January 31) for those sub-Areas where rail presence has been confirmed, and all Best Management Practices and mitigations identified in the ISP EIS/R must be implemented.

Additionally, the following mitigations will be employed on the site to avoid impacts to the CLRA (Spelled out in **Attachment 3: Environmental Compliance**):

- Perform work during Sept 1 thru Feb 1 to avoid CLRA breeding season (BIO-5.1;CM-18)
- For work within the Clapper rail breeding season, surveys will be performed in the early spring according to FWS protocols (CM-18)
- Provide CLRA Field biologist supervision. (BIO-5.1)
- Assure that field personnel are trained in general CLRA biology and CLRA identification and call detection. (BIO-5.1)
- Report any CLRA activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.1)

Salt marsh harvest mouse. As there is suitable Salt Marsh Harvest Mouse (SMHM) habitat throughout the proposed treatment areas (All sub-areas), SMHM presence will be assumed for all operations, and appropriate mitigations will be employed for all impacts identified in the PEIS/R. Salt marsh harvest mice do not inhabit the lower marsh elevations where *Spartina* is typically found. Control activities only have the potential to affect SMHM habitat during entrance and egress from treatment areas. In addition to the following mitigations (spelled out in **Attachment 3: Environmental Compliance**), Best Management Practices including minimizing access routes will be utilized to assure the reduction of potential impacts to the SMHM and its habitat.

- Use shortest possible access route through any pickleweed habitat. Flag areas of repeated access (BIO-4.1;CM-13)
- Use protective mats or other covering over pickleweed in areas or repeated access (BIO-4.1;CM-13)

* Potentially affected species include soft bird's-beak, salt marsh harvest mouse, harbor seals, California black and clapper rails, salt marsh common yellowthroat, some tidal marsh song sparrow subspecies, western snowy plovers, California least terns, Chinook salmon, steelhead, and Sacramento splittail.

Treatment Plan

Management Objectives and Efficacy Criteria

The ultimate goal for the Whale's Tail Complex would be to reduce the *Spartina* infestation in all of the Sub-Areas to a low-intensity management level, such that the potential for infestation of adjacent restoration sites would be lessened or eliminated completely.

2004 Season: Due to the impending breach in the northern levee of the main channel of Old Alameda Creek by CDFG as part of their Eden Landing/North Creek Restoration, work within the 2004 Season must be focused on minimizing the invasion pressures on these newly opened marshland areas. One of the stated goals of the Eden Landing Restoration is to establish vegetation relatively quickly within the new marshland by providing shallow marsh habitat suitable for seeding establishment. Unfortunately, this will also lead to the rapid colonization of these areas by non-native invasive *Spartina* hybrids if the established adjacent populations are not controlled first.

If the proposed breaching timeline is followed as currently proposed, the northern levee will be breached in the fall of 2004. While the ISP strongly recommends that the proposed breaching activities be delayed until a full treatment season has been allowed to proceed within the adjacent *Spartina*-infested areas defined in this plan, this basic treatment plan assumes that the breaching will proceed as planned. With this in mind, in an effort to delineate areas within the Whale's Tail Complex where early season (pre-Fall) *Spartina* control work might proceed, clapper rail surveys were conducted in late January and early February 2004 by representatives of CDFG and the US Fish & Wildlife Service. Of the six Sub-Areas included within this Site-Specific Plan only 13d, Northern Whale's Tail, was found to be free of breeding populations of clapper rail, and therefore suitable for early season *Spartina* treatment. The remaining five sites will therefore be treated post-September 1st as personnel, tides, weather and access allow.

Treatment of the Sub-Areas would proceed in the following order: Sub-Area 13d, Northern Whale's Tail Marsh would be treated with herbicide early in the season, and multiple treatments of the site would be undertaken in order to treat at least once the majority of the *Spartina* within the Sub-Area. Work done under this plan would augment *Spartina* control work accomplished under TSN: ISP-2004-14, the *Spartina* control plan for Northern Whale's Tail Marsh.

In the post-September 1st treatment season, there are very few dates in 2004 where tides will be suitable for treatment on the remaining Sub-Areas in the Complex. Treatment on the remaining Sub-Areas will therefore be prioritized to maximize the impact on the *Spartina* population in an effort to minimize infestation pressures on the Eden Landing Restoration.

Sub-Areas 13a, b, and c would be the first priority in the post-September 1st treatment season. Herbicide treatments along the levees would maximize treated area in the limited time available for treatment for Sub-Areas 13a and c. Sub-Area might also be treated in this timeframe using amphibious vehicles and possibly boats spraying from the channel. If it is not possible to treat the entire central island during the available tidal windows, then priority will be given to the northern banks of the island to attempt to protect the breach area from an overwhelming influx of *Spartina* propagules.

Sub-Area 13e, the Southern Whale's Tail Marsh should be approached in a similar way to the northern Whale's Tail Marsh, though there will be additional access issues due to the larger channels located there. The first priority of this site following September would be to treat the bayside clones to the fullest extent possible via amphibious vehicles, as well as those areas readily accessible by trucks and personnel from the adjacent levee system.

Sub-Area 13f. The Cargill Mitigation Marsh presents unique challenges and opportunities. The marsh was found to contain at least one pair of breeding clapper rail in the winter 2004 Surveys, so treatment of this area must necessarily wait until the post-September 1st treatment season. This shortened treatment window will allow only short time periods for efficacious treatment via herbicide, and in the spirit of IVM, the ISP is exploring other options for control at this site that are feasible to implement within a short time frame, achieve high levels of control, and immediately remove this site as a source of propagules within the Complex. As Sub-Area 13f is currently surrounded by accessible levees and is only breached in two locations, one option for control will be to construct a structure or structures at the breach points to enable controlled inundation of the marsh to essentially drown the *Spartina* on the site. This option will be discussed further in the Treatment Strategy section below.

