California Regional Water Quality Control Board
San Francisco Bay Region

Order No. R2-2008-0078
Waste Discharge Requirements and Water Quality Certification for

U.S. Fish and Wildlife Service and
California Department of Fish and Game
South Bay Salt Pond Restoration Project (SBSPRP), Phase I

Findings

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

Purpose of the Order

1. The U.S. Fish & Wildlife Service (FWS) and the California Department of Fish & Game (DFG), hereafter jointly and independently referred to as the Discharger, are currently regulated by Waste Discharge Requirements (WDRs) Order No. R2-2004-0018 (Initial Stewardship Plan (ISP)). The Discharger has applied for reissuance of WDRs to implement Phase I of the South Bay Salt Pond Restoration Project (SBSPRP) by submitting a Report of Waste Discharge/Application for 401 Certification on March 12, 2008. The Project covered by this Order includes:

   I. New tidal marsh restoration or management of approximately 3,069 acres of former salt ponds referred to as "Phase I" of the 15,100-acre complex;

   II. Ongoing management of ponds in accordance with the ISP as permitted by Order No. R2-2004-0018, which will be rescinded upon adoption of this Order (see Provision E.1); and

   III. Ongoing operation and maintenance.[1]

2. The Project's goal is to restore and enhance native wildlife habitats and wetlands, maintain or improve flood protection, and provide wildlife-oriented public access and recreation. The Project is needed because approximately ninety percent of the original marsh ecosystems around San Francisco Bay have been lost.

3. Under the ISP, the Discharger released low salinity pond waters from former salt ponds to the Bay and operated and maintained ponds while it developed a restoration plan. This Order covers the first phase of restoration that will involve 3,069 acres of the 15,100 acres. Future

[1] Operation and Maintenance similar to operation and maintenance of the salt ponds performed by Cargill Inc., under Water Board Resolution No. 95-115.

phases will come before this Board for approval. Adaptive management is an important component of the SBSPRP (see Findings 90-92) and will allow information learned from earlier phases of the SBSPRP to be incorporated into later ones.

4. The future ratio of tidal marsh to managed ponds will be between 50:50 and 90:10. These two endpoints represent the two alternatives that were evaluated for this project under the California Environmental Quality Act (CEQA). The variability between projected ratios of tidal marsh to managed ponds is significant because it is uncertain what percentage of managed ponds is necessary to provide habitat for shorebirds and waterfowl, and whether managed ponds can be reconfigured to protect water quality.

Site Location and Description of entire 15,100-acre SBSPRP

5. The overall 15,100-acre SBSPRP is located in South San Francisco Bay and consists of three former salt pond complexes and adjacent habitats: the Alviso Ponds, Ravenswood Ponds, and Eden Landing Ponds, as shown on Figure 1. The SBSPRP will be implemented in a number of phases taking place over many years, on the order of several decades.

Discharger

6. FWS owns and manages the 8,000-acre Alviso pond complex and the 1,600-acre Ravenswood pond complex, and DFG owns and manages the 5,500-acre Eden Landing pond complex. The Alviso pond complex consists of 25 ponds on the shores of the South Bay in the towns of Fremont, San Jose, Sunnyvale and Mountain View, within Santa Clara and Alameda Counties. The Ravenswood pond complex consists of seven ponds on the bay side of the San Mateo Peninsula. The Eden Landing pond complex consists of 23 ponds on the shores of the East Bay, west of Hayward and Union City in Alameda County. Each agency is responsible for the acreage it owns and not that of the other agency.

Regulatory Background of the SBSPRP: Initial Stewardship Plan (ISP)

7. In 2003, the Discharger purchased 15,100 acres of salt ponds from Cargill Incorporated in South San Francisco Bay. In 2004, this Board issued WDRs Order No. R2-2004-0018 to the Discharger to release low salinity waters from these ponds to waters of the State in order to prepare them for future restoration. As part of those WDRs, the Discharger developed an ISP to operate and maintain ponds within the Alviso, Ravenswood, and Eden Landing complexes before restoration. The ISP indicated that planning and design for long-term restoration would take about five years, and that additional time would be required for implementation. Objectives of the ISP include: (a) to cease commercial salt operations, (b) to introduce tidal hydrology, (c) to maintain existing wildlife habitat, (d) to facilitate long-term restoration, (e) to minimize management costs, and (f) to meet water quality standards.

8. This Order is organized into three sections: Phase I Marsh Restoration and Pond Management; Management of Ponds Under the Initial Stewardship; and Ongoing Operation and Maintenance. The Findings are followed by Prohibitions, Specifications, Receiving Water Limitations, and Provisions. Attachments include Figures, Supplemental Tables, the

Adaptive Management Plan, the Water Quality Self Monitoring Plan, the Landscape and Habitat Monitoring Plan, and Standard Provisions and Reporting Requirements.

I. Phase I Marsh Restoration & Pond Management

Site Location & Description of Phase I Activities of the SBSPRP

9. The 3,069-acre Phase I actions of the SBSPRP will include tidal habitat restoration, pond reconfiguration, and recreation/public access actions, as well as monitoring activities and applied studies in six different ponds, or pond systems, across the three pond complexes (see Figure 2). The proposed Phase I actions will restore a mosaic of habitats, including tidal brackish and salt marsh, tidal mudflat, salt panne, subtidal flats and channels, sloughs, ponds, marsh ecotones, upland transition zones, and open water habitats (managed ponds), to support populations of fish and wildlife, special-status species, migratory waterfowl, shorebirds, and anadromous and resident fishes. After implementation of actions authorized by this Order, Phase I target habitats in Ponds A6 and E8A/E9/E8X are expected to develop over 50 years but may take longer.

10. Multiple options for pond reconfiguration and water regime management will be used to enhance and create ponds with a variety of depths (including vegetated pannes, salt flats, very shallow ponded areas, and deep-water areas) and salinities (e.g., ponds with salinity close to Bay water as well as higher salinity brine ponds), and associated levees and islands. The areas of each pond or group of ponds and the predicted target habitats are listed in Table 1.

Table 1. Proposed Phase I Restoration Actions

PHASE I RESTORATION ACTION	ANTICIPATED START OF CONSTRUCTION	TYPE OF RESTORATION	ACREAGE	ANTICIPATED CONSTRUCTION COMPLETION
Alviso Pond Complex (FWS)				
Pond A6	Summer 2010	Tidal habitat	330	2010
Pond A8	Summer 2009	Reversible muted tidal habitat	1,400[1]	2009
Pond A16	Summer 2009	Reconfigured managed pond	242[2]	2011-2012
Ravenswood Pond Complex (FWS)				
Pond SF2	Fall 2008	Reconfigured managed pond	237	2010
Eden Landing Pond Complex (DFG)				
Ponds E8A, E9, and E8X	Summer 2009	Tidal habitat	630	2011
Ponds E12 and E13	Summer 2009	Reconfigured managed pond	230	2012
Total Acreage			**3,069**	

[1] This acreage includes Ponds A5, A7, and A8S, which would be affected by tidal inundation over the low internal levees that separate these ponds from Pond A8.

[2] This acreage does not include Pond A17, which will be operated jointly with Pond A16 to manage water levels within Pond A16; species supported in Pond A17 are not expected to change.

Note: Recreational facilities include: Alviso Pond Complex improvements to the Bay Trail; Ravenswood Pond Complex improvements to Bay Front Park and Pond SF2; and Eden Landing Complex trail construction, kayak launch, and viewing platforms.

11. Adjacent water bodies and ponds affected by Phase I actions include: Mt. Eden Creek; Old Alameda Creek; North Creek; Alviso Slough; Guadalupe Slough; Coyote Creek; and Artesian Slough.

Benefits of Wetland Restoration

12. The proposed project will make a large and valuable contribution to tidal wetland restoration in the San Francisco Bay region, which was recommended by the *Baylands Ecosystem Habitat Goals Report* (1999) and the *Comprehensive Conservation and Management Plan* (1993; updated 2007); both studies encouraged the return of salt ponds to tidal marsh where feasible.

13. Restoring tidal wetland functions to former salt ponds will improve water quality in the South San Francisco Bay Estuary on a spatially significant scale with large contiguous habitat to maximize ecotonal or edge habitat, and minimize non-native vegetation (if appropriate management efforts are taken to control non-native species). Marsh systems that are tidally connected to the estuary improve water quality by filtering and fixing pollutants, in addition to protecting beneficial uses by providing the following: nursery habitat and protection from predation for native fish species, significant biological productivity to the

estuarine system, and habitat for rare and endangered species such as the salt marsh harvest mouse (*Reithrodontomys raviventris*) and the California clapper rail (*Rallus longirostris obsoletus*). Successful SBSPRP restoration would also provide shallow-water habitat for migrating shorebirds and foraging and nesting islands for birds such as Forster's terns, American avocets, Caspian terns, black-necked stilts and snowy plovers. In addition to habitat and water quality benefits, tidal marsh restoration will also help protect communities from floods, storms, and sea level rise.

14. Public access and recreation elements are an important component of the overall restoration strategy. These elements help to educate the public, achieve regional public access and recreation goals (e.g., the Bay Trail), and to build public support for future phases of restoration. The project goals of habitat creation and public access are being carefully balanced, and an adaptive management approach is being implemented, to ensure that public access does not significantly affect the habitat goals of the project.

15. The SBSPRP area can be divided into four general habitat types covering a total of 15,100 acres. The habitat types in Table 2 present the resulting acres of each habitat type after implementation of the proposed Phase I actions in 3,069 acres of salt ponds. The net benefit is an increase in tidal marsh, muted tidal, and reconfigured managed pond habitats, and a corresponding decrease in salt ponds. The Phase I restoration actions will provide approximately 2,360 acres of tidal habitat (including approximately 1,400 acres of reversible muted tidal habitat) and 709 acres of reconfigured managed ponds.

Table 2. Existing Habitats in the SBSPRP Area and Proposed Habitat Changes from Phase I

Habitat Type	Pond Complex	Existing Habitats	Phase 1 Future Habitats	Net Changes as a Result of Phase I
Former Salt Ponds	Alviso	7,360	5,388	
	Ravenswood	1,440	1,203	
	Eden Landing	4,420	3,560	
	Subtotal:	**13,220**	**10,151**	**-3,069**
Tidal Marsh Habitat	Alviso	1,230	1,560	
	Ravenswood	50	50	
	Eden Landing	600	1,230	
	Subtotal:	**1,880**	**2,840**	**+960**
Reversible Muted Tidal Habitat	Alviso	0	1,400	
	Ravenswood	0	0	
	Eden Landing	0	0	
	Subtotal:	**0**	**1,400**	**+1,400**
Reconfigured Managed Ponds	Alviso	0	242	
	Ravenswood	0	237	
	Eden Landing	0	230	
	Subtotal:	**0**	**709**	**+709**
	TOTAL	**15,100**	**15,100**	**0**

Current Regulatory Status of Wetlands in the SBSPRP

16. *Existing wetlands.* Existing wetlands and other waters of the State will be impacted by Phase I dredge and fill activities. Table 3 below summarizes the Phase I impacts to existing wetlands in the six Phase I action ponds. Since temporary disturbances will not last more than a few months, only 256 acres of permanent impacts are counted in the total 3,069-acre area, leaving an estimated 2,814 acres restored or managed for wildlife after Phase I is completed in 50 years. No compensatory mitigation is required for impacts to existing wetlands and waters of the State, since this restoration project will result in many more acres of restored and enhanced habitats than the acres of habitat that are impacted.

Table 3. Summary of Dredge and Fill Information for Phase I of the SBSPRP

POND/POND SYSTEM	TEMPORARY DISTURBANCE AREA (ACRES) (EXCLUDED FROM TOTAL)	DREDGE AREA (ACRES)	FILL AREA (ACRES)	PERMANENT IMPACTS (= DREDGE + FILL ACRES)	POND SIZE (ACRES)	ACRES RESTORED OR IMPROVED FOR WILDLIFE
A6	1.74	1.98	3.21	5.2	330	325
A8	0.15	0.81	0.11	0.92	1,400	1,399

A16	22.2	110	35.2	145.2	242	97
SF2	18.2	55.7	21.4	77.1	237	160
E8A/E8X/E9	242	2.88	5.49	8.37	630	622
E12/E13	4.72	9.92	8.98	18.9	230	211
Total	289	181	74	256	3,069	**2,814**

Note: Permanent impacts are calculated as dredge plus fill acres. Temporary disturbance is not counted as a permanent impact. The fill area for Ponds A16 and SF2 includes areas where fill will be used for the construction of nesting islands.

17. The U.S. Army Corps of Engineers (Corps), as the federal regulatory agency implementing the Clean Water Act (CWA), is expected to issue a CWA Section 404 permit after the Water Board has adopted this combined WDR/CWA 401 Certification. The Corps initiated an Endangered Species Act, Section 7 consultation with FWS and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). Biological Opinions from both agencies are pending. After their release, assuming that, with the implementation of the Terms and Conditions and the Reasonable and Prudent Measures, the Project will not jeopardize the continued existence of species listed under the federal Endangered Species Act, the Water Board will approve the final SBSPR Monitoring Plan.

18. 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. BCDC is expected to take an action after adoption of this Order.

Related Studies and Projects in South San Francisco Bay

19. Since the mid-1990's, many projects and studies have been conducted to support the large-scale SBSPRP and the Phase I activities (see http://www.southbayrestoration.org/Documents.html).

