FINAL ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

South San Diego Bay
Coastal Wetland Restoration and Enhancement Project
(San Diego County, California)

Lead CEQA Agency

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(National Marine Fisheries Service)

October 20, 2009

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Introduction

The U.S. Fish and Wildlife Service (Service) San Diego National Wildlife Refuge (NWR) Complex and the Port of San Diego (Port) propose to implement the South San Diego Bay Coastal Wetland Restoration and Enhancement Project (South Bay Restoration Project), with funding support from the California Coastal Conservancy (Conservancy), National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS) through the American Recovery and Reinvestment Act of 2009, the Service's Wildlife and Sport Fish Restoration Program and Coastal Program, and the U.S. Environmental Protection Agency (EPA) (Table 1). The South Bay Restoration Project involves the restoration and enhancement of approximately 280 acres of coastal wetland and upland habitat within the south end of San Diego Bay, San Diego County, California (Figures 1 and 2). The project consists of activities at three locations: 1) restoration of tidal influence to the western salt ponds within the South San Diego Bay Unit of the San Diego Bay NWR, which are State tidelands managed by the Service; 2) enhancement of tidal circulation and restoration of coastal wetlands within the Chula Vista Wildlife Reserve (CVWR), held in trust by the State Lands Commission and managed by the Port; and 3) restoration and enhancement of coastal upland and wetland habitat at Emory Cove also on State tidelands managed by the Port.

Table 1 Funding Sources for the South Bay Restoration Project
State and Local Funding Sources
California Coastal Conservancy
Port of San Diego - Environmental Fund
Federal Funding Sources
NOAA Coastal and Marine Habitat Restoration Project Grant (Funds allocated through the American Recovery and Reinvestment Act of 2009)
USFWS National Coastal Wetlands Conservation Grant
EPA West Coast Estuaries Initiative for the California Coast
San Diego National Wildlife Refuge Complex
USFWS Coastal Program

Figure 1

Figure 2

The three areas proposed for restoration and/or enhancement are identified as enhancement opportunity areas in the San Diego Bay Integrated Natural Resources Management Plan (INRMP) prepared by the U.S. Navy and Port in 2000. Additionally, the restoration of the western salt ponds will implement the first phase of salt pond restoration, as identified in the San Diego Bay National Wildlife Refuge Comprehensive Conservation Plan (CCP) and Final Environmental Impact Statement (FEIS) (*USFWS 2006*).

The project is subject to both the National Environmental Policy Act (NEPA) of 1969 (42 USC 4341 et seq.) and the California Environmental Quality Act (CEQA) (PRC 21000 et seq.). NEPA is required because some of the proposed action will take place on lands managed by the Service as a NWR, and funding for the project will be provided by several federal agencies, including the Service and NOAA/NMFS. CEQA is required because the project will receive funding from the Conservancy, a state agency, and two of the project components will be implemented by the Port.

This attachment, which serves as an final environmental assessment (EA) under NEPA and an Initial Study (IS) for the Final Mitigated Negative Declaration (MND) under CEQA, has been prepared in accordance with NEPA and the Council on Environmental Quality NEPA Regulations contained in C.F.R. Parts 1500-1508, as well as CEQA and the CEQA Guidelines, (California Code of Regulations Title 14, section 15000 et seq.). This EA/IS describes the purpose and need for the proposed action, the project objectives, and environmental consequences of the proposed action. Alternatives to the proposed action and an analysis of the environmental consequences of each alternative are also included to comply with NEPA. The EA is used to determine whether the proposed action will result in a Finding of No Significant Impact or require the need for an EIS. The analysis provided in the EA/IS also aids the Service, NOAA/NMFS, Conservancy, and Port in their decision-making process. The lead agency under NEPA is the Service and the lead agency under CEQA is the Conservancy. NOAA/NMFS has agreed to be a Cooperating Agency under NEPA and the Port is a responsible agency under CEQA.

In September 2006, the Service signed a Record of Decision for the San Diego Bay NWR CCP and programmatic Final Environmental Impact Statement (FEIS). The FEIS analyzed the direct, indirect, and cumulative impacts of implementing the proposed CCP, which included a preliminary proposal to restore the western salt ponds within the South San Diego Bay Unit. Additional details about the restoration proposal are now available and are addressed within this EA/IS. The previously prepared FEIS, which is incorporated by reference into this document, is available for review at the San Diego NWR Complex Office (760-930-0168), located at 6010 Hidden Valley Road, Suite 101, Carlsbad, California, or online at http://www.fws.gov/ sandiegorefuges/new/ccp/ccp.htm. Also incorporated by reference into this document are the Port's determinations that the Emory Cove component of the proposed action is Categorically Exempt pursuant to Section 15301 (Class 1) of the CEQA Guidelines and Categorically Excluded under Sections 8.a.(13) and 8.d.(4) of the Port's Coastal Development Permit Regulations (complete documentation is provided in Appendix B).

Chapter 1 - Purpose of and Need for the Action

Over the past 150 years, dredging and filling operations to accommodate maritime and urban developments have resulted in the loss of 42 percent of San Diego Bay's historic shallow subtidal habitat, 84 percent of its intertidal mudflat habitat, and 70 percent of its salt marsh habitat. Most of the native upland and wetland/upland transition habitat has also been lost to development. The greatest opportunities for restoring these historic coastal bay habitats are available in South San Diego Bay which supports more than 90 percent of the remaining historic intertidal habitat in the Bay.

The south end of San Diego Bay is designated as a Western Hemisphere Shorebird Reserve Network Site and a Globally Important Bird Area, demonstrating the existing importance to migratory bird conservation of the native habitats that remain in south San Diego Bay. Seven federally or state listed threatened and endangered species, tens of thousands of migratory birds that travel along the Pacific Flyway, and a diverse array of fish, including species managed under the Coastal Pelagics and Pacific Groundfish Fishery Management Plans are all supported within this portion of the bay. Unfortunately, habitat quality to support some of these species, such as the Federally-listed endangered light-footed clapper rail (*Rallus longirostris levipes*), has been severely reduced as a result of habitat fragmentation, human disturbance, and changes in historic hydrologic regimes. Approximately 1,625 acres in south San Diego Bay, including the three sites represented within the proposed action, have been identified as potential restoration areas to improve habitat for coastal dependent species.

1.1 Purpose of the Action

The purpose of the proposed project is to restore and enhance approximately 280 acres within San Diego Bay to support a range of high quality coastal habitats representative of the historic coastal habitats that occurred in south San Diego Bay prior to the late 1800s. These include shallow subtidal, intertidal, wetland/upland transition, and upland scrub habitats. Opportunities for restoring and enhancing these types of coastal habitats, particularly tidally influenced wetland habitats, in Southern California are limited, therefore, where opportunities do exist, restoration of the physical and biological processes that are characteristic of healthy wetland ecosystems is a high priority. Restoration and enhancement of the habitats that historically occurred along the edge of the bay in the vicinity of Emory Cove and the restoration of intertidal habitats that once occupied the current site of the western salt ponds will result in the reestablishment of native habitats essential to the plants, fish, and wildlife currently and historically supported within south San Diego Bay, including the endangered light-footed clapper rail. Enhancement of tidal circulation and restoration of native salt marsh vegetation at the CVWR will provide additional habitat in San Diego Bay for fish and migratory birds, including expanded foraging habitat for the California least tern (*Sternula antillarum browni*).

1.2 Need(s) for the Action

In 1850, approximately 28 large, distinct estuarine wetlands were recorded along the south coast of California. The total historical coastal wetland acreage of these wetlands is estimated to have been between 44,000 and 55,000 acres (*Southern California Recovery Project 2001*). Since that time, many of Southern California's coastal wetlands have been dramatically altered or destroyed by human activity. Today, only about 13,000 acres of coastal wetlands remain along the Southern California coast. Some of this acreage includes areas that have been protected or restored, while other areas remain degraded as a result of adjacent urban and suburban development, agricultural operations, or other human activity. Implementation of the proposed project would result in the restoration and enhancement of approximately 280 acres of land and water that historically supported estuarine and associated coastal upland habitats along coastal Southern California.

The loss and degradation of Southern California's coastal wetland habitat has left many species struggling to survive, including the federally and state listed endangered light-footed clapper rail and California least tern and the state listed endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) (*California Department of Fish and Game [CDFG] 2007*). To adequately address the needs of these and other listed species, a range of historical wetland habitat types should be restored and enhanced. For example, the light-footed clapper rail would benefit most directly through the restoration of native cordgrass (*Spartina foliosa*) dominated salt marsh habitat, while the federally listed threatened western snowy plover (*Charadrius alexandrinus nivosus*) and other shorebirds of management concern would benefit from the restoration of a range of intertidal habitats, including tidal mudflats. These habitats are highly valued in southern California; and should be accommodated in restoration plans. To address this need, approximately 120 acres of the estuarine habitats restored in the western salt ponds would be available to support the foraging and nesting requirements of the light-footed clapper rail and provide foraging habitat for shorebirds of management concern; 25 acres of restored subtidal habitat would provide foraging areas for the California least tern; and approximately 19.5 acres of intertidal mudflat habitat would provide foraging areas for a variety of shorebirds of management concern. Within the CVWR, approximately 60.5 acres would be restored and enhanced to expand foraging opportunities for the California least tern and shorebirds of management concern.

Another critical component of a healthy coastal wetland ecosystem is the wetland/upland transition zone, which represents a gradient between the upper marsh and upland scrub community. Unfortunately, very little of this transitional habitat zone persists in Southern California. Historically, it was within these areas that shorebirds, clapper rails, and other organisms found sheltered refuge from predators during periods of high tide. Important wetland/upland transition habitat will be restored and/or enhanced within the higher elevations of the Emory Cove site and along the upper edges of the western salt ponds.

The need for restoration and enhancement of coastal habitats throughout California and within San Diego Bay are documented in numerous regional habitat conservation plans, species recovery plans, and bird conservation plans. The Conservancy's Strategic Plan 2007 (*California Coastal Conservancy 2007*) includes a statewide strategy for restoring and enhancing biological

diversity in coastal wetlands that states: "For identified key regional habitat types, concentrate on restoring systems that are of sufficient size and complexity to help ensure lasting ecological integrity." In addition, the long-term objective of the Conservancy's Southern California Wetlands Recovery Project (WRP) is to reestablish a mosaic of fully functioning wetlands systems, with a diversity of habitat types and connections to upland communities, which preserves and recovers self-sustaining populations of species. The current proposal shares these same objectives.

The need to conserve (e.g., restore, enhance, and protect) native coastal habitats for the migratory birds that travel along the Pacific Flyway, as well as for the area's resident coastal bird populations, is also acknowledged in the following bird conservation plans and recovery plans:

- United States Shorebird Conservation Plan (*Brown et al. 2001*);
- Southern Pacific Shorebird Conservation Plan (*Hickey et al. 2003*);
- Waterbird Conservation Plan for the Americas (*Kushlan et al. 2002*);
- North American Waterfowl Management Plan (*2004*);
- Partners in Flight North American Land Bird Conservation Plan's Watch List and Stewardship Species of Continental Importance (*Rich et al. 2004*); and
- Recovery Plans for the California Brown Pelican, California Least Tern, Light-footed Clapper Rail, and Western Snowy Plover (*USFWS 1983, 1985a, 1985b, 2007*).

Locally, the need to restore, enhance, and protect native coastal habitat in and around San Diego Bay in perpetuity is addressed in the following planning documents:

- San Diego Bay Integrated Natural Resource Management Plan (*U.S. Navy 2000*);
- Port of San Diego Master Plan (*Port 2007*);
- Restoration and Enhancement Plan for Tidelands to Benefit San Diego Bay's Natural Resources (*Port 2008*); and
- San Diego Bay National Wildlife Refuge (NWR) Comprehensive Conservation Plan (CCP) (*USFWS 2006*).

Restoring and enhancing approximately 280 acres of coastal habitat within South San Diego Bay will contribute to the achievement of the goals and objectives set forth in these plans for the long-term conservation of native coastal habitats and species.

1.3 Project Objectives

- To restore a minimum of 100 acres of habitat within the western salt ponds suitable of supporting the endangered light-footed clapper rail.
- To restore a minimum of 30 acres of subtidal habitat within the western salt ponds to provide habitat for fish and foraging areas for the California least tern.
- Restore and enhance a minimum of 50 acres on the CVWR to improve habitat quality for fish and wildlife**.**
- Restore and enhance the wetland and native upland habitats found at Emory Cove to improve habitat quality to support native plants and wildlife.

1.4 Decision(s) to be Made and Applicable Authorities

Prior to implementing the proposed South Bay Restoration Project, a variety of decisions, approvals, and permits must be obtained. These include:

- State Coastal Conservancy - Adopt the Final Mitigated Negative Declaration and approve the allocation of grant funds
- Port Board of Commissioners – Issuance of Coastal Development Permit for CVWR and accept the grant funds
- Service - Sign a Finding of No Significant Impact allowing implementation of the western salt ponds restoration; approve the commitment of grant funds, and comply with Section 7 of the Endangered Species Act (ESA)
- NOAA - Sign a Finding of No Significant Impact; approve the commitment of ARRA funds, comply with ESA requirements related to the Eastern Pacific Green Turtle; and complete consultation under the Magnuson-Stevens Fishery Conservation and Management Act for federal permitting and funding activities that could adversely affect Essential Fish Habitat
- U.S. Army Corps of Engineers - Issue Letter of Permission, Section 404, and/or Section 10 Permits
- San Diego Regional Water Quality Control Board - Issue a 401 Water Quality Certification or Waste Discharge Requirements
- California Coastal Commission - Issue a Coastal Consistency Determination for restoration of the western salt ponds
- California State Historic Preservation Officer - Sign a Memorandum of Agreement with the Service related to the restoration of the western salt ponds
- Caltrans - Issue an Encroachment Permit for construction access across State Route 75
- Metropolitan Transit System - Issue a Right-of-Entry Permit for construction access across the Bayshore Bikeway
- U.S. Department of the Navy - Approve alterations to the current conditions in the northwestern corner of Pond 11, which is owned by the Navy
- San Diego County Air Pollution Control Board - Comply with Rule 1501 of the Air Pollution Control District's Rules and Regulations

For the Federal Agencies utilizing this document to assist their decision making process, the following authorities apply to the proposed action:

- American Recovery and Reinvestment Act of 2009
- Coastal Zone Management Act of 1972, as amended
- National Wildlife Refuge Administration Act, as amended (16 U.S.C. 668 dd et seq.).
- National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57)
- National Environmental Policy Act of 1969 (NEPA) (P.L. 99-160)
- Endangered Species Act of 1973 (16 USC 1531 et seq.)
- National Historic Preservation Act of 1966, as amended (16 USC 470 et seq.)
- Archaeological and Historic Preservation Act of 1974
- Clean Air Act, as amended (42 USC 7401 et seq.)

- Federal Water Pollution Act of 1948, as amended (33 USC 1251 – 1376; Chapter 758; P.L. 845, 62 Stat. 1155) (Clean Water Act)
- Rivers and Harbors Act of 1899
- Fish and Wildlife Coordination Act of 1932, as amended
- Migratory Bird Treaty Act, as amended (16 USC 703 et seq.)
- Executive Order 12898, 11 February 1994, Environmental Justice

1.5 Consultation and Coordination

Comments on the draft EA/MND were solicited from various local, state, and federal government agencies, Tribal governments, non-governmental organizations, and the public during a 33-day comment period. The draft MND and EA/IS was also sent to the California State Clearinghouse for distribution. A total of 11 agency and public comments and 8 requests for an extension of time were received during the public review period.

An extensive public outreach program for the San Diego Bay NWR CCP, which included the proposal to restore the western salt ponds, was conducted prior to the approval of the CCP and signing of the Record of Decision in September 2006. Public outreach included two initial scoping meetings, seven public workshops, posting information on the Refuge Complex website, various interagency meetings, eight planning update mailings, and several Federal Register notices. In addition, two letters were sent to 22 Tribal governments and other tribal organizations regarding the CCP process and encouraging participation in the development of the CCP. A subsequent letter describing the current proposal to implement a portion of the Final CCP was sent on September 16, 2009.

The three components of the current proposal were also included as potential restoration and enhancement projects in the INRMP. The development of the INRMP was a cooperative effort involving 13 local, state, and federal agencies, as well as members of academia, environmental organizations, and land conservancies. Three public workshops were held during the plan development process to obtain verbal comments, and written comments on the draft plan were requested and received. The final plan, approved in 2000, was signed by the U.S. Navy, Port, Service, CDFG, and National Marine Fisheries Service.

In 2006, the Board of Port Commissioners directed the creation of an Environmental Committee to assist the Port in evaluating and implementing environmental programs. The purpose of the Committee is to advise the Board of Port Commissioners on programs, policies, and projects that would ensure the protection and improvement of the environmental condition of San Diego Bay and the surrounding tidelands. Among other things, the Committee is responsible for providing input to the Port on setting priorities for environmental issues, and reviewing projects to be selected by the Board for funding through the Port Environmental Fund. All projects, including the Emory Cove and CVWR components of the current proposal, that receive funding from the Port Environmental Fund are selected through a public process. The membership of the Committee includes a balance of resource and regulatory representatives from academia, environmental advocacy groups, government agencies, and Port tenants. All Committee meetings are noticed and open to the public.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The proposed action consists of Alternatives 1A(1), 2A(1), and 3A, as described below. The proposed action and alternatives to the proposed action are presented in the EA/IS to fulfill the Federal agencies responsibilities under NEPA. The alternatives have been developed to explore and analyze different ways to achieve the purpose and need of the proposed action, and are intended to represent a reasonable range of alternatives to the proposed action. The decision makers in approving the project may modify the proposal or may approve a different alternative or combination of alternatives addressed in this document following consideration of comments received during the public review period.

Under NEPA, a reasonable range of alternatives generally includes several "action" alternatives, as well as the "no action" alternative (NEPA Section 1502.14(d)). Under the no action alternative, the proposed action would not be implemented and the project site would continue to be managed in its current state. The no action alternative can include not distributing funding, not authorizing a permit, not providing approval, and/or not implementing restoration and enhancement (*Council on Environmental Quality, 40 Most Asked Questions, Question 3*). The no action alternative provides a description of what would happen if no action is taken, and it also serves as the baseline to which all other action alternatives are compared.

This EA/IS evaluates alternatives for each of the three project components as follows:

WESTERN SALT PONDS **Alternative 1A** - Restore Intertidal Habitat using Material Imported from the Chula Vista Wildlife Reserve **(Option 1)** Retain Existing culverts between Ponds 10 and 10A **(Proposed Action)** **(Option 2)** Replace Existing culverts between Ponds 10 and 10A with a New Weir **Alternative 1B** - Restore Intertidal Habitat w/out Importing Material from the Chula Vista Wildlife Reserve **(No Import Alternative)** **Alternative 1C** - Maintain Existing Salt Ponds **(No Action)**
CHULA VISTA WILDLIFE RESERVE **Alternative 2A** - Restore Intertidal Habitat **(1 – Pumping Option)** Pump Excavated Material to Pond 11 **(Proposed Action)** **(2 – Trucking Option)** Truck Excavated Material to Pond 11 **Alternative 2B** - Restore Intertidal Habitat, Dispose of Excavated Material Onsite and/or at a Landfill **(No Import Alternative)** **Alternative 2C** – Maintain Current Conditions **(No Action)**
EMORY COVE **Alternative 3A** - Accept Federal Funds to Assist in Restoration/Enhancement Proposals at this Site **(Proposed Action)** **Alternative 3B** - Do Not Accept Federal Funds **(No Action)**

The total acres of coastal habitat to be restored and/or enhanced under the proposed action (Alternatives 1A(1), 2A(1), and 3A) are presented in Table 2 below. Habitat acreages that would be restored and/or enhanced under the various alternatives are described in Section 2.2.

