APPENDIX A:

REVISED TENTATIVE ORDER

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

REVISED TENTATIVE ORDER

WASTE DISCHARGE REQUIREMENTS AND WATER QUALITY CERTIFICATION FOR:

U.S. FISH AND WILDLIFE SERVICE

BAIR ISLAND RESTORATION PROJECT, REDWOOD CITY, SAN MATEO COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter the Water Board) finds that:

1. This Order serves as the Waste Discharge Requirements (WDRs) and Water Quality Certification for the project under Section 401 of the Clean Water Act, for the Bair Island Restoration Project (BIRP), which consists of portions of three islands located on the Bair Island Complex. Inner Bair Island is west of Smith Slough, and Middle and Outer Bair Islands are west of Redwood Creek (Figure 1). This Order provides receiving water limits, criteria for upland and wetland fill, discharge specifications, and monitoring and reporting requirements to regulate habitat restoration activities for the BIRP.

2. This Order will regulate the placement of sediments and construction activities at the BIRP to restore approximately 1,400 acres of diked salt marsh and uplands to predominantly tidal marsh and associated habitats.

Discharger

3. The approximately 1,400-acre BIRP is within the 2,635-acre Bair Island Complex. With the exception of several privately owned parcels, the complex is owned by the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (FWS). FWS manages the portions of the BIRP owned by CDFG.

4. As the current owner/manger of the 1,400-acre property covered by this Order, FWS, an agency of the U.S. government, is hereinafter referred to as the Discharger. The Discharger owns the land and is the local sponsor of the BIRP. This Order applies only to the 1,400-acre restoration area, but the Environmental Impact Report for the BIRP includes calculations and observations for the entire 2,635-acre complex.

Certification Application and Report of Waste Discharge

5. The Discharger has received two conditional water quality certifications from the Water Board to begin preliminary restoration work on Inner Bair Island. The first was issued on October 27, 2006, and the second on May 1, 2007. On December 31, 2007, the Discharger submitted an application for a Section 401 Water Quality Certification and a Report of Waste Discharge for the proposed wetland restoration and placement of both upland fill and sediment dredged from the Redwood Creek shipping channel, which borders the Bair Island Complex. A monitoring plan for the BIRP was submitted and is included here as Attachment 1.

Site Location and Description

6. The wetland restoration site is bounded by Redwood Creek and Steinberger Slough. The individual islands in the Bair Island Complex are separated by Smith Slough and Corkscrew Slough. Both Redwood Creek and Steinberger Slough are connected to San Francisco Bay. Once the levees are breached, Steinberger and Smith Slough will be tied to the project area tidally. Outer and Middle Bair Islands are abandoned salt ponds near Redwood City (Figure 1.) The total site covers approximately 2,635 acres and ranges from approximately 3 to 10 feet North American Vertical Datum 1988 (NAVD 88). Since the project area is surrounded by levees and waterways, it currently receives no tidal input or runoff from outlying areas. Non-native grasslands and diked wetlands occupy much of the project area (Table 1). The habitat acreages from the EIR/EIS were calculated for the entire 2,635-acre Bair Island Complex. The proposed 1,400-acre project includes 1,136 acres on Middle and Outer Bair and 264 acres on Inner Bair Island. Most of the post project acreage will be tidal wetlands.

Table 1
Existing and Proposed Habitats on the Bair Island Complex

Habitat Type	Existing		Proposed*	
Land Cover:	**Acres**	**Percent**	**Acres**	**Percent**
Inner Bair Island				
Aquatic	48.71	15	48.71	15
Developed	8.47	3	8.47	3
Diked Salt Marsh	9.06	3	0	0
Non-Native Grassland	187.89	58	30	9
Seasonally Ponded Water	32.82	10	0	0
Tidal Salt Marsh	36.90	11	236.67	73
Total	**323.85**	**100**	**323.85**	**100**
Middle Bair Island				
Aquatic	112.01	12.5	112.01	12.5
Diked Salt Marsh	553.64	61.8	0	0.0
Non-Native Grassland	38.02	4.2	38.02	4.2
Tidal Salt Marsh	192.54	21.5	746.18	83.3
Total	**896.21**	**100**	**896.21**	**100**
Outer Bair Island				
Aquatic	100.21	7.0	100.21	7.08
Diked Salt Marsh	468.90	33.1	0	0.00
Muted Tidal Salt Marsh	51.77	3.6	0	0.00
Non-Native Grassland	141.45	9.9	30	2.12
Shell Mounds	5.63	0.3	5.63	0.40
Tidal Salt Marsh	647.13	45.7	1,279.3	90.40
Total	**1,415,09**	**99.6**	**1415.14**	**100**
Overall Site	**2,635.13**		**2,635.2**	
Source: H.T. Harvey & Associates				
*The proposed habitats are assumed to develop within 50 years.				

Site History

7. Historically, Bair Island was part of a large complex of tidal marshes and mudflats within the drainage of the San Francisco Bay and Belmont Slough. Bair Island was diked in the late 1800s and early 1900s for agricultural uses, including cattle grazing. Bair Island was converted to salt evaporation ponds starting in 1946, and remained in active salt production until 1965. The lands were subsequently drained and eventually sold to a series of real estate development companies. A local referendum in the City of Redwood City halted development plans for Bair Island. CDFG and the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) both acquired portions of Bair Island over time. The Peninsula Open Space Trust (POST) purchased most of Bair Island that remained in private ownership and turned over its interest in the property to the two agencies. The lands owned by CDFG are included in the Bair Island Ecological Reserve.

A Memorandum of Understanding (MOU) was signed in 1997 by CDFG and the Refuge agreeing that all CDFG lands on Bair Island would be operated and managed by the Refuge as a part of the Don Edwards San Francisco Bay National Wildlife Refuge. This restoration and management plan would be implemented by the Refuge on CDFG and Refuge-owned lands in accordance with the MOU.

8. Small parcels of land on Middle Bair Island along Redwood Creek remain in private ownership. A small area of the Bay outside of Outer Bair Island is privately owned. The San Carlos Airport also retains a portion of Inner Bair Island as a flight safety zone (SCASZ). In addition, two easements exist on Bair Island: (1) for the PG&E towers and transmission lines that run throughout the site, and (2) for the South Bayside System Authority (SBSA) sanitary sewer force main that runs underneath most of the southern part of the levee on Inner Bair Island. Pedestrians and bicyclists currently use the top of the Inner Bair Island levee as a 3.3-mile loop trail and in the dry season use a cross pond trail from the Whipple Avenue trailhead to the levee along Smith Slough.

9. For many years, prior to the management of Bair Island by the Refuge, landowners attempted to limit access and prevent trespassing on Inner Bair Island. However, after many failed attempts to block all public access (including motorcycles and all-terrain vehicles) to Inner Bair Island, landowners stopped blocking foot access to the levees and pathway on Inner Bair Island. Since acquiring Bair Island, the Refuge has maintained the same level of public access until a public use plan can be generated for all of Bair Island.

Current Regulatory Status of the BIRP

10. The second Water Quality Certification issued by the Water Board for restoration work on Bair Island on May 1, 2007, covered work to be performed during 2007 for the BIRP. This work involved substantial impacts to wetlands including filling 130 acres of wetlands for the purpose of initiating the restoration project and creating a levee to impound sediments dredged from the Port of Redwood City ship channel. Mitigation was not required since the overall restoration project would supply ample mitigation for these impacts.

11. The US Army Corps of Engineers (Corps), as the federal regulatory agency for implementing the Clean Water Act, issued a 404 permit for the 2007 Water Quality Certification, and will issue another 404 permit after the Water Board has approved this combined WDR/401 Certification. The Corps initiated a Section 7 consultation with FWS and the National Oceanic and Atmospheric Administration (NOAA). Biological opinions from both agencies have been approved.

12. The San Francisco Bay Conservation and Development Commission (BCDC), a state regulatory agency, is responsible for issuing a consistency determination (CD) and a permit to the Discharger. The CD is for actions on federal lands, and the permit is for actions on lands owned by the state. BCDC also has an active role in the planning and design of the project. One element of BCDC's CD/permit will address public access via the Bay Trail.

Project Objectives

13. Specific project objectives included in the Discharger's permit application are:
    - breaching external levees and placing ditch blocks to increase channel formation;
    - placing fill obtained from dredging and upland sites both to create ecological habitat and to speed vegetation development in the SCASZ; and
    - providing public access features.

Project Description

14. The goal of the BIRP is to restore approximately 1,400 acres of diked wetlands and historic salt ponds within the 2,635-acre Bair Island Complex to tidal salt marsh (Figure 1). The purpose of the restoration activities is to restore high quality tidal marsh habitat to Inner, Middle and Outer Bair Island, thereby enhancing habitat for special status species, migratory waterfowl, and shorebirds. The target habitats are expected to be restored within 50 years, but the time frame may be longer due to unforeseen circumstances.

15. Following restoration, Bair Island will become an integral part of the extensive wetland complex within South San Francisco Bay. The project has been the subject of an extensive multi-year design and permitting process culminating in a Final EIS/EIR dated June 2006. An overview of project features is shown on Figure 2.

16. Public Access for pedestrians and bicyclists will be allowed along a 2.7-mile levee trail on Inner Bair. This trail will be provided along a portion of the perimeter levee of Inner Bair, running from the Refuge's parking lot near Pete's Harbor. An orientation kiosk and viewing/environmental education platforms will continue to be provided at both ends of the levee trail, adjacent to Smith Slough. No public access will be allowed on Outer and Middle Bair Island except by Refuge-guided trips and other specific exceptions that are approved by a Refuge Special Use Permit. Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek will be allowed; however, fishing will not be permitted from land. Hunting of waterfowl on Outer Bair Island will be allowed per state regulations.

17. Tasks already approved by the Water Board's Water Quality Certifications at Inner Bair Island include the following: a combination of upland fill and dredged material will be used to expand the southern levee of Inner Bair Island to adequately protect the SBSA sewer line, raise the San Carlos Airport property above the 100-year flood plain, and create a cross-levee and raise the perimeter levee to contain material dredged from the Port of Redwood City ship channel. Levees will be breached at historic slough channel locations (IB1 and IB2) on Inner Bair Island and borrow ditch cutoff berms will be created to prevent tidal capture by the existing borrow ditches. Fill will be used to raise ground levels on Inner Bair from current elevations of approximately 0.0 to between 2.0 and 3.0 feet NGVD, requiring between 1, 000,000 to 1,500,000 cubic yards of fill. Once

the fill placement is completed, the dredge material cross-levee will be graded down to match the upland fill surface, and starter channels will be created.

18. The following tasks will be performed to prepare Middle and Outer Bair Islands for restoration (see attached plan figures for locations of all permitted structures). These will follow pre-project *Spartina alterniflora* control efforts by others (the Spartina Control Project Group), which are deemed important by the Discharger in the project vicinity. Except for the two breaches and ditch blocks on Outer Bair, all tasks are contingent on adequate funding.

    - Task 1: Breach Outer Bair Island to Steinberger Slough at levee breach locations OB1 and OB4 (fall 2008). Construct ditch blocks OBDB1 and OBDB2.

    - Task 2: Build flow restrictor (FC1) in Corkscrew Slough, including fill and rock placement and construction of kayak portage. Build flow constrictor (FC2) in Smith Slough including rock placement on Inner Bair Island breaches (summer 2009).

    - Task 3: Construct Middle Bair Island Decant Water Placement Improvements.

    - Task 4: Construct ditch blocks MBDB1 through MBDB4 and channel connectors MBCC1 through MBCC4, and subsequently breach Middle Bair Island (2009) at MB1, MB3, MB4, and MB5. Breach Outer Bair at OB3 once flow constrictor in Corkscrew Slough is completed.

Task 1: Outer Bair Levee Breach

19. Beginning in September 2008, excavation will begin at OB1 and OB4 to remove existing wetland vegetation in preparation for breaching the levee in accordance with the FWS biological permit requirements. Under the guidance of a qualified biologist, a maximum of 1.54 acres of existing pickleweed plants will be hand-removed with a weed-eater prior to mechanical ground disturbance. The weed-eater will start in the middle and work outward to avoid trapping mice in the last remaining area to be removed. An amphibious excavator or bulldozer (transported by raft or helicopter) will be used to excavate material from the salt marsh outside of the levee to create the new channel for tidal flows. The excavated substrate will be used to create two ditch blocks in the borrow ditches at OBBD1 and OBDB2 and in the eastern borrow ditch of Outer Bair Island. If additional material is required to block the borrow ditches, up to 12,000 linear feet (0.55 acres) of the levee on the western edge of Outer Bair Island along Steinberger Slough may be graded to a height no lower than +6 feet NGVD (after pickleweed removal). The new tidal channel will be excavated through the existing pickleweed mass from Steinberger Slough towards the levee with the last block left in place until low tide to ease excavation and minimize sediment transport. This process is anticipated to require two weeks to a month; however, a larger block of time has been allocated. Task 1 is anticipated to be completed by the end of January 2008. Outer Bair Island will be exposed to tidal action at OB1 and OB4.

Task 2: Build Flow Restrictor (FC1) in Corkscrew Slough and a Flow Constrictor (FC2) in Smith Slough Including Fill and Rock Placement.

20. Beginning in mid-June 2009, the flow restrictor in Corkscrew Slough will be constructed using water- and land-based heavy equipment. The Corkscrew Slough structure will be approximately 300 feet long, 30 feet wide, and will crest at +5.1 with a 30 foot notch in the center to allow a limited flow of water and small boat passage at high tide. Corkscrew Slough will be posted as a 5 mph, no wake zone to further minimize impacts from recreational boating. The flow restrictor berm will be constructed of excavated or import fill, quarry stone or of linked cellular coffers. If quarry stone is used, it will be placed directly into the channel. Linked cellular coffers will be driven into the slough with a vibrator mounted on a barge and then the cells will be filled with dirt/rock after cell placement. Adjacent to the flow restrictor structure, a portage will be built on the existing Outer Bair levee to facilitate small boat passage at low tide. A 15 x 15-foot wooden observation platform and interpretive signs will be placed at levee level, extending west from the levee surface, over the existing borrow ditch. A ditch block will be placed across the Outer Bair Island borrow ditch at the flow restrictor site, as well as in the borrow ditch between OB3 and OB4. The two flow constrictors will be similar. The objective of the Smith Slough structure (FC2), which will be built between IB1 and IB2, is to redirect all tidal flow in Smith Slough to the remnant slough within Inner Bair. The IB2 breach would be armored to prevent uncontrolled increase in breach dimensions. This would prevent increased flow velocities at Pete's Outer Harbor. With the exception of the notch, this structure will be similar to that in Corkscrew Slough.

Task 3: Construct Middle Bair Island Decant Water Placement Improvements.

21. As needed to contain decant water from dredge fill placement operations on Inner Bair Island scheduled to begin in June 2008, minor modifications to the levee on Middle Bair Island may be required to contain decant water. In addition to minor raising of Middle Bair levees, a rock apron will be required at the outlet location of the dredge pipe to prevent erosion. All decant water will be contained on Middle Bair Island, and no decant effluent will be discharged during the construction phase of the project.

Task 4: Construct levee breaches at Middle Bair Island at MB1, MB2, MB3, and MB4; ditch blocks MBDB1 through MBDB4; channel connectors MBCC1 through MBCC4; and subsequently breach Middle Bair Island (2009). Construct levee breach at Outer Bair (OB3).

22. Using an amphibious excavator (or similar equipment), four ditch blocks will be placed in borrow ditches and four channel connectors will be excavated across internal levees of Middle Bair Island. Material for the ditch blocks may be obtained after pickleweed removal from the levee along Steinberger Slough, if needed (up to 0.55 acres, not to fall below +6 feet NGVD). Levee breaches at MB1 through MB4 will be constructed to breach Middle Bair Island for habitat restoration. The levee breach at OB3 will be constructed to complete breaches on Outer Bair for habitat restoration. Clapper rail counts will be conducted prior to construction at all locations following FWS protocols.

23. To achieve the goals of this restoration project, impacts to the existing site may involve impacts to wetlands and water quality and beneficial uses of waters of the State. Of the beneficial uses designated for the Bair Island Complex and adjacent areas, potential for impacts from the BIRP might exist for
    - Preservation of Rare and Endangered Species (RARE)
    - Water Contact Recreation (REC-1)
    - Wildlife Habitat (WILD)

Impacts to Existing Wetlands

24. The Bair Island Restoration and Management Plan (EIR/EIS Volume 11, Appendix A) describes the existing habitat, the restoration goals, and projected habitat enhancement and creation. This section describes a short summary of impacts to wetlands and waters of the State.

25. *Existing wetlands* Existing wetlands and other waters of the State will be impacted from dredge and fill activities, and from increased tidal prism scouring of outboard marshes. Impacts to wetlands are shown on attached Preliminary Design Parameters Table (Attachment 2). Table 2 below summarizes the impacts to existing wetlands on the three islands.

Table 2
Wetland Impact Acreages

	Outer Bair	Middle Bair	Inner Bair	Total
Excavation, Breacl Connector Channe	3.23	2.87	4.27	10.37
Fill, Ditch Blocks,	0.18	0.22	0.35	0.75
Marsh Plain Fill & Construction Fill	0.00	0.00	251.48	251.48
Flow restrictor Str *	0.44	1.00	0.56	2.00
Totals	3.85	4.09	256.66	264.60

* Divided evenly between Outer Bair, Middle Bair, and Inner Bair

26. On Inner Bair Island:

    255.66 acres will be impacted on Inner Bair Island. Of this,
    - 105 acres are ruderal upland habitat;
    - 107.48 acres of diked wetlands, upland seasonal wetland complex, and borrow ditches and remnant sloughs, and open water will be temporarily impacted.
    - 39.00 acres diked wetlands on San Carlos Airport property and the SBSA easement will be permanently impacted.

- 0.56 acres of wetlands will be permanently impacted by the construction of the flow restrictor in Smith Slough.

The implementation of the project on Inner Bair will disturb 256.66 acres, 213 of which are temporary and 105 of which are to uplands. Implementation of the project will permanently impact 39 acres of wetlands and other waters of the State.

27. On Middle and Outer Bair Island:
    - 6.50 acres will be either filled or excavated by the construction of the breaches, ditch blocks, and connector channels will be permanently impacted.
    - 1.44 acres will be permanently impacted from the construction of the flow restrictor structures.

    The implementation of the project on Outer and Middle Bair Islands will cause permanent disturbance to 7.94 acres of wetlands.

28. *Decant Water on Middle Bair Island* During and after the dredging project, a total of 511.6 acres on Middle Bair Island will be flooded to depths ranging from 0 inches (saturated soil) to 24 inches deep. A very rough estimate of the duration of ponding is 4.8 months. Middle Bair Island has standing rainwater each winter and will be flooded after the levees are breached; the storage of decant water on Middle Bair will have no impact on existing habitat on the island.

Benefits of Wetland Restoration

29. The proposed restoration project will restore wetlands on the west side of the San Francisco Bay and supplement tidal salt marsh restoration already occurring as part of the South Bay Salt Pond Restoration Project. Together these projects represent a large and valuable contribution to the increase in tidal marsh wetlands recommended by the Wetland Ecosystem Goals Report (1999) and the Comprehensive Conversation and Management Plan (1993; updated 2007).