2005 Season: Early in 2005, a new round of California clapper rail surveys will be undertaken within the Complex to update distribution data. This new data will determine a revised strategy for the Complex where appropriate. With that in mind, the treatment strategy outlined for the 2004 Season will be continued, with treatment in Northern Whale's Tail early in the Season to enable re-treatment of previously treated areas where necessary, and initial treatment of those areas missed in 2004.

Treatment of the Main Channel Sub-Area will aim toward complete treatment of all *Spartina* within the area during the time allowed, especially those areas that may represent the most threat as propagule sources for the Eden Landing/North Creek breach. Treatment of the Southern Whale's Tail Area would involve the repeated treatment of those areas treated in the 2004 season where applicable, and initial treatments of untreated *Spartina* within the Sub-Area.

The Cargill Mitigation Marsh Site will be monitored for efficacy during the 2005 Season. If the marsh has been successfully inundated, the structures erected to hold back the water will be monitored for continued functionality and repairs will be made where necessary. Any *Spartina* plants established along the levees on the periphery of the marsh would be treated with herbicide during the season. If efficacy monitoring of the site indicated that the *Spartina* that was inundated in 2004 was dead, normal tidal flows could be restored to the marsh by early winter 2005.

2006 Season: Treatment strategies for the 2006 Season will be much like the 2005 treatment season, relying upon new clapper rail survey results, the previous season's efficacy results, and the treatment of all areas where no treatment has yet been undertaken.

2007 Treatment Season and Beyond: Continue previous season's approaches, aiming toward a program of 100% treatment of non-native *Spartina* within the Complex, and beginning the implementation of an ongoing maintenance phase of control work in conjunction with adjacent *Spartina* infested marshlands. This maintenance phase will be in effect until such time as the re-invasion or propagule pressure from adjacent *Spartina*-

infested areas has been eliminated or diminished to such an extent as to not pose a significant threat to the restored, *Spartina*-free Channel and adjacent marshlands.

Treatment Method(s)

A number of treatment methods are proposed for the Whale's Tail Complex. The following methods and acres treated are estimates based on current known conditions. Actual area treated by each method will depend upon many factors.

<i>Treatment Method</i>	<i>Acres of Spartina</i>
Sub-Area 13a, Northern Bank of Old Alameda Creek	6.2 total
Application of glyphosate (Aquamaster) herbicide by:	
○ Conventional spray truck	6.2
Sub-Area 13b, Central Island of the Old Alameda Creek Channel	16 total
Application of glyphosate (Aquamaster) herbicide by:	
○ Amphibious vehicle	12
○ Shallow-bottomed boat	4
Sub-Area 13c, Southern Bank of Old Alameda Creek	6.2 total
Application of glyphosate (Aquamaster) herbicide by:	
○ Conventional spray truck	6.2
Sub-Area 13d, Northern Whale's Tail Marsh	20 total
Application of glyphosate (Aquamaster) herbicide by:	
○ Conventional spray truck	5
○ Personnel equipped with backpack sprayers	1
○ Amphibious vehicles	14
Sub-Area 13e, Southern Whale's Tail Marsh	37 total
Application of glyphosate (Aquamaster) herbicide by:	
○ Conventional spray truck	8
○ Personnel equipped with backpack sprayers	2
○ Amphibious vehicles	27
Sub-Area 13f, the Cargill Mitigation Marsh (2 options)	19 total
Application of glyphosate (Aquamaster) herbicide by:	
○ Conventional spray truck	2
○ Personnel equipped with backpack sprayers	2
○ Amphibious vehicles	14
<i>or</i>	

Temporary, controlled inundation by:	
○ Construction of an adjustable weir system	18.5
Application of glyphosate (Aquamaster) herbicide by:	
○ Conventional spray truck/backpack sprayer	0.5

During subsequent years, these methods will be refined and the most efficacious method will ultimately be used to treat the Sub-Areas within the Complex.

2004 Treatment Strategy

Treatment strategy for the 2004 Season is informed by the results of the late January/early February 2004 California clapper rail surveys for access timing to the Complex for treatment. Of the six Sub-Areas delineated in this plan, only one, Sub-Area 13d, Northern Whales' Tail Marsh, was found not to have breeding pairs, and therefore open to early season control efforts. Control within the remaining five Sub-Areas is prioritized for proximity to the proposed breach site in the Northern Bank of the Old Alameda Creek Channel for the Eden Landing/North Creek Restoration, the likelihood of adjacent infestations to exert propagule pressure on the restored areas, availability of treatment resources by the responsible landowners, cooperative tidal windows, and levee access. The latter two considerations are addressed separately in the following section "Access and Timing".

Sub-Area 13d, Northern Whale's Tail Marsh. Sub-Area 13d is bordered on the eastern, northern and southern sides by vehicle-accessible levees used regularly by CDFG for maintenance and monitoring activities. The western border is the Bay, with a complex, undulating shoreline infested with *Spartina*. The levees that surround the three sides of the marsh provide ample area for staging and deployment operations of equipment and personnel for control of the *Spartina* in the Marsh.