20. The SBSPRP is also coordinating with several other restoration or environmental projects in the South Bay, including the Corps' South San Francisco Bay Shoreline Study, the San Francisco Estuary Invasive Spartina Project, the Eden Landing Ecological Reserve Restoration Project, the Lower Guadalupe River Flood Protection Project, the Alviso Slough Restoration Project, and the Bair Island Restoration Project.

General Phase I Construction Activities

21. Restoring former salt ponds to tidal marsh habitat, re-configuring ponds for wildlife habitat, and providing recreational facilities will involve the following construction activities:

    Tidal Restoration. Construction activities involved in the proposed tidal habitat restoration include the following. These activities apply only to ponds where restoration is actively occurring:

- Breach sections of outboard levees.
- Lower sections of outboard levees.
- Breach internal levees.
- Excavate pilot channels to sloughs through the fringe marsh outboard of outboard levee breaches or dredge lock access to allow for marine access.
- Construct ditch blocks in the perimeter and internal borrow ditches with material excavated from the levee breaches and lowered levees, or from other clean sediment.
- Import sediment (according to Specifications B.1 and B.2).
- Side-cast of dredge spoils into adjacent marsh.
- Excavate portions of outboard sloughs, if necessary to enlarge the channel and obtain borrow ditch block material.
- Construct marsh ponds/pannes by constructing shallow depressions in pond bottoms prior to restoration of tidal action, or along the tops of lowered internal levees.
- Remove or abandon existing water control structures.
- Reconfigure culvert connections.
- Break up gypsum layer in some pond bottoms by mechanical means.

Managed Ponds. Construction activities involved in reconfiguring managed ponds include the following:

- Install, replace, or modify intake/outlet water control structures with tide gates.
- Install fish screens on outboard intake/outlet water control structures as appropriate.
- Construct low berms to divide a given pond into multiple cells.
- Install water control structures, such as flashboard weirs, in internal berms to regulate flow among cells. Installation of water control structures will most likely require the construction of cofferdams using sheet piles on the internal side of the levee to dewater the construction area, as needed.
- Construct intake and outlet canals to convey water among individual cells.
- Construct internal islands for nesting, roosting, and foraging using fill material excavated from the windward side of the islands.
- Grade pond bottoms to achieve desired grades and elevations.
- Improve, raise, and extend levees between managed ponds and existing or restored marshes as necessary to prevent tidal inundation of managed ponds.
- Install or operate pumps as necessary.
- Excavate pilot channels to the Bay through the fringe marsh outboard of new water control structures to allow for marine access.
- Improve levees around ponds to improve maintenance access.

Recreational Elements. Construction activities involved in installing or upgrading public access and recreation elements include the following:

- Upgrade the existing Bay Trail.
- Construct viewing platforms and interpretive stations.

- Upgrade the portions of trails that follow existing levees to provide a minimum width of 6 to 8 feet (ft) of compacted earth and allow multi-use, excluding equestrians.
- The interpretive stations will include elements such as a view portal, educational symbols, and storyboarding. They will be constructed of a combination of wood and steel and will be sized based on the site location.
- A kayak/boat launch will be constructed approximately 8 to 10 ft wide and 20 ft long to accommodate non-motorized small boats (e.g., kayaks and canoes) and small motorized craft for use in hunting.
- Install Americans with Disabilities Act (ADA)-compliant features for all trails as soon as possible. Currently, Phase I action ADA-compliant features include the trail to the Oliver Salt Works interpretative area and all Ravenswood area recreational features. ADA-compliant features will be added to the Shoreline Trail and loop trail (Eden Landing), the Moffett Bay Trail, and the A16 viewing platform at a later date (these actions are not covered under Phase I actions).

22. **Sources of Material – Sources of fill for Phase I actions** will include material excavated from on-site breaches, borrow ditches, and levees. Fill material that is imported to any of the SBSPRP sites, consisting of either dredged sediments or upland soil, shall be determined to be acceptable for use in the SBSPRP based on criteria approved by Water Board staff, per Specifications B.1 and B.2 and Provisions E.41 and E.43. If upland material is imported, the Discharger must submit a Quality Assurance Program Plan for sampling and analysis that includes proposed acceptance criteria and which is acceptable to the Executive Officer.

Specific Phase I Activities

23. General descriptions of each of the planned pond habitats are provided below and details of construction, equipment, and personnel for these actions are summarized in Attachment B(i), Table B-1.

POND A6 TIDAL HABITAT RESTORATION

24. Alviso Pond A6 will be restored to tidal action to ultimately create approximately 330 acres of tidal salt marsh and tidal channel habitat through levee breaching, levee lowering, pilot channel excavation to the sloughs, and the installation of borrow ditch blocks (Figure 3 and Attachment B, Table B-2). The habitat will evolve over time through natural tidal processes. Pond A6 restoration will not include recreation, public access, or flood control features. Restoration construction is expected to last 2 to 4 months within 1 year or season. Restoration will not occur in Pond A6 until the nearby occurrence of invasive cordgrass is treated to prevent its spread. It is expected that treatments will occur in 2008 and 2009 consistent with the "best practices" developed jointly between the Discharger and the Invasive Spartina Project. As Pond A6 is dry and subsided, Bay waters will flow into this pond when the Discharger reconnects it to the Bay, and, therefore, there will not be a discharge of highly saline waters from this pond.

POND A8 REVERSIBLE MUTED TIDAL HABITAT CONVERSION

25. Implementation of Phase I actions at Pond A8 will introduce muted tidal action to create approximately 1,400 acres of shallow subtidal habitat in Ponds A5, A7, and A8 through the construction of a 40-ft notch at the southern end of Pond A8, and modified management of existing water control structures on Ponds A5 and A7 (Figure 4 and Attachment B, Table B-3). To facilitate tidal exchange, the Project will excavate an approximately 475-foot-long pilot channel through the fringe marsh of Alviso Slough, immediately outboard of the armored notch. The top width of the constructed pilot channel will be over-excavated to approximately 130 feet to minimize erosion. The depth of the pilot channel will extend through the erosion-resistant vegetation and root mass to approximately 9 feet below existing grade. Restoration of tidal action to Pond A8 is designed to be reversible. In the event that unacceptable ecological impacts begin to occur, tidal exchange to Pond A8 can be eliminated to prevent long-term adverse impacts. Water management at Ponds A5, A7 and A8 would then revert to the current Initial Stewardship Plan (ISP) operations. Water exchange will be limited and tidal range within the three ponds will be muted during the dry summer and fall months. Even with the fully open 'notch', water level fluctuations in these three ponds will be small relative to fully tidal habitats; over a tidal cycle, water levels in Ponds A5, A7, and A8 will vary by approximately 0.5 ft compared to the greater than 8-ft tide range in Alviso Slough. Water levels in Pond A8 (409 acres) will exceed elevations of internal levees and spill into adjacent Ponds A8S, A5 and A7 (1,023 acres) and modify the existing hydrologic regime in these ponds as well. Water levels will fluctuate over the tidal cycle evenly across the area of all the ponds, but depths will vary due to differences in bed elevations. Depths will exceed those at which the ponds are presently managed (<1 ft) over the majority of the 1,400 acres most of the time.

26. Prior to implementation of Phase I actions at Pond A8, water depths in other ponds will be lowered to replace the loss of shallow water foraging habitat presently offered in Ponds A5 and A7 (possible candidate ponds include: Ponds A1 and A2W; A9, A11 and A12; AB1 and AB2; and A3N). Compared to water discharges through culverts fitted with flap gates, the two-way (ebb and flood) flows across the open notch will minimize the potential for fish trapping inside the pond. During periods when Pond A8 is subject to muted tidal action, flow across the notch will not be obstructed by gates or other structural elements. Partial restoration of tidal prism in these ponds will promote channel scour and increase salinity along Alviso Slough. The expected potential increases in channel width and salinity, and likely increase in salt marsh dominated vegetation over the existing freshwater marsh dominated vegetation will help improve navigation access in a sustainable fashion. Exchange between Pond A8 and Alviso Slough will be managed as needed during the wet season to maintain flood storage capacity presently offered by the ponds and avoid anadromous fish trapping by eliminating tidal exchange during this period. Initially, tidal exchange during the summer and fall months will be limited by opening only one of the several 'bays' in the armored notch. Additional bays would be opened subsequently if monitoring confirms that tidal scour does not threaten to erode downstream levees. Restoration construction is expected to last approximately 6 months within 1 year/season.

POND A16 RECONFIGURATION, VIEWING PLATFORM, AND INTERPRETIVE DISPLAY

27. The Pond A16 managed pond will be reconfigured to create islands for nesting birds and shallow water habitat for shorebird foraging (Figure 5 and Attachment B, Table B-4). The Pond A16 Phase I action will create 242 acres of high quality nesting and shallow water foraging habitat for shorebirds. It is important to note that the reconfigured, managed pond habitat of the type proposed for Pond A16 restoration, a high density of bird nesting islands interspersed with shallow water foraging habitat, is a large-scale experiment. The Alviso Pond A16 managed pond will be reconfigured to create 50 islands for nesting birds and shallow water habitat for shorebird foraging via the installation of 3 new water control structures, excavation of pilot channels to Coyote Creek and Artesian Slough, development of an internal water circulation system using a series of berms and water control structures such as flashboard weirs, and the construction of the nesting islands. As in the ISP, water will be introduced into Pond A16 from A17. The intakes into Pond A17 from Coyote Creek will be screened to exclude anadromous fish. In addition, a viewing platform and interpretive station will be constructed at Pond A16. Restoration construction is expected to occur over 2 seasons within a 24 month period.

STEVENS CREEK TO SUNNYVALE BAY TRAIL SPINE

28. The 2.25-mile Stevens Creek to Sunnyvale Bay Trail Spine will be an integral spine connection in the Association of Bay Area Government's (ABAG) Bay Trail project, a partially constructed 500-mile recreational "ring around the Bay." The spine trail will ultimately be designed in accordance with ABAG Bay Trail Design Guidelines that require a two-way, multi-use trail 10 to 12 ft in width and paved with asphalt, with 2-ft dirt shoulders on either side. The proposed trail will provide year-round access for pedestrians and bicyclists and other users and will meet Caltrans Class I bikeway standards. In the longer term, this alignment will include a flood protection levee. The Bay Trail will then be retrofitted and incorporated into the design of the levee. As this may take many years, this segment of Bay Trail will be opened for immediate access to this part of the Project area, using the existing levee until a more permanent segment can be constructed.

    No significant construction activities are proposed for this trail as part of Phase I. Rather, the existing levee, which is currently not accessible to the public, will be opened to public use with minor amenities added. Future improvements to the trail to meet Caltrans Class I trail standards will be the subject of a future Biological Assessment tiered to the Programmatic action.

POND SF2 RECONFIGURATION, VIEWING PLATFORM, INTERPRETIVE STATION, AND TRAIL UPGRADES

29. Ravenswood Pond SF2 will be reconfigured to create 237 acres of high quality nesting and shallow water foraging habitat for shorebirds. It is a large-scale experiment similar to Pond A16. Water levels will be managed via the installation of 2 new water control structures, excavation of pilot channels through the fringe marsh outboard of the new water control structures, development of an internal water circulation system using a series of berms and water control structures such as flashboard weirs, and the construction of 36 nesting islands

(Figure 6 and Attachment B, Table B-5). Three cells would be created; the two eastern cells would be reconfigured to create nesting islands for birds and shallow water habitat for shorebird foraging. The third, western cell would be managed to provide snowy plover habitat similar to existing conditions. In addition, 2 viewing platforms and interpretive stations will be constructed, and portions of the existing trail along Pond SF2 will be upgraded. Restoration construction is expected to occur over 2 seasons within a 24 month period. As Pond SF2 is dry, Bay waters will flow into this pond when the Discharger reconnects it to the Bay, and, therefore, there will not be a discharge of highly saline waters from this pond.

BAYFRONT PARK VIEWING PLATFORM

30. The viewing platform at Bayfront Park will be constructed in partnership with the City of Menlo Park and will be located at one of the high points in the Park that provides a vantage point to view Greco Island as it meets Pond R4 (Figure 2). Currently the Park contains many trails, but signage along existing trails will direct visitors to an at-grade viewing platform and interpretive station to describe the process of creating a functioning tidal marsh at Pond R4 such as is seen at Greco Island. Phase I actions at Bayfront Park will only require the construction of an interpretive station at a high point at Bayfront Park, well away from the edge of the salt marsh surrounding the park.

PONDS E8A, E8X, AND E9 TIDAL HABITAT RESTORATION

31. Eden Landing Ponds E8A/E8X/E9 will be restored to tidal action to create tidal salt marsh and tidal channel habitat through levee breaching, excavation of pilot channels through the fringe marsh outboard of certain levee breaches, levee lowering, and the installation of borrow ditch blocks to create 630 acres of restored tidal marsh habitat (Figure 7 and Attachment B, Table B-6). As with Pond A6, the habitat evolution will occur gradually over time through natural tidal processes. The restoration is designed to maintain or improve existing levels of flood protection in Old Alameda Creek. Restoration of these ponds may be phased, with Pond E8A being restored first, followed (possibly one or more years later) by E9; Pond E8X may be restored to tidal action along with either E8A or E9. Restoration construction is expected to occur over 2 seasons within a 24 month period.