30. Once the project construction is complete, the Discharger intends to manage the site as part of the Bair Island Complex, Don Edwards National Wildlife Refuge.

Investigations, Removals, and Remediations

31. In general, the site history and land use indicate that the release of pollutants is not expected to occur once the site is open to tidal action.

32. Soil was sampled on Middle Bair and Outer Bair Island and tested for salinity using electrical conductivity (EC). Middle Bair had relatively low ECs (range 1.9 to 14.14 parts per thousand [ppt]; and mean 6.4 ppt) presumably due to reduced salt water input. Samples from Outer Bair Island were higher (range 45 to 140 ppt; mean of 67 ppt). These soil salinities are within the range of tidal salt marshes (including salt pannes) in California and vegetation is present on both islands indicating that salinities are not high

enough to preclude it. Any impacts to water quality from the soil salinities of either of these breaches should be brief since the breaches will occur at different times and tidal restoration should rapidly dilute salt on either of the islands. Monitoring of water quality as described in the Self Monitoring Program (Attachment 3) will be conducted for a period after the levee breaches to ensure that salinity levels are close to ambient bay levels after the site is open to tidal action.

33. Existing ship-channel dredged material proposed for beneficial reuse on the site was sampled and found to be acceptable as surface fill (i.e., the biologically active zone where most organisms live and/or feed) by Water Board staff for the project.

34. One mercury sample was analyzed in the West Bay Complex near the Redwood City Ponds (South Bay Salt Ponds) and was found to be below the Water Board's cover criteria and San Francisco Bay ambient concentrations. Other inorganics from that sample, with the exception of nickel which exists naturally in the Bay, were found to be below the cover criteria. Since one sample is insufficient to be definitive, mercury levels in biosentinel species such as inland silversides will be measured as part of the Monitoring Plan for the site (Attachment 1). Baseline samples of mercury in blood, tissue, and eggs of wildlife have been collected and analyzed throughout the San Francisco Bay to which future samples from the BIRP can be compared.

BIRP Design Overview

35. The wetland restoration can be divided into projects on each of the three islands that make up the Bair Island Complex:

    Outer Bair Island -Restoration of this island will be initiated in 2008. The breaches on Steinberger Slough will be completed at this time. The breach on Corkscrew slough will not occur until the flow constrictor in the slough is completed in 2009.

    Middle Bair Island - Restoration of this island will not be initiated until the flow constrictors in Corkscrew and Smith Sloughs are completed in 2009.

    Inner Bair Island - Sources of Material - Fill sources include material excavated from on-site breaches and levees (used in ditch blocks). The majority of the fill to be placed on Inner Bair Island to raise the elevation will come from a combination of upland and dredged sources. Any sediments being imported to Bair Island (both upland soil and dredged sediments) shall be determined to be clean based on criteria approved by the Water Board staff. While some of the Water Board's Environmental Screening Levels may protect wetland species, most of these levels are generally not considered protective of wetlands or of uplands that are adjacent to sensitive aquatic environments such as restored wetlands. To ensure that imported upland material meets the requirements of the Water Board, a Quality Assurance Plan Program (QAPP) was prepared for the project (Attachment 4).

Water Quality Concerns

36. Mercury methylation: Mercury occurs naturally in the San Francisco Bay environment and has been introduced as a contaminant in various chemical forms from a variety of anthropogenic sources. Ambient levels of sediments in San Francisco Bay are elevated in total mercury above naturally occurring background levels. Although mercury often resides in forms that are not hazardous, it can be transformed through natural processes into toxic methylmercury. Natural accretion processes in salt marshes continually supply fresh layers of sediment that release mercury in a form that can become biologically available to mercury-methylating bacteria. The resulting concentration of methylmercury is dependent on numerous variables: redox potential, salinity, pH, vegetation, sulfur, dissolved organic carbon, nitrogen, and seasonal variations in each of the identified variables.

37. Wetland restoration projects can increase levels of methylmercury. However, it is not clear at this time whether restoration can cause more methylation than the baseline from un-restored sites. Natural sedimentation occurring in sediments brought by the tides and creeks may also provide a source of mercury that may be methylated in the BIRP. Although models are being developed to address these issues in the San Francisco Bay, it is currently not possible to estimate the methylmercury concentrations, bioaccumulation, and bio-magnification in the food chain. The Lead Agency for the California Environmental Quality Act (CEQA) did not identify the potential for increased methylmercury production as a potentially significant unavoidable impact of the project. However, the Water Board's Basin Plan (2006) and Mercury TMDL[1] state that wetlands may contribute substantially to methylmercury production and biological exposure to mercury within the Bay. Based on this, the Water Board finds that the potential for increased methylmercury production is a potential significant unavoidable impact of the BIRP. Periodic monitoring of biosentinel species at the site will be conducted as outlined in the Monitoring Plan (Attachment 1) to determine if mercury methylation poses a potential problem. If elevated levels of methylmercury are found, the Discharger may be required to investigate ways to design and operate features of the BIRP to minimize methylmercury uptake and loads to the Bay; and monitoring may be increased to include water, sediment, and/or additional biosentinel species.

38. Mosquito abatement: Of the wetland habitats in the project areas, only transitional ecotones and seasonal wetlands are considered to have the potential to produce problem numbers of mosquitoes. The BIRP is in the jurisdiction of San Mateo County Mosquito Abatement District. The Discharger is coordinating with the District during design, implementation, and operation phases of the project to mitigate for any increases in potential mosquito breeding habitat.

[1] http://www.waterboards.ca.gov/sanfranciscobay/TMDL/sfbaymercurytmdl.htm

39. If fine-grained dredged material (Bay Mud) is allowed to dry out on the surface, the following adverse effects on wetland environments can occur: it can harden, which makes it a poor substrate for wetland biota; it can develop deep cracks that harbor mosquitoes; and it can cause metals to become soluble, thereby increasing their potential to leach out when the site is re-flooded.

Hydrogeomorphic and Habitat Concerns

40. To assure that the predicted hydrology and the habitat goals listed in Table 1 are being achieved, criteria described in the Monitoring Plan (Attachment 1) will be tracked including geomorphic evolution, water quality, biosentinel mercury, vegetation, birds, and endangered species. The three islands will be divided into four geomorphic units (one on Inner Bair, two on Middle Bair, and one on Outer Bair; see Figure 1 of the Monitoring Plan). Monitoring to track project performance will continue in each of the four geomorphic units for at least 15 years. No penalties will be imposed for a failure to achieve the interim and final habitat goals, but an investigation will be undertaken by the Discharger and other agencies, including the Water Board, CDFG, the Corps, and BCDC, and management modifications will be made as necessary to put the project back on a restoration path that will achieve the desired habitats.

Applicable plans, policies, and regulations

41. Basin Plan: The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Resources Control Board, U.S. EPA, and the Office of Administrative Law where required. The latest version can be found at the Water Board's website at www.waterboards.ca.gov/sanfranciscobay/Download.htm

42. Beneficial Uses: The Basin Plan does not designate beneficial uses for salt ponds and diked baylands. According to the Basin Plan, existing or potential beneficial uses are designated as follows:

    Beneficial Uses for the South Bay Basin, Lower San Francisco Bay:
    a. Ocean, Commercial, and Sport Fishing (COMM)
    b. Estuarine Habitat (EST)
    c. Industrial Service Supply (IND)
    d. Fish Migration (MIG)
    e. Navigation (NAV)
    f. Preservation of Rare and Endangered Species (RARE)
    g. Water Contact Recreation (REC-1)
    h. Noncontact Water Recreation (REC-2)
    i. Shellfish Harvesting (SHELL)
    j. Wildlife Habitat (WILD)

Beneficial Uses for the San Francisco Bay, Santa Clara Basin:

a. Ocean, Commercial, and Sport Fishing (COMM)
b. Estuarine Habitat (EST)
c. Industrial Service Supply (IND)
d. Fish Migration (MIG)
e. Navigation (NAV)
f. Preservation of Rare and Endangered Species (RARE)
g. Water Contact Recreation (REC-1)
h. Noncontact Water Recreation (REC-2)
i. Shellfish Harvesting (SHELL)
j. Fish Spawning (SPWN)
k. Wildlife Habitat (WILD)

43. Following implementation of the BIRP, hydrologic connectivity of the Bay with the formerly isolated salt ponds will result in the designation of beneficial uses. Based on the process for designation described under Wetlands Protection and Management, page 4-50, in the Basin Plan, the following beneficial uses are anticipated:
    a. Estuarine Habitat (EST)
    b. Fish Migration (MIG)
    c. Preservation of Rare and Endangered Species (RARE)
    d. Water Contact Recreation (REC-1)
    e. Noncontact Water Recreation (REC-2)
    f. Wildlife Habitat (WILD)
    g. Ocean, Commercial, and Sport Fishing (COMM)

State Plans and Policies:

44. This project is consistent with the Basin Plan Wetland Fill Policy that establishes that there is to be no net loss of wetland acreage and no net loss of wetland value when the project and any proposed mitigation are evaluated together, and that mitigation for wetland fill projects is to be located in the same area of the Region.

45. This project is also consistent with the goals of the following components of State Wetlands Policy: California Wetlands Conservation Policy (Executive Order W-59-93, signed August 23, 1993) includes ensuring "on overall loss" and achieving a "…long-term net gain in the quantity, quality, and permanence of wetland acreages and values…" "Senate Concurrent Resolution No. 28 states that "it is the intent of the legislature to preserve, protect, restore, and enhance California's wetlands and the multiple resources which depend on them for benefit of the people of the State." Section 13142.5 of the CWC requires that the "[h]ighest priority shall be given to improving or eliminating discharges that adversely affect …wetlands, estuaries, and other biologically sensitive areas."

46. Comprehensive Conservation and Management Plan: The BIRP is consistent with the objectives of the CCMP (1993 and updated in 2007) for the San Francisco Estuary,

including creation of wetland resources and reuse of dredged material for projects such as wetland creation/restoration, and upland building material, where environmentally acceptable.

47. San Francisco Bay Area Wetlands Ecosystem Goals Project: The BIRP is consistent with the recommendations of the 1999 Goals Report for the South Bay to restore tidal wetlands.

48. CEQA requires all projects approved by State agencies to be in full compliance with the act. CDFG, as lead agency together with FWS, has prepared a final environmental impact report that has been considered and relied upon in preparation of the Order. The Water Board, as a responsible agency under CEQA, finds that all environmental effects have been identified for project activities which it is required to approve, and that those proposed project activities, as conditioned, will not have significant adverse impacts on the environment with the exception of the potential for increased methylmercury production. Methylmercury production is a potential significant unavoidable impact of the project. The Water Board concludes that this potential significant impact is unavoidable but finds that the benefits of the project outweigh this potential significant unavoidable adverse environmental effect and is thus considered acceptable.

Additional Findings

49. The following standard conditions apply to this Order:

    a. Every certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to CWC §13330 and 23 CCR §3867.

    b. Certification is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR §3855(b) and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

    c. Certification is conditioned upon total payment of any fee required pursuant to 23 CCR §3833 and owed by the Discharger.

    d. Wetland Tracker: It has been determined through regional, state, and national studies that tracking wetland mitigation/restoration projects must be improved to better assess the performance of these projects, following monitoring periods that last several years. In addition, to effectively carry out the State's No Net Loss Policy for wetlands, the State needs to closely track both losses and mitigation/restoration project success. Therefore, we require that the Discharger use a standard form to provide Project information related to impacts and mitigation/restoration measures. An electronic copy can be downloaded at

http:www.waterboards.ca.gov/sanfranciscobay/certs.htm. Project information concerning impacts and mitigation/restoration will be made available at the web link: http://www.wetlandtracker.org.

e. An annual fee for WDRs pursuant to Section 13260 of the California Water Code is required.

Notification and Public Notice

50. The Water Board notified the Discharger and interested agencies and persons of its intent to issue WDRs for the BIRP and provided them with an opportunity to submit their written views and recommendations.

51. The Board, in a public meeting on March 12, 2008, heard and considered all comments pertaining to the proposed WDRs for the project.

It is Hereby Ordered pursuant to the provisions of Division 7 of the California Water Code and regulations, and guidelines adopted thereunder, that the Discharger, its agents, successors, and assigns shall comply with the following:

A. PROHIBITIONS

1. It is prohibited to discharge decant water except to the designated ponds on Middle Bair Island from dredged material that has already passed the screening guidelines approved by Water Board staff.

2. Discharges of water, material, or wastes which are not otherwise authorized by the Order are prohibited.

3. The direct discharge of wastes to surface waters or surface drainage courses is prohibited, except as authorized by this Order.

4. Except for the dredged material already approved for re-use by Water Board staff, it is prohibited to import additional dredged material without first following the testing protocol described in Specification #1 below and obtaining Water Board staff approval.

5. The activities subject to these requirements shall not cause a condition of pollution or nuisance as defined in Sections 13050(i) and (m), respectively, of the California Water Code.

B. SPECIFICATIONS

1. Imported Dredged Material Screening Procedures: Water Board staff shall review and approve data characterizing the quality of all dredged material (Bay sediments) proposed for use as fill on Inner Bair Island prior to placement at the project site. This review shall be coordinated through the multi-agency Dredged Material Management Office, of which the Water Board is a member. Sediment characterization shall follow the protocols specified in:
   - **a.** The DMMO guidance document, "Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region" (Corps Public Notice 01-01, or most current version) with the exception that the water column bioassay simulating in-bay unconfined aquatic disposal shall be replaced with the modified effluent elutriate test, as described in Appendix B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only); and,
   - **b.** Water Board May 2000 staff report, "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines," or most current revised version.

   Modifications to these procedures may be approved on a case-by-case basis pending the Discharger's ability to demonstrate that the dredged material is unlikely to adversely impact beneficial uses.

2. Imported Upland Soil Screening Procedures: Imported soil from upland borrow sites must be determined to be clean based on the procedures and screening guidelines contained in the QAPP (Attachment 4).

3. Appropriate soil erosion measures shall be undertaken and maintained to prevent discharge of sediment to surface waters or surface water drainage courses.

C. RECEIVING WATER LIMITATIONS

For the following Receiving Water Limitations, the Project Boundary shall be defined as the limit of the receiving waters at mean low-low water level, which is the topographic contour representing an elevation of 0 ft. NAVD88.

1. The Project activities shall not cause:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam at any place more than 100 feet from the Project Boundary or point of discharge, which persists for longer than 24 hours;
   b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;
   c. The temperature of any cold or warm freshwater habitat to be increased by more than 5 degrees Fahrenheit above natural receiving water temperature, unless a qualified biologist can demonstrate that such alteration in temperature does not adversely affect beneficial uses;
   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin; and
   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State at any one place within 1 foot of the water surface:

   a. Dissolved Oxygen: 5.0 mg/L, minimum
   When natural factors cause lesser concentrations, then these activities shall not cause further reduction in the concentration of dissolved oxygen.

   b. Dissolved Sulfide: 0.1 mg/L, maximum

   c. pH: Variation from normal ambient pH by more than 0.5 pH units

   d. Un-ionized Ammonia: 0.025 mg/L as N, annual median; and
   0.16 mg/L as N, maximum

   e. Nutrients: Waters shall not contain biostimulatory substances in concentrations that

promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

f. Salinity: Outflow from the site will not increase salinity in the receiving waters by more than an average of 5 ppt over natural conditions during any tidal cycle.

3. Turbidity of the waters of the State, at any place more than 100 feet from the Project Boundary or point of discharge, shall not increase by more than the following for more than 24 hours, to the extent practical:

Receiving Waters Background	**Incremental Increase**
< 50 NTU	5 NTU maximum
≥ 50 NTU	10% of background, maximum

4. The discharge shall not cause a violation of any particular water quality standard for receiving waters adopted by the Water Board or the State Water Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Water Board will revise and modify this Order in accordance with such more stringent standards.

D. PROVISIONS

Dredged Material Placement

1) The Discharger must survey levees and make any necessary repairs on Middle Bair Island to ensure full containment of decant water from dredged sediment placement. A levee inspection report shall be submitted at least 30 days prior to dredge material placement and, if applicable, a work plan and schedule for making any repairs or improvements.

2) Dredged material will be kept under standing water until breaching and tidal influence is restored. At least 30 days prior to dredge material placement a report shall be submitted, acceptable to the Executive Officer, which describes how the area will be kept wet.

Levee Breaches

3) Levee breaches shall occur at different times in order to minimize adverse water quality impacts to the San Francisco Bay.

Monitoring and Reporting

4) Monitoring and reporting shall follow the attached Monitoring Plan (Attachment 1), which can be modified only with Executive Officer approval.

5) For the BIRP, the Discharger shall be responsible for submitting biennial monitoring reports (every other year) with biennial memos in the intervening years. The monitoring periods will cover 15 years for each phase beginning after each of the four geomorphic units have been constructed and their levees breached. The biennial monitoring reports will: (i) analyze all physical and biological data collected to date, and contain appropriate figures, graphs, and photos; (ii) assess progress to date; and (iii) make recommendations for future monitoring and assessment. The biennial memos will notify the Water Board of any sampling occurring during that period and any problems, and will provide appropriate photos. For each geomorphic unit, monitoring reports will be due at the end of Year 2, 4, 6, 8, 10, 12, and 14 and biennial memos will be due in the intervening years. A final report for each geomorphic unit will be submitted in Year 15.

6) Aerial or satellite photos (such as those available on Google Earth) should be reviewed annually to assure that no adverse or unforeseen events are occurring, such as excessive scour or erosion, sedimentation, or establishment of highly invasive plants. More detailed analysis of aerial photos should be conducted every other year to allow measurements of channel widths, vegetation zones, and other important features listed in the Monitoring Plan (Attachment 1). If habitat targets are not met by the end of the 15-year monitoring periods, the technical advisory committee (see Provision D.7. below) should determine whether aerial or satellite photos should continue for a specified period, such as every 5 years, until the target habitats are achieved, or whether the BIRP has provided adequate wetland habitat benefits to call it a success and discontinue monitoring.

7) A Bair Island Technical Advisory Committee (BITAC) will be organized and convened by the FWS and CDFG, and will invite representatives from the Water Board, BCDC, California Coastal Conservancy, the Corps, National Marine Fisheries Service, and any other interested group or member of the public. The purpose of this committee will be to assess progress of the restoration project by reviewing monitoring data, and to suggest adaptive management strategies. Results of the data analysis will be presented to the BITAC annually or biennially for discussion and comment. The BITAC can include members of the Wetland Monitoring Group of the San Francisco Bay Wetland Restoration Project.

8) At the end of the monitoring periods for each of the four geomorphic units of the project (one on Inner Bair, two on Middle Bair, and one on Outer Bair), the wetland restoration site should be assessed for wetland functionality using a method approved by the Executive Officer.

9) The Discharger is responsible for all monitoring and reporting requirements at the BIRP. However, the Wetland Regional Monitoring Program run by the San Francisco Estuary Institute or any other regional entity equipped to take on regional wetland monitoring in the San Francisco Bay Region, may be delegated by the Discharger to carry out some of the obligations for monitoring, analysis, and reporting.

10) All Monitoring Reports shall be provided in the form of one hard copy and one electronic copy. In the case of large files, the electronic copy can be sent on a CD or be made accessible on a permanent website.