Table 2
Coastal Habitat to be Restored and/or Enhanced under the Proposed Action

Project Component	**Acres to be Restored/Enhanced** (approximate)
Western Salt Ponds	230
Chula Vista Wildlife Reserve	50
Emory Cove	25
Total (acres)	**305**

2.2 Proposed Action and Alternatives for the Three Project Components

The three components of the South Bay Coastal Restoration Project (i.e., western salt ponds, CVWR, and Emory Cove) are described separately below; however, where one component may be dependent upon another component to achieve the needs of the overall project, this interdependency is noted in the appropriate sections.

2.2.1 Western Salt Ponds

The western salt ponds, consisting of Ponds 10, 10A, and 11, include approximately 223 acres of open water and seven acres of associated levees. Located in the southwest corner of San Diego Bay (refer to Figure 2), these three salt ponds are currently part of a 1,060-acre commercial solar salt facility that operates under a Special Use Permit from the Service. As part of the commercial solar salt operation, these ponds function as primary ponds and have salinity levels similar to those of the adjacent bay. The tide gate in Pond 10 allows water from the bay to enter the solar salt system, but once the bay water flows into the salt pond system, it is never reintroduced into the bay. The salt pond system is a closed system; the ponds are not subject to tidal exchange.

The western salt ponds are located on public trust lands managed by the Service as part of the San Diego Bay NWR under a 66-year lease with the California State Lands Commission. Implementation of the proposed action would result in the restoration of tidal exchange to the western salt ponds in a manner that would support a range of tidal habitats, from subtidal to high salt marsh (Figure 3). Note that the distribution of habitats shown in Figure 3 is subject to refinement during final engineering.

Three alternatives are evaluated for the western salt ponds. Under the first alternative (1A), the ponds would be restored using material imported from the CVWR. Alternative 1A has two

Figure 3

options related to Pond 10A: 1) retain the existing culverts between Pond 10 and 10A (proposed action), and 2) replace the existing culvert with a new weir. The habitat distribution within Pond 10A is different under each option. The second alternative (1B) would restore the ponds without importing material from the CVWR. The third alternative (1C) is the no action alternative.

2.2.1.1 Proposed Action: Alternative 1A – Restore Intertidal Habitat using Material Imported from the Chula Vista Wildlife Reserve

Project Description

Overview. Under the proposed action, tidal influence would be restored to approximately 223 acres of commercial solar salt ponds (i.e., the western salt ponds) to support a range of habitats including shallow subtidal, intertidal mudflat, cordgrass-dominated salt marsh, pickleweed-dominated salt marsh, and native wetland/upland transitional habitat (refer to Figure 3). The restoration design for this alternative emphasizes: 1) the creation of a system of subtidal channels provided to ensure adequate tidal circulation throughout the western salt ponds; and 2) the restoration of cordgrass-dominated salt marsh habitat, habitat that historically occurred along the south end of San Diego Bay prior to the construction of the salt works (Figure 4). The estimated acreages for each of the habitat types expected to be supported within the western salt ponds under this alternative are provided in Table 3.

Table 3
Estimated Habitat Acreages for Alternative 1A(1)
(Proposed Action, Western Salt Ponds)

	Pond 11 (acres)	**Pond 10** (acres)	**Pond 10A** (acres)	**TOTAL** (acres)
Subtidal	21.8	3.4	9.5	**34.7**
Intertidal Mudflat	12.7	3.1	3.7	**19.5**
Low Salt Marsh	63.8	58.3	1.2	**123.3**
Mid Salt Marsh	5.0	14.2	2.5	**21.7**
High Salt Marsh	2.5	5.0	6.8	**14.3**
Coastal Scrub (Upland)	1.2	2.5	12.8	**16.5**
TOTAL (acres)	**107.0**	**86.5**	**36.5**	**230**

Restoration of the western salt ponds will require removing Ponds 10, 10A, and 11 from the existing solar salt pond operation; constructing a new tide gate in Pond 12 to serve the remaining solar salt operation to the east of the Otay River; altering the elevations in the western ponds to achieve elevations appropriate for supporting the desired habitat types; and breaching the ponds to restore tidal influence. Commercial solar salt production would continue within the eastern ponds under a revised Special Use Permit. The removal of the western salt ponds from commercial salt production is likely to reduce annual salt production

Figure 4

by 20 percent, representing a reduction in revenues for South Bay Salt Works. This would also result in reduced rental income to the San Diego County Airport Authority, which leases the 17 acres on which the salt processing plant is located to South Bay Salt Works.

New Tide Gate Construction. Currently, all of the water within the existing solar salt ponds at the south end of San Diego Bay enters the salt pond system via an existing tide gate in Pond 10. After being held in Ponds 10, 10A, and 11 for a period of time, the water is then moved to Pond 12, located across the Otay River channel to the east, via a siphon that extends from the northeast corner of Pond 10 across the floor of the Otay River channel into Pond 12. With the proposal to restore the western salt ponds, a new water entry point for the solar salt operation would be needed. Because Pond 12 is currently the point at which water flows into the system from the western ponds, it was determined that the most suitable location for a new tide gate would be along the western level of Pond 12 (Figure 5). The new tide gate will allow for the continued operation of the salt works on the east side of the Otay River. Salt pond management via solar salt production is necessary to ensure that conditions in the remaining functioning salt ponds are not significantly altered and will continue to support migratory birds in a manner equivalent in value to existing conditions until such time as the ponds are restored to tidal influence.

Construction of the new tide gate will involve the removal of an approximately 40-foot-long section of the existing outer levee in Pond 12 and replacing that portion of the earthen levee with a new concrete and steel water control structure/tide gate (Figures 6 and 7). The tide gate will consist of a four cell concrete box culvert with flap gates on the salt pond side (east side) of the structure and stop gates on the Otay River side (west side). The entire structure would be 36 feet wide from east to west and 33 feet, 3 inches long from north to south. The apron of the structure would extend to at least -0.43 feet MLLW, with the bottom of the box culvert to be placed at about 4.5 feet NAVD88 and the top of the flap gates at 10.5 feet NAVD88. The tide gate will be designed to include a 16-foot-wide driving surface to accommodate vehicle access across the top of the structure. Rip-rap may need to be placed at the based of the apron on the east and/or west side of the structure. The project specifications are subject to minor revision during final design.

An area of approximately 16,300 square feet (0.374 acre) would be graded in association with the installation of the new tide gate, generating 300 cubic yards of material. Approximately 12,830 square feet (0.294 acre) of the area to be affected would be disturbed as a result of the construction of temporary cofferdams needed to keep water out of the area during construction. Permanent impacts of 3,614 square feet (0.08 acres) would occur on both the east and west side of the tide gate. Approximately 204 square feet of the area to be permanently impacted currently supports tidally influenced habitat. A portion of this habitat (approximately 60 square feet) would be replaced with the structure's concrete apron and the 144 square feet would likely be impacted during the placement of rip rap around the outside

Figure 5

Figure 6

Figure 7

of the apron. Some areas of permanent impact would occur above elevation 7.40 feet NAVD88 and would therefore have no affect on wetland habitat. Approximately 2,530 square feet (0.058 acre) of impacted area would consist of recontoured levee that would be lowered to meet the grade of the new structure and 940 square feet would be occupied by the new structure. The majority of the recontoured levee slopes would be at elevations that would support tidally influenced habitat and would be expected to revegetate through natural recruitment.

Temporary cofferdams would be installed prior to preparing the levee for tide gate installation. The type of temporary cofferdams to be installed has not yet been determined, but the most common cofferdams are constructed using soil, steel sheeting, or wooden sheathing. Because of existing site conditions, it is likely that steel sheeting will be installed. If, however, the temporary cofferdams are constructed with soil, the soil would be borrowed from existing internal levees within Pond 12 that are located in proximity to the new tide gate site. Approximately 2,300 cubic yards of material would be needed to construct a cofferdam on each side of the proposed structure.

Once the cofferdams are in place, the area between the two cofferdams would be dewatered, with the water pumped from the construction site into Pond 12. Following dewatering, the outer levee of Pond 12 would be excavated, removing approximately 300 cubic yards of material, to create a space for the installation of the tide gate. The excavated material would be placed on internal levees located within Pond 12. Once the tide gate is in place, the material used to create the cofferdams would be removed. In the case of earthen cofferdams, the soil would be returned to the location within Pond 12 in which it was obtained.

Construction access for the tide gate project would be through the salt works, via the outer levees and all construction staging would be confined to the salt works. The types of land-based equipment that would be needed for tide gate installation include a bulldozer, front end loader, dump truck, backhoe, de-watering pump, and possibly a pile driver and crane. Project construction is expected to begin sometime in late 2009 and will take approximately two to four weeks to complete.

As part of the scope of this project component, to mitigate permanent impacts to approximately 204 square feet of intertidal habitat, approximately 820 square feet of intertidal wetland habitat would be restored and enhanced within the Refuge on a site located along the northern bank of the Otay River channel, upstream of the project site. The details of this restoration project are described in Section 4.8.1.

Tidal Conditions. The primary objective of this project component is to restore tidal influence to the western salt ponds. As proposed, full tidal exchange would be restored in Ponds 10 and 11, and a muted tidal exchange would occur in Pond 10A. The range of elevations supporting specific habitats types will differ in Ponds 10 and 11, which will have full tidal exchange, and Pond 10A, which will experience a muted tidal exchange. Elevations associated with each type of habitat in the western ponds are shown in Table 4.

Table 4 Habitat Elevations for the Western Salt Ponds (top of range, in feet NAVD88)				
HABITAT	**POND 11**	**POND 10**	**POND 10A Option 1**	**POND 10A Option 2**
Upland	no limit	no limit	no limit	no limit
Intertidal				
High Marsh	7.4	7.4	5.3	7.4
Mid Marsh	5.6	5.6	4.9	4.4
Low Marsh	4.1	4.1	4.7	4.2
Non-Vegetated	2.6	2.6	4.6	4.1
Subtidal	-0.4	-0.4	4.3	4.0

Source: (*Everest International 2009*)

Two options were evaluated for the connection between Ponds 10 and 10A including: Option 1- the existing condition, which consists of five circular culverts each with a 30-inch-diameter pipe and an invert elevation of +4.0 feet NAVD88; and Option 2 - construction of an optimized weir inlet under the bike path that would have an inlet invert width of 60 feet and an invert elevation of +4.0 ft NAVD88. After breaching the western salt ponds, Pond 10A with the existing culvert connection (Option 1) would have the most tidal muting of the two options. Installing a weir inlet under the bike path (Option 2) would result in no muting of the high tides but there would still be muting of the low tides. For Pond 10A, the lowest water elevation is controlled by the ground elevation of the pond, which has a lowest elevation of +4 ft NAVD88. The amount of tidal muting experienced within Pond 10A will affect the habitat distribution within the pond as indicated in Table 4. Under the proposed action, the existing culvert configuration under the bike path would remain (Option 1).

Salt Pond Preparation. Preparing the western salt ponds for restoration will involve modifying the elevations within the ponds to provide conditions suitable for supporting the desired habitat types and breaching the outer levees to restore tidal influence within the ponds.

Modification of the elevations will be accomplished through excavating and redistributing substrate material within and between Ponds 10 and 11 and, for this alternative, importing and distributing material from the CVWR in Pond 11 to achieve elevations within the ponds suitable for supporting the habitat types and acreages indicated in Table 3. Of the material to be excavated within Ponds 10 and 11, approximately 150,000 cubic yards will be redistributed among these ponds to help achieve desired elevations. In general, the proposed earthwork will result in lowering the elevations in Pond 10, which tend to be higher than +4.5 feet mean lower low water (MLLW), and raising the elevations in portions of Pond 11, which tend be to significantly lower than +3.5 feet MLLW, to maximize the area within both ponds that will have elevations between +3.5 feet and +4.5 feet MLLW, which is the elevation range appropriate for supporting cordgrass-dominated salt marsh habitat (*Zedler et al. 1999*).

In addition to the redistribution of 150,000 cubic yards of material between Pond 10 and 11, this alternative also includes the proposal to import approximately 50,000 cubic yards of excavated material from the CVWR to Pond 11 to maximize the amount of cordgrass within the restored pond. (Transport methods for the 50,000 cubic yards of material are described in detail in Section 2.2.2.1.).

A system of subtidal channels will be created within Ponds 10 and 11 to facilitate good tidal circulation within the restored ponds. These subtidal channels will range from elevations of about -4.00 feet NAVD88 at the deepest points to -0.40 feet NAVD88 along the edges of the channels. Approximately 46,500 cubic yards of material (soil) will be generated as a result of constructing the channels. This material will be redistributed within Pond 11, as described above. Based on the preliminary engineering designs, accommodating the tidal channels within Ponds 10 and 11 will require two openings within the internal levee that currently separates Ponds 10 and 11. An existing opening in the levee located near the western edge of the ponds will be used as one of the connection points and an additional connection will be cut in this internal levee about halfway between the eastern and western edges of the ponds (refer to Figure 3). Another existing opening in this internal levee near the eastern edge of the ponds will be closed as it is not needed for tidal circulation. The design of the channel system and location of the levee openings is subject to modification during final engineering, but these changes are not expected to be substantial.

To facilitate full tidal exchange within Ponds 10 and 11, the outer levees will be breached in two locations. Modeling to determine what the appropriate location, size, and invert elevation of the breaches must be to achieve full tidal exchange was conducted for the project (*Everest International 2009*). The results of the modeling indicate that a breach at the northeast corner of Pond 11 would have to be 170 feet wide with an invert width of 80 feet and sides with a slope gradient of 4:1 (Figure 8). The invert elevation of this breach would be -2.5 feet NAVD88. The second breach would be created at the location of the existing tide gate in Pond 10. Modeling indicates that this breach would have to be 115 feet wide with an invert width of 30 feet and an invert elevation of -2.5 feet NAVD88 (refer to Figure 8). The soil excavated from the breach sites will be used to build up adjacent portions of the levees and/or used to create a berm around Pond 10A (additional details provided below). The tide gate removed from Pond 10 will be transported off the site. Any materials that can be recycled will be taken to an appropriate metal recycling center and all other material will be transported to a landfill.

The portions of the levees not affected by breaching will be retained to provide roosting habitat and refugia for various avian species. However, the entire length of the levees will not be enforced with fill or actively maintained, therefore, some portions of the levees may erode over time due to the long-term effects of tidal erosion, wind waves, and sea level rise.

The only earthwork anticipated in Pond 10A would be that required to construct a low berm around the eastern edge of the pond boundary, as described below. The required earthwork and habitat distributions within the ponds will likely be further refined during the preparation of final construction plans.

Figure 8

Construction Methods. The potential construction methods for restoring the salt ponds can be grouped into land-based earthwork and hydraulic dredging. Both earthwork construction methods are being considered at this stage to bracket the range of available options. The earthwork methodology that will ultimately be used to restore the western salt ponds will depend upon the feasibility and/or availability of construction equipment. For example, it is not known if the soils in the existing ponds can support tired or tracked land-based equipment. It is also not known what hydraulic dredges will be close enough to the project site to make mobilization affordable. The two methods are described in greater detail below.

Land-Based Earthwork

Earthwork in "dry" soil conditions would rely on the use of land-based equipment to excavate, haul, and grade the soil to achieve the proposed ground contours. The first step would be to drain the existing ponds either by moving the water in the ponds to Pond 12 or releasing water through the existing tide gate in Pond 10 during naturally occurring low tides. Under the latter option, after the water has been released tidal exchange at the connection between Pond 10 and the Otay River would be blocked off. The remaining water would then be drained with the use of mechanical pumps and the ground would be allowed to dry. Assuming dry areas can support land-based equipment, dozers, backhoes, scrapers, and trucks would be used for earthwork construction. After the proposed ground contours are achieved, the levees would be breached to introduce continuous tidal exchange.

Up to 50,000 cubic yards of soil will be delivered from the CVWR restoration site to Pond 11. If this soil is available before land-based earthwork begins, then the soil would be deposited to match the planned contours as best as possible. After diking and drying, final grading would then be performed with land-based equipment. If the imported soil is not available until after completion of the land-based earthwork, then a second round of grading would be performed to achieve the final ground contours. Breaching the outer levees of Ponds 10 and 11 would be completed with backhoes and other land-based equipment, and material would be used in the ponds to provide higher elevation areas that would later provide refugia for rails and other shorebirds during high tides.

The type and quantity of land-based equipment needed to complete the earthwork construction is listed in Table 5. This listing includes the types and quantities of construction equipment, as well as power ratings, expected daily hours of operation, expected number of construction days, and total number of expected construction hours. The hours of operation were estimated from the quantity of earthwork and daily output of each piece of equipment (*RSMeans 2006*). The equipment hour estimates below are large enough to cover either of the imported soil scenarios discussed above. The equipment required to transport soil from the CVWR is not included in Table 5, instead refer to Section 2.2.2.1 below.

Table 5 Dry Earthwork Equipment for Salt Pond Restoration					
Equipment	**Quantity**	**Power Rating**	**Hr/Day**	**Days**	**Total Hours**
Bulldozer	1	300 hp	10	60	599
Front End Loader (5cy)	1	250 hp	10	62	616
Dump Truck (12 cy)	8	300 hp	10	63	5066
Backhoe (3cy)	1	290 hp	10	4	40
De-watering pump (330 gpm)	10	10hp, 230V	24	37	8800

It is anticipated that construction activities using land-based equipment would occur between sunrise and sunset of each day and from Monday through Saturday of each week. Construction would begin sometime after mid September 2010 and would be completed by mid February 2011. No construction activity is proposed within the salt ponds or at the CVWR during the California least tern nesting season (April 15 to September 1). It is estimated that all the work related to the restoration of the salt ponds under this land-based earthwork scenario would be completed within three to four months.

Hydraulic Dredging

Hydraulic dredging would use mainly water-based equipment to dredge, transport, and distribute the soil. A significant component of hydraulic dredging is mobilizing the equipment to the project site. Dredges can be transported to the site via water or land depending on the unit size and access conditions. The U.S. Army Corps of Engineers, Los Angeles District (USACE-LAD) has used dredge types ranging from clamshells to hydraulic cutterhead suction dredges (cutterhead dredge) for prior work in Southern California (*USACE-LAD 2008*). For this project, it was assumed that a small, electric cutterhead dredge would be used to complete the dredging. This dredge would be mobilized to the project site via land and then assembled in one of the ponds. Access to the ponds could be via State Route (SR) 75 to the northern levee of Pond 11 or from northern terminus of 8th Street in Imperial Beach. The specific location for mobilization will be determined based on coordination with Caltrans District 11 and the cities of Coronado and Imperial Beach.

Water control structures would be essential for the dredging operations in Pond 10 and for disposal of dredged material into Pond 11. For dredging, sufficient water levels must be maintained to float the barge holding the cutterhead and supply the slurry for sediment transport. At the disposal end of the pipeline, the high volumes of water in the slurry must be allowed to drain away from the pond without damaging infrastructure. It is assumed that elevated water from Pond 11 would be allowed to drain back to Pond 10 to re-supply the cutterhead dredge. Only a small amount of water would be lost and require re-supply through water control structures. After draining the ponds, final grading would

be performed with land-based equipment and the levee breaches would be completed with backhoes and other land-based equipment.

The type and quantity of dredging and earthwork equipment needed to complete the earthwork construction under this dredging option is listed in Table 6. This listing includes the types and quantities of construction equipment, as well as power ratings, expected daily hours of operation, expected number of construction days, and total number of expected construction hours. The hours of operation were estimated from the quantity of earthwork and daily output of each piece of equipment (*RSMeans 2006*). The equipment hour estimates below are large enough to cover either imported soil scenario discussed previously. The equipment required to transport soil from the CVWR is not included in Table 6, instead refer to Section 2.2.2.1 below.

It is anticipated that construction activities using hydraulic dredging equipment would occur 24 hours per day from Monday through Saturday. There would be an average down time of two hours per day for crew changes, maintenance, and repairs. If hydraulic dredging cannot operate 24 hours per day, the overall number of days would be longer than listed in Table 6. Construction would likely begin in mid September and be completed by mid February. It is estimated that all the work under this option would be completed within three to four months.