PONDS E12 AND E13 RECONFIGURATION, INTERPRETIVE STATION, AND TRAILS

32. Phase I activities include the reconfiguration and management of Ponds E12 and E13 as a small-scale salt pond system to create 230 acres of high quality shallow water foraging areas at varying salinities and 6 constructed nesting islands (Figure 8 and Attachment B, Table B-7). This will include the replacement of an existing pump, installation of three new water control structures for intake and discharge, development of an internal water circulation system using a series of berms and flashboard weirs, and the construction of nesting islands. Ponds E12 and E13 will be reconfigured to create shallow water foraging habitat for migratory shorebirds, with a range of salinities, and a limited number of islands for nesting bird habitat. Activities at Ponds E12 and E13 will test the extent to which focused management of shallow water habitats can increase migratory shorebird densities and the

importance of salinity on the density of foraging shorebirds and their prey as applied studies. Activities at these ponds will also evaluate techniques for vegetation management, predator management, and water and salinity management.

MT. EDEN CREEK VIEWING PLATFORM, BOAT LAUNCH, INTERPRETIVE STATION, AND TRAIL

33. A trail will be constructed along the existing levee on the south side of Mt. Eden Creek (Figure 2). This trail will be 6 to 8 ft wide on an existing managed pond levee, and will have a firm and stable, hardened surfacing for public access. The nearby staging area will support 58 motor vehicles and is being built as part of the restoration plan for the northern 835 acres of the Eden Landing Ecological Reserve (ELER), a separate action currently underway. A kayak/boat launch located north of Pond E12 and on the north side of Mt. Eden Creek, will be accessible year-round from the existing levee road that leads from the staging area to the Mt. Eden Bridge. The launch will accommodate non-motorized small boats (e.g., kayaks and canoes). Additionally, this area can be used to launch small motorized boats for management and monitoring activities and for recreational waterfowl hunting access to certain designated areas of the pond complex. Mt. Eden Creek is currently being restored under a separate action such that kayakers can travel 2.5 miles from the launch point to the Bay. Other amenities at the launch/staging area will include seating areas. A viewing platform, seating, and an interpretive station will be located on the south side of Mt. Eden Creek.

34. A total of 5 miles of new trails will be constructed along existing levees as part of the Phase I public access plan at Eden Landing. New trails will have firm and stable, hardened surfacing to allow for hikers and cyclists, and ADA compliant features will be installed as funding allows. Currently the managed pond levees provide firm and compacted surfaces so paving will not be required. The trails will be open to the public. Post and cable fencing may be required along certain portions of the trails to prevent human disturbance to adjacent habitat areas.

35. The historic Oliver Salt Works currently consists of remnants of the old salt production / harvesting-related facilities (e.g., pilings, foundations). Under the proposed Phase I actions, the salt works will be accessible to the public by the new trail, and will be open year-round. An interpretive station will be designed to tell the history of the salt works at this location, explain how salt is produced, and explain the salt works' cultural, economical, and social linkage to the greater San Francisco Bay Area. Restoration construction is expected to last 3 to 5 months within 2 years/seasons.

II. Management of Ponds Under the Initial Stewardship Plan (ISP)

ISP Activities Since 2004

36. Since 2004, the ponds within the SBSPRP area have been managed by the Discharger to provide habitat values while the long-term restoration plan is being developed. During ISP implementation, Bay waters have continued to be circulated through water control structures and existing levees have been maintained for minimum flood protection. Additionally, some

ponds have been managed for bird or other wildlife habitat as seasonal ponds, which fill with rain water in the winter, and which dry through evaporation in the summer months. Finally, other ponds have been operated as high salinity ponds. The Island Ponds (Ponds A19, A20 and A21) in the Alviso pond complex were breached to tidal action in March 2006. The detailed design for the restoration was completed by Santa Clara Valley Water District (SCVWD) and included two breaches to Pond A19, one breach to Pond A20, and two breaches to Pond A21. All breaches were on the south side of the ponds, connecting the ponds to Coyote Creek (FWS and SCVWD 2006).

37. Phase I restoration actions will directly impact the design and management of Ponds A6, A8, A16, SF2, E8A, E8X, E9, E12, and E13. This Order also continues to permit the Discharger to operate the remaining ponds under the management protocols that were authorized under the ISP. Most of the remaining ponds are managed to maintain open water conditions. Without the introduction of Bay water, these ponds would dry down during the summer and become seasonal ponds in the winter, which would significantly reduce open water habitat. Operating former salt ponds as managed ponds is considered by the Board to be a transitional phase between salt-making and restoration. This transitional lagoon management phase for most of the former salt ponds benefits the environment in the near term by providing shallow open water habitat for shorebirds, thus avoiding the consequences of operating them as seasonal ponds (See Finding 88).

38. While this lagoon management phase benefits the environment by providing habitat, it has posed challenges for water quality, particularly dissolved oxygen, due to algae proliferation in the ponds during the summer when the days get longer and hotter. The water quality impacts associated with operating former salt ponds as managed ponds could be overcome by opening the ponds to unrestricted tidal action. However, at this time, there are constraints that prevent the Discharger from moving more aggressively in this direction. First, the Discharger needs to ensure that flood control structures are built between the ponds and developed lands before it can consider opening much of the Project Area ponds to tidal action. Additionally, the Alviso ponds are subsided, so the Discharger needs to phase tidal restoration to ensure that sediment accretion in these ponds will not result in a corresponding erosion of nearby mudflats. At this time, natural processes (e.g., windy conditions) resuspend sediment from mudflats, creating high sediment concentrations in the water column that are subsequently redeposited on the mudflats, when the water column becomes more quiescent. If the Discharger does not carefully phase the restoration of salt ponds to tidal action, additional flow into the salt ponds could result in the transport, and subsequent deposition, of much of the sediment into former salt ponds, instead of to mudflats. Finally, because former salt ponds provide bird habitat, the Discharger needs to carefully transition pond systems from managed to tidal while ensuring that existing shorebird and waterfowl habitat is not adversely affected. This Order requires that, through applied studies and adaptive management, the Discharger address the above constraints. In other words, the Discharger needs to maximize restoration of former salt ponds to tidal marsh, but must do so in a phased approach for biological reasons (i.e., maintaining bird habitat).

39. Findings 41 to 50 describe each pond system in more detail. The purpose of these findings is to (a) illustrate how flow will be routed in the Alviso and Eden Landing Pond Systems, (b) document the dimensions of individual pond systems, and (c) illustrate the time it will take Bay water to circulate through pond systems that operate under directional flow. The residence time of pond systems is important because stagnant waters (i.e., ponds with long residence times) are more likely to experience water quality problems, such as low dissolved oxygen levels, due to excessive algal growth. While the residence times indicated in Tables 4 through 8 reflect averages and will likely change based on management practices implemented by the Discharger, they do illustrate the significant lag time and subsequent management constraints involved in improving dissolved oxygen levels by flow management alone.

Alviso Complex

40. The findings below describe how FWS will operate ponds that are affected by Phase I actions and the remaining ponds operating under the ISP. To maximize water circulation patterns within ponds, FWS plans to operate all ponds that are unaffected by Phase I actions as directional systems (as described in the findings below).

41. ***Alviso System A2W***. This system consists of two ponds that will not be affected by Phase I actions. The intake pond A1 receives water at its northwesterly end from Charleston Slough via an existing 60-inch gate structure. From A1 a 72-inch siphon that runs under Mountain View Slough transfers water to A2W. The outlet pond A2W discharges pond water at its northerly end to the Bay through a 48-inch gate structure (Discharge Point A-A2W-1). The table below shows the expected summer hydraulic residence times for this system.

Table 4: Summer Hydraulic Residence Times for Pond System A2W

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
A1	277	1.4	387.8	49	4.0
A2W	429	1.9	815.1	49	8.4
Total	706				12

42. ***Alviso System A3W***. This system consists of five ponds that will not be affected by Phase I actions. The intake pond AB1 receives water from the Bay via a 36-inch gate structure and from a 48-inch culvert. The outlet pond A3W discharges pond water through three 48-inch gates to Guadalupe Slough (Discharge Point A-A3W-1) near the Sunnyvale Water Pollution Control Plant (WPCP) outfall. The normal flow in this system follows two routes. One route is from AB1 to A2E to A3W. The second route is from AB1 to AB2 and then to A3W. This system also includes pond A3N, which operates as a seasonal pond. The table below shows the expected summer hydraulic residence times for this system.

Table 5: Range of Summer Hydraulic Residence Times for Pond System A3W

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
AB1	142	1.2	170.4	21 to 62	1.4 to 4.1
AB2	170	1.0	170.0	21 to 62[1]	6.7 to 19.7
A2E	310	2.1	651		
A3W	560	1.8	1008	21 to 62	8.2 to 24.2
Total	1182[2]				16 to 48

[1] In this table, the outlet flow for AB2 and A2E is a summation as these ponds operate in parallel. To estimate the hydraulic residence time of the system, Ponds AB2 and A2E were assumed to have equal residence times.

[2] The total area does not include Pond A3N (163 acres) since the Discharger proposes to operate it as a seasonal or batch pond and thus flows to this pond are not expected to be significant.

43. ***Alviso System A7***. This system consists of three ponds. As explained in an earlier finding, these ponds (A5, A7, and A8) will be affected by Phase I restoration actions. Until Phase I actions are implemented, this system will continue to operate as it was under the ISP. Under this scenario, the intake pond A5 receives water from Guadalupe Slough through two 48-inch gate structures. From A5 the Discharger routes water to A7. The outlet pond A7 discharges water through two 48-inch gate structures to Alviso Slough (Discharge Point A-A7-1). Over the past few years, the Discharger has been operating A8 as a seasonal pond to maintain high salinities (between 120 and 150 parts per thousand [ppt]) that favor brine shrimp production. The table below shows the expected summer hydraulic residence times for this system.

Table 6: Range of Summer Hydraulic Residence Times for Pond System A7

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
A5	615	1.0	615	13 to 26	11.9 to 23.9
A7	256	0.9	230.4	13 to 26	4.5 to 8.9
Total	871[1]				16 to 33

[1] The total area does not include Pond A8 (406 acres) since the Discharger operates it as a seasonal or batch pond and thus flows to this pond are not expected to be significant.

44. ***Alviso System A14***. This system consists of seven ponds that will not be affected by Phase I actions. The intake pond A9 receives water from Alviso Slough through two 48-inch gates. The outlet pond A14 discharges water through two 48-inch gate structures into Coyote Creek (Discharge Point A-A14-1). The route of flow through this system is from A9 to A10 to A11 to A14. Over the past few years, the Discharger has operated ponds A12, A13, and A15 as batch ponds to maintain higher salinity levels (between 80 and 120 ppt) for brine shrimp habitat. Because water intakes at A9 have the potential to entrain migrating salmonids, this system cannot intake water from Alviso Slough between December and April. The table below shows the expected summer hydraulic residence times for this system. Since the Discharger plans to close the intake structure at pond A9 during the winter to avoid

entraining migrating salmonids, relatively small flows will discharge from this system in these months.

Table 7: Range of Summer Hydraulic Residence Times for Pond System A14

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
A9	385	2.2	847	22 to 44	9.7 to 19.4
A10	249	2.6	647.6	22 to 44	7.4 to 14.8
A11	263	3.1	815.3	22 to 44	9.3 to 18.7
A14	341	0.9	306.9	22 to 44	3.5 to 7.0
Total	1238[1]				30 to 60

[1] The total area does not include Ponds A12, A13, and A15 (309, 269, and 249 acres) since the Discharger proposes to operate these ponds on a batch basis and thus flows to them are not expected to be significant.

45. ***Alviso System A16***. This consists of two ponds (A17 and A16). As explained in an earlier finding, Pond A16 will be affected by Phase I restoration actions. Once the Discharger implements Phase I actions, Pond A17 will be operated under muted tidal conditions. Until Phase I actions are implemented, this system will continue to operate as it was under the ISP. Under this scenario, A17 intakes water from Coyote Creek through a 48-inch gate. From A17 a 50-foot levee gap transfers water to A16. From A16 a 48-inch gate structure discharges into Artesian Slough (Discharge Point A-A16-1). In this system, both intake and discharge structures include operable gates to close off all flow, allow inflow only, or outflow only. The table below shows the expected hydraulic residence times for this system in the summer. Because the Discharger needs to close the intake structure at pond A17 in the winter (to avoid entraining migrating salmonids) and may use it as an alternative discharge point, only small flows will discharge from this system during these months.

Table 8: Summer Hydraulic Residence Times for Pond System A16

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
A17	131	1.2	157.2	24	3.3
A16	243	1.7	413.1	24	8.7
Total	374				12

46. ***Alviso System A23***. This system consists of two ponds (Ponds A22 and A23) that are owned by FWS. During the ISP, Cargill has managed these ponds as seasonal ponds (intake only, no discharge) to provide snowy plover habitat. This Order does not permit discharges from this pond system to the Bay or tributaries to the Bay since Cargill is expected to continue operating these ponds as seasonal ponds until their transfer to FWS in 2011. After the transfer, the FWS is expected to continue to operate them as seasonal ponds.

Eden Landing Complex

47. The findings below describe how DFG will operate ponds that are affected by Phase I actions and the remaining ponds. The tables presented below describing the Eden Landing Systems do not include estimated residence times because DFG operates all of the Eden Landing systems under muted tidal flows.