11) Aggressive non-native plant species that threaten sensitive native tidal marsh communities should be kept off site to the extent feasible, including those listed under Tier I (and to a lesser extent Tier II) of the Water Board's "Invasive Non-Native Plant Species to Avoid in Wetlands Projects in the San Francisco Bay Region" (2006). The Discharger should review this list and discuss with the Water Board staff which species will be feasible to keep off the wetland restoration site, and which will not. Invasive cordgrass (*Spartina alterniflora*) is a high priority for preclusion from `tidal wetlands restoration sites in the Bay Area, and the Discharger will coordinate efforts with the Invasive Spartina Project to eradicate this species.

12) As-built plans shall be submitted to the Water Board noting changes from the plans submitted with final bid within 90 days of the completion of construction of each phase of the project.

13) The Discharger shall notify the Water Board in writing 30 days prior to the actual start dates of major construction phases.

14) The Discharger shall conduct monitoring activities according to the Self-Monitoring and Reporting Program (SMP) (Attachment 3), attached to this Order, and as may be amended by the Executive Officer. At any time after adoption of this order, the Discharger may file a written request proposing modifications to the attached SMP. If the proposed modifications are acceptable, the Executive Officer may issue a letter of approval incorporating the revisions into the SMP.

Construction Operations

15) A qualified biologist shall conduct a tailgate talk to inform construction crews regarding the sensitive wildlife resources and exclusion zones within the proposed construction areas, and regarding what to do if special status species are encountered.

16) A qualified biologist shall be present to monitor construction activities in or near areas known to be occupied by salt marsh harvest mouse and California clapper rail. The biologist shall have the authority to install or require wildlife protection measures such as fencing, noise buffers or noise level limitations during avian breeding seasons, and temporary halting or redirecting of construction activities to avoid impacts to sensitive species. Water Board staff shall be notified if construction activities are halted or redirected.

17) To the extent feasible, the Discharger shall avoid construction activities during the nesting period of the California clapper rail (February 1-August 31). If construction activities must occur during nesting periods, a qualified biologist shall conduct pre-construction surveys up to 72 hours before construction begins, using survey methods approved by the FWS. Due to tidal influences on construction/survey areas, surveys shall be conducted as close to the actual construction period as is practicable. The exact survey distances vary depending on site characteristics, such as natural barriers, between potential nests and construction activities. The Water Board staff shall be notified if the work plan is modified.

18) The Discharger shall minimize in-water construction during periods when listed species may be present.

19) Since the Discharger will be impacting greater than one acre to restore the site, prior to the beginning of project construction, it shall submit a Notice of Intent (NOI) to the State Water Board under the General NPDES construction permit and shall implement required Best Management Practices (BMPs) to prevent water pollution from construction activities. The Discharger shall utilize both in-water and on-land BMPs including the use of coffer dams and measures to prevent and control the potential spills of hazardous material into the creeks and sloughs. Contractors are required to implement BMPs identified in a Storm Water Pollution Prevention Plan (SWPPP) for controlling soil erosion and discharges of other construction-related contaminants such as fuel, oil, grease, paint, concrete, and other hazardous material. Emergency response, routine maintenance, and preventative activities would be included in the plan. The plan shall be submitted to the Water Board for review and comment at least 30 days prior to the start of construction and must be acceptable to the Executive Officer.

20) The Discharger shall have a construction monitor on site to ensure that the project is constructed according to plan. The construction monitor also resolves implementation questions and refers "Requests for Information" and "Submittals" to the design engineers. Biological monitors, either FWS staff or contractors, shall be on site during specific activities to ensure compliance with mitigation measures and protection of listed species, as discussed above. Construction monitoring notes and observations shall be submitted to the Corps with the as-built report described below.

Soil Excavation and Placement Provisions

21) To minimize the effects on special status fish species caused by temporary increases in suspended sediment and turbidity, the use of silt trapping devices shall be employed during all in-water work conducted in the sloughs or bay, where appropriate.

22) To minimize the effects on special status fish species resulting from the loss of existing habitat, construction activities in river or slough areas having immersed or submersed aquatic plants shall be avoided to the maximum extent practical.

23) Blasting and pile driving shall be conducted in late summer or early fall, when few fish species are present, and shall be conducted at low tide, when fish will be further away.

24) Ditch blocks shall be located in such as way as to not trap fish at low tide. Berms adjacent to starter channels shall be constructed on one side of the channel only, and shall be discontinuous, in order that fish have easy access to the starter channels as the tide recedes.

25) Construction activities shall be scheduled to avoid the nesting periods of the special status wildlife species, to the extent practical. When construction is conducted during the nesting period of a special status species known to be present, the activities shall be restricted to maintain a 150-foot buffer between heavy equipment and the nesting sites. Construction

activities shall be scheduled in such a way as to limit the period of disturbance in a particular area to as brief a time window as is practical.

26) Before constructing facilities within tidal marsh habitat, the Discharger will conduct clearance surveys for all species of concern in the construction area.

27) To the extent feasible, the Discharger will avoid construction activities in or near marsh habitat suitable for the salt marsh harvest mouse.

Design Provisions

28) The Discharger will have a California-licensed civil engineer evaluate the stability of the levee system with respect to wind-driven wave erosion resulting from project implementation. If necessary, the civil engineer will recommend measures to reduce the risk of erosion. These measures may include monitoring and adding sacrificial soil material at the toe of the levee as needed, limiting fetch by installing in-pond barriers or deflectors, or repairing levees as needed.

29) The Discharger will conduct site-specific surveys of the power towers to ensure that the towers are not adversely affected. Surveys will include an assessment of the potential marsh erosion around the tower footings. If necessary, site-specific measures will be implemented to ensure stability of the utility towers. These measures may include encasing the towers with concrete to above the high-water mark and relocating levee breaches to reduce impacts.

30) The Discharger will coordinate with the San Mateo County Mosquito Abatement District during the design, implementation, and operations of the BIRP.

31) Before beginning construction, the contractor will develop, in consultation with the appropriate representative(s) of the Discharger, a plan indicating how public access to the BIRP area will be maintained during construction. If needed, flaggers will be stationed near the construction activity area to direct and assist members of the public around the activity areas while maintaining access to the area.

32) In accordance with CWC Section 13260, the Discharger shall file a report with this Water Board of any material change or proposed change in the character, location, or volume of effluent or sediment to be discharged. Any proposed material change in the operation shall be reported to the Executive Officer at least 30 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant new soil disturbances, any new modifications to site drainage, or any modifications or adjustments to the effluent discharge.

33) The Discharger shall submit Final Design Plans (95% complete) acceptable to the Executive Officer to be reviewed for consistency with the EIR, with the Permit Application, and with previously approved design changes. A summary report of changes, if any, shall be submitted with the 95% design. If there are no changes, then no further Executive Officer or Water Board action is required.

General Provisions

34) All documents submitted to the Water Board must be acceptable to the Executive Officer.

35) The Discharger shall comply with all the Prohibitions, Limitations and Provisions of this Order, immediately upon adoption of this Order, unless otherwise provided below.

36) The Discharger shall notify the Water Board immediately whenever violations of this Order, for which the Discharger is responsible, are detected.

37) The Discharger shall remove and relocate any wastes that are discharged at any sites in violation of this Order.

38) The Discharger shall implement and comply with appropriate Best Management Practices (BMPs), including the successful reestablishment of native vegetation as appropriate, to enhance wildlife habitat values, and to prevent and control erosion and sedimentation.

39) No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed from the BIRP site by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area and any adjacent area where such material may be washed into waters of the State.

40) Construction contractors working on the Project will be required to provide their employees with spill prevention and response training, and will be required to have spill response equipment available at the job site, as directed by the Discharger. Contractors will provide double containment for any hazardous materials or wastes at the job site. Contractors will be prepared to respond to any spill immediately and to fully contain spills in the BIRP area, including any open-water areas.

41) To prevent channel erosion and potential damage to adjacent levee systems, the Discharger will repair unintended levee breaches that are not consistent with the restoration option selected for implementation.

42) The Discharger shall maintain a copy of this Order at the BIRP site at all times. The Order shall be available at all times to site personnel. The Discharger shall ensure that all individuals working on the BIRP site, including all contractors and sub-contractors, are familiar with the contents and requirements of this Order, and with all relevant plans and BMPs.

43) The Discharger shall permit the Water Board or its authorized representative, upon presentation of credentials:

    a. Entry onto to premises on which wastes are located and/or in which records are kept.

b. Access to copy any records required to be kept under the terms and conditions of this Order.
c. Inspection of any monitoring equipment, construction area(s), or monitoring method completed as part of the Project.
d. Sampling of any discharge or surface water covered by this Order.

44) This Order does not authorize commission of any act causing injury to the property of another or of the public; does not convey any property rights; does not remove liability under federal, state, or local laws, regulations or rules of other programs and agencies; nor does this Order authorize the discharge of wastes without appropriate permits from this agency or other agencies or organizations.

45) The Discharger shall immediately notify the Water Board by telephone whenever an adverse condition occurs as a result of the proposed discharge or construction activities. An adverse condition includes, but is not limited to, a violation or threatened violation of the conditions of this Order, significant spill of petroleum products or toxic chemicals, or other events that could affect compliance. Pursuant to CWC Section 13267(b), a written notification of the adverse condition shall be submitted to the Water Board within two weeks of occurrence. The written notification shall identify the adverse condition, describe the action(s) necessary to remedy the condition, and specify a time schedule for performance, subject to modification by the Water Board.

46) The Discharger shall halt work activities if dead or dying fish, or fish exhibiting stress, are observed within 1,000 feet of work activity or discharge. The Discharger shall immediately assign a qualified biologist to investigate the cause of the problem, and to identify an acceptable response, if the cause is determined to be the work activity or discharge. The Discharger shall immediately report all incidents of dead, dying, or stressed fish, as well as prescribed action plans, to the Water Board.

47) All reports pursuant to this Order shall be prepared under the supervision of a suitable professional in the State of California.

48) This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Section 13330 of the CWC and Section 3867 of Title 23 of the California Code of Regulations (23 CCR).

49) This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR Subsection 3855(b) and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

50) Certification is conditioned upon total payment of any fee required under Title 23 of the California Code of Regulations (CCR) and owed by Discharger.

51) The Water Board may modify, or revoke and reissue, this Order if present or future investigations demonstrate that the discharge(s) governed by this Order will cause, have the potential to cause, or will contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters. The Water Board may reopen this Order to review results of the Discharger's and Water Board staff's studies and new data on Section 303(d) listed contaminants and decide whether effluent limits should be revised.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on .

_____

Bruce H. Wolfe
Executive Officer

Attachments

Attachment 1: Monitoring Plan
Attachment 2: Design Parameter Tables
Attachment 3: Self Monitoring Program (SMP)
Attachment 4: Quality Assurance Plan (QAPP)

Figure 1: Bair Island Vicinity and Project Map

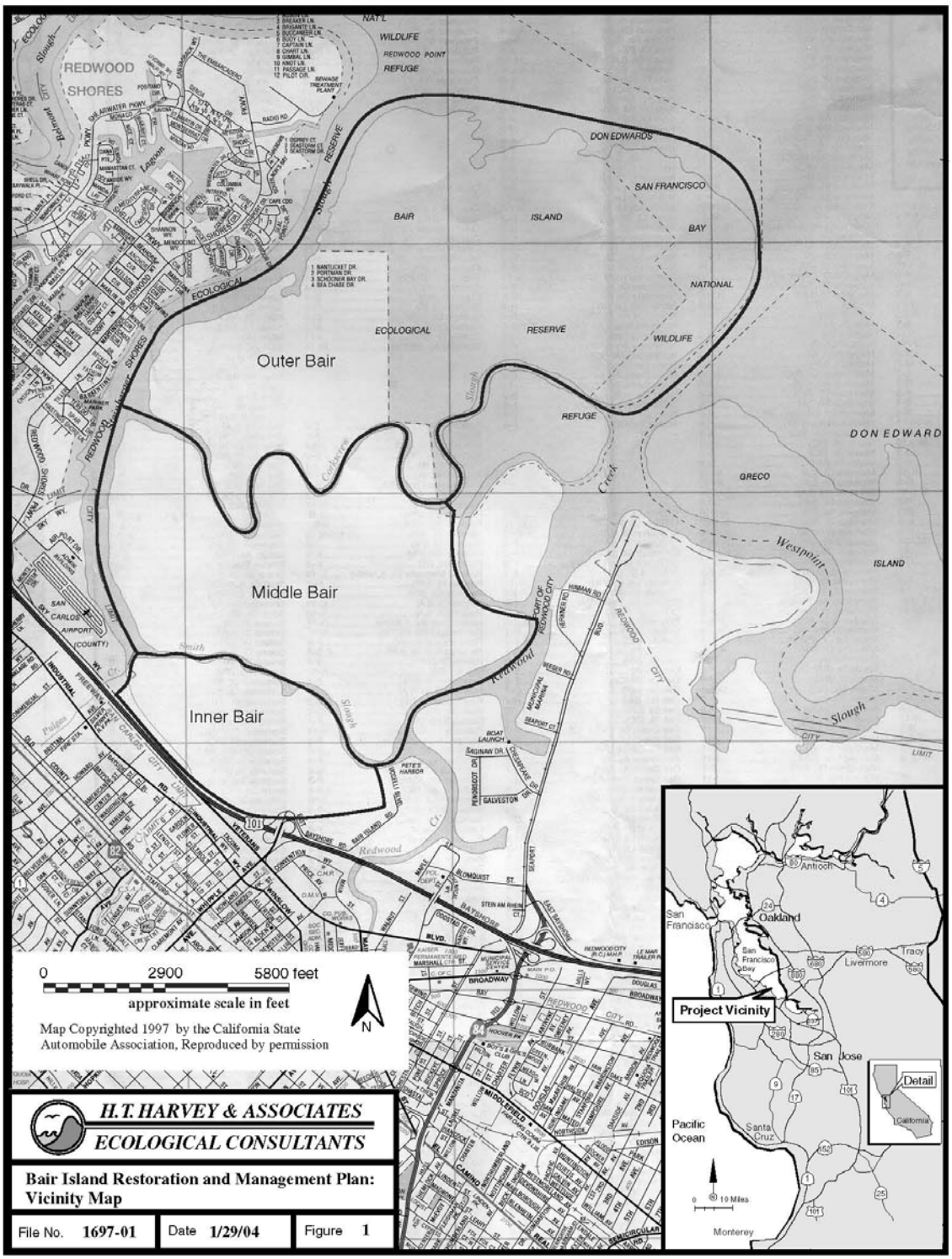
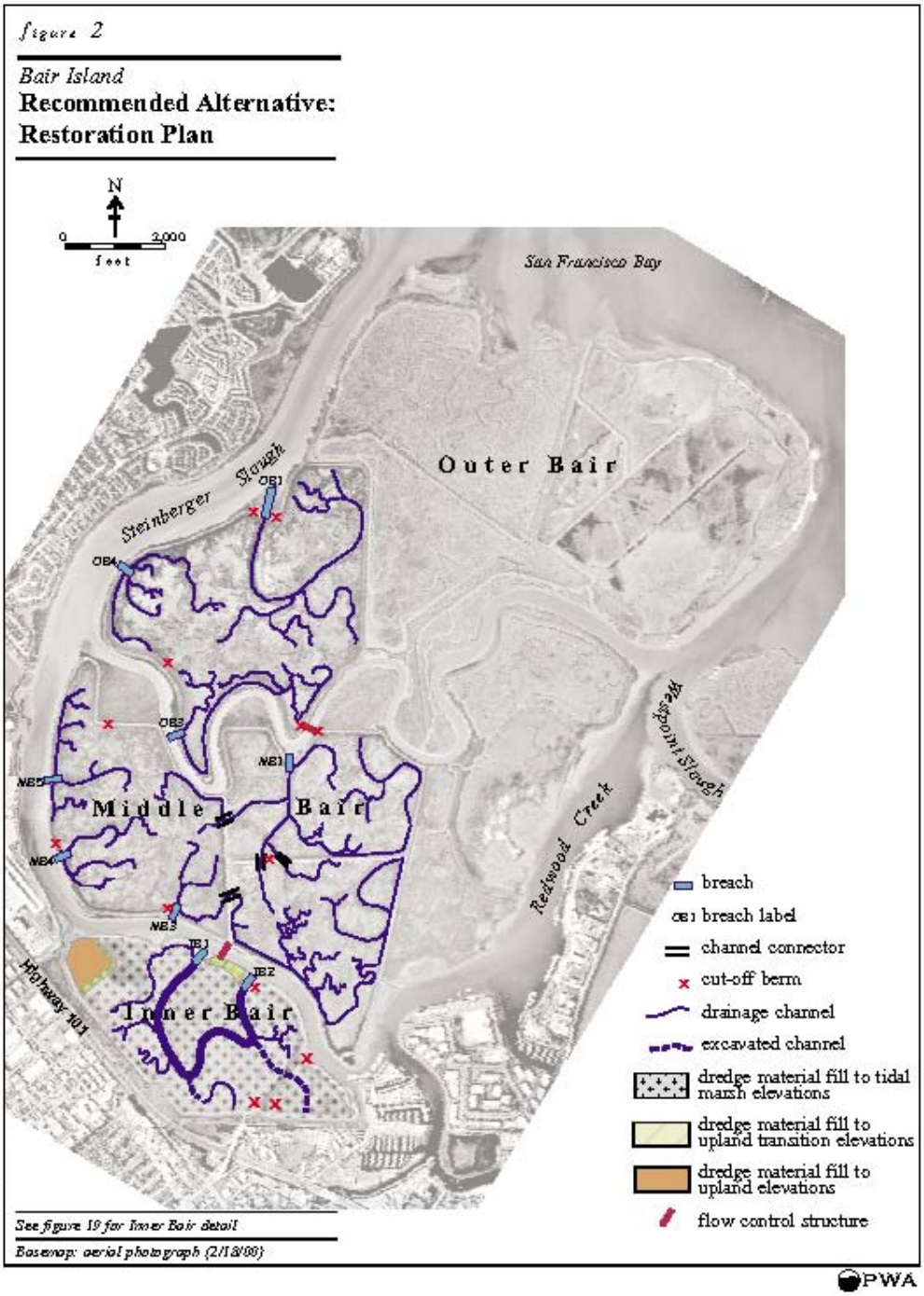


Figure 2: Bair Island Restoration Plan Design and Project Features



Attachment 1

Bair Island Restoration Project
Draft Monitoring Plan

October 2007

Prepared for:

US Fish and Wildlife Service
9500 Thornton Avenue- Newark, CA 94560

Prepared by:

Life Science!, Inc.
1059 Court St. #106—Woodland, CA 95695

Table of Contents

SUMMARY:

The monitoring plan is designed to determine if the project is making progress towards meeting its goals to increase native species and habitats without causing unacceptable impacts (e.g., increased velocity at Pete's Harbor and increased sedimentation rate in the Redwood Creek Shipping Channel) efficiently.

The following elements will be monitored: Tidal Circulation (Flooding), Slough Morphology, Marsh Morphology (Sedimentation), Habitat Mapping and Vegetation, California Clapper Rail, Salt Marsh Harvest Mouse, Introduced Predators, Invasive Plants, and Structures. Baseline data will be collected for all elements 1 year prior to construction. The monitoring schedule and frequency are detailed in Table 1 in Section 4.