Three methods of herbicide application will be used within this Sub-Area: levee-based herbicide spray trucks equipped with high-pressure hoses of 100 or more feet in length, ground crews equipped with backpack sprayers that would use levee-based spray trucks or similar "nurse rigs" as mobile staging areas, and lightweight, tracked, amphibious vehicles like the Hydrotraxx or the Argo carrying individual vehicle-mounted spray equipment into the marsh.

The initial target for control in this Sub-Area will be the shoreline, which represents the greater portion of the infestation, and is most likely to provide propagules for the further spread of the *Spartina* throughout the area. Due to the extent of the infestation in this area, ground-based personnel carrying backpack sprayers would be inappropriate. Additionally, the sensitivity of the substrate combined with the potential for negatively impacting the endangered salt marsh harvest mouse precludes any attempt to drive a heavy spray truck into the marsh. Therefore, one or more lightweight, tracked, amphibious vehicles would be the preferred choice.

These vehicles could deploy at low tide from the northern and southern levees delineating the Sub-Area and work south and north respectively toward the center, treating the *Spartina* along the way. Both hand held sprayers for directed spot-spraying activities and boom-type equipment for the larger meadows of *Spartina* would be used. As necessary,

equipment and supplies necessary to refuel or re-supply the treating vehicles would be stationed at the ends of the levees where these vehicles accessed the marsh.

Along the levees, spray trucks equipped with long, high-pressure hoses would enable personnel to treat those areas within reach of the hose length. Two or three additional personnel would be equipped with backpack sprayers and penetrate into the interior of the marsh to treat invaded pans, flats, and channels. These roaming ground-based personnel would use the spray trucks as mobile staging areas for refilling their treatment packs at need.

Sub-Areas 13a and 13c, the Northern and Southern Banks of Old Alameda Creek.

Both of these Sub-Areas may be treated in identical ways. Ready access to the sites is available via the levees on either side of the Creek Channel following the end of the breeding season on September 1st. The *Spartina* infestations in these areas are confined to relatively thin bands along the creek side, and are readily accessible to spray truck crews moving along the levees. Therefore, at once or in sequence these two levees may be treated with spray-truck based crews along their lengths.

Sub-Area 13b, the Central Island of the Old Alameda Creek Channel. Clapper rail surveys of 2004 revealed breeding populations along much of the length of the Central Island of the Channel. Portions of this Sub-Area lie directly adjacent to the proposed breach site of the Eden Landing/North Creek into the Channel and therefore require high prioritization.

Treatment of the interior, and all but the extreme edges of the island may be accomplished by lightweight, tracked, amphibious vehicles equipped with suitable spray apparatus. These vehicles will likely require refilling of their spray tanks during the treatment operations, and for that purpose, boats deployed in the channel at high tide prior to treatment operations may cache supplies (water, herbicide, dye) at predetermined locations along the island. Alternately, helicopters may be more appropriate to ferry supplies to treatment crews during or prior to treatment operations.

For the treatment of those areas inaccessible via the interior of the island, namely those plants growing lower in the channel, a shallow-bottomed boat equipped with spray apparatus may be used within either of the borrow ditches on either side of the Channel. If tidal windows do not allow treatment of both sides of the Central Island in this manner, then priority should be given to the northern side of the island as this side is in closer proximity to the proposed breach point in the Northern Levee.

Sub-Area 13f, Cargill Mitigation Marsh. There is at least one breeding pair of clapper rail currently using the Cargill Mitigation marsh according to 2004 Surveys. This site represents a large source of propagules for re-infesting adjacent marshland areas if left uncontrolled. Due to the very short window of time available for treatment of this area, limited resources available for treatment during that time, and the need for rapid control within this area, there are two main control options for this Sub-Area, both of which may or may not fit with the stated Performance Criteria of the Salt Evaporator Pond B-1 Tidal Marsh Restoration begun in 1995.

This site is surrounded by accessible and intact levees with two relatively small breach points on the western side, draining into the Southern Whale's Tail Marsh area. As such, the contained 49 acres of this site present an opportunity to forego the use of herbicides and instead use temporary and controlled inundation of the site to drown the *Spartina*. This could be accomplished by constructing an adjustable weir system at the larger of the

two levee breach points and filling the smaller breach. The weir system would be used to fill the marsh at high tides and effectively suffocate the *Spartina* within the marsh over the course of one to several growing seasons. High tides would be allowed in twice a year, and the marsh would be flushed on the same time frame to preclude the marsh from developing stagnant conditions, high salinity, or excessive buildup of nutrients as the plant matter in the marsh decays. During the period of inundation, the marsh would be converted to open water habitat suitable for many bird species. Also during the inundation period, those *Spartina* clones located along the periphery of the marsh would be treated with herbicide to completely treat all of the *Spartina* in the marsh.

The secondary option for treatment of the site would involve the conventional use of herbicides within the marsh, using levee-based spray trucks and personnel, ground-based backpack applicators, or lightweight, tracked, amphibious vehicles or some combination of the three.

Sub-Area 13e, the Southern Whale's Tail Marsh. Treatment of this area will be identical to the treatment of the Northern Whale's Tail Marsh area except that the areas where the channels flow into the Bay will possibly require greater caution when using amphibious vehicles. Priority will be given to the western marsh edge and following that, the channels within the marsh.