Table 6
Dredging Earthwork Equipment for Salt Pond Restoration

Equipment	Quantity	Power Rating	Hr/Day	Days	Total Hours
12” Cutterhead Dredge	1	500 hp (electric)	22	25	560
Support Boats	2	300 hp	4	30	240
Bulldozer	1	300 hp	10	17	166
Front End Loader (5 cy)	1	250 hp	10	1	8
Dump Truck (12 cy)	1	300 hp	10	10	95
Backhoe (3 cy)	1	290 hp	10	4	40
Dewatering pump (330 gpm)	10	10hp, 230 V	24	37	8000

Construction Staging and Access. Under either construction method, construction staging area would be required. The two sites that could be used for construction staging include: the northern levee of Pond 11, which would be accessed from SR-75 just to the south of the existing parking area for the County of San Diego’s Biological Study Area; and the eastern levee of Pond 10, which would be accessed from the end of 8th Street in Imperial Beach. Coordination with Caltrans, the Metropolitan Transit System, the Cities of Coronado and Imperial Beach, and the Bayshore Bikeway Working Group will occur during the development of final restoration plans to incorporate appropriate design and construction specifications related to traffic control for SR 75 and the Bayshore Bikeway, as well as the protection of the existing infrastructure (e.g., bike path surface, street curbs, roadway surface).

Berm around Pond 10A. In addition to the restoration-related construction activity proposed within Ponds 10, 10A, and 11, the project also includes a proposal to construct an earthen berm along the eastern edge of Pond 10A from just south of the Bayshore Bikeway south for a distance of approximately 1,500 linear feet. The 1.5 to 2.0-foot-high earthen berm would have a 10-foot crest width and 4:1 side slopes. The crest elevation of the berm at 1.5 feet above existing ground level would be 8.5 feet NAVD88. This berm will retain tidal waters within the boundaries of the Refuge during the highest high tides, which occur once or twice each year. Approximately 500 cubic yards of material would be required to construct the berm. This material would be obtained from within the western salt ponds and would not require any material to be imported to the site from outside the Refuge boundary. The type of land-based equipment needed to create this berm would include a bulldozer, front end loader, dump truck, and backhoe.

Construction of the berm would likely occur between December 2010 and February 2011 and would take approximately two weeks to complete. Once completed, appropriate native vegetation would be planted on the berm.

Project Fencing. The restoration plans also include a future proposal to install a maximum six-foot-high, black vinyl chain linked fence along some or all of the western edge of Ponds 10, 10A, and 11. To the extent possible, the fence would be installed below the grade of the highway, near the base of the slope that extends down from the highway to the ponds, and above the influence of the tides. Native vegetation would be planted adjacent to the fence where it would occur within sight lines from SR-75 to obscure its appearance.

Planting Plan. A detailed planting plan will be developed for the recontoured ponds. The focus of this planting plan will be on establishing cordgrass within Ponds 10 and 11. In addition, species that would be considered for planting in the mid-high marsh zones include shore grass (*Monanthochloe littoralis*), salt grass (*Distichlis spicata*), jaumea (*Jaumea carnosa*), alkali heath (*Frankenia salina*) and saltwort (*Batis maritima*). Many of the species being considered for planting can be propagated from cuttings harvested from the existing salt marshes of south San Diego Bay. Cordgrass would be propagated from seed collected in surrounding salt marsh areas in south San Diego Bay.

Monitoring Plan. A detailed monitoring plan is being developed. Below is a general description of what may be included in the plan. The project will include pre- and post-construction monitoring of the physical and biological processes occurring in the ponds. Preconstruction monitoring will begin in September 2009. Funding is currently available to continue monitoring for three years following pond breaching, which is expected to occur in February 2011. Additional monitoring will continue beyond 2014 as funding becomes available. Preconstruction monitoring of physical processes will cover existing topography and pond bathymetry, water quality, and soil characteristics (e.g., soil texture, organic content, salinity/conductivity, and pH). The biological processes being considered for preconstruction monitoring include some level of benthic macroinvertebrate sampling and sampling of fish, as well as monthly bird presence and absence surveys through the existing salt works and additional bird use surveys in the western ponds. Vascular plants within the restoration area will also be mapped and inventoried. Post-construction monitoring will

replicate pre-construction monitoring to identify changes within the ponds over time. The data will enable the Service to determine if project objectives are being met and if there are any unexpected outcomes that require changes in management to achieve project objectives.

2.2.1.2 Alternative 1B - Restore Intertidal Habitat without Importing any Material from the Chula Vista Wildlife Reserve

Project Description

Overview. Alternative 1B is similar to Alternative 1A in all respects except for the amount of earthwork that would occur. Under Alternative 1B, no material would be imported to the western salt ponds from CVWR or any other location. The restoration plan for Alternative 1B (Figure 9) would focus on: 1) creating a subtidal channel network, as proposed in Alternative 1A, that would ensure adequate tidal circulation within the ponds; and 2) providing elevations to support more intertidal mudflat within Ponds 10 and 11 than is proposed in Alternative 1A. The estimated acreages for each of the habitat types expected to be supported within the western ponds under this alternative are provided in Table 7.

New Tide Gate Construction. The relocation of the tide gate from Pond 10 to Pond 12 would be identical to that described in Alternative 1A.

Salt Pond Preparation. Preparing the western salt ponds for restoration under Alternative 1B would be similar to Alternative 1A, in that 150,000 cubic yards of material would be redistributed within the ponds. However, the 50,000 cubic yards from the CVWR would not be imported to the site. The location of the subtidal channel network would remain the same as that shown in Alternative 1A. The outer levees would be breached in two locations, just as described for Alternative 1A.

Table 7
Estimated Acreages for the Habitats to be Restored in the Western Salt Ponds Under Alternative 1B

	Pond 11 (acres)	**Pond 10** (acres)	**Pond 10A** (acres)	**TOTAL** (acres)
Subtidal	25.1	3.4	0	**28.5**
Intertidal Mudflat	20.6	8.8	0	**29.3**
Low Salt Marsh	52.5	52.7	7.3	**112.6**
Mid Salt Marsh	5.0	14.2	18.5	**37.7**
High Salt Marsh	2.5	5.0	7.4	**14.9**
Coastal Scrub (Upland)	1.2	2.5	3.3	**7.0**
TOTAL (acres)	**106.9**	**86.6**	**36.5**	**230.0**

Figure 9

Construction Methods. The construction method options to be utilized are identical to those described in Alternative 1A.

Berm around Pond 10A. A berm would be constructed around Pond 10A as described in Alternative 1A.

Culvert between Ponds 10 and 10A. Under this alternative, only culvert option 1, the existing conditions, would be considered.

Project Fencing. The proposal for future fencing around some or all of the western salt ponds as described in Alternative 1A is also included in the scope of the project under this alternative.

Planting Plan. The objectives of the planting plan, as described for Alternative 1A, would also apply to this alternative; however, larger areas of unvegetated intertidal habitat would be supported under this alternative.

Monitoring Plan. The implementation of pre- and post-construction monitoring under this alternative would be the same as described for Alternative 1A.

2.2.1.3 Alternative 1C - No Action

Under the No Action Alternative, the western salt ponds would continue to be used for commercial solar salt production and no habitat restoration would be implemented.

2.2.2 Chula Vista Wildlife Reserve

The CVWR, which consists of a 60-acre "island" connected to the South Bay Power Plant site via an access road, is located in south San Diego Bay, approximately 4,600 feet northeast of the western salt ponds (refer to Figure 2) and just to the west of the South Bay Power Plant. This site consists of two shallow basins divided by a higher fill area of which 6.5 acres is managed for California least tern nesting.

2.2.2.1 Proposed Action: Alternative 2A – Restore Intertidal Habitat and Export Excavated Material to Pond 11

Project Description

On-Site Excavation and Site Preparation. Alternative 2A proposes to expand functional intertidal coastal salt marsh habitat by lowering much of the highest intertidal and supertidal portions of the CVWR and connect a new channel system to the existing developed channels within the basins (Figure 10). The work would be conducted in the southern portions of both the east and west basins of the CVWR. Habitat acreages before and after project implementation are presented in Table 8.

Figure 10

Table 8 Habitat Acreages at the Chula Vista Wildlife Reserve (Existing and Proposed)		
Habitats	**Existing (acres)**	**Proposed (acres)**
Shallow Subtidal	1.6	2.3
Intertidal Mudflat	5.6	5.6
Coastal Salt Marsh (low)	23.2	32.0
Coastal Salt Marsh (mid)	4.7	4.7
Coastal Salt Marsh (high)	7.3	4.4
Least Tern Nesting Area	6.5	6.5
Unvegetated Levees/Berms	5.2	4.8
Disturbed/Unvegetated Uplands	6.4	0.2
Total Acreage	**60.5**	**60.5**

To achieve the desired habitat types, the southern portions of both the east and west basins would be lowered from +5.0 to +12 feet MLLW to elevations appropriate for supporting low and mid salt marsh habitat. The proposed excavation would generate approximately 50,000 cubic yards of material comprised principally of fine clay and silt. This material originates from the excavation of materials from the J-Street (Chula Vista) Marina. Under this alternative, the 50,000 cubic yards of material generated to restore the CVWR would be exported to Pond 11.

A combination of conventional earthmoving equipment, as listed in Table 9, would be used to implement the project. Excavators, bulldozers, and loaders would be used to cut the topography down from existing high elevations to marsh grades. The excavated material would then either be transported to a sump located at the southern end of the CVWR or loaded into trucks and taken via existing roads to Pond 11. Once the construction equipment is delivered to the site, only limited equipment exchanges would occur through haul-in and haul-out on highway transport trailers.

Table 9 Dry Earthwork Equipment Estimate for the Chula Vista Wildlife Reserve					
Equipment	**Quantity**	**Power Rating**	**Hr/Day**	**Days**	**Total Hours**
Bulldozer	1	300 hp	8	60	640
Front End Loader (5cy)	2	250 hp	8	60	1280
Dump Truck (12 cy)	8	300 hp	8	60	5120
Trackhoe	3	250 hp	8	60	1920
Water Truck	1	290 hp	8	60	640
Skip Steer	1	250 hp	8	60	640

Construction staging will occur along the southern edge of the CVWR and access to the site for mobilization and demobilization will be via Interstate 5 (I-5), using the L Street exit, west to Bay Boulevard. The project is anticipated to take up to four months to complete and construction will occur between September 1 and March 15. All construction equipment will be removed from the site and any rehabilitation of the on-site nesting area, which had been occupied by the contractor during construction, will be occur no later than April 1.

Transport of Excavated Material. As described in Alternative 1A (western salt ponds), the material excavated from the basins will be transported to Pond 11 to create and expand the extent of the necessary elevation conditions in that pond for supporting cordgrass habitat. Two options will be considered for transporting this material to Pond 11. The preferred option is to transport the material by pumping it through a pipeline that will extend from the CVWR to Pond 11. Alternatively, the material could be trucked to Pond 11. Additional information regarding the transport of the 50,000 cubic yards of material is provided below.

Alternative 2A(1) Pumping Option - Export Material via Pumping System (Proposed Action)

To prepare the excavated material for transport to Pond 11 via a pumping system would require the use of a hydraulic suction pump with a cutterhead. Pumping would be from the bottom of a deep sump, excavated at the south edge of the CVWR. An approximately 10-foot-wide intake cut would be made through the existing armored shoreline to connect the adjacent channel that runs along the southern edge of the CVWR with the sump. The channel would be constructed in a manner that would allow water to spill into the sump from the discharge channel at all tides. The depth of the channel would be equivalent to or shallower than the floor of the channel to provide a constant flow of water at the rate necessary to balance pumping.

The water intake channel will be screened using either a temporary porous rip rap barrier or installing a temporary wide mesh screen or chain-link fencing to prevent turtle and adult fish impingement. In addition, the impingement barrier surface area will be scaled to ensure that water velocity never exceeds 2 knots across the barrier (less than half the velocity of adjacent channel flows at low tides). The specific design of the exclusion barrier will be developed through a performance specification and implementation of this measure would be reviewed and approved by the Port.

The sediment pump would either be a stationary pump set in a temporary pit to be excavated within the existing disturbed uplands or a pump mounted on an excavator arm that could be moved around the pit to optimize sediment/water balance. The pump would push a sediment/water mix through a floating or sunken dredge line to Pond 11. Pumping the slurry material across the bay would likely involve the use of diesel hydraulic pumps with 8-14-inch discharge hoses. Booster pumps are not anticipated to be required for the 6,200 feet of pumping distance between the CVWR and Pond 11.

The line would likely consist of steel or welded HDPE plastic that is assembled on the CVWR and floated across to Pond 11 during high tides using a workboat towing the pipeline as excavators feed it off of the land. The pipeline may be bolted together in

sections using flanges to connect links of pipe. Once in place, the pipeline would be anchored into position with temporary anchors adequate to protect the line from large-scale movement during rising and falling tides and power plant cooling water discharge flows. The pipeline would be periodically monitored to ensure that anchors remain secure and no significantly leakage is occurring. The contractor may use a variety of anchoring devices including plow anchors, clump weights, or temporary piles to secure the discharge hose across the discharge channel. The pipe would either sit hard on the bottom, or float up and down with the tides. It would not obstruct flows or tides, and the Contractor would be required to provide at least one sunken segment at the deeper channel adjacent to the island, in order to accommodate the limited small vessel traffic in the area, as well as hazard buoys or signs to warn boaters of the presence of the pipeline in the water.

Pumping pre-handled material from a sump generally results in higher sediment to water ratios than does dredging because material is dumped or pushed directly onto the intake. As a result, it is expected that blends of 20-60% solids would be moved in the slurry stream. At 25% solids, it is anticipated that 30 million gallons of water would be required to transfer the material to Pond 11. This volume constitutes 7.5% of the flow volume passing through the South Bay Power Plant on a daily basis under normal operating conditions or 5% of the plant's maximum operational capacity. Over the estimated four months of construction, the daily average would be expected to be approximately 0.06% of the daily average flow through the South Bay Power Plant cooling system.

The slurry is to be pumped with operations running up to 24 hours per day for up to 6 days per week. The final working hours will be determined through design and bid document preparation.

Alternative 2A(2) <u>Trucking Option</u> - Export Material using Trucks
Under this transport option, the 50,000 cubic yards of material excavated from the site would be transported to Pond 11 via truck. The proposed truck route would extend from the South Bay Power Plant to the northern levee of Pond 11, a distance of approximately six miles (12-miles round trip). Once the trucks exit the plant site, they would travel north on Bay Boulevard to the L Street on-ramp to southbound I-5. Trucks would exit southbound I-5 at Palm Avenue (SR-75) and travel west and then north on SR-75 to the northern levee of Pond 11. Return trips would use the same route in reverse. Truck activity would occur between the hours of 9:00 a.m. and 4:00 p.m. to avoid the use of these roadways during peak traffic hours. A total of 5,000 round trips would be required if 10-cubic-yard capacity trucks are used to transport the material and 2,500 round trips if 20-cubic-yard capacity trucks are used. An estimate 56 truck trips per day would occur over a 60-day period. Traffic control at the unloading site (Pond 11) would be provided during this operation to avoid any safety issues along SR-75.

<u>Planting Plan</u>. Once the excavation and disposal tasks have been completed, volunteers, providing 750 volunteer hours, will assist in planting cordgrass in the excavated basins. Disturbance to the site's 6.5-acre least tern nesting site by April 1, 2011, which is prior to the

commencement of the least tern nesting season. Under the pumping option, the slurry mixing pit would be filled with previously excavated material, the barrier placed at the sump intake channel would be removed, the intake channel would be filled, and the armored shoreline would be restore to pre-construction conditions. If all or a portion of the pit was located within the least tern nesting site, once the pit is filled, it would be capped with sand set aside when the pit was constructed.

Monitoring Plan. Annual monitoring and data analysis will consist of: measuring the annual accumulation of sediment at the CVWR, from 2011 to 2016; monitoring vegetation growth and abundance from March 2010 to March 2016; comparing the 2008 baywide bird, eelgrass and fisheries studies for South Bay to the same study results from 2012/2013 baywide surveys to determine species density and abundance changes between surveys; and, water quality monitoring of turbidity, nitrogen, ammonia, phosphorus and dissolved oxygen in the water at the CVWR from 2011 to 2016. Based on the comparative analysis of the annual monitoring results, the project will develop recommendations for future restoration projects to more effectively achieve restoration objectives.

Annual vegetation monitoring will consist of establishing line-intercept transects with GPS and assessing percent plant coverage and type of plants present. Vegetation growth and abundance will be compared with the previous monitoring periods. Additionally, an inventory of animal species will be noted, plus an assessment of general site conditions along with site photos will encompass the annual vegetation report.

2.2.2.2 Alternative 2B – Alternative Use of the Excavated Material

Project Description

Overview. This alternative would include the same restoration and enhancement proposals that are described in Alternative 2A (refer to Figure 10). The primary difference is that instead of exporting the excavated material to Pond 11, the material would either be disposed of onsite, or the material would be trucked to a nearby landfill.

On-Site Excavation and Site Preparation. On-site excavation and site preparation as described under this alternative would be identical to that described in Alternative 2A.

Construction Methods. The construction methods described in Alternative 2A would also apply to this alternative.

Transport of Excavated Material. Under Alternative 2B, none of the excavated material from the CVWR would be transported to Pond 11. Instead, this alternative includes two alternative options for disposal of the excavated material. Under the first option, the 50,000 cubic yards of material would be buried within the least tern colony site, raising the site by approximately 5.7 feet to a maximum elevation of 15.7 feet MLLW. Once the material was in place, the site would be recovered with sand. While this is a viable option, it would create greater management needs due to an increased potential for sand loss from wind and water erosion.

A second option would be to transport the excavated material (50,000 cubic yards) offsite, must likely to the Otay Landfill. This would result in 2500 trips using 20-ton capacity trucks traveling a total roundtrip distance of 13 miles. The truck route would include I-5 south to I-905 east, to I-805 north to Main Street in Chula Vista and then north on Maxwell Drive. This route is similar to the route used by trash transport vehicles unloading at the landfill. Trucks would travel to the landfill between the hours of 9:00 a.m. and 4:00 p.m. An estimate 56 truck trips per day would occur over a 47 day period.

Planting Plan. All aspects of the planting plan under this alternative would be identical to that described in Alternative 2A.

Monitoring Plan. All aspects of the monitoring plan under this alternative would be identical to that described in Alternative 2A.

2.2.2.3 Alternative 2C - No Action

Under this alternative, no excavation would occur at the CVWR and current conditions on the site would continue.

2.2.3 Emory Cove

The Emory Cove site is located approximately 1,500 feet north of Pond 11 on the western edge of south San Diego Bay (refer to Figure 2). This area incorporates portions of a remnant coastal salt marsh that extends from Emory Cove south to the southwestern corner of Pond 11. Consisting of elevations that support a range of wetland and upland habitats, this site is one of only a few areas on San Diego Bay that provide natural high tide refugia for shorebirds. The native habitats that occur on this site have experienced long-term degradation as a result of human activity (e.g., dumping, trampling), as well as from the invasion of nonnative vegetation, primarily ice plant (*Carpobrotus endulis*), that occupies approximately 3.8 acres of the site.

The Emory Cove component of the larger restoration project is fully permitted and has been determined to be Categorically Exempt pursuant to Section 15301 (Class 1) of the CEQA Guidelines, therefore, no additional CEQA review is required for this project. However, because Federal funds are being provided through a Service's National Coastal Wetlands Conservation Grant to assist in the implementation of the Emory Cove proposal, compliance with NEPA is required. As a result, this component of the project is addressed in the EA/IS to meet the requirements of NEPA.