Biennial monitoring reports (BMRs) will be prepared biennially for 15 years after each geomorphic unit is breached (Year 2, 4, 6, 8, 10, 12, 14) and biennial memos (BMs) will be submitted in the intervening years, and a final report will be submitted at the end of the fifteen year for each unit. BMRs (i) will analyze all physical and biological data collected to date and contain appropriate figures, graphs, and photos; (ii) will assess progress to date; and (iii) will make recommendations for future monitoring and assessment. The BMs will notify the Water Board of any sampling occurring during that period and any problems ad will provide appropriate photos. A final report will be submitted after Year 15 for each unit. Some of the elements will be monitored for longer than 15 years, i.e. until the success criteria have been met or the potential hazard is no longer a concern.

1.0 INTRODUCTION

Bair Island is located adjacent to the San Francisco Bay in Redwood City, San Mateo County, California (Figure 1). Historically, Bair Island was part of a large complex of tidal marshes and mud flats within the drainage of Bay and Belmont Sloughs[1]. Bair Island was diked in the late 1800's and early 1900's for agricultural practices including cattle grazing. The island was converted to salt evaporation ponds by Leslie Salt Company starting in 1946, and remained in salt production until 1965. The lands were drained and eventually sold to a series of real estate development companies.

The California Department of Fish and Game (CDFG) and the Don Edwards San Francisco Bay National Wildlife Refuge (hereafter, "Refuge") both acquired portions of Bair Island over time. In 1997, the Peninsula Open Space Trust (POST) purchased the remaining portions of Bair Island and turned over their interest in the property to these agencies. The San Carlos Airport also retains a portion of Inner Bair Island as a safety zone. In addition, two easements exist on Bair Island, one for PG&E towers and transmission lines that run throughout the Bair Island complex and the other for the South Bay System Authority (SBSA) force main that runs underneath most of the southern part of the levee on Inner Bair. In accordance with a Memorandum of Understanding between CDFG and the United States Fish and Wildlife Service (USFWS), the portions of Bair Island owned by CDFG known as the Bair Island Ecological Reserve are managed by the Refuge.

[1]Phillip Williams & Associates. 2000. Bair Island Existing Hydrologic Conditions Assessment. Phillip Williams & Associates. 2003. Bair Island Preliminary Flood Assessment. September 19, 2003.

This site is a large, restorable complex of former salt evaporators, and has been a major priority for addition to the Refuge since the original boundaries were drawn. The restoration of tidal habitats at Bair Island is ecologically important to South San Francisco Bay. Following restoration, Bair Island will become an integral part of the extensive wetland complex within the Refuge and adjacent state and privately owned wetlands.

In addition to restoring 1,400 acres of tidal wetlands to the much depleted South San Francisco Bay (SFB) tidal-marsh complex, the restoration activities planned for Bair Island provide a unique opportunity for documenting the effects and chronology of events that evolve during the implementation of a tidal salt-marsh restoration. Although similar restoration projects have occurred within the SFB (e.g., Cooley Landing, Warm Springs), and a set of *Design Guidelines for Tidal Wetland Restoration in San Francisco Bay* (Williams & Faber 2004)[2] has been developed and used for this project, all restoration projects are unique and future environmental and climactic events are unknown, so their development should be monitored and adaptively managed. Therefore, the Bair Island restoration plan, while primarily describing the steps required to produce a successful salt-marsh restoration, also provides a monitoring plan and the testing of hypotheses. These efforts will track the development of the tidal marsh as well as provide valuable information for future restoration projects. The Monitoring Review Team of the San Francisco Bay Wetland Restoration Project also provided recommendations for Bair Island the monitoring program.[3]

1.1 PROJECT GOALS AND OBJECTIVES

The San Francisco Bay Wildlife Society (SFBWS) and the USFWS developed goals and objectives for the restoration of Bair Island. These goals and objectives, presented below, are consistent with the policies of the Don Edwards San Francisco Bay National Wildlife Refuge, to which Bair Island now belongs. We assume a 50-year planning horizon, consistent with that used by other San Francisco Bay restoration projects currently in planning. Restoration and monitoring of Bair Island will be closely integrated with the South Bay Salt Pond Restoration effort, which has similar goals and objectives.

Goals of the Bair Island Restoration Project

• Restore Bair Island to native tidal salt-marsh habitat.
• Provide habitat for endangered and other native species.
• Enhance the public's appreciation and awareness of the unique resources of Bair Island.

Objectives for the Bair Island Restoration Project

- Restore and enhance habitat for the endangered California Clapper Rail (*Rallus longirostris obsoletus*) and salt marsh harvest mouse (*Reithrodontomys raviventris*).
- Create and enhance habitat for California sea-blite (*Suaeda californica*), and other wetland dependent species, if compatible with restoration for the Clapper Rail and harvest mouse.

[2] Philip Williams & Phyllis Faber. 2004. Design Guidelines for Tidal Wetland Restoration in San Francisco Bay. Prepared for the Bay Institute and California State Coastal Conservancy, Oakland, CA.
[3] The summary notes of the Monitoring Review Team can be found on the San Francisco Estuary Project's website at http://www.wrmp.org/review.html.

- Minimize disturbance to sensitive species (e.g., Clapper Rails, harbor seals [*Phoca vitulina*]).
- Provide the control of undesirable species including invasive plants, undesirable predators, and mosquitoes.
- Enhance the public's awareness of the unique resources at Bair Island by providing opportunities for wildlife-oriented recreation and nature study.

1.2 PROPOSED RESTORATION DESIGN

The proposed action restores full tidal inundation to Inner, Middle, and Outer Bair. Each unit is effectively delimited as the area drained through a particular breach, each functioning as a separate "geomorphic unit". Due to its large size and the location of breaches, Middle Bair is divided into East and West geomorphic units (Figure 1) for restoration and monitoring purposes. Each of these four units of Bair Island will be assessed separately to measure restoration performance and to implement required adaptive management measures. The geomorphic units will be mapped on aerial imagery.

For Middle and Outer Bair, natural estuarine sedimentation will raise the marsh plain surface to allow complete vegetation establishment over time. Restoration will include features to encourage reestablishment of the natural tidal drainage network and discourage the capture of tidal flows by borrow ditches at these two islands. At Inner Bair, dredged materials or other approved sources of fill will be used to raise the marsh plain prior to breaching.

Channel modifications would be made at Smith and Corkscrew sloughs to minimize project related effects on high sedimentation rates in the Redwood Creek shipping channel and flow velocities at Pete's Outer Harbor. These channel modifications include the realignment of Smith Slough to its historic meander through Inner Bair and the partial blocking of Corkscrew Slough to the east of the Middle Bair breaches. For details of these project design features please see the Bair Island Restoration and Management Plan[4].

Middle and Outer Bair Islands. Levees will be breached at selected historic slough channel locations on Middle and Outer Bair islands, restoring natural tidal flows. Pickleweed-dominated marsh vegetation will establish quickly in areas already at high intertidal elevations. Natural estuarine sedimentation on the lower mud-flat areas will gradually build up these areas to elevations high enough for the establishment of cordgrass and pickleweed. Borrow-ditch cutoff berms will be created to prevent tidal capture by the existing borrow ditches, allowing the natural channel system to re-establish. Interior berms and levees will be lowered or removed where possible, creating additional tidal habitat. Levees desired for upland refuge habitat or required to protect infrastructure from wind-wave erosion would be left in place.

Based on initial ground elevations and predicted sediment supply, some vegetation colonization will begin immediately following restoration implementation. Most of this marsh formation will occur along the perimeter of the restoration areas, along historic slough channels or on higher elevation areas. Substantial tidal marsh vegetation establishment is expected at Outer Bair within 30 to 50 years and at Middle Bair within approximately 50 years.

[4] H. T. Harvey & Associates and Phillip Williams & Associates. 2002. Bair Island Restoration and Management Plan. Produced for the San Francisco Bay Wildlife Society and the U.S. Fish & Wildlife Society. 110 pp.

Inner Bair Island. A combination of upland fill and dredged material, will be used to expand the southern levee of Inner Bair Island to adequately protect the SBSA sewer line, raise the San Carlos Airport property above the 100-year flood plain, and create a cross-levee and raise the perimeter levee to contain material dredged from the Port of Redwood City ship channel. Levees will be breached at historic slough channel locations on Inner Bair Island and borrow ditch cutoff berms will be created to prevent tidal capture by the existing borrow ditches. Fill will be used to raise ground levels on Inner Bair from current elevations of approximately 0.0 to between 2.0 and 3.0 feet NGVD, requiring between 1, 000,000 to 1,500,000 cubic yards of fill.

Public Access-- Public access for pedestrians and bicyclists will be allowed along a 2.7-mile levee trail on Inner Bair. This trail will be provided along a portion of the perimeter levee of Inner Bair, running from the Refuge's parking lot near Pete's Harbor. An orientation kiosk and viewing/environmental education platforms will continue to be provided at both ends of the levee trail, adjacent to Smith Slough. No public access will be allowed on Outer and Middle Bair Island except by Refuge guided trips and other specific exceptions that are approved by a Refuge Special Use Permit.

Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek will be allowed, however fishing will not be permitted from land. Hunting of waterfowl on Outer Bair Island will be allowed per state regulations.

1.3 PROJECT TIMELINE

Bair Island Restoration project was initiated in 2007. The project is large and therefore will be implemented over a period of several years.

1.4 MONITORING OBJECTIVES

The objectives for the monitoring program are to ensure that the restoration meets the project's objectives by achieving the goals stated above. Adaptive management decisions based on monitoring data will increase the potential for project success, especially since tidal restoration at Bair Island will be implemented in phases.

2.0 MONITORING ELEMENTS

The monitoring plan is designed to determine if the project is making progress towards efficiently meeting its goals without causing unacceptable impacts (e.g., increased flooding, velocity at Pete's Harbor and sedimentation rate in the Redwood Creek Shipping Channel). Once regulatory monitoring requirements have been met within a geomorphic unit of Bair Island, monitoring for this unit will be phased into the larger scale Long Term Monitoring Plan (LTMP) for the South Bay Salt Pond (SBSP) Restoration Project, currently under development by the Refuge, the Sacramento Field Office and the SBSP Restoration Project Science Team. For the purposes of the LTMP, the SBSP action area is divided into six marsh complexes and Bair Island is within the "Bair/Greco/Ravenswood" marsh complex. Monitoring elements of the SBSP LTMP will include landscape evolution via aerial photography, bathymetry, slough cross sections, water levels in sloughs and the Bay, sediment quality and accumulation, water quality, mercury,

California clapper rail, salt marsh harvest mouse, snowy plover, least tern, shorebirds and waterfowl, estuarine fish, harbor seals, phytoplankton, invasive plants, and predators ([5].

In addition, monitoring for invasive exotic *Spartina* species will be coordinated with the San Francisco Invasive Spartina Project; details of monitoring and management are not repeated here. Monitoring will be conducted in the late spring/early summer after most cordgrass growth has occurred. Ground-based control will be conducted as early as June if no clapper rails are present and after August 31st if rails are present. Aerial control will be conducted June through October. Most control will be herbicide application using imazapyr-based (or other EPA approved) herbicides.

Sediment testing of dredge/fill material to be imported to Inner Bair Island is not included here but will be a part of the regulatory permits. Monitoring for compliance with the Refuge's dog walking rules will be managed by the Refuge as stated in the EIS/R[6] and are not repeated here. Compliance with the FWS and NMFS Biological Opinions will be done in cooperation with these agencies and are not included here. Monitoring of infrastructure such as flow restrictors will be done on a regular basis as a part of the Refuge's operation and maintenance program and will not be included in the monitoring program.

2.1 MONITORING ASSUMPTIONS

Monitoring in each of the four geomorphic units of Bair Island will initially focus on physical processes, then focus will shift to ecological parameters when marsh vegetation begins to grow. To ensure that habitat types are progressing as planned and no severe problems are occurring, habitat elements will be tracked and assessed annually by aerial or satellite photos. Each of the four units will be treated as a separate project for the purpose of monitoring and adaptive management. Prior to breaching the levees, baseline surveys will be conducted using aerial photos and a wetland assessment method acceptable to the Executive Officer.

Due to the complexity of the project, the methods, number and location of monitoring points, and data interpretation will be determined by the professionals responsible for the individual monitoring elements, and subject to the approval of the Executive Officer.

Monitoring for the endangered California clapper rail and salt marsh harvest mouse will be triggered when vegetation mapping shows that marsh vegetation has reached at least 75% cover over 5 contiguous acres of mid to high marsh habitat within a geomorphic unit, or after 10 years, which ever comes first. If vegetation does not reach 50% after 10 years, the Bair Island Technical Advisory Committee (BITAC) will assess whether the project is developing adequately and if management actions are necessary to guide habitat development at the site.

2.2 PHYSICAL ELEMENTS

Physical monitoring will be carried out at specified intervals to help to understand how the physical system is responding to the restoration design implementation and to determine if any intervention is required. This part of the monitoring program includes several geomorphic and hydrologic elements that will be monitored by a qualified engineer or geomorphologist. The

[5] Personal communication, Joy Albertson, FWS Refuge Biologist.
[6] California Department of Fish and Game and US Fish and Wildlife Service. South Bay Salt Ponds Initial Stewardship Plan: Environmental Impact Report/Environmental Impact Statement. June 2006.

monitoring schedule and frequency are described in Table 1 of Section 4. The number of stations and the exact locations of the monitoring locations will be determined by the engineer/geomorphologist responsible for design of hydrologic monitoring. All monitoring locations will be determined by Global Positioning Systems (GPS) to facilitate accurate mapping. Because a detailed sampling plan has not been prepared at this time, prior to implementation of the plan it will be submitted to the Executive Officer for approval.

Physical monitoring of the channels and breaches will be conducted using a combination of targeted data collection (peak water height recorders, channel cross-sections, and erosion stakes) and hydrologic modeling. The potential for increased tidal-current velocities at Pete's Harbor was identified as a significant project constraint early in the restoration design development. It is expected that the major channels will scour; the change in cross-section will be compared to baseline and what is predicted by the model. The change in cross section can be used to infer change in velocity and tidal prism. If there is deviation between observed cross-sections and model predicted cross-section, more intensive monitoring may be required.

Of concern is that the project might lead to flooding of adjacent human land uses. This risk will be tracked by: 1) installation of peak water height recorders at the likely locations of flooding and/or sensitive areas, 2) direct observation of the tide heights relative to the protective levee tops, during the wintertime period of greatest risk and 3) review of cross sections. The number and locations of the peak height recorders and frequency of data collection will be determined by the model requirements, tides, and weather, and will be subject to Executive Officer approval.

As described in PWA (2003), a revised flood assessment may be required if monitoring of water levels indicates that the flow restrictors are not performing as expected (i.e., the amount of tidal flows in Redwood Creek and Smith Slough are significantly higher that existing conditions). If a revised flood estimate is required, cross sections will be surveyed along Steinberger Slough. Significantly fewer cross sections will be required if a revised flood estimate is not needed. Additionally, cross section data will also be collected along Redwood Creek to document whether or not tidal restoration of Bair Island has increased the shoaling rate along the Shipping Channel. Cross sections will be surveyed before restoration.

Physical Baseline Data:
Prior to construction, baseline data will be collected for all physical and some biological elements (see Table 1). Data for each element will be collected at the time of year and with methods that will be used during post-construction monitoring. For example, if flooding must be monitored during high tides and winter storms, baseline data must be collected during winter storms and high tides. Aerial or satellite photographs will be used to establish the pre-project conditions for slough morphology.

Element 1: Aerial or Satellite Photos:
An annual aerial or satellite photo of the project area will be reviewed by FWS or its consultant team to track the target habitats and assure that no adverse physical or biological processes are occurring. A summary of the predicted habitats is included in the monitoring report (Table 2). Google Earth photos are acceptable if they show channel formation, vegetation by species, and sedimentation and accretion processes; photos with enough detail to detect changes in slough channel widths and vegetation zones should be analyzed every other year. The San Francisco Estuary Institute (SFEI) recommends that habitat mapping be done annually in August during a

spring series low tide on georectified aerial imagery of 1 m2 pixel resolution, and mapped onto its Wetland Tracker. (Also see Element 5: Habitat)

Element 2: Tidal Circulation
Tidal circulation will initially be assessed annually by reviewing the channel cross section data, installing peak water height recorders, and direct observation. After reviewing this data, qualified hydrologists and/or the Bair Island Technical Advisory Team (BITAC) should determine whether additional data types or more sampling stations are needed, and the continued frequency of monitoring.

Additional tide height data or flow data from tide gauges and velocity meters will not be collected for the hydrology model unless necessary. These data are very expensive and the flow data (velocity or tidal prism) are especially difficult and expensive to collect.

Element 3: Slough Morphology (Tidal Velocity/Erosion)
A model of tidal flows (prisms) and velocities was used to assess potential environmental impacts and to guide design of the project. The immediate end result of changes in tidal prism and velocity is change in channel cross-section/erosion. Channel monitoring will likely provide an adequate assessment of tidal prism and velocity, and can be measured at minimal cost compared to the tidal parameters. As a result, the project will monitor channel cross-sections in the major channels and the breaches as an indicator of tidal velocity and prism. It is expected that the major channels will scour; the change in cross-section will be compared to baseline and what is predicted by the model. The change in cross- section can be used to infer change in velocity and tidal prism. If there is deviation between observed cross-sections and model predicted cross-section, more intensive monitoring may be required.

To assess flooding potential to adjacent uses, it is likely that cross-sections will be needed along both major channels (Steinberger and Redwood Creek), plus the breaches associated with each geomorphic unit (these will happen sequentially over time), and along the major cross-channels that interconnect Steinberger and Redwood Creek (Smith and Corkscrew Sloughs). The number and placement of the cross-sections will be determined by the professionals responsible for hydrologic monitoring and will be subject to Executive Officer approval.

If the cross-sections and model indicate a threat to adjacent land uses, then corrective actions may be necessary. Adaptive management strategies will be developed in consultation with the regulatory agencies.

Within each geomorphic unit, five channel monitoring points along larger channels will be marked with rebar and GPS coordinates recorded. Prior to breaching, the channel width and depth at each point with be measured. Initially, channel measurements will be recorded annually (first 5 years). In addition, the evolution of small channels and drainage networks within the project will be tracked by mapping these features using aerial photography. Sloughs and channels within the geomorphic units will be clearly marked on aerial photos.

Element 4: Marsh Morphology
Marsh plain development will be monitored adjacent to the marked channel monitoring points and at the sites of levee breaches. Erosion stakes will be placed at these locations to monitor loss or gain of the marsh surface and GPS coordinates will be recorded. Marsh morphology will also

be inferred from cross-sections, aerial photos, and vegetation response. Small channels and pannes will be mapped. Initially, marsh morphology will be recorded annually (first 5 years).

The Bair Island Monitoring Review Team noted in its recommendations for the Bair Island Monitoring Plan that collecting sedimentation plates or pins was not critical to monitor at the site since it is not highly subsided, it is already partially vegetated, and salinity is relatively low there compared to some tidal marsh restoration sites.

Monitoring Schedule. Monitoring of physical elements will follow the schedule summarized in Table 1 in Section 4.