Access and Timing

Sub-Area 13d: Northern Whale's Tail Marsh. Access to this area is via a vehicle-accessible levee system that borders the marsh on the north, east and south sides. Ground-based personnel can readily access the marsh from the levees, and will have moderate obstacles in the way of sinuous channels (some obscured) within the marsh. Access to these levees is via locked gate controlled by CDFG. Lightweight, tracked, amphibious vehicles may access the bay edge sand/shell beaches and mudflats by traversing short distances over higher marsh pickleweed/*Spartina* stands. Where repeated entrance and egress are necessary during treatment, weight distributing fabric mats will be placed on the marsh and the travel routes flagged to protect salt marsh harvest mice. Once in the marsh, these vehicles will be able to traverse the shoreline below habitat suitable for the mouse.

Work within the Sub-Area may commence as soon as May 2004 and proceed until October 2004. Given this timeframe, repeated treatments of the Sub-Area are possible based on treatment efficacy monitoring. Treatment of the western shoreline should be done at a retreating low tide or full low tide to enable safe access and egress from the area as well as proper dry times for the chemical. The higher marsh portions of the marsh can be treated during higher tides as they are less likely to be inundated during the summer. Consultation of relevant tide charts will determine specific treatment timings.

Sub-Areas 13a and 13c, the Northern and Southern Banks of Old Alameda Creek.

Following the end of the clapper rail breeding season on September 1st, spray trucks may be mobilized along the levees at low or receding low tide. Crews could work from the upstream portions to the mouth of the channel to take the greatest advantage of the tidal windows, which will be limited in the fall. Levees are accessible through locked gates controlled by CDFG and the ACFCD.

Sub-Area 13b, the Central Island of the Old Alameda Creek Channel. Access to this site will be post-September 1st. Amphibious vehicle access to the Island will be via the

southern levee near the 20-Tide Gates area near Union City or where appropriate. These vehicles will then traverse the central island along its length treating Spartina as they proceed with a hand-held spray gun for spot-spray work and with boom equipment for the larger stands. Treatment in this fashion will require receding tides for proper safety and treatment efficacy.

Access for any required shallow-bottomed boat will be via the western end of the Northern Levee of the Channel or other suitable place identified by the treatment professionals involved in the operations. This site will be chosen based on several criteria including safety of personnel, ease of entry and egress (especially in cases of emergency), potential damage to the environment with a special concern for endangered species, as well as the potential for the site to increase the danger of spills.

Sub-Area 13f, Cargill Mitigation Marsh. Either the temporary inundation approach or the conventional herbicide application approach would be initiated following the end of the breeding season on September 1st. The temporary inundation option would require detailed analysis of appropriate tidal timings. Both options would require access to the site via the adjacent levee system. Conventional herbicide treatments would be done during one of the limited low tide windows in September or October. The levees associated with this site are accessed via locked gates controlled by the ACFCD.

Sub-Area 13e, the Southern Whale's Tail Marsh. Vehicle access to the marsh will be via the levees to the north and east of the marsh. Suitable areas for deployment of amphibious vehicles will be flagged, and where necessary to protect the endangered salt marsh harvest mouse, areas of repeated use will be covered in weight-distributing fabric. Some areas may be treatable from the levee system adjacent to the marsh, though on the eastern side a foot bridge spans a small breach close to the northeastern corner of the marsh. This foot bridge will likely inhibit access to the main eastern levee by spray trucks or amphibious vehicles. The eastern levee of the Cargill Mitigation Marsh provides access to the southernmost portions of the Southern Whale's Tail Marsh, and spray trucks and amphibious vehicles will be able to access the marsh using this route. From here, treatment of the areas surrounding the outlet of the main channel should be possible, along with treatment along the main channel and around the remnant dredge lock there. As in most of the other areas treatment should commence at a receding tide to allow for maximal time for treatment.

Equipment and Materials

A general description of the equipment and materials needed for each treatment method follows. Details and costs appropriate for each Sub-Area are included in **Attachment 2: Work Program**, as devised by the responsible ISP partner.

Herbicide Application

Herbicide application will be done with various approaches identified below. Please refer to the Treatment Methods section to determine the applicability of any particular option the Sub-Area in question

Conventional spray truck- Spray trucks equipped with mixing tanks for herbicide, water, surfactant and dye, high pressure hose equipment, 100-400 foot hose, mechanical hose retractor and other suitable equipment.

Personnel equipped with backpack sprayers- 4 gallon pump-action herbicide backpack sprayers used by personnel to traverse the marsh and treat the plants in smaller satellite patches.

Lightweight amphibious tracked vehicles- vehicles such as the Hydrotraxx or the Argo equipped with mix tanks and spray apparatus including hand held spray guns and booms. Used for those areas where lower ground pressure impacts are required due to the substrate, where the Spartina patches are larger than can be feasibly treated with backpack sprayers, or where access by spray truck is impossible.

Shallow-bottomed boats- boats equipped with spray apparatus including tanks, spray guns, booms, or a combination thereof. Can include fan or airboats and well as outboard motor propelled craft. These boats can be used to directly treat the Spartina plants, or to simply ferry tools and supplies to personnel within the treatment area.

Temporary inundation

For this treatment option, an adjustable weir system will be developed for the larger of the two breach points in the levee on the western side of Sub-Area 13f. This system may require lining the bottom of the breach and driving solid bracing members on either side to support modular weir pieces that could be inserted and removed at need.

Personnel and Contract Requirements

Personnel and equipment allocation necessary for completion of the work proposed within each Sub-Area shall be developed by the landowners responsible for treating each Sub-Area. In coordination with the ISP, these approaches will conform to the contracts developed by the State Coastal Conservancy, as well as the treatment approaches identified in this plan for the Complex. Upon completion, each Sub-Area's Work Program will be attached to this Site Plan in **Attachment 2: Work Program**.