48. ***Eden Landing System E2 and E2C***. The E2 system consists of four ponds and the E2C system consists of eight ponds. Neither of these systems will be affected by Phase I actions. In 2005, DFG linked these systems together. The objective of system E2/E2C is to maintain year-round open water habitat in Ponds E1, E2, E6, E5, and E2C and winter open water habitat in all of the ponds (E1, E2, E7, E4, E6, E5, E2C, E1C, E4C, E5C, and E6C). Pond E3C, owned by Cargill, is still part of the E2C system and will be operated as year-round open water habitat until it is decoupled from circulation patterns. In the E2 system, the intake pond E1 receives water from Old Alameda Creek through four 48-inch gates and through a 30,000 gallon per minute (gpm) pump. During the winter months, the inflow from Pond E1 circulates through Ponds E7, E6, E5, E4, and E2 before discharging to the Bay (Discharge Point E-2-10) through two 48-inch gates. In the summer months, DFG intakes water at E-1 and transfers water from E-1 to E-2, while operating E-2 under muted tidal conditions. During the fall, DFG links systems E2 and E2C by routing water from pond E7 to ponds E6 and E5 to makes up for evaporation losses and reduce salinity. DFG operates ponds E6 and E5 as batch ponds. This means that ponds E6 and E5 have low salinity in the spring and DFG allows for evaporation to increase salinity during the summer months. On average, DFG estimates that salinity levels in ponds E6 and E5 will increase from about 30 ppt to 120 ppt between May and November. The high salinity waters in Ponds E6 and E5 are routed, in the winter months, to ponds E4 or E6C and diluted before reaching discharge locations. In the E2C system, DFG operates pond E2C under muted tidal conditions (intake and discharge at the same structure) to the Alameda Flood Control Channel (Discharge Point E-2C-14). DFG operates Ponds E6C, E4C, E5C, and E1C as seasonal ponds. This means that ponds E6C, E4C, E5C, and E1C have open water conditions during the winter months, shallow water conditions in the spring and fall, and dry conditions during the summer months. To moderate salinity levels and improve dissolved oxygen levels in the E2C system, DFG increases intake volumes at E2C and periodically drains intake waters to adjacent seasonal ponds (E5C, E4C, and E1C) to improve turnover of pond system waters. The surface area for ponds in the E2 and E2C systems are shown in the tables below.

Table 9: Surface Area of Pond System E2

Pond	Area (acres)
E1	337
E7	209
E4	175
E2	673
Total	1394

Table 10: Surface Area of Pond System E2C

Pond	Area (acres)
E6	176
E5	159
E6C	78
E4C	175
E3C	153
E2C	24
Total	942

49. ***Eden Landing System E6A***. This system consists of three ponds (E6A, E6B, and E8) and two control ponds (less than one-acre each) that will not be affected by Phase I actions. The ponds in this system are managed seasonally, with varying salinities ranging from low to medium levels. During the summer months, Pond E6A and E6B may be operated as intake ponds with no discharge to maintain breeding habitat and shallow water foraging habitat for the western snowy plover. In other words, during the summer months, DFG operates this system to enhance seasonal ponding via limited intake at E6A. During the fall, DFG would fill the ponds with water so it can operate these ponds as open water habitat during the winter months, with Pond E6A and E6B operating under muted tidal conditions. Pond E8 generally operates as a seasonal pond with intake and flow through to E6B and E6A in the winter. The surface area for ponds in the E6A system is shown in the table below.

Table 11: Surface Area for Pond System E6A

Pond	Area (acres)
E8	180
E6B	284
E6A	340
Total	804

50. ***Eden Landing System E8A***. This system consists of six ponds (Ponds E9, E8A, E8X, E12, E13, and E14) that will be affected by Phase I restoration efforts. Until Phase I actions are implemented, this system will continue to operate as it did under the ISP. Under this scenario, operating conditions change depending on the season. During the summer months, pond E9 operates under muted tidal conditions (i.e., it intakes water through four 48-inch gates from Mount Eden Creek and discharges from one into Mount Eden Creek), while during the winter months, the normal route of flow in this system is from E9 to E8A then to Old Alameda Creek, with supplemental muted tidal discharge from pond E9. Typically, pond E8A will be dry during the summer months with circulation flow occurring in borrow ditches that comprise about 10 percent of its area. Ponds E12, E13, and E14 operate as seasonal ponds (i.e., these ponds are open water during the winter and become dry during the

summer months). Pond E8X is very small and is operated to provide shallow water and mudflat habitat for water birds. The quantity of intake at Pond E9 has improved with the restoration in November 2006 of tidal action to Mt. Eden Creek. The discharge culvert in the northeast corner of Pond E8A also acts as a supplemental intake during the summer when muted tidal intake/discharge operations are used to minimize water quality impacts. To moderate salinity levels and improve dissolved oxygen levels in the E8A system, DFG has increased intake volumes at E9 and periodically drained intake waters to adjacent seasonal ponds (E12, E13, and E14) to improve turnover of pond system waters. The surface area for ponds in the E8A system is shown below.

Table 12: Surface Area for Pond System E8A

Pond	Area (acres)
E9	356
E8A	256
Total	612

51. ***Eden Landing System E11***. This system consists of two ponds (E10 and E11) that will not be affected by Phase I actions. The Discharger operates E10 under muted tidal conditions and E11 as a seasonal pond. The surface area for ponds in the E11 system is shown in the table below.

Table 13: Surface Area for Pond System E11

Pond	Area (acres)
E10	214
E11	118
Total	332

Ravenswood Complex

52. FWS owns the Ravenswood ponds, which are part of the larger Redwood City pond complex. The Ravenswood complex includes five subsystems and seven ponds (R1, R2, R3, R4, R5, S5, and SF2) that comprise about 1,600 acres in San Mateo County. During the ISP, Cargill managed ponds north of Highway 84 (i.e., Ponds 1, 2, 3, 4, 5, and S5) as batch ponds. Because the transfer standard for these ponds has been met, Cargill is expected to transfer operation to FWS within the next year. Initially, FWS plans to operate these ponds as seasonal ponds (intake only, no discharge). In the future, FWS may operate (a) ponds R1, R2, and R3 as muted tidal ponds systems with inlet/outlet structures, and (b) ponds S5, R5, and R4 under directional flow by intaking Bay water through pond S5, then to pond R5, and finally to R4 for discharge to the Bay. In the event that FWS changes the operation of any of the Ravenswood Ponds (with the exception of SF2, which will be affected by Phase I restoration efforts) so that changes will result in discharges to the Bay or tributaries to the

Bay, FWS must document that such discharges will not adversely affect water quality (see Provision E.3).

Overview of Pond Discharges

53. This Order permits discharge from former salt ponds as waters from the South Bay are taken into pond systems and then discharged more-or-less continuously. The main parameters of concern for pond discharges include salinity, metals, dissolved oxygen, pH, and temperature.

54. ***Salinity Levels of Pond Discharges.*** For ponds unaffected by Phase I actions, the Discharger will continue to operate these ponds to limit salinity discharge levels. While the Discharger designed pond systems to ensure that discharged salinity levels remain below 40 ppt, the Discharger modeled the impact on receiving water salinities of discharging salinity levels near 44 ppt, in order to be conservative (for development of Order No. R2-2004-0018). This modeling effort showed that discharging pond waters at salinity levels up to 44 ppt will not cause any significant or potentially significant impacts to any receiving waters.

55. ***Salinity as a Surrogate for Metals***. To ensure that pond waters do not discharge metals at toxic levels, this Order uses salinity as an indicator parameter for the concentrations of metals. Many of the metals present in the ponds are present as inorganic salts. Therefore metals concentrations are anticipated to follow salinity levels. Increases in salinity represent a worst-case scenario for the parallel increase in metals concentrations. In other words, if only evaporation affected metals concentrations, they would increase proportionately with salinity. However, other factors within the ponds, such as biological uptake and adsorption to fine sediments, will reduce metals concentrations. Accordingly, using salinity as a surrogate for metals concentrations should be more protective, as it will only consider evaporation, which is the mechanism by which metals concentrations increase. Besides offering more protection, the use of salinity will give the Discharger immediate feedback on conditions at discharge points and within pond systems, and thereby enable it to implement corrective measures in a timely manner based on monitoring results.

56. ***Metals Concentrations.*** Metals concentrations in the discharge should not exceed applicable water quality objectives, provided that the Discharger operates each pond system to maintain salinities below 44 ppt. The tables below show the estimated maximum metals concentrations associated with an in-pond salinity of 44 ppt. This indicates that, if salinity levels remain below 44 ppt, discharges from the Alviso and Eden Landing Systems will meet water quality objectives for metals.

Table 14: Maximum Salinity and Associated Metals Levels for the Alviso System[1]

Maximum Salin	Cr µg/	Ni µg/	Cu µg	Zn µg/	As µg/	Se µg/	Ag µg	Cd µg	Hg ng	Pb µg/
44 ppt	1.22	8.05	2.98	1.83	10.7	0.4	0.01	0.08	1.8	0.31
WQO[2]	11.4	27	13	86	36	5.0	2.2	0.27	50	3.2

[1] To estimate the maximum metals concentrations from the Alviso System for continuous discharges, Order No. R2-2004-0018 considered an average of Regional Monitoring Program (RMP) data from 1997-1999 at the South Bay Station and salt ponds with salinities of 31.6 and 42 ppt.

[2] The Basin Plan only specifies water quality objectives south of Dumbarton Bridge for copper and nickel. For the other inorganics, water quality objectives are from the California Toxics Rule. Since the Board must express limits for metals in the total recoverable form, Board staff used default translators to convert dissolved water quality objectives to total. The water quality objectives for chromium, cadmium, and lead are freshwater driven and based on a hardness of 100 mg/L as $CaCO_3$, which is the lowest value found in sloughs (in this case Guadalupe Slough) monitored near the discharge in the Regional Monitoring Program.

Table 15: Maximum Salinity and Associated Metals Levels for the Eden Landing System[1]

Maximum Salin	Cr µg/	Ni µg/	Cu µg	Zn µg/	As µg/	Se µg/	Ag µg	Cd µg	Hg ng	Pb µg/
44 ppt	3.67	11.8	4.27	5.48	11.9	0.36	0.02	0.10	16	0.84
WQO[2]	11.4	16.3	4.6	58	36	5.0	2.3	0.27	25	3.2

[1] To estimate the maximum metals concentrations for the Eden Landing System for continuous discharges, Order No. R2-2004-0018 considered an average of RMP data from 1997-1999 at the Dumbarton Bridge Station and salt ponds with salinities of 31.6 and 42 ppt.

[2] These Basin Plan water quality objectives apply to waters north of Dumbarton Bridge except for copper, which is from the California Toxics Rule. This is because the Basin Plan does not specify a saltwater objective for copper. The Discharger performed site-specific translators for copper and nickel. Therefore, the values shown in Table 16 represent site-specific water quality objectives.

57. ***Diurnal Variations in Dissolved Oxygen and pH***. Algal growth in salt ponds can cause dissolved oxygen and pH levels to vary significantly over the course of a day. This is because during daylight hours, photosynthesis will produce oxygen and consume dissolved carbon dioxide. At night, respiration will produce dissolved carbon dioxide and consume oxygen. Therefore, any significant algal growth will cause dissolved oxygen and pH levels to peak during the late afternoon and to be at their lowest levels in pre-dawn. Since implementation of the ISP in 2004, continuous monitoring data within former salt ponds shows that pH levels can vary significantly and are often above the Basin Plan objective of 8.5. However, receiving water data has also shown that high pH levels from pond discharges are quickly normalized in nearby sloughs and the Bay. Continuous monitoring data for dissolved oxygen within former salt ponds has also shown significant variations throughout the day. As described in later findings, the biggest water quality challenge for former salt ponds has been maintaining dissolved oxygen at concentrations that are safe for aquatic life.

58. ***Temperature***. Since implementation of the ISP began in 2004, continuous monitoring data show that discharges from former salt ponds have complied with the Thermal Plan. Due to shallow water depths and limited tidal exchange, water temperature in the salt ponds is elevated and varies widely throughout the day. Annual water temperatures within the ponds generally range from 40 to 80°F and generally track air temperature. The State's Thermal

Plan indicates that discharges shall not exceed the natural temperature of receiving waters by 20°F, and discharges shall not cause temperatures to rise greater than 4°F above the natural temperature of the receiving water at any time or place.

59. ***Migration of Salmonids***. Steelhead trout and Chinook salmon migrate in South Bay sloughs, or slough channels that receive pond discharges. During certain times of the year, Coyote Creek and Alviso Slough may contain steelhead trout and Chinook salmon. The table below describes the upstream and downstream migration periods when former salt ponds have the potential to affect migrating salmonids.

Table 16: Migration Periods for Salmonids

Species	Upstream Migration	Downstream Migration
Steelhead Trout	January-March	March-April
Chinook Salmon	September-November	March-April

While Steelhead Trout and Chinook Salmon migrate primarily downstream in March and April, storm induced migrations can begin as early as December. For this reason, NMFS recommends that the Discharger close intakes on all salmonids creeks and sloughs from December through April. Therefore, this Order requires that, during this period, the Discharger close intake structures at Ponds A9 and A17 unless it installs fish screens. As part of the Phase I action for Pond A16, the Discharger indicates that it plans to install fish screens at Pond A17.