Element 5: Habitat. SFEI's Wetland Tracker has aerial photographs as part of the South Bay Salt Pond Restoration Project on which habitat maps can be developed for Bair Island. Habitat maps can be developed annually or during Years 0 (baseline), 1, 3, 5, and every (second?) fifth year thereafter until a target percent cover is reached, which can be 25% for vegetation and 75% for California clapper rails and salt marsh harvest mice. The FWS requires habitat mapping of sufficient detail to quantify when 5 acres of mid to high marsh occurs on the project site so that it can measure low, medium, and high marsh in each geomorphic unit at least every 2 years.

2.3 BIOLOGICAL ELEMENTS

Element 6: Vegetation.
Vegetation colonization in wetland areas will be monitored using aerial photography supported by ground-truthing. Aerial images will be interpreted with a Geographic Information System (GIS) to estimate percent cover in the wetland areas. Ground-truthing will be performed to verify vegetation signature on the aerial photos, and to make qualitative assessments of species richness and community composition. Annual satellite or aerial photos will be taken and analyzed to assess overall habitat development. Google Earth photos are acceptable if the vegetation growth and channel development can be discerned.

The GIS maps will quantify vegetation until a target of 25% cover is reached in a minimum of 5 contiguous acres within a geomorphic unit. This benchmark will trigger more detailed habitat mapping which will include descriptions of specific vegetation communities. Tidal marsh acreage will be categorized as high, medium, and low elevation marsh. When the 75% vegetation cover is reached, it will trigger California clapper rail monitoring (Element 9), and salt mouse harvest mouse surveys (Element 10). Subject to Executive Officer approval, a wetland functional assessment (such as CRAM) may be performed which may eliminate the need for extensive vegetation transects; if a functional assessment is used, a baseline will be done at the site before levees are breached.

Element 7: **Birds**.
Birds in addition to the California clapper rail should be monitored in consultation with the FWS staff. The Monitoring Review Team for Bair Island recommended that bird surveys be conducted as a baseline and one year following levee breaches, and then during the following years after the initial trigger for vegetation monitoring of 25% is met: years 1, 3, 5, 10, and 15 or until target habitats have been met. Monitoring should be conducted in each geomorphic unit and during all species for a wide range of avian species. Shorebirds and waterfowl can be done with window surveys; marsh birds can include song sparrows, marsh wrens, and yellow throats; and marsh

predators and passerines can simply be included on a species list to determine the total number of avian species.[7] Suggested protocols for tidal marsh birds can be found at www.sfei.org.

Element 8: **Invasive Exotic Plants**
Disturbance can increase the establishment of invasive non-native species; monitoring will be performed throughout the 15 year monitoring period, particular attention will be paid to invasive species monitoring in the years immediately after construction. Monitoring for invasive non-native plant species that threaten sensitive native tidal marsh communities will be ongoing. Particular attention will be paid to controlling invasive cordgrass (*Spartina alterniflora, S. densiflora, S. patens*) and working with the Invasive Spartina Project. Other highly invasive species will be kept off the site to the extent feasible, including those listed under Tier I (and to a lesser extent Tier II) of the Water Board's "Invasive Non-Native Plant Species to Avoid in Wetland Projects in the San Francisco bay Region"[8]. Explanations for those that cannot be controlled will be provided.

Element 9: California Clapper Rail.
A primary goal of the restoration of Bair Island is the creation of habitat for California Clapper Rails. Clapper Rails currently breed on the restored portion of Outer Bair Island, in Corkscrew Slough and the Deepwater Slough area of Middle Bair Island. Clapper Rails also breed on nearby Greco Island.

The objective of the clapper rail surveys at Bair Island is to determine breeding presence in each geomorphic unit, and secondarily to estimate breeding densities. Post restoration, monitoring will begin at any one of the four geomorphic units only after 75% cover of vegetation occurs in a minimum of 5 acres of contiguous suitable breeding habitat. After that target is reached, breeding season call count surveys (following USFWS approved survey protocol) will be conducted in that geomorphic unit every five years until California clapper rails are detected within that unit, which will fulfill the clapper rail performance expectations for the restoration, as detailed in Table 2. The USFWS will also use the monitoring data to track the rail population in the restored habitats and implement adaptive management as determined necessary by the Service. Subsequent clapper rail surveys in that unit will be conducted as part of the LTMP (per Joy Albertson, Refuge Biologist).

Breeding season call counts will be conducted as follows: Clapper Rails will be surveyed at Outer, Middle-West, Middle-East and Inner Bair Island using 800 meter (m) long (0.5 miles) transects positioned on the diked levees. Each transect will consist of 5 stations at 200 m intervals. Each of the survey stations along a transect will be marked with a flagged rebar post with the transect and station numbers labeled on the flagging. Number and placement of transects within each survey area will be determined based on amount and location of optimum habitat quality at that time. Surveys will be conducted on each transect three times per survey season, with surveys at least one week apart (Following USFWS approved survey protocols).

Element 10: Salt Marsh Harvest Mouse.
A primary goal of the restoration of Bair Island is the creation of habitat for Salt Marsh Harvest Mouse (SMHM). The objective of the SMHM monitoring is to detect presence of this species within each restored pond, and secondarily to determine capture efficiency. Monitoring will

[7] Joy Albertson, US FWS Refuge Biologist.
[8] (www.waterboards.ca.gov/sanfranciscobay/certs.htm under "Fact Sheets for Wetland Projects, Appendix I).

commence when mid and high elevation vegetative cover, consisting primarily of pickleweed, reaches at least 75% cover of vegetation occurs in a minimum of 5 acres of contiguous marsh within a geomorphic unit. (i.e., Inner, Middle-East and Middle-West, Outer) of Bair Island (see Vegetation Monitoring element).

Salt marsh harvest mouse trapping surveys will be conducted as follows:

All trapping will be conducted using Sherman live-traps, following USFWS-approved survey protocols and permit conditions. We propose to use the non-random method of trap placement because a high concentration of traps is required to detect this species when it is present in low numbers. In addition, only a narrow time window is available for trapping (i.e., when Clapper Rails are not nesting and nighttime tides are low) and a large number of areas must be monitored. Therefore, the trapping protocol is designed to detect the colonization of the restored marsh by SMHM.

Because the geomorphic units are large and there will likely be considerable spatial variation in mouse abundance within marsh areas, two grids (divided into 1 or 2 lines) of 50 traps each (spaced 10 m apart, 100 total traps) will be established within each pond, within the best mid-to high marsh habitat of 5 acres of more. If possible, the grids will overlap with vegetation/elevation transects established on the marsh plain. Each grid will be trapped for four nights. Special precautions need to be observed in order to trap on the marsh plain. Trapping will have to occur in a neap tide window in the fall when the marsh plain supporting pickleweed will not be inundated for the 4-day window of trapping.

The USFWS will use the monitoring data to track the salt marsh harvest mouse use of habitats and implement adaptive management as determined necessary by the Service. Trapping will be conducted every five years within a geomorphic unit until SMHM are captured on the restored marsh plain, which will fulfill the salt marsh harvest mouse performance expectations for the restoration of the unit, as detailed in Table 2. Any subsequent salt marsh harvest mouse surveys conducted in that unit will be conducted as part of the LTMP (per Joy Albertson, Refuge Biologist). The LTMP will largely depend upon a vegetation mapping based habitat assessment to determine the amount of potential salt marsh harvest mouse habitat in each geomorphic unit of Bair Island. As detailed above in the Vegetation Mapping section, aerial photographs will be taken of Bair Island every one to two years and acreages of low, medium and high marsh will be calculated.

Element 11: Introduced Predators.

Introduced predators such as the non-native red fox (*Vulpes vulpes regalis*) and high populations of native predators can have significant negative effects on nesting birds, including California Clapper rails. Restoration of Clapper rail habitat should not occur without concurrent predator management. Red foxes and other target mammalian predators will continue to be trapped at Bair Island following guidelines in the Predator Management Plan[9] for the protection of endangered species in tidal wetlands.

[9] Foerster, K.S. and J.E. Takekawa. 1991. San Francisco Bay National Wildlife Refuge predator management plan and final environmental assessment. U.S. Fish and Wildlife Service, Newark, CA. 54pp.

Element 12: Biosentinel Mercury Monitoring. Mercury:
Water and sediment will not be monitored post construction for mercury unless biosentinel levels are high and require further investigation of methyl-mercury sources. The Refuge will request the CBDA Biosentinel Mercury Monitoring Program (BMMP) add a sampling station within the Bair Island project area. The South Bay Salt Pond Restoration Project (SBSP), with its partners such as SFEI, is sampling certain Alviso ponds and sloughs mercury using birds, fish and brine flies. The Refuge will ask the SBSP to add a sampling station on Bair Island. If the BMMP and/or SBSP cannot conduct this monitoring then the Refuge will follow the BMMP or SBSP fish collection and mercury analysis protocols. One station will be established on the portion of Outer Bair Island that is expected to be the first area restored to tidal action. Sampling will be conducted at least biennially (every other year) and annually if funding is available. Once Middle and Inner Bair Island is breached the Outer Bair Island data will be analyzed to determine if a station should be established in Middle Bair Island.

Element 13: Structure Monitoring.
As noted in Section 2.0, monitoring of infrastructure such as flow restrictors will be done on a regular basis as a part of the Refuge's operation and maintenance program and will not be included in the monitoring program. Flow restrictors will be monitored at least quarterly and after major storm events as a part of their normal operations and maintenance program at the major structures. The breaches and ditch blocks will be monitored twice a year after the winter and spring high tides. For all structures, particular attention will be paid to stability and erosion.

Element 14: Water Quality.
Salinity, pH, temperature, turbidity, and dissolved oxygen will be measured at each breach until receiving water limits have been met for 3 months or the BITAC has determined that the site cannot meet those limits. Water quality sampling is described in the Self Monitoring Program (Attachment 3) of the Water Board's Order.

Element 15: Current velocities will not be monitored as originally intended, unless a qualified hydrologist or the BITAC deems them important.

2.4 Schedule

Monitoring Schedule. Monitoring will follow the schedule summarized in Table 1 in Section 4. Note that some of the monitoring elements can be discontinued early, if data and discussion with the San Francisco Bay Wetland Monitoring Group or Bair Island Technical Advisory Committee (BITAC) and approved by the Executive Officer indicates that performance is satisfactory.

3.0 Reports

As-built plans will be submitted to the Corps, BCDC and the Water Board within 90 days of the completion of construction of each project element. The plans will note changes from the final bid set of plans and will include notes from the construction manager and monitor.

Monitoring reports describing the data collected shall be submitted biennially (every two years) beginning on December 1st, for 15 years post-construction of each element (Years 2, 4, 6, 8, 10, 12, 14). In addition to submitting the biennial monitoring reports, FWS may submit informal memo reports in the interim years. Biennial post-construction monitoring reports will include

monitoring results, analysis of quantitative monitoring data, and evaluation of performance objectives, and suggested corrective actions. The report will include photographs and figures identifying monitoring station locations and photo points. An essential aspect of monitoring is routine and frequent site visits for the purpose of looking for problems. The Refuge staff will keep a journal of observations and have a well established line of communication through project and site management such that on-site problems that might be missed through formal monitoring are encountered and addressed. Copies of journal entries will be included in monitoring reports.

The monitoring report will include a list of the names of the persons who collected the data and prepared the reports. Monitoring reports will include details of any adaptive management actions that have been implemented in the proceeding years. Reports will be submitted to the Corps, BCDC, Redwood City, and San Mateo County.

4.0 MONITORING TIMELINE

Baseline data will be collected the year prior to the initiation of construction on each geomorphic unit. The duration of monitoring of several of the elements will be determined by performance in the field. For example, development of clapper rail and salt marsh harvest mouse habitat may take longer than 10 years. If so, surveys will be performed until the success criteria are met. Flooding and channel morphology will be monitored until it is clear that potential hazards are no longer a problem.

Table A-1. Monitoring Elements, Frequency and Methods for 15-Year Monitoring Periods in Each of the 4 Bair Island Geomorphic Units.

(Further development of methods and frequencies and changes in this monitoring plan should be subject to review by a Bair Island Technical Advisory Committee (BITAC) which should coordinate with the South Bay Salt Pond Restoration Project .)

Element	Frequency	Method
Baseline Monitoring will be conducted for: a) overall pre-project site condition (to show eventual development of slough & marsh morphology, vegetation, habitats, vegetation and/or wetland functions, and invasive cordgrass); b) cross-sections c) a wetland functional assessment d) birds e) water quality f) CA. Clapper Rails g) Salt Marsh Harvest Mice	Baselines conducted 1 year prior to construction on each of the geomorphic units (the project is presumed to have 4 gemomorphic units). b)TBD c) TBD d) TBD e) water quality measured as per Attachment 3 (see SMP) for 3 months after receiving water limits have been met at each breach	Some baseline elements remain to be determined (TBD) a) annual aerial or satellite photos of sufficient quality to show significant changes in habitats (including slough and vegetation development, invasive cordgrass invasions, and accretion/erosion). (See box below for details.) b) the number and locations to be determined with approval by the BITAC c) TBD d) TBD e) See SMP f) Using USFWS protocols g) Using USFWS protocols
1. Aerial or Satellite Photos	Annually	Annual aerial or satellite photos should be of sufficient quality to show significant changes in habitats and overall site condition. Google Earth photos are acceptable if they can reveal changes from year to year in habitats (sloughs, vegetation, sediment processes). SFEI recommends habitat mapping be done annually in August during a spring series low tide on georectified aerial imagery of 1 m2 pixel

		resolution. SFEI's Wetland Tracker is appropriate to map the habitats if it can meet FWS' need to assess the quantity of low, medium, and high marsh in each project section and determine when clapper rail and harvest mouse surveys will be triggered (75% cover in 5 continuous acres)..
2. Tidal Circulation (flooding)	Annually for the first 5 years or until FWS, the BITAC, and/or expert hydrologists or modelers determine that the slough morphology indicates flooding potential is no longer a concern. Continued monitoring at 2, 3, or 5-year intervals unless more frequency is required.	Channel cross-sections, peak water height recorders, and direct observation; tide gauges will be used in sensitive areas only if necessary.
3. Slough Morphology & Surveys	Same as for #2 Tidal Circulation	Slough surveys and channel cross-sections will be marked and width and depth measurements taken. Number and location of cross-sections TBD. Use cross-section data to re-run the predictive model and, if data indicates a threat, employ corrective actions. Aerial photos used to detect changes in larger channels.
4. Marsh Morphology	Annually until FWS or BITAC determines no longer necessary.	Inferred from cross-sections, aerial photos, and vegetation response. Levee breaches will be marked and elevation measurements taken. Small channels and pannes mapped.
5. Habitat	Annually or biennially until vegetation cover reaches 25%, then vegetation cover can be mapped. (When 25% vegetation cover is achieved within a geomorphic unit, vegetation mapping can replace habitat monitoring. Thereafter every 2 years for 15 years or until performance criteria are met.) FWS needs to be able to determine when 5 contiguous acres of mid to high marsh occurs.	Aerial or satellite photograph interpretation (see #1 above for aerial/satellite mapping). If necessary, ground-truthing will be conducted.
6. (a) Vegetation	Starting after 25% cover is achieved in a geomorphic unit; every 3 years for 15	Transects to ground truth aerial photographs and characterize marsh vegetation.

(b) OR Wetland Assessment Method such as CRAM	years.	[For one available method, see CRAM at www.sfei.org]
7. Birds	Baseline; 1 year after breach; then after vegetation reaches 25%; then every 3 years for 15 years	TBD in consultation with the FWS. Suggested avian groups include waterfowl & shorebirds; marsh birds; and avian predators. [For suggested method, see WRMP bird protocols for tidal wetlands www.sfei.org]
8. Invasive Exotic Plant Species	Ongoing	Direct Observation
9. Calif. Clapper Rail	Initiated after 75% cover of mid to high marsh vegetation is achieved in 5 acres of contiguous suitable habitat in each geomorphic unit, and every 5 years until CLRA breeding season use is confirmed.	Using USFWS protocols
10. Salt Marsh Harvest Mouse	Initiated after 75% cover of mid to high marsh vegetation is achieved in 5 acres of contiguous suitable habitat (as defined by the SMHM and Clapper Rail Recovery Plan) in each geomorphic and every 5 years until SMHM use is confirmed.	Using USFWS protocols
11. Introduced Predators	Ongoing	Direct observation
12. Mercury	Annually after breaching	Using BMMP protocols
13. Structures	Flow restrictors, quarterly and after major events; breaches and ditch blocks semi-annually	Direct observation
14. Water Quality	water quality measured as per Attachment 3 (see SMP) for 3 months after receiving water limits have been met at each breach	Multiparameter probe for salinity, pH, temperature, turbidity, dissolved oxygen until limits met for 3 months
Elements that will be monitored only if necessary:		
15. Current Velocities		A qualified hydrologist should confirm that velocity measurements are not necessary before removing this from the monitoring program.

Table A-2. Performance Expectations for the Bair Island Restoration Project site

Element	Performance Expectations
Tidal Circulation (flooding)	No increased tidal flooding or sedimentation of the Redwood Creek channel.
Slough Morphology	Slough morphology will mimic similar tidal marshes.
Marsh Morphology	Marsh morphology will mimic similar tidal marshes.
Habitat	25% Total Vegetation will trigger Vegetation, CCR, and SMHM Monitoring By Year 50 the 3 Islands should have: • Between 50-95% vegetated tidal marsh; • 50-75% mudflats; • 30-50% channels; • 10-20% tidal panes.
Vegetation	The distribution of habitat types will be similar to tidal marshes. Appropriate habitat for CCR and SMHM will be present. The original HT Harvey Hypothesis was: "Inner B.I. will rapidly colonize with cordgrass and pickleweed with substantial areas of vegetated marsh by the end of Year 5. It will likely transition into a perennial pickleweed marsh by Year 15. Outer Bair will be mostly vegetated in 10 -- 25 years. Middle Bair will take the longest to vegetate, and is expected to do so in 25 -- 50 years." This may take 50-100 years longer than expected.
Calif. Clapper Rail	California Clapper Rail will be present in all geomorphic units once appropriate habitat has been established.
Salt Marsh Harvest Mouse	Salt Marsh Harvest Mice will be present in all geomorphic units once appropriate habitat has been established.