The individual Work Programs should include a detailed budget for proposed work and personnel as well as any appropriate contract budget details. Included with this Site-Specific Plan for the Whale's Tail Complex is a basic Work Program Outline that identifies many of the items that should be included in a Work Plan associated with this overall Site Plan. Each landowner may have previously developed Work Plan protocols appropriate for their particular agency or group, and to the extent that these Work Plan formats include the relevant information included in the Work Plan Outline, and conform to any State Coastal Conservancy contract requirements, they shall be an acceptable format for inclusion into this overall Site-Specific Plan for the Complex.

Site Safety and Spill Prevention

A Site Safety and Spill Prevention Plan has been developed for this site, and will be implemented (see **Attachment 4: Site Safety and Spill Prevention**).

Permitting and Environmental Compliance

Required Permits and Authorizations

The following federal, state, and regional authorizations are required to implement the proposed work. Copies of these authorizations are included in **Attachment 3**:

Environmental Compliance, and any permit requirements have been incorporated into the Site Specific Project Mitigation Table in that attachment.

Permit/Action	Agency	Required for work at this site	Status
CWA Section 404	ACOE	No	N/A.
RHA Section 10	ACOE	No	N/A
Endangered species consultation	USFWS	Yes	Programmatic B.O. issued 8/29/03. Site specific B.O. pending.
NPDES Permit	SWRCB/ RWQCB	Yes	ACFCD has coverage under Statewide NPDES permit for herbicide work. CDFG will issue an NOI as ISP partner.
Section 401 WQC	RWQCB	No	N/A
BCDC permit	BCDC	No	N/A
FPS Notification	CDFG	Yes	Notification to be submitted.
Streambed Alteration Agreement	CDFG	N/A	N/A

Mitigation and Conservation Measures

Pursuant to the ISP Programmatic EIS/R, the project has been evaluated to determine potential site-specific impacts and necessary mitigation and conservation measures. This evaluation is attached as **Site-Specific Project Impact Evaluation and Site Specific Project Mitigation** checklists (**Attachment 3: Environmental Compliance**). All mitigations identified in the Site Specific Project Mitigation checklist will be implemented and verified by the ISP Field Supervisor.

Compliance Monitoring and Reporting

The Project will comply with all applicable regulations and permits and will submit reports according to the requirements of the agencies. Monitoring for compliance with the statewide NPDES permit will be completed according to the Water Quality Monitoring Plan developed by the ISP. Portions of the WQMP applicable to this site are attached.

All data collected from this project will be reviewed by the ISP Monitoring and Data Assessment Team, and data and reports will be available on the ISP website (www.spartina.org).

Research

Research plans for this Complex have not yet been completed. Several researchers have expressed interest in testing the efficacy of Acetic Acid treatments in areas of the Complex, and monitoring and testing of the controlled inundation approach to Sub-Area 13f may be included in a research proposal. Any full implementation of research protocols developed or implemented in association with the ISP for this Complex will be included in **Attachment 5: Research Plan**.

Also potentially proposed for this site are aerial applications of Imazapyr herbicide on Sub-Areas 13a-c. If this experimental work proceeds, a detailed plan will be included in **Attachment 5: Research Plan**.