60. ***Adaptive Management to Improve Water Quality.*** Since the ISP was implemented in 2004, the interim management of discharges from former salt ponds has posed challenges for water quality, particularly dissolved oxygen, due to algae proliferation in the ponds when the days get longer and hotter. The Discharger has tried a number of corrective measures to improve oxygen levels. These include switching pond systems from directional flow to muted tidal flow, installing baffles, installing solar-powered aerators, and increasing flows to reduce residence times. While some corrective measures (e.g., baffles, muted tidal flows) appear to have improved discharge dissolved oxygen levels in some pond systems, the use of solar powered aerators and attempts to increase flow through the ponds have not had discernible results because the ponds are too large for existing intake/discharge structures or a few aerators to have a meaningful impact on dissolved oxygen levels at the discharge point.

61. ***Dissolved Oxygen and Within Pond Fish Mortality.*** While both FWS and DFG have experienced difficulty in maintaining adequate dissolved oxygen levels at pond discharge points, the problem, at least with respect to fish mortality, has been more severe for ponds managed by FWS. During the summer months, ponds in the Alviso complex intake more Bay waters, and therefore, more fish than those in the Eden Landing complex. This is because ponds in the Alviso complex are subsided due to historic groundwater pumping. In the past four years, there have been three reported occasions when a severe depletion in

dissolved oxygen levels has led to gulls feeding on oxygen stressed fish (Pond A16) or conditions where low dissolved oxygen levels caused fish mortality (Ponds A1, A5, A7, and A16). In the Eden Landing complex, there are no known reports of fish mortality since implementation of the ISP.

62. ***FWS - Adaptive Management.*** All of the discharge ponds in the Alviso System have, at times, failed to meet the dissolved oxygen limitation prescribed in Order No. R2-2004-0018 at the discharge point. However, the most severe impacts (fish mortality) from low dissolved oxygen have occurred within Ponds A1, A5, A7, and A16. In each of these cases, FWS was implementing a corrective measure to improve dissolved oxygen levels at the discharge point (i.e., muted tidal flows or discharge timing) that would result in reduced circulation patterns within ponds, and therefore, lower within-pond dissolved oxygen levels. To provide a better balance between within-pond water quality and receiving water quality, in 2008, FWS began operating all of its ponds under directional flow to maximize flow through. This operation is intended to reduce stagnant areas in the back portion of ponds, and, therefore, reduce the likelihood of fish mortality.

63. ***FWS - Altering Managed Ponds.*** By operating ponds to minimize the impact of low dissolved oxygen levels on beneficial uses (i.e., balancing within-pond water quality with receiving water quality), FWS recognizes that simple operational changes will not significantly improve discharge water quality with respect to dissolved oxygen. In other words, future adaptive management changes will likely be aimed at altering pond geometry, changing residence times, and/or water depths. To determine how former salt ponds should be modified in the long term, FWS has implemented applied studies at Ponds A3W, A14, and A16.

64. ***DFG - Adaptive Management***. While DFG has experienced low dissolved oxygen levels in former salt ponds, the effect of low dissolved oxygen does not appear to be as significant as that experienced in the Alviso complex. This is because ponds in the Eden Landing complex are at higher elevations, have trouble taking in waters during the summer months, and therefore, are often operated as seasonal ponds. In other words, many of the DFG ponds do not have much water in the summer months when maintaining adequate dissolved oxygen levels is most problematic. To minimize the effect of pond discharges on receiving waters, DFG plans to continue operating ISP ponds under muted tidal conditions. In its larger systems (E8A and E2/E2C), DFG increases pond turnover rates, and thereby optimizes within-pond water quality (in its intake ponds) by routing water from intake ponds to seasonal ponds.

65. ***DFG – Altering Managed Ponds***. While there has been no reported fish mortality in the Eden Landing Ponds, DFG has not shown that managed ponds, as currently designed, are ecologically sustainable. This is because dissolved oxygen levels within ponds do not always comply with Basin Plan objectives. For this reason, DFG has implemented an applied study at Pond E10.

66. ***Regulation of Dissolved Oxygen.*** The Basin Plan's water quality objective for dissolved oxygen is 5.0 mg/L. However, during the implementation of Order No. R2-2004-0018, the Water Board recognized that, without the installation of aerators, it would not be feasible for a well-operated lagoon system to meet an instantaneous dissolved oxygen limitation of 5.0 mg/L. Additionally, it has been noted that sloughs in the South Bay often do not meet the Basin Plan objective of 5.0 mg/L. For this reason, the Discharger has been implementing best management practices if dissolved oxygen levels fall below a 10^{th} percentile of 3.3 mg/L (calculated on a weekly basis) at the point of discharge. This dissolved oxygen trigger was based on levels found in Artesian Slough near Heron Rookery in July 1997. These values are the most relevant representation of natural dissolved oxygen variations in sloughs or lagoon systems currently available. Even using this trigger value as a threshold, the Discharger has repeatedly been implementing corrective measures (e.g., discharge timing, muted tidal flows, and installing baffles) to address low dissolved oxygen levels in pond discharges. In order to improve dissolved oxygen levels in former salt ponds, the Discharger will likely need to implement corrective measures aimed at significantly reducing residence times and/or altering pond geometry.

67. ***Applied Studies.*** To address how the Discharger needs to adaptively manage ponds in the long term, this Order requires that the Discharger continue to implement applied studies. These studies will focus on ponds that may be operated as managed ponds in the long term (e.g., A3W, A14, and E10) and ponds that will be reconfigured (SF2 and A16) under Phase I restoration actions. The purpose of these applied studies is to guide long-term restoration efforts to determine (a) how pond geometry (surface area, depth, filling borrow ditches) should be altered to make managed ponds ecologically sustainable, (b) if the Discharger should move towards a restoration effort that will involve fewer managed ponds and more tidal marsh (especially if managed ponds cannot be reconfigured to become ecologically sustainable), and (c) how to develop a site-specific objective for dissolved oxygen in managed ponds.

III. On-Going Pond Operation & Maintenance

68. On-going maintenance for those ponds that are not specifically modified as a part of Phase I is also a critical element of the project. On-going operations and maintenance of all ponds in the SBSPRP area is included in this Order. Lack of maintenance to the existing levees and water control structures could have flood management and water quality implications if uncontrolled breaches are allowed to happen. The goal of these activities is to maintain the current level of maintenance in order to protect the existing infrastructure and neighboring communities, until specific restoration actions are carefully planned and implemented in subsequent project phases.

69. Waterbodies affected by ongoing operations and maintenance of ponds will include (see Figure 1):

- Eden Landing: Alameda Flood Control Channel, Old Alameda Creek, Mt. Eden Creek, and North Creek (Adjacent Ponds: E1, E1C, E2, E2C, E4, E4C, E5, E5C, E6, E6A, E6B, E6C, E7, E8, E8A, E8X, E9, E10, E11, E12, E13, and E14).

- Ravenswood: Lower South San Francisco Bay and Ravenswood Slough (Adjacent Ponds: R1, R2, R3, R4, R5, S5, and SF2).

- Alviso: Lower South San Francisco Bay, Alviso Slough, Guadalupe Slough, Coyote Creek, and Artesian Slough (Adjacent Ponds: A1, A2W, AB1, A2E, AB2, A3W, A3N, A5, A6, A7, A8, A8S, A9, A10, A11, A12, A13, A14, A15, A16, A17, A19, A20, A21, A22, and A23).

70. Operations, management, and maintenance activities will be performed periodically for all Project facilities, including reconfigured and managed ponds, recreational/public access facilities, and (less frequently) tidal habitat restorations. These operations, management, and maintenance activities are currently being performed in a manner described in the Biological Opinion issued to Cargill (5 July 1995; Reference #1-1-95-F-47). The Discharger has already undertaken the responsibilities for operations, management, and maintenance activities as part of the SBSPRP. Levees, ponds, and water control structures will then be routinely operated and maintained according to a protocol to be outlined in the Biological Opinions, expected summer 2008. Additional operations, management, and maintenance activities are described in Provision E.43 and Table B1.

71. Portable pumps, such as diesel-powered pumps, may be used occasionally for operations and maintenance activities, such as supplementing gravity flows through water control structures or dewatering cells or canals for maintenance.

Laws, Regulations, and Policies

72. Basin Plan: The Porter Cologne Act (Section 13240) authorizes the Water Board to develop a Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) which 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 http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml

73. The Basin Plan includes the following Beneficial Uses for the San Francisco Bay, Santa Clara Basin, South Bay Basin, and Lower San Francisco Bay. Because the salt ponds are hydrologically connected to San Francisco Bay, these Beneficial Uses also apply to the salt ponds:
    - Ocean, Commercial, and Sport Fishing (COMM)
    - Estuarine Habitat (EST)

- Industrial Service Supply (IND)
- Fish Migration (MIG)
- Navigation (NAV)
- Preservation of Rare and Endangered Species (RARE)
- Water Contact Recreation (REC-1)
- Noncontact Water Recreation (REC-2)
- Shellfish Harvesting (SHELL)
- Fish Spawning (SPWN)
- Wildlife Habitat (WILD)

74. This project is consistent with the goals of the following components of the State Wetlands Policy: California Wetlands Conservation Policy (Executive Order W-59-93, signed August 23, 1993), which is incorporated in the Basin Plan, that includes ensuring "no 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 California Water Code (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."

75. The San Francisco *Baylands Ecosystem Habitat Goals* and the *Comprehensive Conservation and Management Plan* (referred to in Finding 12) are regional plans that support the restoration of San Francisco Bay salt ponds to tidal marsh. The Phase I SBSPRP is consistent with the recommendations in those two reports.

76. 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 Water Board and State Water Board need to closely track both losses and mitigation/restoration project success. Therefore, the Water Board requires that the Discharger use a standard form to provide Project information related to impacts and mitigation/restoration measures. An electronic copy of the form and instructions can be downloaded at http://www.waterboards.ca.gov/sanfranciscobay/certs/shtml. Project information concerning impacts and mitigation/restoration will be made available at the web link: http://www.wetlandtracker.org.

CEQA Findings

77. CEQA requires that the effects of projects be analyzed to prevent significant avoidable impacts and to reduce or mitigate unavoidable impacts. All projects approved by State agencies must be in full compliance with CEQA. DFG, as lead agency together with FWS, certified a final environmental impact statement/report (EIS/R) on March 11, 2008, 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 that it is required to approve, and that those proposed project activities, as conditioned and with Monitoring (Attachments D and E) and Adaptive Management (Attachment C), will not have significant adverse impacts on the environment. The lead agency's CEQA Findings are presented below (Findings 78-109).

78. The Environmental Impact Statement/Report (EIS/R) prepared for the SBSPRP includes both programmatic level and Phase I specific impact analysis (EDAW et. al, 2007). Over a 50-year period, the EIS/R found that the benefits from the overall SBSPRP and Phase I projects outweighed adverse environmental impacts, after mitigation and incorporating adaptive management, is taken into account. No mitigation measures were deemed necessary for the potential impacts to hydrology and flood management; geology, soils and seismicity; or biological resources -- all of which were considered to be less than significant or beneficial.

79. The SBSPRP will be implemented in a series of phases over many years, on the order of decades. Each phase will have its own project level CEQA documentation that will tier off of the programmatic EIS/R approved by DFG and FWS. Subsequent phases of the SBSPRP are not covered by these WDRs.

80. Potential water quality impacts, their associated proposed mitigation measures, if applicable, and whether the impact duration is ongoing or only during the construction phase are found in Table 17. The impacts are numbered coincident with the EIS/R where a full impact analysis is provided.

Table 17: Potential Impacts to Water and Sediment Quality Identified in the EIS/R

POTENTIAL IMPACT	PROPOSED MITIGATION MEASURE	DURATION
Impact 3.4-1: Changes in algal abundance and composition, which could in turn degrade water quality by lowering DO and/or promoting the growth of nuisance species	Less than Significant Impact with Adaptive Management*	Ongoing
Impact 3.4-2: Potential to cause localized, seasonally low DO levels as a result of algal blooms, increased microbial activity, or increased residence time of water.	Less than Significant Impact with Adaptive Management*	Ongoing
Impact 3.4-3: Potential to mobilize, transport, and deposit mercury-laden sediments, leading to exceedance of numeric water quality objectives, TMDL allocations, and sediment quality guidelines for total mercury.	Less than Significant Impact with Adaptive Management*	Ongoing
Impact 3.4-4: Potential increase in net methylmercury production and bioaccumulation in the food web.	Less than Significant Impact with Adaptive Management*	Ongoing
Impact 3.4-5: Potential impacts to water quality from other contaminants.	Mitigation Measure 3.4-5a: Stormwater Pollution Prevention Plan.	Construction Phase
	Mitigation Measure 3.4-5b: Selenium Management.	Ongoing

POTENTIAL IMPACT	PROPOSED MITIGATION MEASURE	DURATION
	Mitigation Measure 3.4-5c: Minimizing Illegal Discharge and Dumping.	Ongoing
	Mitigation Measure 3.4-5d: Monitoring sediments to follow existing guidance and comply with emerging regulations.	Construction Phase
	Mitigation Measure 3.4-5e: Urban Runoff Management.	Ongoing
	Mitigation Measure 3.4-5f: Bacteria.	Ongoing
Impact 3.4-6: Potential to cause seawater intrusion of regional groundwater sources.	Mitigation Measure 3.4-6: Well abandonment, monitoring, and communication programs coordinated between the Project proponents (Corps, FWS, and DFG) and ACWD and SCVWD.	Ongoing

*Staircase issue, i.e., an issue used to describe impacts that will be mitigated through Adaptive Management in a step-wise fashion.