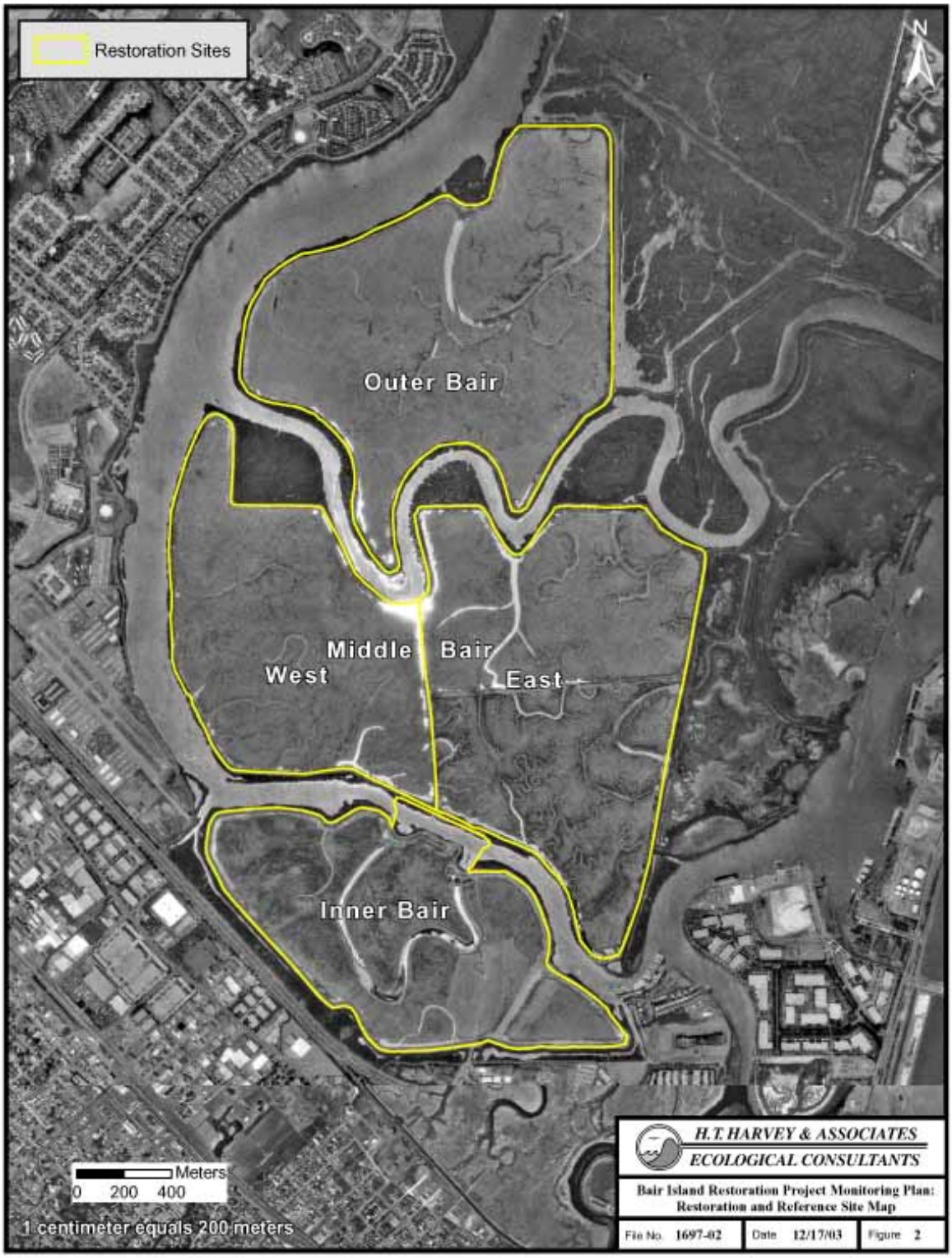


Figure A-1. The four Geomorphic Units of Bair Island

Attachment 2

6036 BAIR ISLAND
Preliminary Design Parameters
for Permitting

Excavation

Location	Structure	From	To	Figure Number	lat*	long*	Existing Parameters: (E) Levee highest El (ft)	Preliminary Design Parameters: Width at Levee Crest (ft)	Bottom width (ft)	Thalweg el. (ft NAVD)	Slope to OG (H:V)	Volume Cut (cy)	Impacted Area (sf)	Notes:
OB1	Breach	Steinberger Slough	Outer Bair	C-2	37d31'53"	122d13'54"	9.8	130	47	-3.6	4:1	20,000	117,350	
OB3	Breach	Corkscrew Slough	Outer Bair	C-4	31d31'09"	122d14'15"	9.8	65	5	-1.5	4:1	2,000	11,000	
OB4	Breach	Corkscrew Slough	Outer Bair	C-3	37d31'41"	122d14'29"	10.3	100	7	-1.7	4:1	2,000	12,700	
MB1	Breach	Corkscrew Slough	Middle Bair Island	C-5	37d31'02"	122d13'47"	9.3	141	64	-4.2	4:1	9,000	60,400	
MB3	Breach	Smith Slough	Middle Bair Island	C-6	37d30'33"	122d14'16"	9.7	133	34	-3.1	4:1	5,000	17,000	
MB4	Breach	Steinberger Slough	Middle Bair Island	C-6	37d30'44"	122d14'43"	10.1	98	8	-1.8	4:1	2,000	25,400	
MB5	Breach	Steinberger Slough	Middle Bair Island	C-5	37d30'58"	122d14'46"	10.1	101	8	-1.8	4:1	2,000	22,400	
IB1	Breach	Smith Slough	Inner Bair Island	C-8	37d30'24"	122d14'09"	10.0	84	13	-2.1	4:1	2,500	40,700	
IB2	Breach	Inner Bair Island	Smith Slough	C-9	37d30'19"	122d13'57"	9.1	59	13	-2.1	4:1	1,500	25,700	
IB2 Riprap	Rock Slope Protection											-	19,400	2' thick layer at levee tie-in points
MBCC1	Channel Connector	Interior of Middle Bair Island	-	C-7	37d30'51"	122d14'03"	8.0	66	5	-1.2	4:1	1,000	6,900	
MBCC2	Channel Connector	Interior of Middle Bair Island	-	C-7	37d30'43"	122d13'54"	7.9	72	5	-1.2	4:1	1,000	7,900	
MBCC3	Channel Connector	Interior of Middle Bair Island	-	C-7	37d30'43"	122d13'48"	6.2	56	5	-1.2	4:1	1,000	8,400	
MBCC4	Channel Connector	Interior of Middle Bair Island	-	C-7	37d30"37'	122d14'02"	7.2	69	5	-1.2	4:1	1,000	9,100	
Starter Channel	Inner Bair	Inner Bair perimeter eastern borrow ditch	-					22	10	2.3	2:1	6,000	68,000	Thalweg 3' below marsh elevation

Fill

Location	Structure	From	To	Figure Number	lat*	long*	Existing Parameters: (E) Ditch Thalweg el (ft)	(E) Ditch Width (ft)	Preliminary Design Parameters: Crest width (ft)	Approx Bottom width (ft)	Crest el. (ft NAVD)[2]	Slope to OG (H:V)	Volume Fill (cy)	Impacted Area (sf)	Notes
OBDB1	Ditch Block	West of OB1	-	C-2	37d31'51"	122d13'59"	-0.2	121	12	63	5.0	5:1	800	4,200	Build crest to 1' above existing bank grade.
OBDB2	Ditch Block	East OB1	-	C-2	37d31'50"	122d13'51"	1.4	88	12	37	4.0	5:1	500	1,600	Build crest to 1' above existing bank grade.
OBDB3	Ditch Block	North of OB3	-	C-4	37d31'11"	122d14'14"	1.1	88	12	36	4.0	5:1	300	1,700	Build crest to 1' above existing bank grade.
MBDB1	Ditch Block	Btwn MB5 & OB3	-	C-5	37d31'09"	122d14'34"	0.6	72	12	46	4.0	5:1	400	1,800	Build crest to 1' above existing bank grade.
MBDB2	Ditch Block	Btwn MBCC2 & MBCC3	-	C-7	37d30'44"	122d13'51"	0.3	68	12	60	5.0	5:1	400	2,400	Build crest to 1' above existing bank grade.
MBDB3	Ditch Block	West of MB3	-	C-6	37d30'34"	122d14'19"	0.9	92	12	58	5.0	5:1	400	2,800	Build crest to 1' above existing bank grade.
MBDB4	Ditch Block	North of MB4	-	C-6	37d30'46"	122d14'44"	0.7	82	12	54	5.0	5:1	400	2,600	Build crest to 1' above existing bank grade.
IBDB1	Ditch Block	East of IB2	-	C-9	37d30'18"	122d13'54"	-0.2	134	12	46	3.0	5:1	200	2,900	Build crest to 1' above existing bank grade.
IBDB2	Ditch Block	At Smith Slough	-	C-9	37d30'05"	122d13'41'	-0.5	112	12	52	4.0	5:1	200	4,000	Build crest to 1' above existing bank grade.
IBDB3	Ditch Block	Southern Boundary, east	-	C-9	37d29'56"	122d13'49"	0.5	86	12	53	4.5	5:1	200	2,600	Build crest to 1' above existing bank grade.
IBDB4	Ditch Block	Southern Boundary, west	-	C-9	37d29'56"	122d13'55"	0.5	37	12	41	3.5	5:1	200	900	Build crest to 1' above existing bank grade.
FCDB1	Ditch Block (at FC Structure)	Outer Bair at FC Structure 1	-	C-4	37d31'10"	122d13'46"	0.5	40	12	38	3.0	5:1	500	2,700	With small boat portage and viewing platform with interpretive sign; No survey data avail, assume same as FCDB2. Build crest to 1' above existing bank grade.
FCDB2	Ditch Block (at FC Structure)	Middle Bair at FC Structure 2	-	C-4	37d31'08"	122d13'40"	0.4	105	12	42	4.0	5:1	400	2,300	

6036 BAIR ISLAND
Preliminary Design Parameters
for Permitting

Fill (Continued)

Location	Structure	From	To	Figure Number	lat*	long*	Existing Parameters: (E) Ditch Thalweg el (ft)	Existing Parameters: (E) Ditch Width (ft)	Preliminary Design Parameters: Crest width (ft)	Preliminary Design Parameters: Approx Bottom width (ft)	Preliminary Design Parameters: Crest el. (ft NAVD)[2]	Preliminary Design Parameters: Slope to OG (H:V)	Preliminary Design Parameters: Volume Fill (cy)	Preliminary Design Parameters: Impacted Area (sf)	Notes
FC1	Flow Control Structure	Outer Bair in Corkscrew Slough	Middle Bair	C-4	37d31'09"	122d13'43"	-1.6	295	16	415 (including riprap toe)	7.8	5:1	3,500	38,800 (including riprap toe)	30-foot notch for boat passage with depth gauge
FC1 Riprap	Rock Slope Protection												3,000		2' thick layer at levee tie-in points
FC2	Flow Control Structure	Middle Bair in Smith Slough	Inner Bair	C-8	37d30'26"	122d14'03"	-9.2	310	16	257 (including riprap toe)	7.8	5:1	8,000	48,900 (including riprap toe)	
FC2 Riprap	Rock Slope Protection												5,000		2' thick layer at levee tie-in points

Habitat Fill

Location	Structure	From	To	Figure Number	lat*	long*	Existing Parameters: (E) average elevation (ft NAVD)		Preliminary Design Parameters: Fill Design elevation (NAVD ft)			Slope to OG (H:V) where applicable	Volume Fill (cy)	Impacted Area (ac)	Notes
SCASZ Upland Fill	Construction Fill	SCA Property Line	NW to perimeter levees	C-20			2.7		9.3			5:1	310,000	30	Dry fill so no levee required
Transitional Habitat Fill - SCASZ	Construction Fill	SCA Property Line End	IB Wetland Fill	C-20			2.7		9.3 to 5.3			10:1	15,000	3	Dry fill so no levee required
Transitional Habitat Fill - IB Breaches	Construction Fill	IB perimeter levee between IB1 & IB2	IB Wetland Fill	C-20			2.7		9.3 to 5.3			10:1	5,000	1.0	
Inner Bair Tidal Wetland Fill	Construction Fill	Inner Bair(not SCA property)	-	C-20			2.7		5.3			5:1	560,000	125	Dry fill so no levee required
Inner Bair Tidal Wetland Fill - Isolated by Historical Meander	Construction Fill	Inner Bair(not SCA property)	-	C-20			2.7		5.3			5:1	198,000	50	Dry fill so no levee required
Dredged Material Fill (for Wetland Cap)	Dredged Material	East side of Inner Bair, eventually spread over marsh of IB	-	C-20			2.7		5.3			N/A	172,000	31	Final elevation is consolidated after decanting. Weir to decant to contained area, pump to Middle Bair.
Dredge Material Containment Levee	Temporary Levee	Inner Bair - East End	-	T-3	37d30'09"/ 37d29'56"	122d13'42"/ 122d13'52"	N/A	N/A	12	~70	10.0	3:1	25,000	112,400	Tidal wetland elevation + 2' (5.22'+2' = 7.3')
SBSA Fill (after pipeline replacement)	Construction Fill	Whipple Entrance	Pipe exit at airport property	T-3			2.7		12 to 5.3			gradual	185,000	9	Approximately 5,545 ft long

Public Access

	Location		Figure Number	lat*	long*	Preliminary Design Parameters: Impacted Area (sf)	
Parking Lot Expansion	Adjacent east of (E) parking lot		L-1	89d57'59"	26d05'01"	3,715 (asphalt); 2,030 (concrete)	Addition of at least 10 parking spots, accomodation for school bus access, 2 unit bathroom (low maintenance), information kiosk, cross walk stripes to pedestrian bridge (if not existing)
Pedestrian Bridge (Assuming E/W alignment to Bair Island Road, not as shown on plan L-2)	Bair Island Road to IB		L-2	37d29'55"	122d13'27"	200 LF	Predator resistant, ADA accessible
Trail Improvements	IB permimeter, far east edge of airport property		L-3 to L-9	37d30'28" / 37d30'05"	122d14'22" / 122d13'40"	115,000	1.8 miles, ADA Accessible, 15'x30' viewing platforms at both trail ends overlooking Smith Slough with interpreative signage, orientation kiosk at trailhead and parking lot, interpretative signs along trail, low fence (wire) between trail and restored habitat/airport safety zone on both sides

OG = Original Grade

Attachment 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

BAIR ISLAND RESTORATION PROJECT

ORDER No. xxxxx

A. GENERAL

1. Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13383 and 13387(b) of the California Water Code, and in this Water Board's Resolution No. 73-16.

2. The principal purposes of a monitoring program by a waste discharger, also referred to as self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by this Water Board, (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge.

B. SAMPLING AND ANALYTICAL METHODS

1. Sample collection, storage, and analyses shall be performed according to Code of Federal Regulations Title 40, Section 136 (40 CFR S136), or other methods approved and specified by the Executive Officer of this Water Board.

2. Water and soil analyses shall be performed by a laboratory approved for these analyses by the State Department of Public Health (DPH), or a laboratory waived by the Executive Officer from obtaining a DPH certification for these analyses, or by properly calibrated field equipment when approved by the Executive Officer of this Water Board.

3. The director of the laboratory whose name appears on the certification, or his/her laboratory supervisor who is directly responsible for the analytical work performed shall supervise all analytical work including appropriate quality assurance/quality control procedures in his/her laboratory and shall sign all reports of such work submitted to the Water Board.

4. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. DEFINITION OF TERMS

1. Grab sample is defined as an individual sample collected in a short period of time not exceeding 15 minutes. It is used primarily in determining compliance with daily maximum limits and instantaneous maximum limits. Grab samples represent only the condition that exists at the time the wastewater is collected.

2. Duly authorized representative is one whose:

    a. Authorization is made in writing by a principal executive officer or ranking elected official;

    b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such chief engineer, project manager, or field supervisor.

3. Instantaneous maximum is defined as the highest measurement obtained for the calendar day.

4. Median of an ordered set of values is that value below and above which there is an equal number of values, or which is the arithmetic mean of the two middle levels, if there is no one middle value.

5. Receiving waters refers to any water which actually or potentially receives surface water discharged from the Bair Island Restoration Project Area. The receiving waters in this case are the sloughs and San Francisco Bay surrounding Bair Island.

6. Construction phase is defined as that period of time when the site is prepared for marsh restoration and includes all activities leading up to the restoration of tidal action.

7. Construction phase activities are defined as all site activities including the movement of soil or sediment, such as placement of dredged material via slurry techniques, excavation of trenches and toe drains, and all other soil handling such as berm and levee construction.

8. Post-construction phase is defined as the period of time beginning when site construction is substantially completed, and tidal action has been restored to Inner, Middle, and Outer Bair Islands.

9. Post-construction phase activities are defined as all monitoring, site maintenance, and adaptive management activities which take place after construction is completed and tidal action has been restored to the Inner, Middle, and Outer Bair Islands.

10. Project boundary shall be defined as the limit of the receiving waters at mean low low water level, which is the topographic contour representing an elevation of 0 ft. NAVD88.

11. Monitoring period for purposes of reporting for water quality shall be defined as that period of time beginning on the day the levees are breached, and ending when the water quality objectives have been met for three consecutive months. Habitat and geomorphic assessment monitoring period ends 15 years after breaching for each unit. Avian monitoring period ends at 15 years post breach or when vegetation cover reaches 80% or the predominant bird use shifts from shorebirds and waterfowl to resident marsh species, which ever is sooner. After 15 years of monitoring in each of the 4 geomorphic units, if vegetation cover does not reach 75-80% cover, the Discharger will attempt to analyze aerial or satellite photos once every 5 years and assess the extent of habitat development, until 75-80% cover is reached., unless the advisory team determines that adequate habitat has been established at the site.

12. Ambient San Francisco Bay salinity shall be defined as the salinity measure in the San Francisco Bay or Redwood, Steinberger, Smith, or Corkscrew Sloughs at a point 50 feet upcurrent from the breach in the levee separating Inner, Middle, or Outer Bair Islands from the adjacent sloughs or the Bay.

D. SPECIFICATIONS FOR SAMPLING AND ANALYSES

The Discharger is required to perform sampling and analyses according to the schedule in **Table D-1** in accordance with the following conditions:

13. Receiving Waters

    a. In tidally-influenced receiving waters, samples shall be collected at each station on each sampling day during the period within 1 hour following low slack water. Where sampling at lower slack water period is not practical, sampling shall be performed during higher slack water period.
    b. Samples of downstream receiving water shall be collected within the discharge plume and down current of the discharge point so as to be representative, unless otherwise stipulated.
    c. Samples of background receiving water shall be collected upcurrent of the discharge point.
    d. If feasible, samples shall be collected within one foot below the surface of the receiving water body and one foot above the channel or pond bottom.

E. DESCRIPTION OF SAMPLING STATIONS

1. A site plan drawing showing the location of all sampling points should be included. A site plan drawing showing the location of all sampling points shall be submitted with all monitoring reports submitted under this Plan.

2. One receiving water sampling point shall be established at a point 100-150 feet upstream

from the point of discharge into the receiving water, or if access is limited, at the first point upstream which is accessible.

3. Four receiving water sampling points shall be established at a point 100-150 feet downstream from the point of discharge into the receiving water, or if access is limited, at the first point downstream which is accessible.

F. STANDARD OBSERVATIONS

1. Receiving Water

   a. Floating and suspended materials of waste origin (to include oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.
   b. Discoloration and turbidity: description of color, source, and size of affected area.
   c. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
   d. Evidence of beneficial water use: presence of waterfowl or wildlife, fishermen, and other recreational activities in the vicinity of the sampling stations.
   e. Hydrographic condition, if relevant:
      1) Time and height of corrected high and low tides (corrected to nearest NOAA location for the sampling date and time of sample and collection).
      2) Depth of water columns and sampling depths.
   f. Weather condition:
      1) Air temperature.
      2) Wind - direction and estimated velocity.
      3) Precipitation - total precipitation during the previous five days and on the day of observation.

G. REPORTS TO BE FILED WITH THE WATER BOARD

1. **Start-Up Report**: A report on the start-up phase shall be submitted to the Water Board no more than 45 days after each of the initial breaches on the levee on Inner, Middle, and Outer Bair Islands. Each Start-Up Report shall contain the same elements stipulated below under 2, Annual Self-Monitoring Reports, and shall include all data collected during the first 30 days following the breach of each levee.