Attachment 1. Site Maps and Photographs

Attachment 2. Work Program

Attachment 3. Environmental Compliance

Attachment 4. Site Safety and Spill Prevention

Attachment 5. Research Plan

SITE-SPECIFIC PROJECT IMPACT EVALUATION

Site Name: Whale's Tail Complex

TSN: ISP-2004-13

<i>Impact*</i>	<i>Applicable to site</i>	<i>Applicable sub-site</i>	<i>Applicable Mitigations* (by Treatment Method used at site)</i>			<i>Comments/Analysis of Residual Impact at site</i>	<i>Additional Mitigation Required</i>
			<i>Herbicide</i>	<i>Temporary Inundation</i>			
GEO-1: Erosion or deposition of sediment at treatment site	NA/NE					NA/NE - Proposed activities are not ground disturbing and will not elevate erosion above ambient levels.	None
GEO-2: Erosion or topographic change of marsh and mudflat by vehicles used in eradication	A	All Sub-Areas	GEO-2			Herbicide: Residual impact LTS/NLTAE Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation GEO-2). Site conditions consistent with those anticipated in the PEIS/R.	None
GEO-3: Remobilization of sand in cordgrass-stabilized estuarine beaches	A	12d, 12e	GEO-3			LTS/NLTAE – No excavation of estuarine beaches proposed. Residual rhizome mats would retard sand remobilization. Site conditions consistent with those anticipated in the PEIS/R.	None
GEO-4: Increased demand for sediment disposal and potential spread of invasive cordgrass via sediment disposal.	NA/NE					NA/NE- No dredging/sediment disposal proposed	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
GEO-5: Increased volume and velocity of tidal currents in channels due to the removal of invasive cordgrass.	A	All Sub-Areas	GEO-5	GEO-5		No adverse impact (see EIS/R GEO-5 discussion). Site conditions consistent with those anticipated in the PEIS/R.	None
GEO-6: Increased depth and turbulence of tidewaters impounded in salt marsh pans.	A	12d,12e	GEO-6			No adverse impact (see EIS/R GEO-6 discussion). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-1: Degradation of Water Quality due to Herbicide Application	A	All Sub-Areas	WQ-1			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation WQ-1). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-2: Degradation of Water Quality due to Herbicide Spills	A	All Sub-Areas	WQ-2			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation WQ-2). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-3: Degradation of Water Quality due to Fuel or Petroleum Spills	A	All Sub-Areas	WQ-3			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation WQ-3). Site conditions consistent with those anticipated in the PEIS/R.	None
WQ-4: Degradation of Water Quality due to Contaminant Remobilization	NA/NE					NA/NE - No dredging or other sediment-mobilizing activities proposed.	None
WQ-5: Water Quality Effects Resulting from Sediment Accretion	NA/NE					NA/NE – This impact only applies to EIS/R Alternative 3.	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
BIO-1.1: Effects on tidal marsh plant communities affected by salt-meadow cordgrass and English cordgrass.	NA/NE					NA/NE – Field surveys found no salt-meadow or English cordgrass at this site.	None
BIO-1.2: Effects on tidal marsh plant communities affected by Atlantic smooth cordgrass and its hybrids.	A	All Sub-Areas	BIO-1.2			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-1.2). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-1.3: Effects on tidal marsh plant communities affected by Chilean cordgrass.	NA/NE					NA/NE – Field surveys found no Chilean cordgrass at site.	None
BIO-1.4: Effects on submerged aquatic plant communities.	NA/NE					NA/NE – Field surveys found no eelgrass or other submerged aquatic plants at site.	None
BIO-2: Effects on special-status plants in tidal marshes.	NA/NE					NA/NE - Field surveys found no special-status plant species at site.	None
BIO-3: Effects on shorebirds and waterfowl.	A	All Sub-Areas	BIO-3	BIO-3		LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-3). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-4.1: Effects on the salt marsh harvest mouse and tidal marsh shrew species.	A	Sub-Areas 12a, 12b, 12c, 12d, 12e	BIO-4.1			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-4.1). Site conditions consistent with those anticipated in the PEIS/R.	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
BIO-4.2: Effects on resident harbor seal colonies of San Francisco Bay.	NA/NE					NA/NE - No harbor seal colonies at or near site.	None
BIO-4.3: Effects on the southern sea otter.	NA/NE					NA/NE – Outside of known range of southern sea otters.	None
BIO-5.1: Effects on California clapper rail.	A	Sub-Areas 12a, 12b, 12c, 12e, 12f	BIO-5.1 as modified by UFSWS BO	BIO-5.1 as modified by UFSWS BO		LTS/NLTAE at site – Potential project impacts mitigated at site. SU cumulative impacts addressed in EIS/R and CEQA findings.	None
BIO-5.2: Effects on the California black rail.	NA/NE					NA/NE – Outside of known range black rails.	None
BIO-5.3: Effects on tidal marsh song sparrow subspecies and the salt marsh common yellowthroat.	A	All Sub-Areas	BIO-5.3	BIO-5.3		LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-5.3). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-5.4: Effects on California least terns and western snowy plovers.	A	All Sub-Areas	BIO-5.4 as modified by UFSWS BO	BIO-5.4 as modified by UFSWS BO		LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-5.4). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-5.5: Effects on raptors (birds of prey).	A	All Sub-Areas	BIO-5.5			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-5.5). Site conditions consistent with those anticipated in the PEIS/R.	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
BIO-6.1: Effects on anadromous salmonids (winter-run and spring-run Chinook salmon, steelhead).	A	Sub-Areas 12a, 12b, 12c	BIO-6.1			LTS/NLTAE – Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation BIO-6.1). Site conditions consistent with those anticipated in the PEIS/R.	None
BIO-6.2: Effects on delta smelt and Sacramento splittail.	NA/NE					NA/NE – Outside of known delta smelt and Sacramento splittail range.	None
BIO-6.3: Effects on the tidewater goby.	NA/NE					NA/NE – Outside of known range of tidewater goby.	None
BIO-6.4: Effects on estuarine fish populations of shallow submerged intertidal mudflats and channels.	A	All Sub-Areas	BIO-6.4 – minimize spraying			LTS/NLTAE with additional mitigation BIO-6.4(b) (Note: no mowing proposed accept in test plots because of unacceptable impacts to birds)	BIO-6.4(b) - R-11 will not be used adjacent to channel to minimize any potential adverse affects on estuarine fish.
BIO-7: Effects on California red-legged frog and San Francisco garter snake.	NA/NE					NA/NE – Outside of known range of California red-legged frog and San Francisco garter snake.	None
BIO-8: Effects of regional invasive cordgrass eradication on mosquito production.	NA/NE					NA/NE – Site activities will not create additional mosquito habitat.	None
BIO-9: Effects on tiger beetle species.	NA/NE					NA/NE- no potential tiger beetle habitat will be affected.	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
AQ-1: Dust Emissions.	A	All Sub-Areas! Unexpected End of Formula	AQ-1	AQ-1		LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation AQ-1). Site conditions consistent with those anticipated in the PEIS/R.	None
AQ-2: Smoke Emissions.	NA/NE					NA/NE – no burning proposed.	None
AQ-3: Herbicide Effects on Air Quality.	A	All Sub-Areas	AQ-3			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation AQ-3). Site conditions consistent with those anticipated in the PEIS/R.	None
AQ-4: Ozone Precursor Emissions.	NA/NE					LTS/NLTAE without mitigation.	None
AQ-5: Carbon Monoxide (CO) Emissions.	NA/NE					LTS/NLTAE without mitigation.	None
N-1: Disturbance of Sensitive Receptors	A	Sub-Areas 12a, 12b, 12c	N-1			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation N-1). Site conditions consistent with those anticipated in the PEIS/R	None
HS-1: Worker Injury from Accidents Associated with Manual and Mechanical Cordgrass Treatment.	NA/NE					NA/NE- Methods not proposed on site	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
HS-2: Worker Health Effects from Herbicide Application.	A	All Sub-Areas	HS-2			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation HS-2). Site conditions consistent with those anticipated in the PEIS/R.	None
HS-3: Health Effects to the Public from Herbicide Application.	A	All Sub-Areas	HS-3			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation HS-3). Site conditions consistent with those anticipated in the PEIS/R.	None
HS-4: Health effects to workers or the public from accidents associated with treatment.	A	All Sub-Areas	HS-4			LTS/NLTAE - Potential impacts mitigated to less than significant (per EIS/R, Impact/Mitigation HS-4). Site conditions consistent with those anticipated in the PEIS/R.	None
VIS-1: Alteration of Views from Removal of Non-Native Cordgrass Infestations.	A	All Sub-Areas	VIS-1			SU - impacts addressed in EIS/R and CEQA findings. Site conditions consistent with those anticipated in the PEIS/R.	None
VIS-2: Change in Views from native Marsh, Mudflat, and Open Water to Non-Native Cordgrass Meadows and Monocultures.	NA/NE					NA/NE- Applies only to PEIS/R Alternative 3 (No Action)	None
LU-1: Land Use Conflicts Between Herbicide Use and Sensitive Receptors	A	All Sub-Areas				LTS/NLTAE - Limited to less than significant by HS, N and AQ mitigations.	None
LU-2: Land Use Conflicts from Mechanical and Burning Treatment Methods	NA/NE					NA/NE - Methods not proposed for site	None