Water Quality Issues Under CEQA

81. As stated in Findings 38, 57, 60, 61, 62, and 63, the interim management phase has posed challenges for water quality, particularly dissolved oxygen, due to algae proliferation in the ponds when the days get longer and hotter. In order to provide water quality and ecosystem benefit to offset potential low dissolved oxygen conditions associated with lagoon management, the Discharger must minimize the time-period of operating former salt ponds as managed ponds as they are currently configured.

i) *Mercury Methylation*

82. 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 mercury-contaminated sediments that release mercury in a form that can become biologically available to mercury-methylating bacteria and subsequently bioaccumulate in the food chain. The resulting concentration of methylmercury is dependent on numerous variables, including: redox potential, salinity, pH, vegetation, sulfur (including sulfate derived from gypsum layers in pond bottoms), dissolved organic carbon, nitrogen, and seasonal variations in each of the identified variables.

83. The Water Board's Basin Plan (2006), which includes a TMDL for Mercury[2], states that wetlands may contribute substantially to methylmercury production and subsequent biological exposure to mercury within the Bay. Wetland restoration projects can, therefore, increase levels of methylmercury, and monitoring is a useful tool to evaluate whether this is occurring, and can inform management decisions regarding what types of restoration discourage methylmercury production. Natural sedimentation occurring via sediments brought in by the tides and creeks may also provide a source of mercury that may be methylated in the SBSPRP.

84. Sediments in the Alviso pond complex have considerably higher mercury concentrations than Bay sediments (i.e., about 2 to 10 times the ambient Bay concentration). These concentrations are due to the mercury load that historically entered the Project Area from the Guadalupe River watershed. Breaching levees in this complex has the potential to generate increased levels of methylmercury. The Discharger will minimize increases in methylmercury by monitoring and by implementing its Adaptive Management Plan (see Findings 90-107 and Provisions E.8-E.10).

85. The South Baylands Mercury Project (SBMP), commissioned by the Discharger, has begun gathering baseline data on mercury in biota and characterizing methylmercury in the Alviso Slough area, including Alviso Pond A8. One of the main purposes of this Phase I action is to assess if there is any significant change in methylmercury bioaccumulation in and around Pond A8 as a result of the action. Biosentinel species are being developed including brine flies, fish, and resident marsh birds. Sediment and water mercury and additional chemical data have also been gathered to provide further insight into expected conditions after Phase I actions. Data collected as part of the SBMP in 2006 and 2007 are currently being reviewed, and additional sample collection occurred in April and May 2008 (with analytical data to be available in late 2008 or early 2009). When analyses of these data are complete in 2009, a plan will be recommended for monitoring the Phase I action and will be subject to Executive Officer approval.

ii) *Other Contaminants*

86. The proposed alternatives (see Finding 4) for the SBSPRP have the potential to affect water and sediment quality with various constituents other than mercury, methylmercury, nutrients, algae, salinity, and DO. The primary mechanisms that could impair water and sediment quality by introducing these other contaminants include: construction-related activities, maintenance activities, excavating channels, intrusion of selenium from adjacent aquifers, illegal discharges and dumping, increased mobilization and transport of particle-associated contaminants, unplanned levee breaching/failure, surface water contamination from groundwater, increased interaction with urban runoff, and bacterial regrowth in the restored areas.

[2] http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml

iii*) Other Water Quality Issues*

87. 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 SBSPRP is in the jurisdiction of Alameda, Santa Clara, and San Mateo County mosquito abatement districts. The Discharger is coordinating with those districts during design, implementation, and operation phases of the project to mitigate for any increases in potential mosquito breeding habitat.

88. Bay Mud: 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, including mercury, to become soluble, thereby increasing their potential to leach out when the site is re-flooded. Therefore, this Order requires that the Discharger ensure that imported dredged material placed into ponds is kept wet (see Provision E.43).

89. Invasive Cordgrass was inadvertently introduced into San Francisco Bay tidal marshes in the 1970's (predominantly *Spartina alterniflora* and *S. densiflora)* and threatens the existence of the native cordgrass (*S. foliosa*) upon which many tidal marsh species depend. To mitigate for potential impacts from cordgrass, the Discharger is cooperating with the Invasive Spartina Project to eradicate invasive cordgrass and protect the native tidal marsh species (see Provisions E.9 and E.18). In particular, the Discharger collaborated with the Invasive Spartina Project to identify the following "Best Practices" which have been incorporated into the Project:

    a. No Spartina is proposed to be planted in the Project Area. If circumstances arise where Spartina will be planted in the Project Area, the plantings will be genetically verified to be Spartina foliosa.

    b. The Project Area should be monitored annually for the presence of non-native or hybrid Spartina. In addition to field identification, representative samples of any found Spartina should be genetically analyzed to verify absence of S. alterniflora or S. densiflora genetic markers. Any found non-native or hybrid Spartina plants should be removed or killed before their first season of flowering and seed set.

    c. One measure of the Project's success in achieving the Project Objective regarding management of "the spread of non-native invasive species" is that there is no non-native or hybrid Spartina found in the Project Area.

    d. The Project will not initiate connection of ponds with tidal flows (full or muted) at locations where S. alterniflora or S. alterniflora x S. foliosa seed or propagules are likely to get into the Project Area.

    e. The Project will take care to not introduce non-native Spartina seed or propagules into the Project Area on contaminated excavators, dredges, or other equipment. The

Project will require that all equipment be cleaned prior to entry into an intertidal part of the Project Area if it has been in contact with non-native Spartina plants, seeds, or roots.

f. The Project will make sure that any dredged materials brought to the Project Area do not contain non-native Spartina seed or fragments.

g. Variations to the above best practices may be appropriate, based on site-specific conditions and scientific analysis. Proposed variations should be developed with assistance or review from the Invasive Spartina Project. Additionally, the Project will discuss any proposed variations with nearby marsh owners/managers, who could be affected by the actions of the Project.

Adaptive Management Plan (AMP)

90. Adaptive management is an integral component of the SBSPRP. The loop between science and management (while keeping the public informed) is designed to occur at every phase during adaptive management, which results in a stepwise conversion (known as a "staircase") of habitats from ponds to tidal habitats. Additional feedback loops may occur that require modification to pond management between successive phases of additional tidal restoration. Avoidance of impacts will be completed through a combination of adaptive management and mitigation measures. The term "staircase issue" in Table 17 is used to describe environmental considerations that would have an effect on the Discharger's decision making with regard to progress along the tidal habitat restoration "staircase" towards the 50:50 mix of tidal and managed pond habitats and potentially to a 90:10 mix of habitats as described in Finding 4. To ensure that significant impacts to water quality are avoided while progressing with conversion of habitat types, triggers for adaptive management actions will be established well below the thresholds of significance used to analyze impacts to water quality parameters (defined in Section 3.4 of the EIS/R).

91. The Phase I actions will provide the opportunity to address specific uncertainties about how the South Bay ecosystems may respond to restoration actions, through applied studies as described in the AMP. In particular, the break up of hardened gypsum layers for marsh restoration, the creation of bird nesting and roosting islands, mercury mobilization through sediment accretion and methylation, and variations in salinity gradients will be evaluated. The results of the applied studies and small- and large- scale response monitoring associated with Phase I will provide information for future restoration phases. Other staircase issues include sediment dynamics, bird use of changing habitats, effects on non-avian species, effects on invasive and nuisance species, public access and wildlife, and social dynamics. Information on these issues and the process for adaptive management is presented in the attached AMP.

92. To ensure that water quality meets objectives in the Basin Plan, the AMP includes potential management actions that are summarized in Attachment B (ii) Table B-8. The methods

presented in this table are examples of methods that could be done in the adaptive management of the SBSPRP. For the Phase I actions, data will be generated from monitoring and applied studies. The data will be analyzed to determine if the restoration is proceeding towards the defined Project Objectives and if defined triggers have been exceeded, in which case management action needs to be taken.

Monitoring Plans (MPs)

93. Monitoring will ensure that the Project does not cause unintended adverse environmental effects to water, sediment, humans (especially from flooding), wildlife and plants, and that habitat and hydro-geomorphology development is proceeding as expected.

94. Water quality monitoring in Phase I is summarized in Attachment B(iii),Table B-9 and monitoring procedures are provided in the attached Self Monitoring Plan (SMP) (Attachment D).

95. Other Phase I monitoring, including landscape processes, hydrology, habitat, and biological populations is summarized in Attachment B(iii), Table B-9 are provided in the attached Monitoring Plan.

96. To assure that the predicted hydrology and the habitat goals listed in Table 2 are being achieved, criteria described in the MP (summarized in Attachment B(iii), Table B-9) will be tracked, including geomorphic evolution, water quality parameters, biosentinel mercury concentrations, vegetation populations, bird populations, and endangered species populations. Monitoring to track project performance will continue in each of the six pond systems for at least 15 years. No penalties will be imposed for a failure to achieve the interim and final habitat goals, since this is a restoration (not a mitigation) project, but an investigation will be undertaken by the Discharger as part of the SBSPRP Project Management Team. Regulatory agencies will be involved, including the Water Board and BCDC in decision making with the Project's Management Team, and management modifications will be made as necessary to put the project back on a restoration path that will achieve the desired habitats.

97. As stated above in Finding 85, the South Baylands Mercury Project will provide the basis for developing a mercury monitoring plan which will be reviewed and subject to approval in 2009.

Management Options for Adaptive Management

Dissolved Oxygen and Algae

98. The Phase I restorations have been designed to minimize high risk factors for poor water quality (i.e., low dissolved oxygen). Design elements, including hydraulic residence time, water depth, and mixing, have been optimized in each Phase I design. As specified in the AMP, monitoring will be necessary to track the algal abundance and water quality in the

ponds. The three Phase I managed ponds (A16, SF2, and E12/13) will all be operated with shallower water depths than other ISP managed ponds, which should result in greater wind driven mixing and re-aeration of those ponds in Phase I. At the same time, the Board recognizes that the primary purpose of these Phase I actions is to provide experimental results regarding the ability of the Discharger to provide high quality habitat for shorebirds and other avian species whose population could be adversely affected by conversion of ponds to tidal habitats.

99. Increases in algal blooms and decreases in dissolved oxygen (DO) are a potential result of the Phase I actions identified in Finding 98. Phase I risk factors for both algae and DO in any particular pond complex are waters that are deep, slow (long residence times), rich in nutrients, rich in organic matter, subject to calm wind exposure, and highly transparent. Conversely, the lowest risk water bodies would likely be quickly turned over (short residence times), poor in nutrients, poor in organic carbon, windy and opaque. If triggers developed in the Adaptive Management Plan are exceeded in monitored waters as a result of high risk factors, then adaptive management actions will be implemented that convert high risk factors to low risk factors. Examples of such actions include improving water circulation patterns with fill, decreasing hydraulic residence time, increasing exposure to wind, or otherwise increasing the re-aeration rate.

Mercury Methylation

100. Periodic monitoring of biosentinel species and/or sediment and water at the site will be required as outlined in the Adaptive Management Plan, Water Quality Monitoring Plan, and Landscape, Habitat and Biological Species Monitoring Plans (Attachments C, D, and E) after the current mercury studies have been analyzed, 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 SBSPRP to minimize methylmercury uptake and loads to the Bay; and monitoring may be increased to include water, sediment, and/or additional biosentinel species.

101. Movement of mercury-contaminated sediments is a potential outcome of Phase I actions. Mercury concentrations in Bay sediments increase to the south and, as stated earlier, sediments in the Alviso pond complex have considerably higher mercury concentrations than Bay sediments (i.e., about two to ten times the ambient Bay condition). In the Alviso ponds, breaching levees introduces the risk of transporting mercury-contaminated sediments from Phase I ponds to the Bay. This has the potential to exceed the Bay Mercury Total Maximum Daily Load (TMDL) allocation that is based on a target for mercury in suspended sediments. However, as a result of historic subsidence and Bay hydrodynamics, essentially all Alviso projects in Phase I would create accretional areas, resulting in a net loss of mercury from the Bay to the SBSPRP area. Therefore, the EIS/R concluded that restoring the Alviso ponds may actually benefit biological species by burying mercury and effectively removing it from the system.

102. For both Eden Landing and the Ravenswood ponds, there is a risk that the introduction of Bay ambient sediments could increase mercury bioaccumulation within the SBSPRP Area; however, there is not a significant risk to the regional setting.

103. All pond complexes will be monitored and, if triggers are exceeded in the Adaptive Management plan, then actions will be implemented that avoid significant impacts. Examples of such actions include monitoring to evaluate the bioaccumulation impact of mercury-contaminated sediments, capping sediments in pond bottoms with clean fill, or removing mercury-contaminated sediments. The Phase I action at Pond A8 will include an adjustable notch that will allow for tidal exchange between Alviso Slough and Pond A8. This action could allow accumulation of sediments in Pond A8 that originate more directly from the Guadalupe River watershed. The SBMP mentioned under the Monitoring Program above, which is led by the San Francisco Bay Estuary Institute, is taking the first step in the adaptive management process for this geographic area by defining sentinel species and measuring mercury in those species along Alviso Slough. The Phase I action at Pond A8 has intentionally been designed such that it can be reversed, so that the tidal exchange can be cut off if data indicate that methylmercury production and bioaccumulation are being exacerbated by the tidal exchange.

104. The Eden Landing and Ravenswood ponds will have a range of conditions, including accumulations of gypsum on pond bottoms that may release sulfate, which can influence mercury methylation, as well as varying salinities and water depths that will allow the Project to conduct studies to monitor the effects of methylmercury production on different organisms. The AMP can examine the interactive effects of varying salinity and hydraulic residence time on net mercury methylation in the Phase I actions.