2. **Biennial Self-Monitoring Reports**: Written reports shall be submitted biennially for Inner, Middle, and Outer Bair Island, beginning on December 1st, two years following the completion of construction activities in each of the 4 geomorphic units of the restoration project. If feasible, annual memos will be submitted in the intervening years to summarize the data collected and analyzed. Biennial reports shall be submitted until Year 15 after construction for each geomorphic unit, or until vegetation reaches 75%-80%, whichever occurs sooner. The reports shall be comprised of the following: water quality data analysis and geomorphic and habitat assessments over a 15 year period for each phase beginning

after each construction phase is completed. If vegetation does not reach that level before Year 15, a Technical Advisory Committee for the Bair Island Restoration Project should review the monitoring data and recommend next steps.

3. For the Bair Island Restoration Project, the monitoring elements, schedule, performance criteria, and general protocols are contained in the Monitoring Plan (Attachment 1 to Order No._____) for the site.

   a. Letter of Transmittal: A letter transmitting self-monitoring reports should accompany each report. Such a letter shall include identification of changes to the project design, and any unplanned releases or failures that may have occurred since the preparation of the previous self-monitoring report. If unplanned releases are noted, then a discussion of the corrective actions taken or planned, and a time schedule for completion, shall be included.

   b. Map or Aerial Photograph: A map or aerial photograph shall accompany the report showing sampling and observation station locations.

   c. Results of Analyses and Observations: The report format shall be a format that is acceptable to the Executive Officer.

      1) If the discharger monitors any pollutant more frequently than required by this permit using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Self-Monitoring Report.

      2) Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified.

      3) The report shall also include a table identifying by method number the analytical procedures used for analyses. Any special methods shall be identified and should have prior approval of the Board's Executive Officer.

      4) Lab results shall be summarized in tabular form, but do not need to be included in the report.

4. **Final Report**: Reporting requirements under Order No. R2-2008-xxxx will end:
   a) for water quality when the water quality objectives have been met for three consecutive months;
   b) for habitat and geomorphic assessment the monitoring period ends 15 years after breaching for each unit;
   c) for avian monitoring period ends at 15 years post breach or when vegetation cover reaches 80% or the predominant bird use shifts from shorebirds and waterfowl to resident marsh species, which ever is sooner.

If vegetation does not reach 75-80% in any phase, and the Discharger has the resources to analyze aerial or satellite photos every 5 years, then that analysis should be done until the target is reached, or until a Technical Advisory Committee determines that the site is unlikely to achieve that habitat. The Final Report shall be submitted to the Water Board and contain both tabular and graphical summaries of the monitoring data obtained during the Project. In addition, the Final Report shall contain a comprehensive discussion of the compliance record and the corrective actions taken.

5. **Spill Reports**: If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the discharger shall report such a discharge to this Water Board, at (510) 622-2300 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-office hours. A written report shall be filed with the Water Board within five (5) working days and shall contain information relative to:

   a. nature of waste or pollutant,
   b. quantity involved,
   c. duration of incident,
   d. cause of spilling,
   e. Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any,
   f. estimated size of affected area,
   g. nature of effects (i.e., fish kill, discoloration of receiving water, etc.),
   h. corrective measures that have been taken or planned, and a schedule of these activities, and
   i. persons/agencies notified.

6. Monitoring reports, and letters transmitting monitoring reports, shall be signed by a principal executive officer or ranking elected official of the Discharger, or by a duly authorized representative of that person. The letter shall contain the following certification: "I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. RECORDS TO BE MAINTAINED

1. Written reports, laboratory analytical reports, maintenance records, and other records shall be maintained by the Discharger and retained for a minimum of five years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Water Board. Such records shall show the following

for each sample:

a. Identity of sampling and observation stations by number.

b. Date and time of sampling and/or observations.

c. Method of sampling (See Section C - Definition of Terms).

d. Complete procedure used, including method of preserving sample and identity and volumes of reagents used. A reference to a specific section of Standard Methods is satisfactory.

e. Calculations of results.

f. Results of analyses and/or observations.

I, Bruce H. Wolfe, Executive Officer do hereby certify the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in the Water Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Water Board Order No. R2-2008-xxxx.

2. Was adopted by the Water Board on _____.

3. May be revised by the Executive Officer pursuant to U.S. EPA regulations (40 CFR 122.36); other revisions may be ordered by the Water Board.

_____
Bruce H. Wolfe
Executive Officer

Attachments: Table 3-2

TABLE 3-2 - SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSIS FOR BAIR ISLAND RESTORATION PROJECT

SAMPLE POINT:		Outer Bair (OB)	Middle Bair (MB)	Inner Bair (IB)	Receiving Waters: San Francisco Bay; or Steinberger, Corkscrew, or Smith Sloughs; or Redwood Creek
	METHOD	3 breaches; 1 flow control structures	4 breaches; 2 flow control structures	2 breaches; 1 flow control structure	SFBay or Slough Stations 1,, 2, 3, 4
MATRIX: WATER					
Salinity [1]	multiparameter probe	D/M	D/M	D/M	D/M
pH [1]	multiparameter probe	D/M	D/M	D/M	D/M
Temperature [1]	multiparameter probe	D/M	D/M	D/M	D/M
Turbidity [1]	multiparameter probe	D/M	D/M	D/M	D/M
Dissolved oxygen [1]	multiparameter probe	D/M	D/M	D/M	D/M
GEOMORPHIC EVOLUTION					
Tidal Circulation	channel cross-sections, peak water height recorders; direct observation; X (tide gauges only if necessary).	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	
Tidal Channels	measure breach top width and channel cross sections; review aerial/satellite photos; and map channel evolution	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	
Marsh morphology	inferred from cross sections, aerial photos, and vegetation response. Measure levee breaches and elevations there; map small channels and pannes	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	Baseline; A for yrs 1-5; thereafter at intervals of 2,3, or 5 years based on advice of BITAC [2]	

Habitat Development	Aerial or satellite photos	Baseline; A in yrs 1-15; thereafter every 5 years, if feasible, until 75-80% cover is reached	A in yrs 1-15; thereafter every 5 years, if feasible, until 75-80% cover is reached	A in yrs 1-15; thereafter every 5 years, if feasible, until 75-80% cover is reached	
Habitat Maps	Aerial or satellite photos	A or B until vegetation reaches 25% in each geomorphic unit	A or B until vegetation reaches 25% in each geomorphic unit	A or B until vegetation reaches 25% in each geomorphic unit	
BIOTA					
Methyl mercury [3]	Biosentinel Mercury Monitoring program protocols in collaboration with the South Bay Salt Pond Project	Baseline; then A or B	Baseline; then A or B	Baseline; then A or B	Baseline; then A or B
Vegetation (or functional assessment method)	Observations & mapping	Baseline; Map veg. communities starting after 25% cover is reached in each unit; every 3 years for 15 years	Baseline; Map veg. communities starting after 25% cover is reached in each unit; every 3 years for 15 years	Baseline; Map veg. communities starting after 25% cover is reached in each unit; every 3 years for 15 years	--
Invasive Exotic Plants	Observations	Ongoing	Ongoing	Ongoing	Ongoing
Birds	As determined by US FWS [recommend shorebirds, waterfowl, marsh birds, & avian predators]	Baseline; 1 year after breach; after veg. reaches 25%; then every 3 year for 15 years	Baseline; 1 year after breach; after veg. reaches 25%; then every 3 year for 15 years	Baseline; 1 year after breach; after veg. reaches 25%; then every 3 year for 15 years	--
CA. Clapper Rails	As determined by US FWS	Initiated after 75% cover of mid-hig marsh vegetation is achieved in 5 acres of contiguous suitable habitat in each geomorphic unit, and	Initiated after 75% cover of mid-hig marsh vegetation is achieved in 5 acres of contiguous	Initiated after 75% cover of mid-hig marsh vegetation is achieved in 5 acres of contiguous	--

Salt Marsh Harvest Mice	As determined by US FWS	Initiated after 75% cover of mid-hig marsh vegetation is achieved in 5 acres of contiguous suitable habitat in each geomorphic unit, and every 5 years until use is confirmed	Initiated after 75% cover of mid-hig marsh vegetation is achieved in 5 acres of contiguous suitable habitat in each geomorphic unit, and every 5 years until use is	Initiated after 75% cover of mid-hig marsh vegetation is achieved in 5 acres of contiguous suitable habitat in each geomorphic unit, and every 5 years until use is	
Introduced predators	Observations	Ongoing	Ongoing	Ongoing	Ongoing

Notes:

[1] Field test only

2 Bair Island Technical Advisory Committee	
3 Methyl mercury	Monitoring using analysis of biosentinelbirds, fish, or brine flies. Water and sediment will be tested only if inclusion of the in the South Bay Salt Pond biosentinel regional program is infeasible.
A	Once per year
B	Biennial (every 2 years) at a minimum; annually if feasible.
D/M	Once within 3 days prior to breach; during the first and fifth day following breach; weekly during the first month; monthly thereafter until performance objective met for 3 months
Baseline	Baseline monitoring will be conducted before the breach.
S-A	twice per year (semi-annual)
yrs	years
US FWS	US Fish & Wildlife Service

Attachment 4

Quality Assurance Project Plan

For

Inner Bair Island Fill Import and Placement

Revised January 10, 2008

Responsible Organization: US Fish and Wildlife Service

APPROVAL SIGNATURES

Responsible Organization

Title:	Name:	Signature:	Date:
FWS Manager	Clyde Morris or other authorized U.S. FWS representative		
LS! Project Manager	Lisa Stallings		

This is a contractual document.

TABLE OF CONTENTS

1.0 DISTRIBUTION LIST

Title:	Name & Affiliation	Tel. No. & email
FWS PM	Clyde Morris, FWS (or other authorized U.S. FWS representative)	510 792-0222, Clyde_Morris@fws.gov
LS! PM.	Lisa Stallings, LS!	530 669-5667 lisa@lifescienceinc.com
LS! QA	Roger Leventhal, FarWest	510 522-7200 , farwesteng@aol.com
LS! Peer Review	Michael Harrison	(510) 346-9500, mharrison@enviroassets.com
LS! Civil Eng.	Cort Abney, Shoreline Eng.	(530) 676-1620
Fill Import PM	Rob Trujillo Dirt Market	408 395-1490
Board PM	Andre Breaux Greenberg, RWQCB	(510) 622-2324, AGreenberg@waterboards.ca.gov

2.0 PROJECT TASK ORGANIZATION

Quality Assurance (QA) includes activities that ensure that data collected are of adequate quality given the monitoring objectives. Quality Assurance consists of two separate but interrelated activities: Quality Control (QC); and Quality Assessment. Quality control refers to the technical activities employed to ensure that the data collected are adequate given the monitoring objectives to be tested. Quality Assessment activities are implemented to quantify the effectiveness of the quality control procedures.
Some of the steps being taken to ensure that high quality data is produced by the Bair Island Restoration Project efforts include:

- Implementation of provisions described in the Quality Assurance Program Plan (QAPP) document,
- External expert peer review of program's scientific, technical and programmatic processes and finding;
- External third party referee QA program to provide external QA services including QA planning and review assistance, conducting/assisting with laboratory performance audits, data validation and verification efforts.

3.0 PROJECT ORGANIZATION

Involved parties and roles.

Contractor
Dirt Market, fill broker, will be acting as the contractor bringing fill to the site. Fill will come from multiple borrow sites

Construction and Project Manager
Life Science!, Inc. (LS!) is an environmental consulting firm acting as the construction and project manager for the US Fish and Wildlife Service (FWS) for the Bair Island Restoration Project. As the FWS agent, LS! will ensure that the conditions outlined in the Regional Water Quality Control Board (RWQCB) Water Quality Certification are met (all permit conditions).

Project Manager
Lisa Stallings, Ph.D is LS! Project Manager. She will be responsible for all aspects of the project including the organization of field staff, and scheduling.

Quality Assurance Officer
Roger Leventhal (FarWest) is LS!'s Quality Assurance Officer. Roger's role is to establish the quality assurance and quality control procedures found in this QAPP as part of the review of Contractor's field analysis, and in-house analysis procedures. Roger will also work with the Quality Assurance Officer for the Contractor's Laboratory (To be determined) by communicating all quality assurance and quality control issues contained in this QAPP to the Laboratory.

Roger will also review and assess all procedures during the life of the contract against QAPP requirements. Roger will report all findings to Lisa Stallings, including all requests for corrective action. Roger Leventhal may stop all actions, including those conducted by the Contractor's laboratory if there are significant deviations from required practices or if there is evidence of a systematic failure.

Peer Reviewer
Michael Harrison will be the data peer reviewer; he will be a sub-contractor to LS!. Michael will review the data provided by the contractor and request additional sampling and analysis if needed. When he is clear that the site has been adequately characterized and meets the RWQCB requirements, he will prepare the borrow site characterization report write the approval transport the soil.

Construction Monitor
The Construction Monitor will be employed by LS! to make independent appraisal of Borrow Sites to fulfill a program level oversight function. Oversight functions will include random, unannounced Borrow Site and Bair Island project visits. The CM will make random survey's of import fill with organic vapor meter (OVM) or other field screening methods.

Gate Keeper
The Gate Keeper will be approved by LS!, and will be employed by the contractor to ensure that only trucks carrying soil from approved borrow sites are allowed onto the project site.

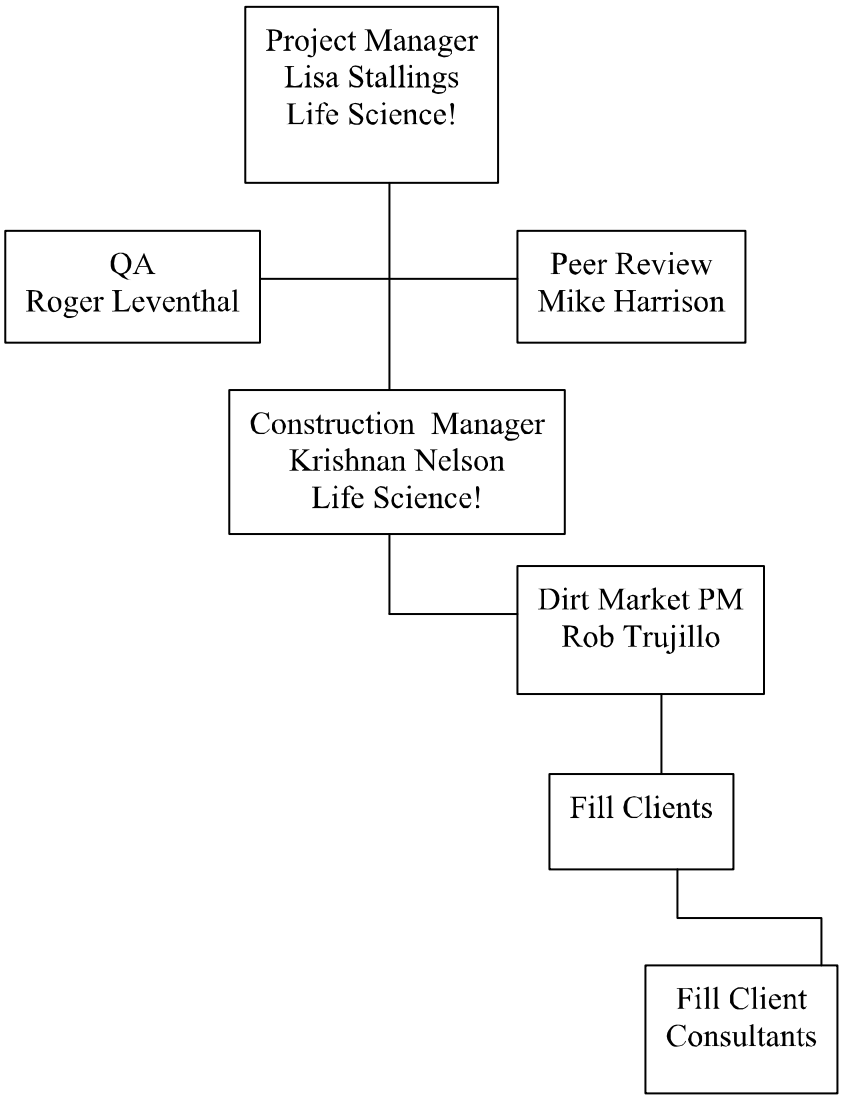
Persons responsible for QAPP update and maintenance.
Changes and updates to this QAPP may be made after a review of the evidence for change by LS!'s Project Manager and Quality Assurance Officer, and with the concurrence of both the RWQCB and Quality Assurance Officer. LS!'s Quality Assurance Officer will be responsible for making the changes, submitting drafts for review, preparing a final copy, and submitting the final for signature.

Organizational chart and responsibilities shown on Table 1.

Table 1. Personnel responsibilities.

Name	***Organizational Affiliation***	***Title***	***Contact Information (Telephone number, fax number, email address.)***
Clyde Morris (or other authorized U.S. FWS representative)	*USFWS*	*Project Director*	*Clyde_Morris@fws.gov*
Lisa Stallings	*LS!*	*Project Manager*	*Lisa@lifescienceinc.com*
Krishnan Nelson	*LS!*	*Construction Manager*	*Krishnan@lifescienceinc.com*
Roger Leventhal	*FarWest*	*QA Officer*	*farwesteng@aol.com*
Michael Harrison	*EnviroAssets, Inc.*	*Peer Review*	*mharrison@enviroassets.com*
Rob Trujillo	*DirtMarket*	*Contractor PM*	*408 395-1490 Robert@dirtmarket.com*

Organization Chart and Responsibilities



4.0 PROBLEM DEFINITION/BACKGROUND

4.1 Problem Statement

The bottom elevations for Inner, Bair are subsided below natural marshplain elevations, and most areas are initially too low in the tidal frame for marsh plants to establish or survive. Average pre-project surface elevations are approximately 1.0 ft NGVD on Inner Bair. Emergent marsh requires minimum elevations around 1.0 to 2.0 ft NGVD for seeds to germinate (Bair Island EIR/EIS, 2007). Bair Island Restoration Project was designed using NAVD; the final elevation of the marsh plain will be elevation +5.3 NAVD.

Sedimentation rates will limit rates of marsh evolution on Inner Bair Island if fill material is not used. The mudflats adjacent to Outer Bair Island are the primary source of sediment to the sloughs surrounding Bair Island and will be the primary source for the restored wetlands. Large winter storms deposit suspended sediments on the mudflats. These sediments are then re-suspended by wave action and carried into the major sloughs adjacent to Bair Island on each tide. Sediment concentrations are lowest for channels further from the Bay such as Smith Slough. Although the Redwood Creek watershed will supply some sediment to the area, this source is not expected to be significant.

Restoration of Inner Bair Island will require the importation of fill. Initially, the project was designed to be filled with dredged material. The use of 100% dredge spoils would have taken over ten years to complete and been very expensive (construction of empoundment levees and difficulty of working with bay mud). It has been decided that the most efficient and cost effective way to fill Inner Bair Island is to use both upland fill and dredged materials to bring the average post project marshplain surface to elevation +5.3 NAVD. Additionally, the potential for increased bird strikes caused by marsh restoration in the San Mateo County Airport Safety Zone was identified as an issue in the EIR/EIS. To mitigate this impact this area will be raised above the 100-year flood plain. The final elevation will be +10.5 NAVD.