2.2.3.1 Alternative 3A - Implement Habitat Enhancement/Restoration (Proposed Action)

Project Description

Overview. Approximately 25 acres of various coastal habitats, including open water, mudflat, intertidal wetlands, and native upland habitat, would be restored and/or enhanced within the Emory Cove site (Figure 11). Restoration and enhancement activities would include the removal of non-native vegetation, primarily ice plant; the removal of debris (e.g.,

Figure 11

tires, shopping carts, plastics, containers) that has been dumped on the site over the years; and the installation of site-appropriate native plants. The estimated acreages for each of the habitat types to be restored and/or enhanced at Emory Cove under this alternative are provided in Table 10.

Table 10
Estimated Acreages for the Habitats to be Restored and/or Enhanced at Emory Cove under Alternative 3A

Habitat Type	Acres Restored/Enhanced
Open Water	10[1]
Intertidal Mudflat	0.7
Salt Marsh	9.5
Salt Pan	1.4
Southern Willow Scrub	0.1
Coastal Sage Scrub	2.9
TOTAL (acres)	**24.6**

[1] Although Figure 11 indicates that Emory Cove includes 13.3 acres of open water, it is the 10 acres located immediately adjacent to the upland area that would benefit from the proposed enhancement activities.

Site Preparation. Enhancement activities, most of which are being implemented by volunteers, have already been initiated. Initial work at the site consists of the removal of debris throughout the site and the eradication of ice plant, an invasive plant that covers about 3.8 acres of the site. It is anticipated that an estimated 25 tons of debris and non-native vegetation will have been removed from the site when the project is completed. A systemic herbicide has been applied to all ice plant areas, using special care to avoid any impacts to existing native vegetation. Plants that have died will be manually removed by volunteers in those areas where the plants are located in proximity to native vegetation. A tractor will be used to uproot the remaining dead vegetation using a brush rake attachment to avoid significant soil removal. All vegetation will be stockpiled prior to disposal.

Site Planting. After removal of the debris and invasive plants, native plants in container stock and native plant seeds collected from the surrounding area will be planted or distributed throughout the disturbed portions of the site. The species to be planted will be determined based on existing elevations at the planting sites, with a combination of wetland and upland plants to be installed. Of the 3.8-acre exotic removal area, approximately 2.9 acres of the site will be restored with a wetland/upland transition habitat and disturbed coastal sage scrub habitat and 0.9 acre will be enhanced with high salt marsh. A small area on the site appears to have the characteristics needed to support the endangered plant, salt marsh bird's-beak (*Cordylanthus maritimus maritimus*); therefore, the Port will work with the Service in an effort to establish this species on the site.

Site Access. The various activities proposed at the Emory Cove site will require access to the site by Port staff, potential contractors, and volunteers. Volunteers will be directed to park at approved

public parking areas at the Biological Study Area to the south and within Coronado Cays to the north. No parking will be permitted along SR 75.

Medium sized (1.0 to 1.5 ton) pick up trucks will be used to haul debris and dead ice plant from the site. This will require vehicular access onto the site from SR 75 and across the Bayshore Bikeway. Traffic control involving temporary signage and flaggers will be present during those times in which trucks are accessing the area. Proposed traffic control will be provided for both vehicular traffic on SR 75 and bicycle traffic on the Bayshore Bikeway.

2.2.3.2 Alternative 3B - No Action

Because all of the required permits have been secured for this project, the no action alternative in this case would relate only to the federal funding source. Therefore, under the no action alternative, this component of the project would continue to be implemented; however, it would not receive any funding from the Service's National Coastal Wetlands Conservation Grant.

2.3 Alternatives Considered But Dismissed From Further Consideration

A proposal to restore Pond 10A to full tidal exchange was considered but dismissed from further consideration because of the depth at which a new culvert would have to be constructed under the Bayshore Bikeway between Pond 10 and 10A, as well as the extent of grading the would be required to lower the existing elevations within Pond 10A to achieve full tidal exchange.

Following further review of the proposed restoration options for the western salt ponds during the public comment period, Alternative 1A(2) was eliminated as a feasible alternative at this time. Option 2 of Alternative 1A would have required the replacement of the existing culverts under the Bayshore Bikeway in the area between Ponds 10 and 10A. Due to time constraints and budget limitations, this option cannot be implemented in association with the current project. However, dismissal of this alternative under the current proposal does not preclude future modification of the existing culvert should post-construction monitoring results indicate that modifications to the existing culvert are necessary to optimize habitat quality in Pond 10A.

CHAPTER 3 - AFFECTED ENVIRONMENT

Only those aspects of the environment that could be affected by the proposed project are discussed in detail in this section. The Initial Study Checklist (Appendix A) documents all other aspects of the affected environment, including those for which this project would have no effect.

Additional information related to one or more of the topics discussed below is provided in the San Diego Bay NWR Final CCP/EIS (*USFWS 2006*) and/or the San Diego Bay INRMP (*U.S. Navy 2000*). The information in both of these documents is summarized below, as appropriate, and the information included in these documents is incorporated herein by reference.

3.1 Topography/Visual Quality

The predominant topographic features of this open water dominated project area include the levee system within the salt ponds and the upland features of the CVWR. Portions of the CVWR extend above the highest high tide levels and are visible from the public areas around the Chula Vista Marina, the north end of the salt ponds, and from across the bay along the Silver Strand. The levees that form the salt ponds at the south end of the bay and the salt ponds themselves are visible from the bay, the County's wildlife observation platform at the South Bay Biological Study Area, located to the north of Pond 11, and from much of the developed upland area that borders the bay to the south.

3.2 Geology and Soils

In 1985, a series of exploratory borings were excavated within the salt works on the levees and adjacent upland areas (*GEOCON 1985*). This investigation revealed that the levees are overlain by two to seven feet of fill soils composed of loose to moderately dense, silty sand and sandy gravel. Underlying these fill soils are Bay Deposits, Older Bay/Alluvial Deposits, and Bay Point Formation. The majority of the salt works is underlain by Bay Deposits, which consist primarily of soft bay muds. The thickness of the Bay Deposits varies from about 23 feet near the center of the salt works to less than five feet at the eastern edges of the crystallizer ponds. Older Bay Deposits/Alluvium occurs below the Bay Deposits and is comprised of saturated, firm, silty sandy clays and moderately dense to dense silty sands. The Bay Point Formation was encountered below Bay Deposits and/or Older Bay Deposits/Alluvium in the vicinity of the western salt ponds. The characteristics of the Bay Point Formation include stiff to hard, sandy clays and dense to very dense silty sand (*GEOCON 1985*).

The CVWR consists of dredge spoils that were excavated in the late 1970s from the present day site of the Chula Vista (J-Street) Marina. Materials excavated from the proposed site of the marina were dried and then trucked to the existing cooling water intake/discharge channel separation dike of the South Bay Power Plant where they were used to construct perimeter levees around two large containment cells. After levee construction, mud from the marina site was pumped as slurry to the interior of each of the closed basins in a sequence where the accumulated water was allowed to spill to the second cell for clarification and back to the Bay through temporary weirs. Very little information is available regarding the chemistry and physical characteristics of the sediments at this site. Sediment characterization is proposed prior to

completion of final restoration plans and the data obtained from this work will determine whether or not the material from this site will be transported to Pond 11 or disposed of in an alternate manner. Based on the origins of the material that was used to create the CVWR, the presents of contaminants of concern at levels that would be considered hazardous are unlikely.

No known faults exist within the project area, however, the potential for liquefaction is relatively high, as is the potential for settlement should fill soil be placed on existing surfaces. GEOCON (*1986*) concluded that based on existing soil characteristics the placement of six to 12 feet of fill soil over the existing ground surface of the levees could cause settlement ranging from six to 10 inches in depth.

The chemistry and physical characteristics of the sediments in the western salt ponds were evaluated in early 2009 (*Anchor QEA 2009*). Sediment sampling, conducted in January, and subsequent laboratory analysis of the collected samples was undertaken to characterize the nature and extent of potential contamination in the pond sediments and to determine grain size and other physical characteristics of the sediments to assist in the development of future planting plans for the restored ponds. A total of 26 stations were sampled for testing within the three ponds. The categories of chemical and physical analyses that were conducted for this analysis included total organic carbon, grain size, bulk density, organochlorine pesticides and total polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), and trace metals (*Anchor QEA 2009*).

The results of the chemical analysis showed that all sample concentrations were below the effects range low (ERL) screening levels for a given analyte with the exception of a few samples. These exceptions included one station in Pond 11 were elevated copper and nickel concentrations compared to ERL were recorded. The ERL for copper is 34 parts per million (ppm), and the sample was measured to contain 36.9 ppm of copper. The ERL for nickel is 20.9 ppm and the sample was measured to contain 21.8 ppm of nickel. Because these measured values are only slightly above the ERL, they were not considered a cause for concern (*Anchor QEA 2009*). Arsenic concentrations were elevated above the arsenic ERL of 8.2 ppm at eight sampling stations throughout the western salt ponds. However, only four of these sample sites showed arsenic levels elevated above the southern California regional background level of 12 ppm and were only slightly elevated compared to that level. The mean arsenic concentration within Ponds 10, 10A, and 11 was significantly below the ERL.

The physical analysis showed that all but one sample from the ponds consisted of a black silty/oily layer near the surface and dense clay at deeper depths. Only one sample contained a large amount of sandy material (*Anchor QEA 2009*). The depth of the clay layer and the black silty/oily layer varied among the ponds.

3.3 Hydrology

The hydrological conditions within San Diego Bay are influenced by tidal processes and surface water runoff (freshwater flows entering the bay from various rivers, creeks, and minor drainages). The ebb and flow of tides within the bay circulate and mix ocean and bay waters and produce currents that influence salinity levels and temperatures throughout the bay (*U.S. Navy*

2000). The water levels in the bay vary with the astronomical tides, with water levels highest during high tide. In the Southern California Bight, the tides are of the mixed, semi-diurnal type, with two highs and two lows of unequal height occurring each lunar day (an average duration of 24.4 hours).

The tidal conditions in San Diego Bay are measured by NOAA, which operates and maintains a long-term primary tide gage at Navy Pier near downtown San Diego (9410170). Tidal datums for San Diego Bay relative to MLLW and NAVD88 are listed in Table 11.

Table 11
San Diego Bay Tidal Datums for the 1983 – 2001 Tidal Epoch

Datum	Elevation (Feet, MLLW)	Elevation (Feet, NAVD88)
Highest Observed Water Level (01/27/1983)	8.14	7.71
Mean Higher High Water (MHHW)	5.72	5.29
Mean High Water (MHW)	4.99	4.56
Mean Tide Level (MTL)	2.96	2.53
National Geodetic Vertical Datum (NGVD) 1929	2.51	2.08
Mean Low Water (MLW)	0.94	0.51
North American Vertical Datum (NAVD) 1988	0.43	0.00
Mean Lower Low Water (MLLW)	0.00	-0.43
Lowest Observed Water Level (12/17/1973)	-3.09	-3.52

Source: (*NOAA 2007*)

The diurnal difference in the high MHHW and the low MLLW tides in the Bay is 5.6 feet, with extremes of 9.8 feet (*U.S. Navy 2000*). The highest tides occur in January and June. Water levels in the Bay are also affected by storm surge, El Nino-Southern Oscillation events, and long-term changes in sea level. The effects of storm surge on water levels in the bay are relatively small; by contrast, El Nino conditions that tend to occur every four to seven years result in changes in water level that led to increases in monthly mean sea level of up to one foot in the Southern California Bight during the 1997-1998 season.

The extent to which extreme high tide levels inundate areas surrounding the western salt ponds under existing conditions is unknown. There is anecdotal evidence that some properties on the east side of Pond 10A are subject to tidal flooding during very high tides. Tidal inundation around the western salt ponds was observed in July 2009 the morning after a night with a high tide of above 7.2 feet NAVD88. During this July site visit, evidence of high water flows overtopping the northern levee of Pond 11 from San Diego Bay during the previous night's high tide was observed. It also appeared that some water flowed through and possibly over the existing tide gate in Pond 10 and some flows passed through an existing pipe connecting the Otay River and Pond 10. High water was also observed in all the ponds and a salt water indicator (pickleweed, *Salicornia virginica*) was growing in the back yards of properties located immediately to the east of Pond 10A (*Everest International 2009*).

Tidal flooding in the western salt ponds is currently controlled in all but the highest tides through active management an existing siphon drain and tide gate intake structure. The siphon drains water under the Otay River in to salt ponds to the east. Water from the bay is allowed to flow into ponds primarily through one-way flap gates that open when the tide in the Otay River is higher than the water level in Pond 10. When very high tides are expected, stop gates are dropped in place to prohibit flow through the flap gates.

The majority of the freshwater flows entering the south end of San Diego Bay originate from the Otay watersheds. Major watercourses in these watersheds include the Otay River and Nestor Creek. Several smaller drainages also enter the bay including an unnamed drainage that flows between Ponds 15 and 28, entering the bay near the South Bay Power Plant cooling outfall.

The Otay River drains a watershed of approximately 143 square miles, extending for a distance of 25 miles east from San Diego Bay to the Cleveland National Forest. The hydrologic conditions in the lower reach of the watershed are influenced by the presence of the Upper and Lower Otay Reservoirs. These reservoirs, which control approximately 69% of the watershed, reduce the frequency of flows in the river and capture sediments that historically were carried by the river into San Diego Bay. Further downstream, just to the east of I-5, a series of excavated pits created as a result of sand mining operations capture those sediments that are generated within the watershed downstream of the reservoirs. The Otay River and Nestor Creek are normally dry except during rain events or when urban runoff is of sufficient volumes to wet these channels (*County of San Diego et al. 1997*). During significant rainfall events, the reservoirs in the upper end of the watershed overfill, resulting in large flows within the Otay River as reflected in the Federal Emergency Management Agency (FEMA) peak discharge estimates that are provided in Table 12.

Table 12
Peak Discharges in the Otay Watershed
Presented in cubic feet per second (CFS)

Return Period	Otay River at Otay Valley Road[1]	Nestor Creek at Palm Avenue[1]	Nestor Creek[2]
10-Year	1,200	No data	730
50-Year	12,000	No data	990
100-Year	22,000	1,093	1,135
500-Year	50,000	No data	3,630

Sources: [1](*FEMA 2002*) [2](*PWA 2003*)

Modeling conducted to predict the effects of a 100-year storm event on properties in and around the western salt ponds indicates that under existing conditions, water levels in the Otay River follow the tide before the arrival of the flood flows. After the arrival of the flood flows, water levels in the Otay River continue to rise until it reaches a peak elevation of 7.5 feet NAVD88 in the Otay River channel between Ponds 10 and 12 and 9.8 feet NAVD88 at the bend in the river channel near the northern terminus of 8th Street in Imperial Beach. Under existing conditions, since there is no tidal connection between the western salt ponds and San Diego Bay, the water levels in the ponds stay at the initial water levels until flood water levels in the adjacent river channel start to overtop the salt pond levees. Water levels in the three ponds rise to a maximum

of about 8.7 feet NAVD88, then recede to the elevation of the levee at approximately 7 feet NAVD88 (*Everest International 2009*).

3.4 Water Quality

Between the early 1800s and the mid to late 1900s, water quality in San Diego Bay suffered serious degradation due to the discharge of untreated municipal sewage and a variety of toxic and nontoxic industrial wastes (*Michael Brandman & Associates 1990*). In 1960, much of the bay was declared polluted due to high bacteria levels. As a result, all water contact activities were prohibited. It was not until 1964 that domestic sewage discharges into the bay, including those from San Diego, Chula Vista, Coronado, and the Naval Amphibious Base, finally ceased and the discharge was instead routed to an ocean outfall. By the early 1970s, major industrial process discharges had also been diverted to the Metropolitan Sewage System and by 1980, all sewage and industrial waste discharges into the bay, including those from naval operations, ceased (*U.S. Navy 2000*).

Until the 1970s, pollution issues in the bay focused on bacterial contamination from discharged sewage, but as bacterial levels were reduced, the focus on the bay's water quality shifted to contaminants related to the discharge of industrial wastes. Various water quality studies in the bay identified high levels of copper, tributyltin (TBT), PCBs, and polycyclic aromatic hydrocarbons (PAHs) in bay sediments (*USFWS 2006*).

In 1998, San Diego Bay was included on California's Section 303(d) list as an impaired water body by the California State Water Resources Control Board (SWRCB) due to benthic community degradation and toxicity. Section 303(d) of the Federal Clean Water Act (33 USC 1250, et seq., at 1313(d)) requires States to identify "water quality limited segments" and then rank each segment, taking into account the severity of the pollution and the uses to be made of the waters. The California 303(d) Listing Policy sets the rules to identify which waters do not meet water quality standards. The Policy distinguishes between the categories of waters that do not meet water quality standards. These categories basically describe the Total Maximum Daily Loads (TMDL) requirement status for each water body pollutant combination. The categories are: 1) waters still requiring a TMDL, and 2) waters where the water quality limited segment is being addressed. Water segments in the "Water Quality Limited Segments Being Addressed" category must meet either of the following conditions:

1. A TMDL has been developed and approved by USEPA and the approved implementation plan is expected to result in full attainment of the standard within a specified time frame; or

2. It has been determined that an existing regulatory program is reasonably expected to result in the attainment of the water quality standard within a reasonable, specified time frame.

The section 303(d) list is required to be reviewed and updated every two years. The latest list of Section 303(d) List of Water Quality Limited Segments for California was approved by the State in 2006, with the EPA granting final approval of the State list in June 28, 2007. The locations

within San Diego Bay located in proximity to the proposed project site that are identified as 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments Requiring TMDLs are presented in Table 13.

Table 13
Water Quality Limited Segments Requiring TMDLs
Located in Proximity to the Proposed Project

Name	Pollutant/ Stressor	Potential Sources	Estimated Size Affected	Proposed TMDL Completion
San Diego Bay	PCBs	unknown	10,783 acres	2019
San Diego Bay Shoreline, at Bayside Park (J Street)	Indicator bacteria	unknown	50 acres	2019
San Diego Bay Shoreline, at Coronado Cays	Copper	unknown	47 acres	2019
San Diego Bay Shoreline, Chula Vista Marina	Copper	unknown	0.41 miles	2019

Source: (*California State Water Resources Control Board 2009*).

The salinity and temperature characteristics of the south San Diego Bay differ from those areas to the north. This a result of the natural conditions, including shallow water depths and poor flushing, as well as human related conditions, such as the discharge of cooling water into the bay from the South Bay Power Plant. With respect to salinity, the area generally between the Coronado Bay Bridge and the Sweetwater Marsh Unit has been described as a seasonally hypersaline region. Here, water is stratified by salinity gradients induced by evaporation. The area south of the Sweetwater Flood Control Channel is described as the estuarine region. In this region, residence time of bay water can exceed one month. During the summer months the evaporation rate can be as high as 62.7 inches (159 cm) per year, causing the bay water in this region to become hypersaline, or saltier than seawater (*USFWS 2006, U.S. Navy 2000*). While conducting a fish inventory in San Diego Bay in the late 1990s, Allen (1999) observed that salinities in the bay varied depending upon the location in the bay and the time of year. Allen found that salinities in the bay were typically higher than 34 parts per thousand (ppt), the average value for seawater. During the first two years of the study, salinities in the bay varied from 39.8 ppt to 33.4 ppt. In October 1996, the South Bay was particularly hypersaline (39.8 ppt).

Temperatures in the south end of the Bay tend to be higher than in the north, although this is not always the case. In addition to the shallow depth of the water, temperatures in this part of the Bay are also influenced by the South Bay Power Plant, which discharges heated cooling water into the bay just south of the CVWR. Studies of marine life in the vicinity of the outfall indicate that the thermal pollution from the power plant discharge causes adverse effects to marine life within 1,801 to 3,901 feet (549 to 1,189 meters) of the discharge point (*U.S. Navy 2000*). Adverse effects to the marine life beyond the cooling channel were however determined to be minimal, mainly affecting crustaceans and gastropod mollusks.