Impact*	Applicable to site	Applicable sub-site	Applicable Mitigations* (by Treatment Method used at site)			Comments/Analysis of Residual Impact at site	Additional Mitigation Required
			Herbicide	Temporary Inundation			
CUL-1: Disturbance or Destruction of Cultural Resources from Access and Treatment.	NA/NE					NA/NE – No-ground disturbing treatment methods proposed	None
CUL-2: Loss of Cultural Resources from Erosion.	NA/NE					NA/NE- No erosion-producing activities proposed	None
CUM-1- Effects of wetland restoration projects on spread of non-native cordgrass	A	All Sub-Areas				Potentially Significant-ISP will attempt coordination of control work at site with the South Bay Salt Ponds Restoration Project.	None
CUM-2- Cumulative damage to marsh plain vegetation	NA/NE					NA/NE- No Mosquito Abatement Districts working on this site	None
CM-7- Post-treatment invasion by invasive species	A	All Sub-Areas	CM-7	CM-7		LTS/NLTAE - Potential impacts mitigated to less than significant (per USFWS BO CM-7).	None

SITE-SPECIFIC PROJECT MITIGATION

Site Name: Whale's Tail Complex, Alameda County

TSN: ISP-2004-13

Impact*	Applicable Mitigation & Conservation Measures (source**)	Applicable sub-sites	Herbicide	Temporary inundation	Implementation Timing	Verification Signatures	
						Implementing Entity	ISP Field Supervisor
GEO-2: Erosion or topographic change of marsh and mudflat by vehicles used in eradication	Minimize vehicle use in marsh (GEO-2; CM-1)	All sub-sites	X		During treatment		
WQ-1: Degradation of Water Quality due to Herbicide Application	Apply herbicide directly to plant at low tide and according to label. (WQ-1; CM-3 & 4)	All sub-sites	X		During treatment		

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WQ-2: Degradation of Water Quality due to Herbicide Spills	Apply under supervision of trained applicator (WQ-2;CM-3)	All sub-sites	X		During treatment		
	Implement spill and containment plan provided or approved by ISP (WQ-2;CM-17)	All sub-sites	X		During treatment		
WQ-3: Degradation of Water Quality due to Fuel or Petroleum Spills	Implement spill and containment plan provided or approved by ISP (WQ-3;CM-17).	All sub-sites	X		During treatment		
BIO-1.2: Effects on tidal marsh plant communities affected by Atlantic smooth cordgrass and its hybrids.	Minimize entry and re-entry into marsh (BIO-1.2;CM-1)	All sub-sites	X		During treatment		
	Avoid staging in high, dense vegetation such as gumplant or pickleweed (FWS GL)	All sub-sites	X		During treatment		
	Place mats or other protectors beneath heavy equipment operating in sensitive high marsh vegetation, especially gumplant (BIO-1.2)	All sub-sites	X		During treatment		
	Avoid herbicide application to non-target vegetation adjacent to treatment area. (BIO-1.2;CM-3,4)	All sub-sites	X		During treatment		
BIO-3: Effects on shorebirds, waterfowl & marshland birds.	Avoid working within 1,000 feet of occupied mudflats during peak Pacific Flyway stopovers. (BIO-3)	All sub-sites	X	X	During treatment		
	Occupy treatment area soon after high tide, before mudflats emerge. (BIO-3)	All sub-sites	X	X	During treatment		
	Haze shorebirds to minimize potential direct contact with herbicide drift. (BIO-3)	All sub-sites	X		During treatment		