Two Water Quality Certifications have been issued by the Water Board to prepare Inner Bair Island for wetland restoration. The first was issued in 2006 to place 65,000 cubic yards on Inner Bair Island (Top Grade Project). The second was issued on April 23, 2007 to place 400,000 cubic yards of material on Inner Bair Island (2007 Cert). During performance of the Top Grade Project under the first certification, deleterious material including asphalt, pipe, and assorted trash was placed on Inner Bair Island. This material was removed after it was discovered by the FWS. The main problem with the pilot project was that there was no process in place to verify that trucks were delivering approved soil material from approved borrow sites; a verifiable chain of custody of the

fill material was not developed and a representative of the restoration project with the authority to reject fill was not on site to monitor and log incoming trucks.

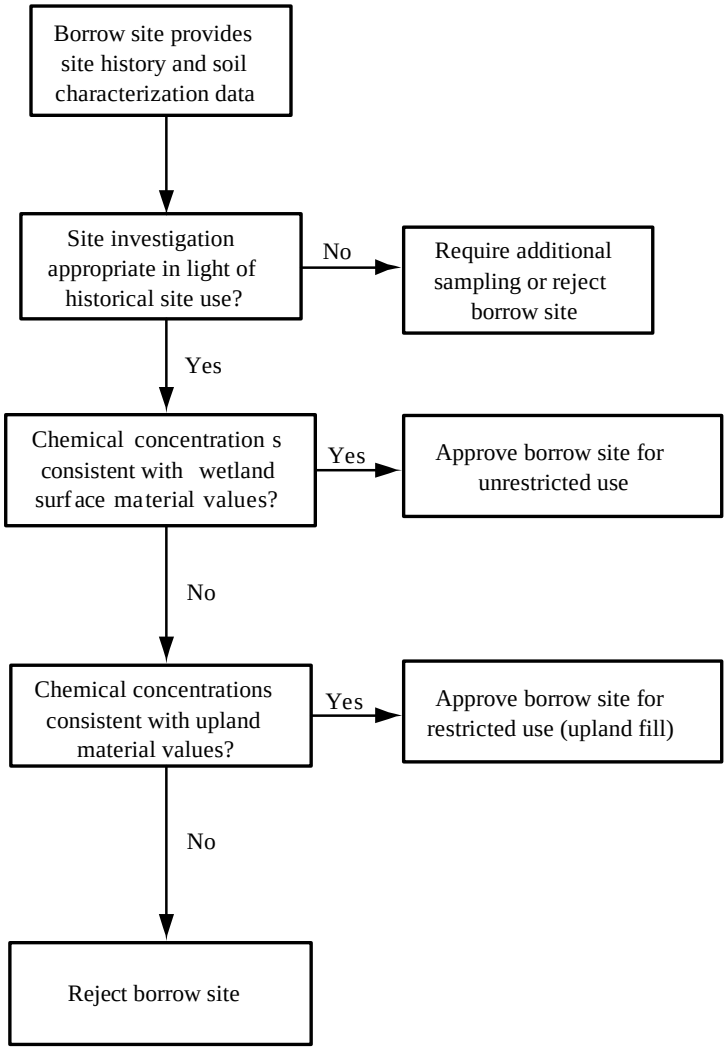
This QAPP has been designed to support the project objective that fill placed on Inner Bair Island under the conditions of the 2007 Water Quality Certification satisfies environmental quality standards for surface materials in wetland environments (RWQBC, 2000), environmental quality standards for upland fill (2007 Cert), and to prevent reoccurrence of the pilot project deviation during the completion of the Inner Bair Island fill project. An additional project goal is to provide information about the approach of using upland fill in wetland restoration. This evaluation will be valuable to many subsided wetland restoration projects in the Bay Area.

4.2 Decisions or Outcomes

This project will allow for the restoration of Inner Bair Island in a timely and cost effective way. Project screening guidelines are designed to ensure that fill materials derived from multiple borrow sites meet environmental quality goals established for the project. Screening will include the following steps:

- Borrow site history will be reviewed to support evaluation of the appropriateness of the borrow site and the sufficiency of fill characterization investigation at the individual borrow sites;
- If borrow site investigations are deemed appropriate in light of site usage information, environmental data will be screened against project goals (2007 Cert. and Table 2). Otherwise, the site will perform additional investigation or be rejected;
- Soil characterization data will be screened. If soil characterization screening data chemical concentrations are deemed consistent with Wetland Surface Material (2007 Cert. and Table 2), soil will be accepted for unrestricted use at the project.
- If chemical concentrations are inconsistent with Wetland Surface Material, screening data will be reviewed against upland soil chemical requirements. If soil characterization screening data chemical concentrations are deemed consistent with Upland Material values (2007 Cert. and Table 2), soil will be accepted for restricted use at the project as upland fill.
- If soil characterization screening data chemical concentrations are inconsistent with Upland Material values (2007 Cert. and Table 2), soil will be rejected. Screening guidelines are presented graphically in Figure 1.
- Exceptions to these decision rules may be considered by Water Board staff on a case-by-case basis, after consultation with the data peer reviewer.

Figure 1. Screening guidelines for borrow site soil



* Please note that exceptions to these decision rules may be considered by Water Board on a case-by-case basis and pre-approval consulation with Water Board is required for sites with complex site histories.

5.0 WATER QUALITY OR REGULATORY CRITERIA

All conditions of the Army Corps of Engineers permit and the BCDC consistency determination will be followed.

Imported dredged sediment or upland soil used as fill material for tidal marsh restoration will meet the Wetland Surface Material Screening Values contained in the 2007 RWQCB Water Quality Certification and Table 2 below. Imported soil used to create an upland airport safety zone for the adjacent San Carlos Airport will meet the Upland Material Screening Values listed in the 2007 RWQCB Water Quality Certification and in Table 2 below.

Table 2. Bair Island Wetland Restoration Site, Proposed Sediment Criteria (June 2007):

Constituent	Wetland Surface Material [a]. [Ambient or ERLs]	Upland Material [b]
Metals:	**mg/kg**	**mg/kg**
Arsenic	15.3	15.3
Beryllium		1.0
Cadmium	1.2[b]	2.7
Chromium	112	130
Copper	68.1	76
Lead	43.2	48
Mercury	0.43	0.43
Nickel	112	160
Selenium	0.64	1.1
Silver	0.58	1.8
Zinc	158	158
Organochlorine Pesticides & PCBs:	**µg/kg**	**µg/kg**
DDTs, sum	7.0	46.1
Chlordanes, sum	2.3	2.3
Dieldrin	0.72	0.72
PCBs, sum	22.7	Non-detect
Polycyclic Aromatic Hydrocarbons:	**µg/kg**	**µg/kg**
PAHs, Total	3,390	3,390
Volatile Organic Compounds (VOCs)		Non-detect

[a]. Regional Water Quality Control Board, San Francisco Bay Region, 2000. (Draft Staff Report) *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*. These levels based primarily on San Francisco Bay ambient concentrations

in addition to the Effect-Range Low values taken from Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder, 1995, in "Incidence of Adverse Biological Effects Within Ranges of Chemicals Concentrations in Marin and Estuarine Sediment," *Environmental Management*, 19:81-97.

[b.] Stanford background; LBNL (1995); Western Regional Background (Shacklette, 1984); Wetland Cover Material and Wetland Foundation Material (Regional Water Quality Control Board, San Francisco Bay Region, 2000).

Hydrocarbons

Hydrocarbon toxicity will be screened against the toxic hydrocarbon components (THCs) presented in RWQBC, 2000, and the 2007 Cert. When hydrocarbon data is provided by Contractor as part of the Phase I/II initial data package in addition to THCs, they will be screened against the following guidelines: total petroleum hydrocarbons (TPH) as gasoline (TPH-g) of 100 mg/Kg, and TPH as jet fuel or kerosene, diesel fuel, or motor oil (TPH-j -d and –m) of 200 mg/Kg, assuming the THCs are consistent with guidance levels. If the toxic components are consistent with guidance levels and the hydrocarbons are inconsistent with the provided screening levels, the potential borrow site will be rejected or required to perform bioassay analyses.

6.0 PROJECT/TASK DESCRIPTION

6.1 Introduction

A Phase I environmental site assessment (ESA) is a qualitative assessment intended to help site users identify potential environmental hazards. For the project, the Phase I is intended to support evaluation of the appropriateness of fill characterization activities, and not to preserve the innocent landowner defense in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Therefore, the Phase I need not support "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as described in ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. At minimum, the Phase I will provide:

- A site history and identify any recognized environmental conditions (RECs) as verified by interviews with past owners, operators, and occupants of the property who are likely to have material information regarding the potential for contamination at the property.
- A review of reasonably available records, such as former site use, building plans, records of any prior contamination events, aerial photographs, and soil and groundwater information;
- A site visit to observe the condition of the property and potential sources of contamination, including sources related to adjacent properties, utility lines, and on-site areas used for various industrial processes;
- Interviews with knowledgeable people, such as site owners, operators, and occupants; neighbors; local government officials; and
- An assessment of the likelihood that contaminants are present at the site.

Beyond a Phase I: A Phase II ESA may be defined as a quantitative assessment. It is the actual testing for specific hazards, which may be identified in the Phase I assessment, such as soil (soil borings), water (monitoring wells), on-site substances, and direct testing of building materials and the property. A Phase II ESA site investigation should include:

- Accurate and legible maps showing all areas of concern identified in the Phase I ESA as well as proposed sampling locations in those areas.
- Identification of the analytical parameters for each sampling location.
- Documentation of the sampling protocol.
- A description of the rationale for selecting each sampling location and the analytical parameters

6.2 Project Tasks

1) Contractor will locate and confirm potential suitability for import fill based on location, economics, timing and quantity of dirt. If a potential borrow site meets a preliminary criteria then Contractor will request a Phase I Site ESA from the potential borrow site client.

2) Contractor will prescreen the Phase I ESA for accuracy and completeness. Items primarily being screened are site history, current use of the site and items that may give clues to any potential contamination issues.

3) If the Phase I ESA for the Import Borrow site meets screening requirements, Contractor will request a current Phase II ESA or actual test data, which will include all the chemical constituents listed in Table 2, unless adequate documentation is provided to justify elimination of certain compounds from the testing program based upon the site history identified in the Phase I (i.e. a "sector-based" approach). Minimum sample frequency will follow recommendations provided within *Information Advisory Clean Imported Fill Material* (DTSC, 2001) and the *Draft Technical Reference Document Characterization And Reuse Of Soil From Multiple Sources For Maintenance Of Levees Adjacent To Aquatic Environments* (RWQCB, 2006), and shall be at minimum four samples. As discussed in DTSC 2001, minimum sampling requirements pertain to potential borrow sites with a site usage history that does not include commercial, agricultural, or industrial exploitation. Potential borrow sites without clear site usage histories will be required to perform site-specific expanded soil investigations commensurate with the uncertainty or potential risk of environmental release associated with the site history. Additionally, Water Board staff will be consulted on sites with complex or uncertain site history prior to issuance of borrow site approvals for such sites. Please note that statistical techniques including confidence interval testing assuming normally distributed data and/or power analyses may be employed on a site-specific basis where such statistics may improve understanding of borrow site conditions after consultation with and approval by Water Board staff.

4) Contractor will screen the data to insure adequate testing frequency and proper representation of the import borrow site per DTSC 2001, RWQCB 2006, confidence interval testing techniques, and item 3.

5) If the test data are deemed consistent with RWQCB requirements for Wetland Surface Materials or requirements for Upland Materials (Table 2), then Contractor will fill out approval request summary form (see attached) as part of a complete submission to LS! for approval.

6) A complete package will include:
    a. Phase I ESA submitted by import borrow site
    b. Phase II sampling locations and rationale and test data
    c. Contractor summary

7) LS! and/or consultants will review or perform a peer review to insure that Contractor prescreening is correct and that in fact the RWQCB requirements have been met. Concerns will be direct to Contractor for further testing or quality assurance.

8) Once all concerns and testing has been performed and completed and once the import borrow site meets proper criteria a borrow site evaluation report and approval letter will be issued.

9) Once the site has been approved and slated for import, LS! and Contractor will perform a site walk of the import borrow site to confirm that the Phase I ESA and test data meet actual site conditions.

10) Once the import borrow site walk has been performed then LS! will authorize the import of the fill.

11) Contractor will dispatch the trucks to truck the import borrow fill to the Bair Island project. A dispatch log will be maintained by the contractor; this log will show which trucks left the borrow site. This log will indicate for the following information such that the contractor's Gate Keeper can only allow approved trucks into the site:
    a. Number of trucks and individual truck ID tag numbers.
    b. Primary trucking company
    c. Name and address of borrow site.
    d. Special instructions for the placement of the soil. For example, some soil may have textures that will meet compaction specification for levees and will be used to construct and/or repair levees

12) When trucks arrive on the site, the Gate Keeper will fill out the attached truck log. This log will enable the Gate Keeper to match up the actual truck data with the dispatch log. If any data from the dispatch log and truck do not match then the truck will not be allowed on the site.

13) LS! Construction Monitor (CM) will make frequent unannounced visits to the borrow sites to ensure that the right material is being loaded. The CM will perform random surveys of import fill prior to placement within the project with

an OVM or other field method including visual and/or olfactory observation. If anomalous materials are observed, shipment of fill from the originating Borrow Site will be halted. Shipment will not be resumed or permanently discontinued until the quality and/or source of the anomalous material is established. The CM will have the authority to turn trucks back.

14) LS! CM will make frequent unannounced visits to the borrow sites to ensure that the right material is being loaded. In the event a borrow site has segregated soils into materials acceptable and unacceptable for use at Bair Island, a LS! technician will be posted at the borrow site to ensure that unacceptable material is not transported to Bair Island.

15) The CM will be responsible for:

- Collecting GPS data and maintaining a GIS database of where individual loads have been placed.
- Checking surface elevations weekly and Coordinating with the Project Civil Engineer to survey surface elevations when key construction is completed.
- Checking that compaction of fill meets the project technical specifications. Coordinating with the independent compaction testing lab when key construction is completed.
- Ensuring that project BMPs are implemented.

6.3 Reporting Requirements

The project will provide quarterly progress reports, including quantity and location of fill placed and a summary of borrow site evaluation reports. Field notes and borrow site evaluation reports submitted during the preceding quarter will be attached as appendices.

6.4 Sample Analytical Program

Soil samples will be collected and analyzed for chemical specific compounds as necessary to evaluate use of the material as wetland surface material in accordance with the methodology set forth in EPA, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, (SW-846), Third Edition of SW-846, as updated by Updates I, II, IIA, IIB, III, IIIA and IIIB, including: metals using EPA Methods 6000/7000 series, organochlorine pesticides using EPA 8081B, for polychlorinated biphenyls (PCBs) by 8082A, for polynuclear aromatic hydrocarbons (PNAs) using EPA Method 8270, Selective Ion Monitoring, acid/base neutrals or semivolatile organic compounds (SVOCs) by EPA Method 8270C. Analytical results for chemical specific compounds shall be reported in dry weight. Bioassay testing shall be conducted in accordance with American Standard of Test Materials (ASTM) guidance 1994a,b,c,d,e,f where such guidance does

not conflict with the Inland Testing Manual, Public Notice 99-3, or Public Notice 99-4. Soil samples may also be collected for physical parameters in accordance with the methodologies set forth in ASTM guidance.

6.4.1 Method Detection Limits

The method detection limit (MDL) is the lowest concentration at which a particular analyte can be measured and reported with a 99 percent confidence that the analyte concentration is greater than zero. MDLs for each target analyte will be determined by the analytical laboratory using the applicable SW-846 protocol or the method specified in *40 Code of Federal Regulations (CFR) Part 136, Appendix B.* The laboratory then develops individual Reporting Limits (RLs) which represent concentration levels that can be consistently obtained by the specified method, and are generally two to five time the applicable MDLs. Unless infeasible, the RLs for data submitted by analytical laboratories shall be below the screening levels provided in Table 2.

6.4.2 Accuracy

Accuracy is a measurement of the bias in a system. Accuracy will be assessed through the evaluation of the percent recoveries associated with laboratory control samples, and matrix spikes. Accuracy is generally expressed as percent recovery (%R), which is defined as:

$$\%R = 100\% \times \left[\frac{s - U}{C_{sa}} \right]$$

where,
s = measured concentration of spiked aliquot
U = measured concentration of unspiked aliquot
C_{sa} = actual concentration of spike added.

If a standard reference material (SRM) is used instead of or in addition to laboratory control samples, accuracy is defined as:

$$\%R = 100\% \times \left[\frac{C_m}{C_{srm}} \right]$$

where, C_m = measured concentration of SRM in the spiked sample and C_{srm} = actual concentration of SRM.

The degree of accuracy and the recovery of the analyte is dependent on the matrix, method of analysis, and compound being measured. The objective for accuracy is to equal or exceed the accuracy demonstrated for the analytical method for samples of similar matrix and contaminant concentration. Accuracy will be controlled by comparing percent recoveries to the acceptable method-specific tables in SW-846 to make sure it falls within the control limits.

6.4.3 Precision

Precision is a measurement of the reproducibility of data under a specified set of conditions. Precision is a quantitative measure that will assess the variability of a data set in reference to the calculated average value. Precision will be assessed by the evaluation of the day-to-day variances in the laboratory control samples. Precision is a measurement of the reproducibility of data under a specified set of conditions. For this project, precision will be evaluated in conjunction with accuracy for the laboratory control samples. If the accuracy is good, the precision is good. Precision will be determined for matrix effects using the MS/MSD samples. Precision will be expressed as relative percent difference (RPD) or relative standard deviation (RSD).

RPD is defined as:

$$RPD = \frac{(C_1 - C_2) \times 100\ \%}{(C_1 + C_2)/2}$$

where C_1 and C_2 are the larger and smaller of the two duplicate values, respectively.

RSD is defined as:

$$RSD = \frac{s}{y_{mean}} \times 100\%$$

where s = standard deviation and y_{mean} = mean of replicate analyses.

Acceptable levels of precision vary with the sample matrix, analytical method, and sample concentration and are provided on a per-method basis in SW-846.

6.5 Project schedule

Activity	Anticipated Date of Initiation	Anticipated Date of Completion	Deliverable	Deliverable Due Date

Start Project	7/1/2007	12/1/2010	Quarterly progress reports	Prior to end of the following quarter
Final Report	1/1/11	2/1/11	Final Report	By 90-days following project completion

6.6 Geographical setting

Inner Bair Island is located in Redwood City, San Mateo County, California. The borrow sites will be located throughout the Bay Area.

7.0 REFERENCES

ASTM. 1994a. *Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediment for Toxicological Testing.* Method E1391-90. In: Annual Book of ASTM Standards, Water and Environmental Technology, Volume 11.04. American Society for Testing and Materials, Philadelphia, PA.

ASTM. 1994b. *Standard Guide for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians.* Method E 729-88. In: Annual Book of ASTM Standards, Water and Environmental Technology, Volume 11.04. American Society for Testing and Materials, Philadelphia, PA.

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USEPA. 1986. *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods* (SW-846). Third Edition of SW-846 with Update I (pages dated September 1992), Update IIA (pages dated August 1993), Update II (pages dated September 1994), Update IIB (pages dated January 1995), Update III (pages dated December 1996), Update IIIa (pages dated April 1998), and Update IIIb (pages dated November 2004).