The Federal Clean Water Act amendments of 1987 established a framework for regulating storm water discharges from municipal, industrial, and construction activities under the National

Pollutant Discharge Elimination System (NPDES) Permitting Program. As a result of these amendments, municipalities throughout the nation are required to obtain a Municipal NPDES Permit. The primary goal of the Municipal Permit is to stop polluted discharges from entering the storm water conveyance system and local receiving and coastal waters.

On February 21, 2001, Regional Board issued a Municipal Storm Water (NPDES) Permit to the City of San Diego, County of San Diego, Port, and 17 other cities. This permit required the development and implementation of storm water regulations to address storm water pollution issues in planning and construction for both public and private development projects. Specifically, development projects are required to include storm water best management practices (BMPs), both during construction and in permanent design, to reduce pollutants discharged from project sites to the maximum extent practicable.

Storm Water Standards have been developed in several municipalities surrounding the Bay that are intended to effectively prohibit non-storm water discharges and reduce the discharge of pollutants from storm water systems during construction and throughout the use of a developed site. In California, the SWRCB, through the nine Regional Boards, administers the NPDES storm water municipal permitting program. Any grading proposals in excess of one acre would require the incorporation of BMPs into the project design as part of the approval of a NPDES Permit (*Water Quality Order 99-08-DWQ - General Permit for Storm Water Discharges Associated with Construction Activity*) from the Regional Board.

In addition, in accordance with Section 401(a)(1) of the Clean Water Act, activities that result in discharge of dredge or fill material into navigable waters of the U.S. would most likely require a 401 Water Quality Standards Certification from the Regional Board. Some of the permits that require a 401 Certification include permits issued under Section 404 of the Clean Water Act and NPDES permits issued by the U.S. Environmental Protection Agency (EPA) under Section 402 of the Clean Water Act. To obtain this certification, the Regional Board must certify that the project will comply with water quality standards related to beneficial uses designated in the Basin Plan for water bodies in Region 9 (San Diego County), water quality objectives, and the Antidegradation Policy, which requires that existing high-quality waters be protected and maintained, unless the need to lower water quality is justified.

3.5 Climate Change, Greenhouse Gas Emission, and Sea Level Rise

Climate Change. Scientific evidence acknowledges that world climate is changing as indicated by increases in global surface temperature, altered precipitation patterns, warming of the oceans, sea level rise, increases in storm intensity, changes in wind patterns, and changes in ocean pH (*Bierbaum et al. 2007, Coastal Resources Center, University of Rhode Island and International Resources Group (CRC&IRG) 2009*). This is significant because "climate is a dominant factor influencing the distributions, structures, functions and services of ecosystems" (*CCSP 2008*). Climate change, defined as any change in climate over time, whether due to natural variability or as a result of human activity (*CCSP 2008*), can interact with other environmental changes to affect biodiversity and the future condition of ecosystems.

Shifts in precipitation patterns and hydrological cycles, sea level rise, and more frequent and severe weather events (e.g., storms and storm surge) are the result of the warming of air and sea. These effects are already being experienced along the world's coastal regions and are expected to intensify in the coming years (*CRC&IRG 2009*). Changes in current climate patterns will have significant consequences for the world's coastal areas. Anticipated affects include accelerated coastal erosion and loss of land and property, flooding, saltwater intrusion, shifts in the distribution and abundance of valuable marine habitats, species and biodiversity, and the accelerated spread of exotic and invasive species (*CRC&IRG 2009*).

In California, climate change poses a serious threat to the economic well being, public health, and natural resources. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snow pack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems (*California Health and Safety Code, Section 38501*).

Greenhouse Gas Emissions. There is scientific consensus that increases in greenhouse gases (GHGs) in the atmosphere drive warming temperatures of air and sea, and that the world's oceans acidify as they absorb the carbon dioxide (*CRC&IRG 2009*). GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities, appears to be closely associated with global warming (*State of California Office of Planning and Research 2008*). California State law defines GHG to include the following: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (Health and Safety Code, section 38505(g)). The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide.

California is a substantial contributor of GHGs, emitting over 400 million tons of CO_2 a year (*California Energy Commission 2006*). Climate studies indicate that California is likely to see an increase of three to four degrees Fahrenheit over the next century. As primary GHGs have a long lifetime in the atmosphere, accumulate over time, and are generally well-mixed, their impact on the atmosphere is mostly independent of the point of emission.

The impact of anthropogenic activities on global climate change is apparent in the observational record. Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of CO_2, methane, and nitrous oxide from before the start of the industrialization (approximately 1750), to over 650,000 years ago. For that period, it was found that CO_2 concentrations ranged from 180 ppm to 300 ppm. For the period from approximately 1750 to the present, global CO_2 concentrations increased from a pre-industrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the pre-industrial period range.

The Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of GHGs at 400 to 450 ppm carbon dioxide-equivalent concentration is required to keep mean global climate change below 2°C (3.6°F), which in turn is assumed to be necessary to avoid dangerous climate change.

To avert the consequences of climate change, California Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, was passed by the Legislature and signed into law by Governor Schwarzenegger in 2002. AB 32 establishes a state goal of reducing GHG emissions to 1990 levels by the year 2020. It directed the California Air Resources Board (CARB) to begin developing discrete early actions to reduce greenhouse gases while also preparing a scoping plan to identify how best to reach the 2020 limit. The CARB recently adopted a statewide 2020 GHG emissions limit and an emissions inventory, along with requirements to measure, track, and report GHG emissions by the industries it determined to be significant sources of GHG emissions. In addition, the CARB has developed a Scoping Plan that outlines the State's strategies for reducing GHG emissions.

With the passage of AB 32, including an analysis of GHG emissions in CEQA documents have become a necessary part of a legally defensible environmental review process. AB 32 recognizes that California is the source of substantial amount of GHG emissions and further acknowledges that global climate change causes economic, human health, natural resources, and environmental impacts in California. In addition, Governor Schwarzenegger set a long range reduction goal of reducing GHGs to 80 percent below 1990 levels by 2050.

There is no statewide CEQA threshold of significance for GHG emissions and global climate change. However, as stated in the Office of Planning and Research (OPR) guidelines (*2009*), the absence of an approved threshold does not relieve the lead agency of its responsibility to determine whether the project has a significant effect.

Current GHG emissions related to the project area include agency vehicle usage by managers and biologists to monitor existing resources and current site conditions. In addition, the salt works operator also generates vehicle emissions during routine maintenance and management of the existing tide gate in Pond 10, as well as implementing the overall salt works operation, including truck trips generated as a result of the sale and transport of salt for the commercial market.

<u>Sea Level Rise</u>. "Sea levels are constantly in flux, subject to the influence of astronomical forces from the sun, moon, and earth, as well as meteorological effects like El Niño" (*Heberger et al. 2009*). According to the water level data collected by a worldwide network of tidal gages, the global mean sea level is rising. Over the past century, sea level has risen nearly eight inches along the California coast (*Heberger et al. 2009*). Sea levels are expected to continue to rise, and the rate of increase will likely accelerate.

The Conservancy Board adopted a Climate Change Policy on June 4th, 2009 that included the determination that until the National Academies of Science report on sea level rise is completed, the Conservancy will consider for its purposes a sea level rise scenario of 16 inches (40 cm) by

2050 and 55 inches (140 cm) by 2100 (*Conservancy 2009*). A sea level rise of 55 inches would flood approximately 150 square miles of land immediately adjacent to current wetlands, and the large sections of the Pacific coast that are not vulnerable to flooding, would be subject to accelerated erosion, resulting in a loss of 41 square miles of California's coast by 2100 (*Heberger et al. 2009*).

Sea level rise will alter California's coast, therefore, adaptation strategies are being evaluated, tested, and implemented to reduce or avoid the predicted impacts (*Heberger et al. 2009*). As part of its Climate Change Policy, the Conservancy stresses the need for climate-sensitive projects to include robust adaptation measures and strategies for addressing climate change and sea level rise such as the adaptive management and monitoring of ecosystem and physical processes to support implementation of management actions that will achieve project objectives under rapidly-changing climatic conditions.

3.6 Air Quality

The South Bay Restoration Project is located within the San Diego Air Basin (SDAB) and is under the jurisdiction of the San Diego Air Pollution Control District (SDAPCD) and the CARB. Air quality within SDAB is influenced to some extent by climatic conditions, particularly a common atmospheric condition known as a temperature inversion. During a temperature inversion, air temperatures get warmer with increasing height rather than cooler. Inversions occur during the warmer months (May through October) when descending air associated with the Pacific high-pressure cell comes into contact with cool marine air. The boundary between the layers of air represents a temperature inversion that traps pollutants below it. The inversion layer is approximately 2,000 feet MSL during the months of May through October, and approximately 3,000 feet MSL during the winter months (November through April). Inversion layers impact local air quality by inhibiting the dispersion of pollutants, which results in the temporary degradation of air quality.

<u>Air Quality Standards</u>. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, which is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). A large body of scientific evidence associates air pollution exposure with a variety of harmful health effects. To protect human health, the EPA and CARB have adopted ambient (outdoor) air quality standards. These national and state health-based standards identify outdoor pollutant levels that are considered safe for the public, including those individuals most sensitive to the effects of air pollution, such as children and the elderly. These standards also provide the basis for determining the significance of a particular pollutant concentration. Activities occurring within the project site are subject to the *2009 Regional Air Quality Strategy Revision (RAQS)*, which was prepared by the SDAPCD to describe air pollution control strategies that as implemented will bring the region (SDAB) into compliance with the federal and state air quality standards. For a project to be consistent with the RAQS, pollutants emitted from a project may not exceed the SDAPCD daily threshold or cause a significant impact on air quality. The RAQS uses the assumptions and projections of local planning agencies to determine control strategies for regional compliance status.

The Federal Clean Air Act (42 U.S.C. §§ 7401-7671q) requires the EPA to set outdoor air quality standards for the nation, referred to as National Ambient Air Quality Standards (NAAQS). To date, standards have been established for sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter equal to or less than 10 microns in size (PM_{10}), fine particulate matter equal to or less than 2.5 microns in size ($PM_{2.5}$), and lead (Pb). The Clean Air Act also permits states to adopt additional or more protective air quality standards if needed. Within California, the California Ambient Air Quality Standards (CAAQS) set parameters for certain pollutants, such as particulate matter and ozone, that provide greater protection of public health than the respective Federal standards. California has also set standards for some pollutants that are not addressed by Federal standards, including sulfates (SO_4), hydrogen sulfide (H_2S), visibility reducing particles, and vinyl chloride. The current national and state ambient air quality standards are provided in Appendix C.

Specific geographic areas are classified as either "attainment" or "nonattainment" areas for each pollutant based upon the comparison of measured data with NAAQS and CAAQS. When an air basin is in compliance with these standards, it is designated as an attainment area. Conversely, when an air basin is not in compliance with a National and/or California air quality standard, it is designated as a nonattainment area for that pollutant. The SDAB is currently designated by the State of California as a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$.

The most significant regional sources of O_3, NO_2, and CO are automobiles and other on-road vehicles. O_3 is formed by the reaction of volatile organic compounds (VOC) and oxides of nitrogen (NOx), which are combustion products from gas and diesel engines. Other important sources of VOC are paints, coatings and process solvents. The major sources of PM_{10} are construction, demolition, and dust from paved and unpaved roads.

Fugitive Dust. The APCD also regulates fugitive dust created as a result of construction activities. Fugitive dust is composed of primarily of inert silicates, which are less harmful to health than the complex organic particulates released from combustion sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and SO_X combining with ammonia. SDAPCD regional rules related to construction activity include Rule 55 *Fugitive Dust,* Rule 50 *Visible Emissions,* and Rule 51 *Nuisance,* which assist in reducing short-term construction-related air pollutant emissions. Rule 55 requires that construction or demolition activity shall not discharge visible dust emissions into the atmosphere beyond the property line of a project for a period or periods aggregating more than three minutes in any 60 minute period. Effective track-out/carry out and erosion control measures must be implemented to minimize visible roadway dust. Rule 50 *Visible Emissions* sets regulations on the discharge of emission air contaminants. Rule 51 *Nuisance* prohibits the discharge of air contaminates or other material in quantities that cause injury, detriment, nuisance, or annoyance to a considerable number of persons or the public.

Asbestos. Asbestos is classified as a known human carcinogen by State, Federal, and international agencies and was identified as a toxic air contaminant by CARB in 1986. It is not currently a pollutant regulated by the CARB; however, pursuant to guidance issued by the Governor's Office of Planning and Research, State Clearinghouse, analysis of potential impacts related to naturally occurring asbestos is recommended in CEQA documents. Asbestos is a term

used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

Rule 1501 (Conformity of General Federal Actions). The purpose of SDAPCD's Rule 1501 (Conformity of General Federal Actions) is to assure that Federal agencies do not take or support actions which are in any way inconsistent with the efforts of the SDAPCD to achieve NAAQS, as established through the Federal Clean Air Act. Additionally, Rule 1501 ensures that Federal agencies do not fail to take advantage of opportunities to assist in the achievement of the NAAQS. As described above, NAAQS identify levels of air quality for "criteria" pollutants (O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb) that have been determined to be the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare. The Federal attainment status for the SDAB has been provided in Table 14.

Table 14
Federal Attainment Status for the San Diego Air Basin

Pollutant	Federal Attainment Status
Carbon Monoxide (CO)	Attainment
Ozone (O_3) (1-Hour)	N/A[1]
Ozone (O_3) (8-Hour)	Non-attainment; unclassified
Nitrogen Dioxide (NO_2)	Attainment
Particulate Matter (PM_{10})	Attainment
Fine Particulate Matter ($PM_{2.5}$)	Attainment

[1] The EPA revoked the Federal 1-hour Standard in June of 2005
Source: (*U.S. EPA 2009*)

For Federal actions that are not exempted under Rule 1501, a conformity determination is required for each pollutant where the total direct and indirect emissions in a nonattainment or maintenance area caused by a Federal action would equal or exceed any of the emission rates listed in Table 15. As required by Rule 1501, the Federal agency must meet the criteria for establishing activities that are presumed to conform by fulfilling the requirements of Section1551.853 – Applicability (g)(1) or (g)(2) of Rule 1501. These sections include requirements that the Federal agency demonstrate through documentation that the action would

not cause or contribute to any new violation or any existing violation of any standard; interfere with provisions in the applicable State Implementation Plan (SIP) for maintenance of any standard; and must provide documentation that the total of direct and indirect emissions from such future actions would be below the emission rates for a conformity determination.

Table 15
Emission Rate Thresholds
for Federal Non-Attainment Areas

Federal Non-attainment Criteria Pollutant	Threshold Emission Rate (tons/year)[1]
Ozone	
VOC	100
NO_X	100

Source: (*SDAPCD, Rule 1501*)

3.7 Noise

Sensitive Noise Receptors. To evaluate the effects of increased noise levels on the surrounding environment, it is important to identify the noise sensitive receptors in the vicinity of a project area. Noise sensitive receptors generally include land uses associated with indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise. These include single- and multi-family residences and associated outdoor use areas, mobile homes, hotels and motels, hospitals, nursing homes, and other related medical care facilities, educational facilities, libraries, churches, parks, and other places where the public gathers. Wildlife areas can also be a noise sensitive receptor, particularly during the breeding season. Noise issues related to wildlife are addressed in the Biological Resources section of this document.

Sensitive noise receptors located in proximity to the various activities proposed in association with the South Bay Restoration Project include: residential units located in Imperial Beach along Boulevard Avenue between 7th Street and Bayside Elementary School, on the west side of 7th Street between Boulevard Avenue and Cypress Avenue, along the northern edge of a mobile home park located to the south of Pond 10A and the east of SR-75, mobile homes within the City of San Diego located between 16th Street and Thermal Avenue and 17th Street and Claire Street along the north side of Palm Avenue, and multiple family residences located to the south of Palm Avenue at the interchange with I-5. The sensitive receptors within the City of Imperial Beach are located in proximity to work proposed to occur within the western salt ponds and at Pond 12, while the sensitive receptors are located along the truck route proposed under one of the alternatives associated with restoration at the CVWR.

Regulatory Setting. Grading activities associated with the proposed action would be subject to the General Plan and zoning ordinance standards and/or guidelines adopted the City of Imperial Beach, City of Chula Vista, and City of San Diego, as applicable. In addition to specific noise standards, each ordinance typically includes a "General Prohibition" that prohibits the generation of noise that is disturbing, excessive or offensive, and causes discomfort or annoyance to reasonable persons of normal sensitivity.

The City of Imperial Beach Municipal Code Section 9.32.020 Prohibited Noises, Section 9.32.020.H prohibits the use of any tools, power machinery or equipment so as to cause noises disturbing to the comfort and repose of any person residing or working in the vicinity, or in excess of 75 A-weighted decibels (dBA), between the hours of 10 p.m. and 7 a.m., except when the same is necessary for emergency repairs required for the health and safety of any member of the community (Ord. 802 § 2 (part), 1990).

The San Diego Municipal Code prohibits construction activity between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, on City holidays, and on Sundays (San Diego Municipal Code Section 59.5.04049(a)). In addition, it is unlawful to conduct any construction activity that will generate an average sound level greater than 75 dBA at or beyond the property lines of any property zoned residential during the 12-hour period from 7:00 a.m. to 7:00 p.m. (San Diego Municipal Code Section 59.5.04049(b)).

The Chula Vista Municipal Code establishes noise level limits for individual generators. Noise level limits vary, based upon the type of receiving land use(s) and time of day. According to the Municipal Code, construction is prohibited Monday through Friday from 10:00 p.m. to 7:00 a.m., and from 10:00 p.m. to 8:00 a.m. on Saturdays and Sundays. Sound levels are measured at the property line of the noise source. Chapter 19.68 of the Chula Vista Municipal Code sets exterior noise limits by land use category; however, as stated in Section 19.68.060(C)(2), construction activities are exempt from the exterior noise standards. In addition, Section 19.68050(C) regulates construction-related vibration such that operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property or at 150 feet from the source if on a public space or public right-of-way.

Speech Interference Criteria. For construction noise, a "substantial" noise increase can be defined as interference with activities during the day and night. One indicator that construction noise could interfere with daytime activities would be speech interference. As the City of Imperial Beach does not have quantitative guidelines for construction noise during normal construction hours, the criteria below is utilized in the analysis to define relative construction-related noise impacts.

Speech Interference Level was designed as a simplified substitute for the Articulation Index, which takes into account that some frequencies are more effective in masking speech than others. The frequency range from 250 to 7000 Hertz is divided into 20 bands. The difference between file average speech peak levels in each of these bands is calculated and the resulting numbers combined to give a single index. It was originally defined as the average of the now obsolete octave-band sound pressure levels in the 600-1200, 1200-2400, and 2400-4800 (Hertz) octaves. At the present time, Speech Interference Level, based upon the octave band levels at the preferred frequencies of 500, 1000, 2000, and 4000 Hz, is considered to provide a better estimate of the masking ability of a noise. As Speech Interference Level does not take the actual speech level into account, the associated masking effect depends upon vocal effort and speaker-to-listener distance. Speech spoken with slightly more vocal effort can be understood well, when the noise level is 65 dBA. A typical building can reduce noise levels by 20 dBA with the

windows closed. This noise reduction could be maintained only on a temporary basis in some cases, since it assumes windows would remain closed at all times.

3.8 Biological Resources

3.8.1 Habitat Types

The existing habitat types occurring within the three primary project sites that comprise the South Bay Restoration Project, including the western salt ponds, CVWR, and Emory Cove, are outlined in Table 16. Figures 12 and 13 illustrate the existing habitat types present on the CVWR and Emory Cove, respectively.