Other Water Quality Issues

105. The main impacts from contaminants, other than mercury, nutrients, and algae, are likely to result from construction activities, which may cause accidental spills or leaks and transient increases of turbidity; however, proper inspection of equipment and proper planning can minimize these impacts. Steps are included in the Provisions to assure that construction and other project-related activities avoid and minimize impacts to water quality and existing habitats.

106. Habitat values in the SBSPRP may also be impacted by increased interaction of the restored area with contaminants transported in creeks, including contaminants in the creek associated with the discharge of urban runoff to the creeks.

107. Treatment of the gypsum deposits could mobilize sulfate. The principal risk from released sulfate is the effect of sulfate on mercury methylation, as discussed above.

108. Preliminary results of Philip Williams & Associates (PWA's) hydrodynamic modeling of salinity (EIS/R Appendix J) indicate that seawater will not intrude into regional groundwater sources and that surface water salinity would not increase substantially in the Eden Landing, Alviso, or Ravenswood pond complexes. The project will coordinate with the county water districts (Alameda County Water District and Santa Clara Valley Water District) to prevent groundwater contamination via improperly abandoned wells, thereby reducing potentially significant impacts.

109. Preliminary results of PWA's hydrodynamic modeling results for salinity (EIS/R Appendix J) indicate that salinity would increase approximately 4 ppt at the southeast edge of the SBSPRP Area in the Guadalupe River and Coyote Creek at the end of the 50-year modeling period. Salinity increases will continue up both water bodies for an unknown distance. The increased salinity concentrations may reach as far as the area of the unconfined portion of the Santa Clara Valley Subbasin on Coyote Creek in the vicinity of Milpitas. The increase in salinity is a result of a greater volume of tidal inflow in the Alviso area, as ponds are opened to tidal action. The greater volume is a product of the same tidal range acting over a greater tidal area. The increase in salinity is not a result of saline discharges from the ponds but is rather the new ambient condition as a result of increased tidal prism.

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

111. The Board, in a public hearing on August 13, 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. Discharges of water, material, or wastes which are not otherwise authorized by the Order are prohibited.

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

3. It is prohibited to import dredged material or upland soils without first following the testing and screening protocols described in Specifications B.1 and B.2, below, and obtaining Water Board staff approval. Movement of on-site material is allowed.

4. Intake from waters of the State into Ponds A9 and A17 between December 1 through April 30, is prohibited. For Pond A17, this prohibition will cease to apply once the intake is properly screened to exclude anadromous fish.

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. 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 prior to placement at any of the Phase 1 or subsequent SBSPRP project sites (See Provision E.41). Sediment characterization shall follow the protocols specified in:

   a. The Dredge Materials Management Office (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 suitable based on the procedures and screening guidelines contained in a Quality Assurance Project Plan approved by the Executive Officer (See Provision E.42).

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

C. EFFLUENT LIMITS

1. All pond waters discharging to the Bay or Sloughs shall meet the following limits:

Constituent	Instantaneous Maximum	Instantaneous Minimum	Units
Salinity	44		ppt
Dissolved Oxygen[1]		5.0	mg/L
pH[2]	8.5	6.5	

[1] This limitation applies when receiving waters contain at least 5.0 mg/L of dissolved oxygen. In cases where receiving waters do not meet the Basin Plan objective, pond discharges must be at or above the dissolved oxygen level in the receiving water.

[2] The Discharger may determine compliance with the pH limitation at the point of discharge or in the receiving water.

2. Pond waters discharging to the Bay or Sloughs shall not exceed the natural temperature of the receiving waters by 20°F, or more.

D. RECEIVING WATER LIMITATIONS

For the following Receiving Water Limitations, the Project Boundary shall be defined as the limit of the receiving waters at mean lower-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 pond waters 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.

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 both the State's Porter-Cologne Water Quality Control Act and the federal 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.

E. PROVISIONS

1) **Order Compliance and Rescission of Previous Waste Discharge Requirements:** Requirements prescribed by this Order supersede the requirements prescribed by Order No. R2-2004-0018. Order No. R2-2004-0018 is hereby rescinded upon the effective date of this Order.

2) **Operations Plan and Adaptive Management.** The Discharger shall continue to implement its Operations Plan for each pond system to ensure the minimization of impacts to beneficial uses from managed ponds. The Discharger shall submit a plan, acceptable to the Executive Officer, that shall describe operational constraints pertinent to each system, and indicate corrective measures available to the Discharger, as outlined in the Adaptive Management Table (Attachment B(ii), Table B-8), if discharge limits may be violated (e.g., salinity, dissolved oxygen, pH). The Discharger shall update each Operations Plan **annually** (as necessary) to reflect any necessary modifications (e.g., increased flow-through) needed to protect water quality and wildlife. The Operations Plan shall also address avian botulism control, mercury methylation and inorganic salt mobilization. To document avian botulism control efforts, the Discharger shall monitor the salt ponds and nearby receiving waters for the presence of avian botulism, and control outbreaks through the prompt collection and disposal of sick and dead vertebrates. To demonstrate that managed pond systems are operated to minimize conditions that could mobilize inorganics and/or the methylation of mercury, the Discharger should describe how it manages water levels within each pond system and recommend corrective measures if data show it is enhancing inorganic salt mobilization and/or methylation of mercury. Each Operations Plan is subject to the written approval of the Executive Officer.

Due Date: Annually by March 1st of each year.

3) **Ravenswood Ponds.** Prior to discharging saline waters from the Ravenswood Ponds (with the exception of SF2), the Discharger shall submit a technical report that evaluates the

potential for (a) discharges to increase the concentration of salinity and/or metals in receiving waters during the initial release and continuous circulation period, and (b) salinity to cause significant impacts to Ravenswood Slough during the continuous circulation period. Additionally, the Discharger's technical report shall include a proposal to add these ponds to the Self-Monitoring Program. This technical report is subject to the written approval of the Executive Officer.

4) **Ecological Sustainability of Managed Ponds.** For long-term managed ponds and for those managed under Phase I actions (i.e., SF-2, A16, E12, and E13), the Discharger shall show how ponds will be managed to improve compliance with Basin Plan water quality objectives, in particular, for dissolved oxygen. The Discharger shall submit an annual report **by March 1 of each year** that documents its efforts towards improving water quality within managed ponds. This Report shall evaluate monitoring data collected under the Applied Studies section of the Self-Monitoring Program and recommend: (a) modifications to the geometry of managed ponds (surface area, filling borrow ditches, levees, inlet and outlet structures) to improve dissolved oxygen levels; (b) if the Discharger should move more aggressively to restore a pond system to tidal action and/or increase the acreage of ponds that will be restored to tidal because of the water quality impacts associated with managed ponds; and (c) data collection requirements necessary to provide a framework for developing a site-specific objective for dissolved oxygen in managed ponds.

   Due Date: Annually by March 1st of each year.

5) All required reports and documents submitted after Board approval of this Order will be subject to Executive Officer approval.

Monitoring and Reporting

6) **Standard Provisions and Reporting Requirements.** The Discharger shall comply with all applicable items of the Standard Provisions and Reporting Requirements for NON-NPDES Wastewater Discharge Permits, August 1993 (Attachment F), or any amendments thereafter with the exception of General Provisions A.4, A.5, and A.10; Treatment Reliability B.2 and B.3; and General Reporting Requirements C.5, as these requirements are not relevant to this project. Where provisions or reporting requirements specified in this Order are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications of this Order shall apply.

7) **Water Quality Self Monitoring Plan**: The Discharger shall comply with the Water Quality Self-Monitoring Program (SMP) dealing predominantly, but not exclusively, with water quality for this Order as adopted by the Board (Attachment D). The Discharger shall submit an annual Self-Monitoring Report (SMR) **by March 1 of each year**. The SMP may be amended by the Executive Officer in response to a written request by the Discharger, or as necessary to assure collection of information to demonstrate compliance with this Order. The Discharger shall report on activities required in Provisions E.8 through E.15.

8) **Landscape, Habitat, and Biological Species Monitoring Plan:** To show progress toward achieving target habitats, monitoring will be required. Specific methods, locations, and sampling procedures for all the Phase I SBSPRP projects are provided in the draft Phase I Landscape, Habitat, and Biological Species Monitoring Plan (Attachment E – Draft) and the Adaptive Management Plan (Attachment C), both of which can be amended with written Executive Officer approval, subsequent to the issuance of the Biological Opinions. The already completed Adaptive Management Plan presents possible future studies and some general methods. The final Monitoring Plan will list:

   (a) target habitat goals for the 9 Phase I areas (A6, A8, A16, SF2, E8A, E8X, E9, E12, and E13); and

   (b) all parameters to be monitored including detailed procedures and locations for assuring that the beneficial uses of water and habitat will be protected and/or improved.

9) The final Landscape, Habitat, and Biological Species Monitoring Plan shall include the following: water and sediment quality; mercury monitoring of biosentinel species in accordance with the South Baylands Mercury Project or other regional program, or mercury in water and sediment; landscape mapping; physical and/or hydrogeomorphic development (i.e., channel and marsh development, tidal circulation); vegetation mapping; highly invasive (detrimental) species which should include plants and introduced predators; specific target species monitored (typically endangered species) or groups such as birds, fish, mammals.

10) **Mercury Monitoring**: Analysis of mercury data collected from the South Baylands Mercury Project and other South Bay projects will be used to determine appropriate triggers to implement activities within the context of the Adaptive Management Plan (Attachment C) to prevent increases in methylmercury production and bioaccumulation. If triggers are exceeded, then adaptive management actions will be implemented to avoid significant impacts. Triggers and actions will be subject to Executive Officer approval.

    Due Date: Report due no later than September 1, 2009.

11) **SBSPRP Phase I projects**: The Discharger shall be responsible for submitting biennial monitoring reports (every other year) with biennial memos in the intervening years. The monitoring periods shall cover 15 years for each phase beginning after each of the six separate units (A6, A8, A16, SF2, E8A/E8X/E9, and E12/E13) have been constructed and restoration initiated. The biennial monitoring reports shall: (i) analyze all physical and biological data collected to date, and contain appropriate figures, graphs, and photos; (ii) assess progress toward target habitats; (iii) provide status updates on the Applied Studies proposal process designed to provide information on wildlife habitats; potential flood hazards; and recreational impacts; and (iv) make recommendations for future monitoring and assessment. The biennial memos shall notify the Water Board of any sampling occurring during that period and any problems, and shall provide appropriate photos. For each project, monitoring reports shall be due at the end of Year 2, 4, 6, 8, 10, 12, and 14 following each Phase I project's implementation and biennial memos shall be due in the intervening years. A final report for each Phase I project shall be submitted in Year 15 after implementation of that Project.

12) **Aerial or satellite photos** (such as those available on Google Earth, or IKONOS images using multispectral satellite imagery) shall be reviewed annually for the six separate units (A6, A8, A16, SF2, E8A/E8X/E9, and E12/E13) to ensure that habitat evolution is occurring without any associated significant adverse or unforeseen events, such as excessive scour or erosion, sedimentation, or establishment of highly invasive plants. If necessary, more detailed analysis of aerial or satellite photos shall be conducted every other year to allow measurements of channel widths, vegetation zones, and other important features listed in the Monitoring Plans (Attachments D and E). If habitat targets for Phase I actions are not met by the end of the 15-year monitoring periods, the technical advisory committee (see Provision E.13) shall 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 SBSPRP Phase I project has successfully provided adequate wetland habitat benefits to justify discontinuing monitoring.

13) A SBSPRP Technical Advisory Committee (TAC) shall be organized and convened through a public process by the Discharger and shall, at a minimum, invite representatives from the Water Board, BCDC, California Coastal Conservancy, the Corps, and the National Marine Fisheries Service. The purpose of this committee shall be to assess progress of the restoration project by reviewing monitoring data, and to suggest adaptive management strategies. Results of the data analysis shall be presented to the TAC annually, or biennially, for discussion and comment. The TAC can include members of the Wetland Monitoring Group of the San Francisco Bay Regional Wetland Monitoring Program, or use that forum for advice and review.

14) At the end of the monitoring periods for each of the Phase I projects, the wetland restoration sites and managed ponds shall be assessed for wetland functionality using a method approved by the Executive Officer.

15) The Discharger shall be responsible for all monitoring and reporting requirements at the SBSPRP sites. However, the Wetland Regional Monitoring Program run by the San Francisco Estuary Institute (SFEI) 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.

16) The Discharger shall use a standard form to provide SBSPRP Phase I project information related to impacts at the restoration and managed pond sites. An electronic copy can be downloaded at http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml. Project information concerning restoration will be made available at http://www.wetlandtracker.org.

17) 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 shall be sent on a CD and be made accessible on SFEI's Wetland Tracker (http://www.wetlandtracker.org).

18) Aggressive non-native plant species that threaten sensitive native tidal marsh communities, 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), should be kept off site to the extent feasible. The Discharger should review the Tier I and Tier II lists and discuss with the Water Board staff the species that the Discharger has determined to be feasible to keep off the Phase I project sites. Invasive cordgrass (*Spartina alterniflora*) is a high priority for preclusion from tidal wetlands restoration sites in the Bay Region, and the Discharger shall coordinate efforts with the Invasive Spartina Project to eradicate this species as identified in Finding 89.