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BIO-4.1: Effects on the salt marsh harvest mouse and tidal marsh shrew species.	Use shortest possible access route through any pickleweed habitat. Flag areas of repeated access (BIO-4.1;CM-15)	All sub-sites	X		During treatment		
	Use protective mats or other covering over pickleweed in areas or repeated access (BIO-4.1;CM-15)	All sub-sites	X		During treatment		
BIO-5.1: Effects on California clapper rail.	Perform work during Sept 1 thru Feb 1 to avoid CLRA breeding season (BIO-5.1;CM-18)	12b, 12c, 12d, 12e	X	X	During treatment		
	For work within the Clapper Rail breeding season, call counts will be performed in the early spring according to FWS protocols (CM-18)	All sub-sites	X	X	Pre-treatment		
	Provide CLRA Field biologist supervision. (BIO-5.1)	12b, 12c, 12d, 12e	X	X	During treatment		
	Assure that field personnel are trained in general CLRA biology and CLRA identification and call detection. (BIO-5.1)	12b, 12c, 12d, 12e	X	X	Pretreatment and during treatment		
	Report any CLRA activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.1)	12b, 12c, 12d, 12e	X	X	During and post treatment		
BIO-5.3: Effects on tidal marsh song sparrow subspecies and the salt marsh common yellowthroat.	Implement CLRA timing restriction (most restrictive). (BIO-5.2)	All sub-sites	X	X	During treatment		

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	Report any SMSS and SCYE activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.3)	All sub-sites	X	X	During and post treatment		
BIO-5.4: Effects on California least terns and western snowy plovers.	Survey access levees for nesting CALT and WSPL prior to entry (BIO-5.4;CM-20)	All sub-sites	X	X	Pre-treatment		
	Report any CALT and WSPL activity immediately to ISP Field Supervisor and in post-treatment report (BIO-5.4)	All sub-sites	X	X	During and post treatment		
BIO-5.5:Effects on raptors (birds of prey)	Minimize helicopter use during nesting season (BIO-5.5)	All sub-sites	X		During treatment		
	Prior to helicopter application of herbicide, a survey by a qualified biologist shall determine the presence of nesting raptors in treatment area. (BIO-5.5)	All sub-sites	X		Pre-treatment		
	Identified nests shall be provided a buffer of 500 feet during spray operations. (BIO-5.5)	All sub-sites	X		During treatment		
BIO-6.1: Effects on anadromous salmonids (winter-run and spring-run Chinook salmon, steelhead).	Target herbicide applications to minimize herbicide use near channel. (BIO-6.1)	All sub-sites	X		During treatment		
	Avoid use of alyphenol ethoxylate surfactants Dec 1 thru April 1 to avoid steelhead spawning. (BIO-6.1)	All sub-sites	X		During treatment		
BIO-6.4: Effects on estuarine fish populations of shallow submerged intertidal mudflats and channels.	Bio-6.4 – minimize spraying near intertidal mudflats and channels (BIO-6.4)	All sub-sites	X		During treatment		

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	Avoid use of alyphenol ethoxylate surfactants adjacent to channel to minimize any potential adverse effects on estuarine fish. (BIO-6.4)	All sub-sites	X		During treatment		
AQ-1: Dust emissions	Suspend activities when winds are too great to prevent visible dust clouds from affecting sensitive receptors (i.e., houses, schools, hospitals). (AQ-1)	All sub-sites	X	X	During treatment		
	Limit traffic speeds on any dirt access roads to 15 miles per hour. (AQ-1)	All sub-sites	X	X	During treatment		
AQ-3: Herbicide effects on air quality	Implement ISP Drift Management plan for aerial applications of herbicide (AQ-3;CM-3,4)	All sub-sites	X		During treatment		
N-1: Disturbance of Sensitive Receptors	Comply with local noise ordinances (N-1)	All sub-sites	X		During treatment		
	Avoid use of helicopters within 1,500 feet of hospitals, schools, or houses during times of occupancy (N-1)	All sub-sites	X		During treatment		
HS-2: Worker Health Effects from Herbicide Application.	Follow handling and application procedures as identified on product label. (HS-2;CM-3)	All sub-sites	X		During treatment		
HS-3: Health Effects to the Public from Herbicide Application.	Minimize drift according to ISP drift management plan or equivalent (HS-3;CM-3,4)	All sub-sites	X		During treatment		
	Post appropriate signage (see attached signage requirements) a minimum of 24 hours pre-treatment (HS-3;CM-3)	All sub-sites	X		Pre-treatment		

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	Avoid scheduling herbicide application near high public use areas during weekends or holidays, or close public access to area 24 hours before and after treatment. (HS-3;CM-3)	All sub-sites	X		Pre-treatment and during treatment		
HS-4: Health effects to workers or the public from accidents associated with treatment.	Maintain ISP or approved equivalent Site Safety and Spill Prevention plan on site. (HS-4)	All sub-sites	X		During treatment		
VIS-1: Alteration of Views from Removal of Non-native Cordgrass Infestations.	Post appropriate signage according to ISP signage protocols. (VIS-1)	All sub-sites	X		Pre-treatment, during treatment, post-treatment		
CUL-1: Disturbance or Destruction of Cultural Resources from Access and Treatment.	Report all discovered prehistoric or historic resources to the ISP Field Supervisor and a qualified archeologist or historic resources consultant and suspend all work at site until archaeological mitigation has taken place. (CUL-1)	All sub-sites	X		Pre-treatment and during treatment		
CM-7: Invasive Species	Monitor cleared patches for recruitment of invasive plant species including perennial pepperweed until native vegetation has become dominant (CM-7)	All sub-sites	X	X	Post treatment		