Table 16
Existing Habitat Types and Associated Acreages within the Western Salt Ponds, Chula Vista Wildlife Reserve, and Emory Cove

Habitat Type	Western Salt Ponds	Chula Vista Wildlife Reserve (west basin)	Chula Vista Wildlife Reserve (east basin)	Emory Cove	Total Acres
Shallow Subtidal (includes open bay water)	0	0.7	0.9	10[1]	**11.6**
Intertidal Mudflat (-0.4 to 2.6 ft. NAVD88)	0	0	5.6	0.7	**6.3**
Coastal Salt Marsh - Low (2.6 to 4.1 ft. NAVD88)	0	12.7	10.4	2.1	**25.2**
Disturbed Coastal Salt Marsh - Mid (4.1 to 5.6 ft. NAVD88)	0	0.9	3.8	5.9	**10.6**
Disturbed Coastal Salt Marsh - High (5.6 to 7.4 ft. NAVD88)	3.0	3.5	3.8	0.5	**10.8**
Salt Pan	0	0	0	1.4	**1.4**
Salt Evaporation Pond	220	0	0	0	**220.0**
Southern Willow Scrub	0	0	0	0.1	**0.1**
Coastal Sage Scrub	0	0	0	0.4	**0.4**
Least Tern Nesting Area	0	6	0	0	**6.0**
Unvegetated Levees/Berms	3.7	2.9	1.8	0	**8.4**
Disturbed/Unvegetated Uplands	3.3	2.6	4.7	3.8	**14.4**
Total	**230**	**29.3**	**31.0**	**24.9**	**315.2**

[1] Although Figure 11 indicates that Emory Cove includes 13.3 acres of open water, it is assumed here that the 10 acres located immediately adjacent to the upland area that would benefit from the proposed enhancement activities.

Figure 12

Figure 13

In addition to the habitats included within these sites, the proposed alignment of the pipeline that would transport material from the CVWR to Pond 11 under Alternative 2A(1) would cross intertidal and shallow subtidal habitats, and the construction footprint for the proposed tide gate in Pond 12 includes shallow subtidal, intertidal mudflat, low salt marsh, and salt pond habitats.

The habitats and various organisms supported by each habitat type described above are summarized in the paragraphs that follow. A more detailed description of these habitats and associated fish and wildlife is presented in the San Diego Bay NWR Final CCP/EIS (*USFWS 2006*) and the San Diego Bay INRMP (*U.S. Navy 2000*), with both documents hereby incorporated by reference.

3.8.1.1 Shallow Subtidal

The open bay waters within south end of San Diego Bay, including the portions of the bay that surround the various project components, are classified as shallow subtidal habitat. This habitat is defined as continually submerged, shallow water habitat that extends from –12 feet to -2.2 feet MLLW (-8.00 feet to -0.40 feet, NAVD88). Shallow subtidal habitat also extends into the northern edge of the CVWR within the deeper tidal channels present on the site. Shallow subtidal habitat supports an abundance of fish, and bird abundance and diversity is higher in this habitat than in any other subtidal habitats occurring in San Diego Bay (*U.S. Navy 2000*).

Shallow subtidal habitat includes both unvegetated, soft bottom areas and areas vegetated with eelgrass (*Zostera marina*). An important component of the unvegetated areas of shallow subtidal habitat is the presence of extensive mats of living algal material formed primarily by the red alga *Gracilaria verrucosa*. These mats, which also include the red algae *Hypnea valentiae* and *Griffithsia pacifica*, provide cover for many species of invertebrates and fishes and appear to serve as a food source for some invertebrates (*U.S. Navy 2000*).

Eelgrass provides food both directly and indirectly to a wide array of organisms. It can enter the food web as detritus, be eaten by fish that are sometimes eaten by larger fish or fish-eating birds, or be consumed directly by birds, such as black brant (*Branta bernicla*), gadwall (*Anas strepera*), and northern pintail (*Anas acuta*). The bay's population of Eastern Pacific green turtles (*Chelonia mydas*) also relies on eelgrass as an important food source. The extent of eelgrass beds within south San Diego Bay has been surveyed periodically over the past 15 years. Survey results indicate that the density and biomass of the Bay's eelgrass beds can vary widely from one season to another and are affected by water depth, sediment grain size, nutrients, light levels, temperature, salinity, and water quality. In 1994, the south end of San Diego Bay supported approximately 700 acres of eelgrass, while in 2000 approximately 1,060 acres were identified (*U.S. Navy and Port 2008*). The most recent survey, conducted in 2008, identified 660 acres in the south bay (*Merkel & Associates 2008*). Figure 14 illustrates how the location of the eelgrass beds in south San Diego Bay has changed over time and where in the bay it has most recently observed.

Figure 14

The 2008 survey identified eelgrass beds along the northern and western boundaries of the CVWR, as well as within some of the tidal channels that extend into the site's two basins. Eelgrass beds were also identified along the northeastern and eastern edges of Emory Cove and to the north of Pond 11. No eelgrass was identified within the proposed route of the pipeline in 2000, 2004, or 2008. Initial identification of eelgrass to the south of the CVWR in the 2003 survey was subsequently changed based on further analysis. The area mistakenly identified as eelgrass, was actually a large area of sea lettuce (*Ulva* sp.). Eelgrass was not identify in the 2008 survey in areas immediately adjacent to the proposed breach locations in Ponds 10 or 11 or in the Otay River channel near the location of the proposed tide gate.

3.8.1.2 Intertidal

Intertidal habitat includes the area between the high and low tides and generally extends from –2.2 feet to +7.8 feet MLLW (-0.40 feet to +7.40 feet NAVD88) and is subject to varying degrees of tidal submergence. Both intertidal flats and coastal salt marsh are included in this habitat type.

Intertidal Flats. Intertidal flats include mudflats, sand flats, and salt flats. These flats occur between the highest high and lowest low tide zones, or generally between the lowest cordgrass and the highest eelgrass habitat areas, at approximately 0.0 feet to +3.00 feet MLLW (-0.4 feet to 2.6 feet NAVD88) in San Diego Bay. Mudflats are present within the eastern basin of the CVWR and within the Emory Cove site. Extensive mudflats also occur to the north of the salt ponds and along the edges of the Otay River channel adjacent to Ponds 10, 11, and 12.

Mudflats consist of various combinations of clay, silt, sand, shell fragments, and organic debris. The water levels on the flats are determined by the daily tidal cycles, which submerge or expose the surface approximately twice per day (*Goals Project 2000*). Mudflats contain abundant organic matter and microorganisms, but not at the level found in eelgrass beds or salt marsh habitat. Although generally thought of as unvegetated, mudflats often contain areas of microorganisms, including diatoms and blue-green algae, which provide food for various species of worms and other invertebrates. These invertebrates in turn provide an important food source for fish, shorebirds, and other organisms.

Pond 10A is not a typical natural mudflat subject to twice daily tidal exchange; however it is filled seasonally during high tides through the tide gate in Pond 10. This pond, which is then periodically drained as a result of the existing salt works operation, may be considered estuarine, intertidal wetland with a small area of vegetated salt marsh habitat at the site's higher elevations.

Intertidal salt flats (i.e., salt pan), which are not very prevalent around San Diego Bay, are relatively flat depressions with limited or no vegetation and highly saline soil conditions. In these areas, which are subject to flooding during high tide, salts accumulate on the surface of the soil as water evaporates from the site. Within the project site, the only area of intertidal salt flat habitat occurs on approximately 1.4 acres on the Emory Cove site.

Coastal Salt Marsh. Coastal salt marsh is composed of salt tolerant vegetation and occurs in the upper intertidal zone above the mudflats and above Mean Sea Level (MSL). It is within the range of regular (daily) to irregular (less than daily) tidal inundation and is exposed more than inundated. In San Diego Bay, coastal salt marsh habitat occurs between approximately +2.3 feet to +7.8 feet MLLW (2.60 feet to 7.40 feet NAVD88) (*U.S. Navy 2000*). Although salt marsh habitat occurs over 43.6 acres within the CVWR and Emory Cove, much of this habitat is considered to be of lower quality due to poor tidal circulation and/or human disturbance. Good quality salt marsh habitat occurs along the edges of the outer salt pond levees, including a portion of the area within the footprint of the proposed tide gate.

At lower elevations, salt marsh habitat overlaps with intertidal flats and is subject to regular inundation. At the higher elevations, tidal inundation may occur only during the highest spring tides. The vegetation types and patterns vary along the marsh plain as a result of these changes in condition, as well as variability in other factors such as salinity, temperature, nutrient levels, sediment characteristics, and past disturbance.

Coastal salt marsh habitat patterns are often distinguished by elevational zones (i.e., low, middle, and high marsh). The tidal range for low marsh, which in San Diego Bay is most often dominated by cordgrass, is generally from +3.5 feet to +4.5 feet MLLW (2.6 feet to 4.10 feet NAVD88). Other plant species typically classified as low marsh species include annual pickleweed (*Salicornia bigelovii*) and saltwort (*Batis maritima*), which can also be found higher in the marsh plain. Low marsh occurs over approximately 23 acres in the CVWR, approximately 2.0 acres in Emory Cove, and along the upper edges of the Otay River channel at it extends between the western and eastern salt ponds. Low marsh habitat also occurs to the east of Pond 12 within the construction footprint for the proposed tide gate.

Middle marsh habitat, which is generally defined as occurring between approximately +5 feet and +6 feet MLLW (4.10 feet to 5.60 feet NAVD88), is characterized by the presence of saltwort, pickleweed (*Arthroceneumum subterminale*), estuary seablite (*Suaeda esteroa*), and arrow grass (*Triglochin concinna*) (*U.S. Navy 2000*). The CVWR supports approximately five acres of middle marsh, the majority of which is considered low quality due to poor tidal circulation. Emory Cove supports approximately six acres of middle marsh, which has been degraded as a result of human disturbance.

High marsh, also referred to as upper salt marsh, can occur within the marsh plain on isolated areas of higher elevation, as well as along the upland edge of the marsh. The elevation range for this habitat in San Diego Bay is approximately +6 feet to +7.8 feet MLLW (5.60 feet to 7.40 feet NAVD88). High marsh habitat in San Diego Bay is dominated by glasswort (*Sarcocornia pacifica*). The CVWR supports approximately seven acres of low quality high marsh habitat, and the Emory Cove site supports 0.5 acres of degraded high marsh habitat. Additional high marsh habitat occurs along some portions of the outer levees of salt ponds, and about three acres of high salt marsh extends around the eastern edge of Pond 10A.

3.8.1.3 Solar Salt Evaporation Ponds

The western salt ponds represent 220 acres of solar salt evaporation ponds. These three ponds are classified as primary ponds within the salt pond system. Bay water enters Pond 10 during the summer through an existing tide gate that allows water to flow into the pond during high tides. Salinity levels in these three ponds range from 11.5 ppt in Pond 10 during the winter to 40 ppt in Pond 11 during the hottest summer months. These ponds have the lowest salinity levels within the solar salt pond system. Fish that enter these ponds through the tide gate become trapped within the system and are either eaten by opportunistic herons, egrets, and terns or die due to hypersaline conditions or the lack of an adequate prey source.

The western ponds currently offer foraging and roosting habitat for a variety of shorebirds and other waterbirds, particularly when fluctuating water levels are low. In addition, they provide rafting habitat for migrating waterfowl, such as lesser scaup.

3.8.1.4 Upland Scrub

Historically, the areas around the Bay occurring at elevations above 7.8 feet MLLW (7.4 feet NAVD88) supported a mix of native upland scrubs, annual flowers, and perennial grasses. These habitats, described as coastal sage scrub and maritime succulent scrub, today only occur as remnants of native habitat surrounded by development or disturbed areas of nonnative weeds and grasses. Coastal sage scrub, a low soft-woody subshrub community, supports California sage brush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum*), lemonade berry (*Rhus integrifolia*), and California encelia (*Encelia californica*). Approximately 0.4 acres of coastal sage scrub habitat is present on the Emory Cove site.

Maritime succulent scrub, which is not currently present within the project site, does occur in small patches on Gunpowder Point and along the slopes of Paradise Marsh to the north and along the historic railroad line to the southeast of the project site. This habitat is dominated by flat-top buckwheat, coast cholla (*Opuntia prolifera*), and California sagebrush. Coastal barrel cactus (*Ferocactus viridescens*), snake cholla (*Opuntia parryi serpentina*), and Ladies' fingers (*Dudleya edulis*) is also found in some locations.

Disturbed upland areas along the western edges of the western salt ponds include some native upland species; however, much of this area is disturbed, supporting nonnative vegetation. Some of the native species in this area include broom baccharis (*Baccharis sarothroides*), coastal goldenbush (*Isocoma menziesii*), and California sagebrush.

3.8.1.5 Southern Willow Scrub

Southern willow scrub consists of deciduous riparian thickets dominated by willows (*Salix sp.*). The Emory Cove site contains a small area (0.1 acre) of southern willow scrub habitat that appears to be supported by runoff that enters the site via a culvert from the adjacent highway (SR-75).

3.8.1.6 Unvegetated Upland Areas

Approximately five acres within the CVWR and seven acres within the western salt ponds site consist of berms or levees. Some of these areas are unvegetated, while others support a combination of low-growing native and nonnative vegetation. At the western salt pond site, portions of the outer levees of Pond 11 support middle and high marsh species including alkali heath (*Frankenia salina*), Jaumea, alkali weed (*Cressa truxillensis*), and salt grass (*Distichlis spicata*). Some of the unvegetated levees and berms provide roosting habitat for migratory and resident birds.

A 6.5-acre area of unvegetated land at the southwest end of the CVWR is managed by the Port as nesting habitat for the California least tern.

3.8.2 Wildlife

3.8.2.1 Birds

A detailed discussion of the range of birds supported by the habitats in and around the San Diego Bay NWR, including the salt ponds and adjacent bay habitats, is provided in the San Diego Bay NWR Final CCP/EIS (*USFWS 2006*). Additional information regarding bird use throughout the south bay is provided in the San Diego Bay INRMP (*U.S. Navy 2000*). The information in both of these documents is summarized below and the specific details included in these documents are incorporated herein by reference.

The south end of San Diego Bay provides a variety of habitats that support tens of thousands of migratory birds that annually travel along the Pacific Flyway. Some birds, such as red-necked phalarope (*Phalaropus lobatus*), stop over to forage and rest within salt ponds and adjacent bay before continuing on to their summer or winter destination via the Pacific Flyway. Other species, such as black brant and eared grebes (*Podiceps nigricollis*) are winter visitors. During the summer months, the area supports a variety of seabirds. South San Diego Bay also supports a number of year round residents, including Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) and great blue heron (*Ardea herodias wardi*).

Although the western salt ponds provide limited foraging opportunities for birds, they do provide important roosting habitat for visiting and resident birds, and rafting habitat for various species of waterfowl. Fish trapped within the western salt ponds are preyed upon by seabirds, waterbirds, and the occasional osprey (*Pandion haliaetus carolinensis*). When water levels are low in Ponds 10 and 10A, which occurs seasonally, shallow or exposed areas, particularly in Pond 10A, provide roosting and some foraging opportunities for various shorebirds. The western salt ponds also provide roosting opportunities for seabirds, shorebirds, and waterbirds. The Federally-listed endangered California brown pelican (*Pelecanus occidentalis californicus*), American white pelican (*Pelecanus erythrorhynchos*), and double-crested cormorant (*Phalacrocorax auritus*) are often observed roosting on the levee that separates Ponds 10 and 11. Terns can also be observed congregating on berms or levees within the western ponds during the summer. Intact high marsh habitat as well as

stands of exotic plant species, including iceplant (*Mesembryanthemum crystallinum and M.* nodiflorum), occurs along some portions of the outer levees of the western salt ponds and provides nesting habitat for the State-listed endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*).

The mudflats to the north of the salt ponds provide important foraging habitat for a range of migratory birds, including long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa fedoa*), and various sandpipers. Across the Otay River channel to the east of the western salt ponds are the higher salinity ponds of the salt works, referred to here as the eastern ponds. It is within these ponds that brine invertebrates, including brine flies (*Ephydra sp.*) and brine shrimp (*Artemia sp.*), become prevalent. The levees within the eastern salt ponds provide important nesting habitat for seven species of ground nesting seabirds, including the federally listed endangered California least tern (*Sternula antillarum browni*), as well as Caspian tern (*Hydroprogne caspia*), elegant tern (*Thalasseus elegans*), royal tern (*Thalasseus maximus*), gull-billed tern (*Gelochelidon nilotica vanrossemi*), Forster's tern (*Sterna forsteri*), and black skimmer (*Rynchops niger*). Other birds including the federally listed threatened western snowy plover (*Charadrius alexandrinus nivosus*), American avocet (*Recurvirostra americana*), and black-necked stilt (*Himantopus mexicanus*) also nest on these levees.

Because of the quality of the habitats present in the south San Diego Bay, this area is recognized by the American Bird Conservancy as a Globally Important Bird Area and has been designated a Western Hemisphere Shorebird Reserve Network Site.

Surveys conducted at the salt works in 1993/1994 found that the western ponds supported a high diversity of bird species, with 54 species observed in Pond 11, 59 species in Pond 10, and 57 species in Pond 10A (*Stadtlander and Konecny 1994*). In terms of the total abundance of birds present in the ponds, 201 to 1000 individuals per hectare were observed in Ponds 10 and 11 and 1001 to 4000 individuals per hectare were observed in Pond 10A. The group or guild most represented in Pond 11 was waterfowl, due in part to the observation of a significant number of lesser scaup (*Aythya affinis*) in the pond in February 1993. Lesser scaup were also highly abundant within those cells surveyed to the north of the Pond 11 in the open bay. Other waterfowl such as bufflehead (*Bucephala albeola*), American wigeon (*Anas americana*), gadwall (*Anas strepera*), and northern shoveler (*Anas clypeata*) that occurred in high or moderate numbers within these three ponds were also found at similar abundance levels in the open bay. The only exceptions were red-breasted merganser (*Mergus serrator*) and ruddy duck (*Oxyura jamaicensis*), which were more abundant in the western ponds than in the open bay, although they were also observed at moderate abundance levels in all cells surveyed within the open bay.

Avian surveys, funded jointly by the Port and the U.S. Navy, were conducted throughout San Diego Bay between March 2006 and February 2007, with the results of these survey compiled in 2009 (*Tierra Data Inc. 2009*). According to the survey results, the relative abundance of shoreline surveyed birds during a falling tide in the western salt ponds was highest in Pond 10A (51 to 100 birds per month per hectare), followed by Pond 10 (21 to 50 birds per month per hectare), and Pond 11 (6 to 20 birds per month per hectare). In the Otay

River channel between the western and eastern ponds, relative abundance was similar to Pond 11. At the CVWR, relative abundance during a falling tide was 6 to 20 birds per month per hectare in the east basin and the areas immediately surrounding the basins, while the west basin relative abundance was lower with 1 to 5 birds observed per month per hectare. Along the eastern shoreline of the Emory Cove site, the relative abundance was 101 to 219 birds per month per hectare. A slight increase in bird abundance in the western salt ponds(6 to 20 birds in Pond 10 and 0 to 5 in Ponds 11 and 10A), in the Otay River channel (0 to 5 birds), and in both basins in the CVWR (6 to 20 birds) was also observed during peaking tide surveys.

Species richness of shoreline surveyed birds was very high (76 to 103 species) for Ponds 10 and 11 and the eastern shoreline within the Emory Cove site (*Tierra Data Inc. 2009*). For the CVWR east basin and Pond 10A, avian species richness was 51 to 75 species and for the west basin and the Otay River channel, is as 31 to 50 species. Relative abundance of waterbirds was very low for all sites associated with the current proposal.