19) No later than April 30 of each year, the Discharger shall provide the Executive Officer with a notification report for proposed operation and maintenance activities to be performed during the period between June 1 of the year in which the notification report is submitted to the Water Board and May 31 of the following year. The notification report shall identify the operations and maintenance activities (See Provision E.44) by Pond Complex and individual pond identification numbers. Proposed activities shall be summarized in a table with the following information: the task number assigned to the proposed activities; the ponds involved; a description of the type of activity (e.g., grading, public access, general levee maintenance, riprap); the proposed duration of the activity, the size/scope of each activity; and a short summary of each activity. The notification report shall also include figures illustrating the proposed locations of the maintenance activities.

CEQA Mitigation Measures Required from the EIR by the Lead Agency:

20) Actions to Minimize Illegal Discharge and Dumping (SBSP Mitigation Measure 3.4-5c). The likelihood of increasing frequency of illegal discharge and dumping shall be minimized with adequate public education and outreach, patrolling of the area, readily accessible and frequently serviced trash and recyclable materials receptacles, and timely clean-up activities. Plans for recreational access in the Project Area will include appropriate trash collection receptacles and a plan for ensuring regular collection and servicing; and "No Littering" signs shall be posted in public access areas.

21) Sediments characterization shall follow existing guidance and comply with emerging regulations (SBSP Mitigation Measure 3.4-5d). The Discharger shall characterize contaminant concentrations in sediments whenever activities will involve moving, transporting, or emplacing soils and sediments or exposing older sediments by dredging and excavation, if there is reason to expect that significant contamination is present in these sediments. Existing guidance for the beneficial re-use of sediments establishes numeric screening guidelines for the placement of sediments in direct contact with water or the burial of sediments beneath a cover layer. This guidance may be refined by the State's emerging program of Sediment Quality Objectives. Sediment characterization data shall be used to follow existing guidance and follow emerging regulations for the placement of sediments and other activities that affect the mobilization and transport of sediments. Sediment characterization data shall be used to determine appropriate disposal or beneficial re-use practices for sediments; if this data indicates that tidal scour outside a levee breach could remobilize sediments that are significantly more contaminated than Bay ambient conditions, the Discharger shall consult with Water Board staff regarding other potential required actions.

22) Bacteria Monitoring and Risk Communication (SBSP Mitigation Measure 3.4-5f). The SBSPRP National Science Panel recommended that monitoring be conducted for avian botulism and bivalve disease and toxicity to humans. Mitigation measures for avian botulism are discussed under in Section 3.6 of the FEIS/R under SBSP Impact 3.6-22. The Project shall consider the need for additional monitoring of shellfish as each phase is implemented. If necessary for the protection of public health, a program of public outreach and communication shall be developed and implemented. The program could include posting of warning signs in multiple languages where monitoring data indicate the need to advise the public of exposure risks from swimming or shellfish consumption.

Other SBSPRP Operations

23) The Discharger shall conduct periodic inspection and maintenance of restoration features to ensure that the restoration is performing as intended. For example, routine inspection of ditch blocks for unintentional channel bypassing or erosion shall be necessary, particularly following storm events. If bypassing or erosion occurs, maintenance of the ditch block shall be performed to prevent unintended channel formation. The Discharger shall summarize the results of these efforts in its annual report.

24) For managed ponds, water levels and salinity shall be managed by FWS and DFG personnel via the adjustment of water intake, outlet, and circulation structures. Periodic inspection and maintenance of restoration infrastructure such as water control structures, managed pond levees and berms, canals, and islands shall be required to ensure that the ponds are operating as intended. Frequent inspection and maintenance of habitat conditions in the ponds, such as water levels and water quality (including salinity and dissolved oxygen), shall be necessary to ensure that the ponds are providing the appropriate environment for the target species (See Adaptive Management Plan in Attachment C).

25) Water levels and flows in the reconfigured managed ponds shall be controlled by adjusting the gate settings at culverts and by adding or removing flashboard risers at weirs. Routine monitoring of water levels shall be necessary to ensure that the ponds are providing the appropriate habitat for desired species. Regular monitoring of water quality will also be necessary to ensure that target water quality parameters (see Attachment B(iii), Table B-9) are met both inside the pond and in discharges. If water levels or water quality targets are not met, changes in the operation of water control structures may be necessary. Periodic maintenance of internal channels and canals (e.g., via excavation), replenishment of islands via excavation and placement of spoils on the islands, vegetation control on islands, and possible predator control shall be needed to ensure that managed ponds are providing desired levels of habitat quality for wildlife.

26) Routine inspection of water control structures in reconfigured managed ponds shall be necessary to ensure that they are functioning properly. Inspection of water control structures and canals for debris or trash obstructions shall be necessary to maintain desired flows. If obstructions are found during inspection, it may be necessary to remove the obstructions either manually or mechanically to maintain flows. Routine inspection of the managed pond

levees, trails and internal berms for unintentional breaching and erosion shall also be necessary. If unintentional breaching or erosion occurs, the berm or levee shall be repaired as needed to maintain pond operations, prevent potential tidal inundation of adjacent managed ponds, and to maintain public access along the trails. Nesting islands shall also need to be periodically examined for erosion.

27) Viewing platforms, interpretive signs, trails, gates, and fences shall be inspected periodically and shall be repaired and maintained as needed. In addition to the initial work described above, the new/improved levees in E9/E14, E10, and E13/E14 shall likely require a second phase of construction after about 5 years of settlement have occurred.

Construction Operations

28) 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.

29) 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.

30) Consistent with the FWS and NMFS Biological Opinions, expected summer 2008, 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.

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

32) Since the Discharger will be impacting greater than one acre in each Phase I project, prior to the beginning of project construction, the Discharger or the Discharger's contractor shall submit a Notice of Intent (NOI) to the State Water Board for coverage under the General National Pollutant Discharge Elimination System (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 such as 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.

33) The Discharger shall have a construction monitor on site to ensure that the project is constructed according to plan. The construction monitor shall also resolve implementation questions and refer "Requests for Information" and "Submittals" to the design engineers. Biological monitors, either FWS or DFG 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 maintained for five years after project construction is completed, and submitted to the Water Board upon request.

Soil Excavation and Placement Provisions

34) To minimize the effects on special status fish species of temporary increases in suspended sediment and turbidity, the use of best management practices for turbidity control shall be employed during all in-water work conducted in the sloughs or bay, where appropriate.

35) 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.

36) 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, so that fish have easy access to the starter channels as the tide recedes.

37) Construction activities shall be scheduled to avoid the local 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.

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

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

Mosquito Abatement Provision

40) The Discharger shall coordinate with the county mosquito abatement districts during the design, implementation, and operations of the SBSPRP Phase I Projects.

Potential Future Sediment or Soil Importation Provisions

41) If sediment is imported for SBSPRP areas during or after the completion of Phase 1 projects, the following conditions shall apply and be subject to Executive Officer approval: (i) instructions listed under Specification B.1 shall be followed; (ii) if the materials is proposed for levee maintenance, a levee inspection report shall be submitted at least 30 days prior to dredge material placement and, (iii) if applicable, a work plan and schedule for making any repairs or improvements shall also be submitted prior to dredge material placement.

42) If upland soil is imported for SBSPRP areas during or after the completion of Phase 1 projects, the following conditions shall apply and be subject to Executive Officer approval: (i) instructions listed under Specification B.2 shall be followed, including the preparation of a Quality Assurance Project Plan; (ii) if the materials is proposed for levee maintenance, a levee inspection report shall be submitted at least 30 days prior to dredge material placement and, (iii) if applicable, a work plan and schedule for making any repairs or improvements shall also be submitted prior to imported soil placement.

43) Imported dredged material placed into ponds shall 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.

On-Going Operation and Maintenance Provisions

44) Construction activities, both within the Phase I ponds and outside of the Phase I action areas, necessary for the on-going maintenance of existing levees and infrastructure may include the following activities, not all of which may be used at a given pond:

A. Repair, replacement and servicing of existing facilities.

a) Repair and replacement of existing bay intake/outlet structures, and related facilities such as pumps, boat launches, gates, pipelines, siphons, open channels and culverts, and removal of silts, debris and algae. Deleterious materials (i.e., litter) shall be segregated from excavated material and discarded as general waste following appropriate characterization and regulatory protocols. Excavated material shall be placed in an identified upland area for reuse, unless otherwise restricted under regulatory criteria.

b) Excavating, clearing, and retrenching of existing intake structures, boat launches and conveying ditches, so long as the existing configuration is not altered and the structure or ditch conforms with its engineered purpose. Excavated material shall be disposed onto

levee tops above the plane of the high tide in a manner that secures the material in place, or be hauled off-site to a non- jurisdictional area for reuse or disposal.

c) Repair and replacement of existing bridges, bridge foundations and abutments within the network of salt pond levees.

d) Repair and replacement of other items such as existing fences, tide gates, siphons in non-tidal areas, power lines, etc, provided such repair and maintenance does not deviate from the plans of the original facility.

e) Repair of ongoing and new authorized reaches of riprap. The authorized riprap areas are designed to have approximately 3:1 slope. If additional work would exceed the existing reach by 10 linear feet, then the proposed design shall be submitted in accordance with the procedures for new work in the riprap section (B.h) below.

B. Ongoing and new work:

a) Placement of dredged and/or imported fill material on the pond side of salt pond levees below the plane of high water in the pond, for the purpose of raising and fortifying the levees to prevent degradation. The dredged and/or imported fill material shall be placed along the inside and the top of the salt pond levee in accordance with appropriate best management practices.

b) Dredging of existing borrow ditches within the salt ponds for the purpose of placing the dredged material on existing levees.

c) Dredging in salt ponds to allow a dredge to cross a pond. This includes the placement of dredged material on the pond, with the placement of dredged material on the pond bottom along the side of the dredged channel.

d) Dredging of and placement of dredged material at up to 21 existing dredge locks within the SBSPRP footprint that are not being utilized by Cargill, and at any newly constructed authorized dredge locks, to allow the dredge to access the salt ponds. Advanced notification for these activities (See Provision E.19) shall include specific quantities of material to be dredged and placed, and drawings indicating prestaked, designated areas for stockpiling, side casting and borrowing material. Breached levee material, stockpiled atop the main levee from the last time the lock was accessed, shall be used to dam the breach following entry. Upon dredge exit, breaching and plugging of levees shall be performed in a similar fashion to that described above. The salt marsh muds that were excavated and sidecast in the access cut shall be retrieved and placed back into the access cut and channel, closing it behind the dredge.

e) Dredging within shallow sloughs to provide up to four feet of clearance for access by the dredge to salt ponds. Dredged material that cannot be placed on salt pond levees may be placed on bare mud flats or sidecast, following approval in accordance with the

notification procedure (See Provision E.19). Some slough dredging may also be performed near dredge locks for the purpose of obtaining additional mud to bring the access cut to the desired elevation following exit by the dredge.

f) Installation of new intake/outlet structures, new pumps, siphons, culverts, power transmission lines channels/ditches, crossing of channels and streams, in conjunction with new work, or relocation of existing structures.

g) Construction of new pumping donuts, internal coffer dams, and internal salt pond levees.

h) Placement of new riprap along outboard and inboard levees, as needed to fortify the slopes and prevent erosion, so long as the proposed new riprap is placed below the high tide line and/or high pond level at a slope of about 4:1 where needed. Care shall be taken to minimize the number of voids between the rubble in order to maintain structural integrity and prevent burrowing. Riprap will not be placed on top of non-eroding salt marshes.

i) Repair and replacement of siphons that cross salt marshes, sloughs and channels that would require extensive trenching and side-casting of mud.

j) Dredging and placement of bay muds into eroded areas along selected outboard levees for the purpose of encouraging the establishment and expansion of salt marsh vegetation as a means of diffusing wave energy and preventing levee erosion. The quantities of dredging material to be moved will vary greatly, depending on site specific conditions, and will be included in the notification procedures (See Provision E.19).

k) General maintenance activities to maintain the Phase I elements of the SBSPRP once implementation is complete. This also includes repair of water control structures and placement of materials on internal levees and nesting islands as needed to maintain ecological function and values.

General Provisions

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

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

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

48) The Discharger shall implement and comply with appropriate Best Management Practices (BMPs) to prevent and control erosion and sedimentation.

49) 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 SBSPRP sites 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.

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

51) The Discharger shall maintain a copy of this Order at the Headquarters of the FWS Don Edwards San Francisco Bay National Wildlife Refuge, located off Thornton Avenue, about 0.8 miles south of State Route 84, in the City of Newark. The Order shall be available at all times to site personnel. The Discharger shall ensure that all individuals working on the SBSPRP sites, including all contractors and sub-contractors, are familiar with the contents and requirements of this Order, and with all relevant plans and BMPs.

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

a. Entry onto 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.

53) 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.

54) The Discharger shall immediately notify the Water Board by telephone or email 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.

55) 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.

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

57) This certification or Order 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).

58) 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.

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

60) 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 shall cause, have the potential to cause, or shall 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 August 13, 2008.

Digitally signed by Bruce Wolfe
Date: 2008.08.14 14:55:19 -07'00'

Bruce H. Wolfe
Executive Officer

Attachments

Attachment A: Figures
Attachment B: Supplemental Tables
Attachment C: Adaptive Management Plan
Attachment D: Water Quality Self Monitoring Program (SMP)
Attachment E: (Draft) Landscape, Habitat, and Biological Species Monitoring Plan
Attachment F: Standard Provisions and Reporting Requirements