3.8.2.2 Fish

The ichthyofauna in San Diego Bay has been well studied over the last two decades (*Merkel & Associates 2000, Allen 1999, Hoffman 1994, Pondella and Williams 2009*). Through the course of these studies, a total of 78 fish species have been observed in San Diego Bay. During the most recent study, which was conducted between April and July 2008, 48 species were collected (*Pondella and Williams 2009*). The most numerous species collected throughout the bay in 2008 included slough anchovy (*Anchoa delicatissima*), comprising 35.3% of the catch; followed by topsmelt (*Atherinops affinis*), comprising 21.6% of the catch; shiner perch (*Cymatogaster aggregate*), 10.8% of the catch; salema (*Xenistius californiensis*), 5.7% of the catch; and arrow goby (*Clevelandia ios*), 5.9% of the catch. Approximately 62% of all fishes sampled in San Diego Bay during this period were juveniles. Based on these results and the results of previous studies, Pondella and Williams (*2009*) concluded that "San Diego Bay provides critical habitat for bay and estuary fishes. The high productivity rate coupled with the abundance of juvenile fishes in the bay highlights the importance of the bay as a nursery habitat."

During Allen's (*1999*) five year study, a number of fish species commonly encountered further south in the Eastern Subtropical and Tropical Pacific were observed in San Diego Bay. These species included California halfbeaks (*Hyporhamphus rosae*), California needlefish (*Strongylura exilis*), red goatfish (*Pseudupeneus grandisquamous*), and Pacific seahorse (*Hippocampus ingens*). The presence of these species, referred to as southern "Panamic Province" fish species, make San Diego Bay "unique among all other southern California embayments" (*Allen 1999*). Six of these species were once again collected during the 2008 study with must of these species collected in the south end of the bay (*Pondella and Williams 2009*).

The shallow subtidal habitat in and adjacent to the project footprint is important to a variety of fish species, including several of the fish species managed by National Marine Fisheries Service (NFMS). Allen's studies in the 1990s found that the most abundant species in the

southern end of the bay included slough anchovy, topsmelt, arrow goby, round stingray (*Urobatis halleri*), northern anchovy (*Engraulis mordax*), and shiner perch. With respect to biomass, round stingrays, spotted sand bass (*Paralabrax maculatofasciatus*, barred sand bass (*Paralabrax* nebulifer), and bat rays (*Myliobatis californicus*) were the dominant species in this area. Pondella and Williams' repeat of this survey in June 2009 identified slough anchovy, topsmelt, shiner perch, and arrow goby as the most abundant species in the south bay. With respect to biomass, round stingrays and spotted sand bass were dominant. Of these species, the slough anchovy, topsmelt, northern anchovy (*Engraulis mordax*), and shiner perch represent important forage species for diving birds.

A total of 25 species were collected in the south end of San Diego Bay during the 2008 survey (*Pondella and Williams 2009*), representing the highest species diversity within the bay during this study. Previous studies have speculated that the south end of San Diego Bay may function as an important nursery area for juvenile California halibut (*Paralichthys californicus*) and young spotted and barred sand bass (*U.S. Navy 2000*). All three species were collected in this area during the 2008 survey and 100% of the halibut and barred sand bass collected were juveniles. Approximately 57% of the spotted sand bass were juveniles (*Pondella and Williams 2009*).

The subtidal and intertidal habitats included within the project footprint of the Emory Cove and CVWR sites, as well as the Otay River channel and the area between the CVWR and Pond 11, provide breeding and foraging habitat for a high diversity of fish species. Although fish are present in the western salt ponds, this is currently a closed system with no way for any fish trapped within the ponds to reenter the bay.

Essential Fish Habitat. San Diego Bay includes areas identified as Essential Fish Habitat for various life stages of fish species managed under the Coastal Pelagics and the Pacific Groundfish Fishery Management Plans (FMPs), as defined in the Magnuson-Stevens Fishery Conservation and Management Act (the Magnuson-Stevens Act). The waters within the bay are utilized by six species addressed in these FMPs, including four of the five fish managed under the Coastal Pelagics FMP and two of the three species managed under the Pacific Groundfish FMP.

When Congress amended the Magnuson-Stevens Act in 1996, it asserted in the Findings section of the Act that "one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States (16 U.S.C. 1801 (A)(9))." The Magnuson-Stevens Act, as amended, requires federal agencies undertaking permitting or funding activities that may adversely affect EFH to consult with the National Marine Fisheries Service (NMFS). The Act also requires Fishery Management Councils to amend all of their FMPs to describe and identify EFH for the fishery based on guidelines established by NMFS, to minimize to the extent practicable adverse effects on such habitat caused by fishing, and to identify other actions to encourage the conservation and enhancement of EFH.

The five species known to occur in San Diego Bay that are managed by NMFS under the Coastal Pelagics FMP include northern anchovy, pacific sardine (*Sardinops sagax*), pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*). The species addressed by the Pacific Groundfish FMP that have been documented in San Diego Bay include the California scorpionfish (*Scorpena guttatta*) and English sole (*Parophrys vetulus*). Table 17 describes the measured relative abundance and biomass of each of these NMFS managed species collected in San Diego Bay between 1994 and 1999 (*Allen 1999*). Only two of these species, northern anchovy and California scorpionfish, were caught during the 2008 surveys and none were recorded from the south end of the bay (*Pondella and Williams 2009*).

Information about the NMFS managed fish species in San Diego Bay is presented below.

Northern Anchovy (*Engraulis mordax*). Northern anchovy historically ranged from the Queen Charlotte Islands, British Columbia, south to Cape San Lucas, Baja California. More recently, populations have moved into the Gulf of California, Mexico. Larvae and juveniles are often abundant in nearshore areas and estuaries, with adults being more oceanic. However, adults can be abundant in shallow nearshore areas and estuaries, and eggs and larvae have been found offshore.

Table 17
NMFS Managed Fish Species in San Diego Bay

Common Name	**Scientific Name**	**Rank[1]**	
		Abundance	Biomass
Coastal Pelagics FMP			
Northern Anchovy	*Engraulis mordax*	1st	3rd
Pacific Sardine	*Sardinops sagax*	4th	l0th
Pacific Mackerel	*Scomber japonicus*	32nd	17th
Jack Mackerel	*Trachurus symmetricus*	52nd	29th
Pacific Groundfish FMP			
California Scorpionfish	*Scorpaena gutatta*	41st	24th
English Sole	*Parophrys vetulus*	76th	73rd

[1]Rank refers to the relative rankings among 78 fish species observed by Allen (*1999*) for total abundance and biomass, respectively.

Northern anchovy are non-migratory but do make extensive inshore-offshore movements and along-shore movements. In some populations, juveniles and adults are observed moving into estuaries during spring and summer and then back out during the fall. Spawning can occur throughout the year. In southern California, spawning occurs between January and May. Larvae consume copepod eggs and nauplii, naked dinoflagellates, rotifers, ciliates, and foraminiferans. Adults and juveniles typically consume phytoplankton, planktonic crustaceans, and fish larvae. Northern anchovy are one of the most abundant fish in the California current and are important prey for a variety of fish, birds, and marine mammals. They are also considered an indicator of environmental stress, being affected by low dissolved oxygen and water-soluble fractions

of crude oil (*Emmett et al. 1991*). Northern anchovy was collected in San Diego Bay during the 1990 surveys (*Allen 1999*) and 2008 surveys (*Pondella and Williams 2009*).

Pacific Sardine (*Sardinops sagax*). Pacific sardine is a pelagic species. Individuals can be found in estuaries, but are most common in open coastal habitats and offshore. The Pacific sardine is wide ranging, with sardines in the Alguhas, Benguela, California, Kuroshio, Peru currents, and off New Zealand and Australia. Changes in distribution are common and linked to environmental conditions. In California, sardines are highly mobile and move seasonally. Older adults move from southern California and northern Baja spawning grounds to feeding grounds off the Pacific Northwest and Canada. Younger individuals (two to four years old) migrate to feeding grounds in central and northern California. Juveniles occur in nearshore habitats off northern Baja and southern California. Although numbers vary greatly, at times sardines are the most abundant fish species in the California current. In southern populations, spawning occurs year-round with a peak from April to August between Point Conception and Magdalena Bay. Eggs and larva are found everywhere adults are found. Sardines are planktivores, consuming both phytoplankton and zooplankton. They are themselves prey for a variety of predators. Eggs and larvae are consumed by numerous planktivores, with juvenile and adults being consumed by a variety of fish, birds, and mammals (*NMFS 1998*). Pacific sardine was collected during the 1990s surveys (*Allen 1999*), but was not collected in 2008 (*Pondella and Williams 2009*).

Pacific Mackerel (*Scomber japonicus*). Pacific mackerel is a pelagic species. In the northeastern Pacific, Pacific mackerel range from Banderas Bay, Mexico, to southeastern Alaska. As a group, they are the same species as mackerel of a variety of names occurring elsewhere in the Pacific, Atlantic, and Indian oceans. Pacific mackerel usually occur within 20 miles of shore. Local populations spawn from Eureka, California, south to Cabo San Lucas, Baja California, between 3 and 320 km from shore, with peak spawning occurring between late April and July. However, fecundity is more closely tied to sufficient food and environmental conditions than to season. Pacific mackerel larvae eat zooplankton, including copepods and fish larvae. Juveniles and adults consume small fishes, fish larvae, squid, and pelagic crustaceans. Pacific mackerel larvae are predated by numerous invertebrate and vertebrate planktivores. Juveniles and adults are important prey for many large fishes, marine mammals, and birds. Due to their larger size, they are likely less important as forage than Pacific sardine or northern anchovy, which are available to a wider variety of predators and are more abundant (*NMFS 1998*). Pacific mackerel is not identified as present in San Diego Bay in either the surveys of the 1990s or the 2008 surveys (*Allen 1999, Pondella and Williams 2009*).

Jack Mackerel (*Trachurus symmetricus*). Jack mackerel is a schooling fish that ranges widely throughout the northeastern Pacific. Individuals are found along the mainland coasts to an offshore limit approximated by a line running from Cabo San Lucas, Baja California, to the eastern Aleutian Islands, Alaska. Typically, small jack mackerel (less then six years of age) are most abundant near the mainland coast and islands in the Southern California Bight. Older individuals fill out the geographic range and are generally found offshore in deep water and along the coastline north of Point Conception,

California. Jack mackerel spawn between February and October in California, with peak spawning activity between March and July. Larvae eat primarily copepods, with the small jack mackerel found off southern California consuming large zooplankton, juvenile squid, and anchovy. Jack mackerel are prey items for large predators such as tunas and billfish. They are likely only of minor significance as prey for marine birds because of the large size of adults and their deep schooling behavior (*NMFS 1998*). Jack mackerel is not identified as present in San Diego Bay the surveys of the 1990s or in 2008 (*Allen 1999, Pondella and Williams 2009*).

California Scorpionfish (*Scorpaena gutatta*). The California scorpionfish ranges from Santa Cruz, California, south to Uncle Sam Bank, Baja California. It is a benthic species found in both sandy and rocky habitats. Individuals are predominantly solitary but are known to aggregate near prominent features both natural and human made. Young fish live in shallow habitats typically hidden within dense algae and bottom-encrusting organisms. Spawning occurs between May and September and peaks in July. Eggs are laid in a gelatinous mass that floats near the surface. The primary food items include juvenile crabs, small fishes (e.g., northern anchovy), octopus (*Octopus* spp.), isopods, and shrimps (*Core Team 1998*). California scorpionfish was collected in San Diego Bay during the 1990 surveys (*Allen 1999*) and 2008 surveys (*Pondella and Williams 2009*).

English Sole (*Parophrys vetulus*). English sole range from central Baja California to Unimak Island, Alaska. They occur in greatest numbers north of Point Conception, California. Juveniles are found in all Pacific coast estuaries from San Pedro Bay, California, to Puget Sound with Elkhorn Slough, California, being the southernmost estuary where they are abundant. Adults make limited movements with a northward migration in the spring to summer feeding grounds, returning in the fall. Spawning occurs over softbottom substrates at depths of 50 to 70 meters. Spawning occurs between December and April for southern stocks. Eggs are buoyant and larvae are pelagic. Adults and juveniles prefer soft sand and mud bottoms, generally in less than 12 meters of water. Larvae are planktivorous, eating different life stages of copepods and other small planktonic organisms. Juveniles feed on copepods, gammaridian amphipods, cumaceans, mysids, polychaetes, small bivalves, clam siphons, and other benthic invertebrates. Adults eat a variety of benthic organisms, but particularly polychaetes, amphipods, molluscs, ophiouroids, and crustaceans. Larvae are likely eaten by larger fishes, with juveniles falling prey to larger fishes, marine mammals, and birds. Adults may be eaten by marine mammals, sharks, and other large fishes. English sole are an indicator of environmental stress, accumulating contaminants and developing cancerous tumors as a result (*Emmett et al. 1991*). English sole is not identified as present in the surveys of the 1990s or in 2008 (*Allen 1999, Pondella and Williams 2009*).

3.8.2.3 Endangered and Threatened Species and Other Species of Concern

Federally-Listed Species

The following text discusses the status of Federally-listed endangered and threatened species supported within and in proximity to the project site. Neither the project site, nor the Refuge includes any Critical Habitat areas.

California Least Tern (*Sternula antillarum browni*). The California least tern, the smallest of the tern species, once nested on unfrequented sandy beaches close to estuaries and coastal embayments. By the 1960s, the availability of these isolated nesting areas had been severely reduced as a result of coastal development and an ever increasing human presence on the beaches. As these natural nesting areas were lost, least tern numbers diminished from uncountable thousands to several hundred. In 1970, the least tern was added to the Federal Endangered Species List.

The California least tern is migratory, arriving along the southern California coast to begin breeding in April and typically departing in late August or early September for the Central or South American coast, where it spends the winter. Only a few beaches continue to support least tern nesting in San Diego County, including the Tijuana Estuary, Naval Amphibious Base Coronado, Naval Base Coronado, Santa Margarita River mouth, and in Ocean Beach near the mouth of the San Diego River (*USFWS 2006*). The majority of the least tern nesting areas now occur on manufactured substrates or fills, some of which were intentionally created to support tern nesting, while others were created for different reasons and inadvertently attracted nesting terns.

Within the project site, a 6.5-acre area of upland located along the southwest edge of the CVWR is managed as nesting habitat for the California least tern. In 2008, 28 breeding pairs of terns were observed at the site and 33 nests were documented (*Patton 2009*). California least tern breeding information for the years 2003 through 2008 is provided in Table 18. California least terns also nest on the levees of the salt ponds located to the east of the Otay River channel, but no least tern nesting has been recorded in the immediate vicinity of the proposed tide gate in Pond 12. No least tern nesting occurs on the levees within the western salt ponds. Least terns, which are generally present in the south bay between mid-April and early September, forage within the bay, the adjacent ocean, and on occasion within the western salt ponds.

Light-footed Clapper Rail (*Rallus longirostris levipes*). The light-footed clapper rail spends its entire life in southern California coastal salt marshes, lagoons, and their maritime environs. Nesting usually begins in March and late nests have usually hatched by August. The birds nest in the lower littoral zone of coastal salt marshes where dense stands of cordgrass are present. They also occasionally build nests in pickleweed. Light-footed clapper rails have also been known to reside and nest in freshwater marshes. They require shallow water and mudflats for foraging, with adjacent higher vegetation for cover during high tides (*Massey et al. 1984*).

It is believed that most salt marshes along the coastline at one time supported clapper rails. However, recent census data indicate that less than 50 percent of the remaining coastal wetlands in California are currently occupied. Destruction of coastal wetlands in southern California has been so extensive that many estuaries where light-footed clapper rails were once abundant have been reduced to remnants. Although salt marsh habitat loss, degradation, and fragmentation are the leading threats to this rail, it is also threatened by disturbance, diseases, contaminants, and predation. The light-footed clapper rail was Federally listed as endangered in 1970.

Table 18 Summary of California Least Tern Breeding at the Chula Vista Wildlife Reserve (2003-2008)						
Observations	**Year**					
	2003	**2004**	**2005**	**2006**	**2007**	**2008**
Date first observed	April 24	April 20	April 26	April 21	April 23	April 9
Date last seen	August 14	Sept. 5	July 29	August 14	August 15	August 29
Date of first nest	April 15	April 15	April 17	April 30	April 15	April 16
Date last nest established	July 1	July 13	July 1	July 4	July 3	July 8
Estimated number of breeding pairs	22-25	30-48	44-53	12-13	33-39	28
Total number of nests	31	66	57	15	46	33
Estimated number of fledglings	6-8	11-18	2	2	0	2

Source: (*Patton 2009*)

No clapper rail activity has been documented at the western salt ponds or the CVWR. However, clapper rails have been observed in the marsh located between Pond 11 and the Emory Cove site. An adult rail and a chick were observed in this area in 2005, there was evidence of the presence of a breeding pair once again in 2006, and in 2007 both a pair of rails and a single rail responded during a high tide survey (*Zembal et al. 2007*). Light-footed clapper rails have periodically been documented in the upper portions of the Otay River channel, well upstream of the project site, between 1984 and 2007. In 1984, five nesting pairs were identified in the area southeast of the historic railroad line. Most recently, one pair was observed in 2005, two pair in 2006, and one pair in 2007 (*Zembal et al. 2007*).

California Brown Pelican (*Pelecanus occidentalis californicus*). The California brown pelican, which is one of six recognized subspecies of brown pelican, occurs along the Pacific Coast of the U.S. and Mexico, including the Gulf of California (*USFWS 1983*). Listed as endangered in 1970 because of widespread pollutant-related reproductive failures, the California brown pelican is still found in its original range, and breeds in the Channel Islands and on several islands off the coast of Acapulco, Guerrero, Mexico.

The energy budget and reproductive potential of the brown pelican is influenced by the availability and quality of roosting and loafing areas (*Jaques and Anderson 1987*). Unfortunately, the availability of roosting areas is declining in California as development continues along the coast. This habitat is important for both breeding and non-breeding birds during the breeding season and particularly for the thousands of wintering migrants

that occupy the coastal areas of the Southern California Bight during late summer and early fall (*Jaques and Anderson 1987*). Brown pelicans are common winter visitor in San Diego Bay, but they can also be observed in the bay year round. During the 2006-2007 avian surveys, pelicans were most commonly observed along the ocean and in the northern region of the bay (*Tierra Data Inc. 2009*). Survey data for 2006-2007 (*Tierra Data Inc. 2009*) included the observation of approximately 20 brown pelicans during the February 2007 survey, with little or no pelican activity occurring in other survey months. In the vicinity of Emory Cove and the western salt ponds, pelican activity occurred in April (40 pelicans at Emory Cove and 27 pelicans around the salt ponds), with little or no pelican activity occurring in other survey months. Within the western salt ponds, brown pelicans have been observed roosting on the internal levee that separates Ponds 10 and 11, along with American white pelicans and double-crested cormorants.

Western Snowy Plover (*Charadrius alexandrinus nivosus*). The western snowy plover nests adjacent to or near tidal waters with a breeding range that extends along the coastal beaches from the southern portion of Washington State to southern Baja California, Mexico (*USFWS 1993*). The breeding season extends from March 1 through September 15. Adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. The snowy plover is primarily a run and glean type of forager.

A significant decline in the Pacific Coast population of western snowy plover as a result of human disturbance, predation, and loss of habitat or habitat quality lead to the Federal listing of this species as threatened in 1993. In southern California, the very large human population and resulting recreation activities have precluded the western snowy plover from breeding on historic beach strand nesting habitat. The levees within the eastern salt ponds on the San Diego Bay NWR represent one of only a few locations where snowy plover breed in southern California. No nesting sites have been documented on the levees within the western salt ponds. Wintering western snowy plovers are occasionally observed foraging on the tidal flats in the Otay River channel and in the vicinity of Emory Cove. No western snowy plovers were observed at the CVWR during the 2006-2007 avian survey and monitoring results from 2003 through 2009 indicate no nesting attempts at this location (*USFWS 2009*).

Salt Marsh Bird's-Beak (*Cordylanthus maritimus maritimus*). Salt marsh bird's-beak is an annual plant that typically grows in the upper elevations of tidal salt marsh habitat, and can occasionally be found in non-tidal salt marsh. One of three subspecies, *Cordylanthus maritimus maritimus* occurs in coastal marshes from northern Baja California and from San Diego County to Santa Barbara County.

A hemi-parasitic plant, salt marsh bird's-beak is believed to derive water and perhaps nutrients through specialized root connections with other species (*USFWS 1985*). It is often found in association with pickleweed, shore grass, salt grass, and Frankenia. Studies indicate that freshwater influence in the spring encourages germination and that salinities at the time of germination usually cannot exceed 12 ppt. Germination and

flowering usually spans May to October but can sometimes occur during the winter. Pollination by upland, native bees is considered important to seed production, and yearly population numbers depend directly on seed dispersal and a site that provides the precise conditions required for germination.

Colonies of salt marsh bird's beak are found in only a few scattered salt marsh habitats between Santa Barbara and San Diego Counties. The subspecies was Federally listed as endangered in 1970 due to destruction and degradation of southern California's coastal salt marsh systems. In San Diego County, it is currently found at Sweetwater Marsh, Naval Radio Receiving Facility (YMCA Surf Camp site), and Tijuana Slough. It has not been located within the proposed project site, although propagation of salt marsh bird's-beak was attempted at the CVWR. This effort was however unsuccessful.

Eastern Pacific Green Turtle (*Chelonia mydas*). The Eastern Pacific green turtle is one of six species of sea turtles found in the oceans in and around the United States. The Eastern Pacific population is a regionally important population of the green turtle (*Chelonia mydas*) that exhibited an extreme decline in total population between the late 1960s and the late 1990s. As a result, the breeding colony populations (including nesting females and their progeny) of East Pacific green turtles on the Pacific coast of Mexico (and in Florida) are Federally listed as endangered. The rest are listed as threatened (*National Marine Fisheries Service and USFWS 1998*). Population decline is attributed to severe overharvest of wintering turtles in the Sea of Cortez between 1950 and 1970, the intense collection of eggs between 1960 and early 1980 on mainland beaches of Mexico, nesting habitat destruction, and incidental capture in commercial fisheries. Primary threats to the species in U.S. waters are from entanglement in debris, boat collisions, fisheries bycatch, and entrainment in coastal power plants.

Larger specimens of the Pacific green turtle can grow to about 4 feet in length and a weight of 440 pounds, although one individual recorded in San Diego Bay weighed almost 530 pounds (*Southwest Fisheries Science Center [SFSC] 2007*). They have a heart-shaped shell, small head, and single-clawed flippers. The adult carapace is smooth, keel-less, and light to dark brown with dark mottling, with whitish to light yellow plastron. Adults feed almost exclusively on sea grasses, including eelgrass, and marine algae.

Although they do not nest as far north as the California coast, Pacific green turtles are often found during the summer months in waters off the coast of California, Oregon, and sometimes as far north as Alaska (*SFSC 2007*). Since the 1850s, sea turtles have been sporadically reported in San Diego Bay. Estimates vary on how many sea turtles inhabit San Diego Bay, but there may be as many as 100 turtles in the population. These turtles tend to congregate in the southern part of the bay where the water is warmed by thermal effluent from the South Bay Power Plant and eelgrass beds are plentiful. Although breeding sea turtles typically leave the Bay in the springtime to migrate to their nesting beaches at mainland Mexico and offshore islands of Mexico, the bay does support a population of these turtles year round. Because threats to the turtle are relatively low in

South San Diego Bay, it represents one of the few "safe" sanctuaries for this species in the Eastern Pacific Ocean (*SFSC 2007*).

The Marine Turtle Research Program (MTRP) at SFSC regularly monitors green turtles in San Diego Bay through biological sampling, sonic tracking, and satellite telemetry. Biological sampling provides not only physical data about the turtles such as weights and measurements, but also involves using skin and blood samples for analyses by the MTRP Molecular Ecology Laboratory. These data are used worldwide in genetic and isotope studies conducted at the lab. Sonic tracking allows the turtles' movements to be tracked throughout the bay. The MTRP also collaborates with the Port and the U.S. Navy to investigate movements of green turtles in San Diego Bay. Occasionally, satellite transmitters are attached to individual turtles, allowing the travels of the turtle to be tracked through a satellite signal that is sent each time the turtle surfaces (*SFSC 2007*).

It is unclear if the turtles are present in San Diego primarily because of the warm water generated by the South Bay Power Plant, or because of a combination of factors, including good foraging habitat, limited threats, and naturally warmer water temperatures due to the shallow water depths in south San Diego Bay. Some researchers propose that the turtles are not present because of the warmer water from the power plant, but because the extensive eelgrass beds available in the bay, which represent the only foraging area within their range in which they are not at risk of being taken by poachers. Eastern Pacific green turtles have been documented in the project area, including in the channel and open bay waters around the CVWR and in the extensive eelgrass beds located to the north of Pond 11 and to the east of Emory Cove (*Eguchi and Seminoff 2008*).

State-Listed Species

The California least tern, light-footed clapper rail, California brown pelican, and salt marsh bird's beak are also listed as endangered by the State of California. The Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), another species listed by the State of California as endangered, also occurs in the vicinity of the project site.

The Belding's savannah sparrow is one of only two listed wetland-dependant avian species that reside year-round in the coastal salt marshes of southern California (*Powell and Collier 1998*). This salt marsh species is therefore reliant upon coastal salt marsh habitat for all of its life history requirements. This subspecies ranges along the southern California coast from Santa Barbara County (Goleta Slough) in the north to El Rosario, Baja California, Mexico in the south (*James and Stadtlander 1991*). Generally nesting within dense stands of pickleweed, the Belding's savannah sparrow's breeding territories can be very small, with individuals nesting semi-colonially or locally concentrated within a larger block of habitat (*Zembal and Hoffman 2002*).

The main factors that influence the long-term survivability of this subspecies are the health and security of its habitat. Human impacts, such as trespassing into closed areas, off-trail use in areas open to the public, and domestic and feral pets entering the marsh, continue to represent a serious threat to the long-term survivability of the Belding's savannah sparrow. This subspecies was listed as endangered by the State of California in 1974 when the numbers of Belding's

savannah sparrows were observed to have decreased dramatically due to the loss, degradation, and fragmentation of coastal salt marsh habitat as a result of development and increased human disturbance (*Zembal et al. 1988*).

Because of the secretive nature of this sparrow, it can be difficult to obtain accurate population estimates (*Zembal et al. 1988*). The population estimate for this subspecies in California increased from 1,084 pairs in 1973 to 2,902 pairs in 2001; however, statewide censuses of this sparrow reveal wide fluctuations in local population sizes (*Zembal and Hoffman 2002*). Statewide surveys have been conducted every five years since 1986. The results of these surveys show a regular presence, but fluctuating numbers, within the San Diego Bay NWR. In 2001 on the South San Diego Bay Unit, 98 territories were identified, with 58 territories observed along the Otay River channel. Another 27 territories were identified within the ribbon of pickleweed that grows along the outer levees of the salt ponds. Within the project site, this subspecies occurs along the levee banks that face the Otay River channel, including along portions of Ponds 10, 11, and 12. Twenty-six territories were found at the South Bay Biological Study Area (*Zembal and Hoffman 2002*), located between western salt ponds and Emory Cove. No observations of this species on the CVWR were made during the 2006 state-wide surveys (*Zembal et al. 2006*).

Birds of Conservation Concern

Table 19 lists the Birds of Conservation Concern that are known to occur within the project site. Species identified as Birds of Conservation Concern can be included on one or more lists, including a list of birds of concerns within each Bird Conservation Region (BCR), within each USFWS Region, and/or throughout the nation. For this project, the list includes BCR 32 (Coastal California), USFWS Region 8 (Pacific Southwest), and the National list. The National list (U.S.) should be viewed as a barometer of the status of U.S. bird populations, providing an "early warning" of birds that may decline to levels requiring ESA protection unless additional conservation measures are taken (*USFWS 2008*).

3.9 Cultural Resources

A complete description of the cultural resources and the archeological setting in and around the south end of San Diego Bay is presented in the San Diego Bay NWR Final CCP/EIS (*USFWS 2006*), which is incorporated by reference into this document.

No prehistoric archaeological sites have been recorded within or immediately adjacent to the Emory Cove site and no sites occur on the CVWR, which was created in the 1980s from dredge spoil. Two sites (CA-SDI-13073H and CA-SDI-5454/12270) have been previously identified in the area adjacent to the western salt ponds along the right-of-way of SR-75. CA-SDI-5454/12270 has been previously recommended for National Register of Historic Places eligibility. This site was originally recorded as having multicomponents including a U.S. Calvary base, the historic WWII era radio facility and bunkers, and a prehistoric midden covering more than ten acres (*Pigniolo 2001*). The site was updated in 1995 (*Apple et al. 1995 in Pigniolo 2001*) and the boundaries were expanded to include both side of SR-75. The update record described the site as an extensive lithic and shell scatter with several hundred flakes, shell dominated by Chione and

Table 19 Birds of Conservation Concern Occurring within the Project Site				
Common Name	**Scientific Name**	**Included on BCC List**		
		BCR 32	**Region 8**	**U.S.[1]**
Reddish egret	*Egretta rufescens*	No	No	Yes
Peregrine falcon	*Falco peregrinus*	Yes	Yes	Yes
Black Oystercatcher	*Haematopus bachmani*	Yes	Yes	Yes
Lesser Yellowlegs	*Tringa flavipes*	No	No	Yes
Whimbrel	*Numenius phaeopus hudsonicus*	Yes	Yes	Yes
Long-billed curlew	*Numenius americanus*	Yes	Yes	Yes
Marbled godwit	*Limosa fedoa fedoa*	Yes	Yes	Yes
Red knot	*Calidris canutus roselaari*	Yes	Yes	Yes
Dunlin	*Calidris alpina*	No	No	Yes
Short-billed dowitcher	*Limnodromus griseus*	Yes	Yes	Yes
Gull-billed tern	*Geochelidon nilotica vanrossemi*	Yes	Yes	Yes
Black skimmer	*Rynchops niger niger*	Yes	Yes	Yes
Burrowing owl	*Athene cunicularia hypugaea*	Yes	Yes	No
Loggerhead shrike	*Lanius ludovicianus*	Yes	Yes	Yes

[1]National List Source: (*USFWS 2008*)

Argopecten, and fire-affected rock. The site, which was reexamined in 2001 (*Pigniolo 2001*), has been affected by the construction of SR-75 and other portions of the site have been covered by fill from road and earlier railroad construction. Recent evaluation of the site indicated that it appears to represent a predominantly Archaic period series of summer occupations the utilized the high point of a knoll overlooking San Diego Bay to the east. Although 30 percent of the site has been destroyed or buried, the remaining portions of the site retains enough integrity and content to meet Criterion D, making it eligible for inclusion on the NRHP (*Pigniolo 2001*).

Requirements for Federal agencies to identify, evaluate, and protect cultural resources are outlined in several Federal regulations (described in greater detail in Section 5.1.3 of this document), including the National Historic Preservation Act (NHPA) of 1966, as amended (PL 89-665; 50 STAT 915; 16 USC 470 et seq. 36 CFR 800). The NHPA sets inventory, nomination, protection, and preservation responsibilities for federally-owned cultural properties and directs Federal agencies to take into account the effects of their actions on items or sites listed or eligible for listing in the NRHP. The criteria used to evaluate eligibility to the NRHP, as contained in 36 CFR 60.4, include, among others, consideration of the quality of the property's significance in American history, architecture, archaeology, and culture and the property's known or likely ability to yield information important in prehistory or history. An historical property must also retain the integrity of its physical identity that existed during the resource's period of significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association.

Within the project site, the salt pond complex and associated buildings within the salt works have also been determined to be eligible for listing in the NRHP. A Historic Resources Evaluation Report (*Gustafson and Gregory 2001*) was prepared for the Western Salt Company Salt Works in association with the Bayshore Bikeway proposal. The report includes the following statements regarding the significance of the site:

> *"The Western Salt Company Salt Works has operated for nearly one hundred years. The unique location provides the Salt Works the elements that are necessary for successful solar salt production. The site consists of a grouping of related resources that are united by design and function. The Salt Works satisfies the requirements for a district under the National Register of Historic Places. The National Register defines a district as a site that "possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development."*

The report further states that the salt works, which retains a high degree of integrity, is eligible for inclusion on the NRHP under Criteria A and C of the National Register of Historic Places (36 CFR 60.4) because the facility played an important role in the solar salt industry in Southern California from 1916 to 1949 and the Salt Works embodies the distinctive characteristics of a solar salt processing facility.

The State Office of Historic Preservation in a letter to the Federal Highway Administration, dated May 28, 2002, concurred with the conclusions of the report and determined that the Western Salt Company Salt Works is eligible for inclusion on the NRHP. The contributing elements to the historic district include: the main processing plant, the pump house between Ponds 21 and 44, the electrical, generator and compressor buildings, the maintenance shop, the 18 condensing or evaporator ponds, the 14 crystallization salt ponds, the levees separating the condensing and crystallization ponds, the short section of narrow-gauge rail line as it crosses the San Diego & Arizona Eastern Railroad tracks, and the salt pile used salt storage after harvesting.

The historic alignment of the Coronado Belt Line (CA-SDI-13,073H), which operated between 1888 and 1896, is located to the south of Pond 10 and extends between Ponds 10 and 10A where the Bayshore Bikeway has subsequently been constructed. A segment of the original track is still present to the south of the bike path, just to the west of 7th Street in Imperial Beach. In 1994, Caltrans with subsequent concurrence from the SHPO concluded that the railroad line did not possess the qualities necessary to be considered eligible for inclusion on the NRHP. On November 8, 2002, the California State Historical Resources Commission concluded that Belt Line Right-of-Way would not be included on the California Register of Historical Resources. This site was however designated as a historic site within the City of San Diego in 2005.

3.10 Land Use

3.10.1 Uses Occurring Within and Adjacent to the Project Site

The western salt ponds, CVWR, and Emory Cove site are all managed for the primary purpose of conserving native habitats and associated wildlife. All of the sites are designated public trust lands, areas held in trust for the citizens of California. The Port manages the CVWR and Emory

Cove in accordance with the Port Master Plan. The CVWR, which is closed to public access, is located in the bay to the west of the South Bay Power Plant. Emory Cove is located at the western edge of San Diego Bay, to the east of SR-75 and the north of the County of San Diego's Biological Study Area where a public parking area and wildlife observation area has been constructed. The Bayshore Bikeway extends through the western portion of Emory Cove.

The Service, which has a lease from the State Lands Commission for the western salt ponds and most of the other salt ponds located to the east of the Otay River channel, manages the salt ponds as a National Wildlife Refuge in accordance with the San Diego Bay NWR Comprehensive Conservation Plan (*USFWS 2006*). A commercial solar salt operation manages the water within the salt ponds to produce salt in accordance with a Special Use Permit from the Service. The salt works operator also has a lease from the San Diego Airport Authority for use of the various structures located on 17 acres at the eastern edge of the ponds. The salt works and its associated levee system are closed to public access, with the exception of the levee between Ponds 10 and 10A. This levee, which is located within the right-of-way of the historic Coronado Belt Line and today supports the Bayshore Bikeway, was not incorporated into the Refuge boundary when the Refuge was established.

The western salt ponds are bordered to the west by SR-75 and to the north by the County of San Diego's Biological Study Area. To the east of Ponds 10 and 11 is the Otay River channel and to the south and southeast of Pond 10A is residential development located within the City of Imperial Beach. Pond 12 is located to the east of Pond 10 across the Otay River channel and to the north of Pond 23. The northwest corner of Pond 11 is owned by the U.S. Navy, as is the County of San Diego Biological Study Area to the north.

3.10.2 Applicable Land Use Plans and Regulations

<u>San Diego Bay NWR Comprehensive Conservation Plan (CCP)</u>
The goals of the CCP (*USFWS 2006*) include: 1) protecting, managing, enhancing and restoring coastal wetland and upland habitats within the Refuge; 2) supporting the recovery of federally and state listed species; 3) providing high quality foraging, resting, and breeding habitat for migratory birds; and 4) providing opportunities for compatible wildlife-dependent recreation and interpretation that foster public appreciation of the unique natural and cultural heritage of south San Diego Bay. Management of Refuge lands and resources occurs consistent with the goals and objectives of the CCP and the purposes for which the Refuge was established.

<u>Port Master Plan</u>
The Port Master Plan provides land use designations and descriptions of appealable coastal development projects for the areas within the Port's jurisdiction. The CVWR and Emory Cove are within the Port Master Plan. The Port has the authority to issue coastal permits for the areas in the Port Master Plan, in accordance with Chapter 8 of the California Coastal Act.

<u>Imperial Beach General Plan</u>
The Imperial Beach General Plan (*City of Imperial Beach 1994*) describes the area along the south end of San Diego Bay as the Bayview Neighborhood, and identifies the Imperial Beach bayfront as unique and environmentally sensitive.

California Coastal Act

Chapter 3 of the California Coastal Act includes the policies considered in reviewing coastal development permits, Local Coastal Plans, and Federal Consistency Determinations. Each proposal submitted to the California Coastal Commission is evaluated for conformity with the policies of this chapter, which address issue such as the protection of coastal resources, public access, and recreational opportunities. The policies presented in Chapter 3 that are applicable to this proposal are outlined below.

Section 30233 -

(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes are permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects. Such activities are limited to specific purposes including: restoration purposes and nature study, aquaculture, or similar resource dependent activities.

(b) Dredging and spoils disposal is to be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation.

(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game, including, but not limited to, the l9 coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California", shall be limited to very minor incidental public facilities, restorative measures, nature study, and development in already developed parts of south San Diego Bay, if otherwise in accordance with this division.

Section 30240 -

(a) Environmentally sensitive habitat areas are to be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

3.11 Public Recreation

The south end of San Diego Bay includes numerous opportunities for participating in both active and passive recreation. Opportunities biking, walking, wildlife observation, and photography are available along the Bayshore Bikeway, as well as at the Biological Study Area, located to the north of Pond 11. Boating and fishing opportunities are also available in San Diego Bay, although due to the very shallow depths present at the south end of the bay, boating activities generally include kayaking, canoeing, and other low profile vessels. Fishing from the shoreline is not permitted at the CVWR, Emory Cove, or the outer levees of the salt ponds. Fishing is also prohibited within salt ponds.

The Bayshore Bikeway extends between Ponds 10 and 10A, outside the boundary of the San Diego Bay NWR. This bikeway is a 26-mile bicycle facility that extends around San Diego Bay

in a combination of off-road and shared roadway segments. In the vicinity of south San Diego Bay, the off-road portion of the Bayshore Bikeway extends from Coronado south and east to Main Street near Interstate 5. This segment of the bikeway provide close up views of Emory Cove and the salt ponds, and distant views of the CVWR within the south end of the bay. The bike path is used by recreational and commuter bicyclists, as well as walkers, joggers, roller bladders, and bird watchers. The County of San Diego's Biological Study Area also provides views of the bay and the adjacent salt ponds and opportunities for wildlife observation.

3.12 Environmental Justice

The goal of environmental justice in the United States is to afford the same degree of protection from environmental and health hazards to all individuals and communities throughout the nation. To understand the current proposal's potential effect as is relates to environmental justice, the following information is presented regarding the economic and ethnic composite of the communities that surround the project site.

The U.S. Department of Housing and Urban Development (HUD) defines low income as 80 percent of the median family income for the area, subject to adjustment for areas with unusually high or low incomes or housing costs. According to the 2000 Census, the median household income in 1999 dollars was $35,882 in the City of Imperial Beach (*SANDAG 2002*). This compares with an estimated countywide median household income of $47,067. An income of $37,650 would represent 80 percent of the median family income for the region; therefore, based on the figures available, Imperial Beach meets the definition of low income.

The ethnic composite of the areas surrounding the project site are presented in Table 20. For purposes of comparison, the percentage of minorities in the communities surrounding the project site is higher than the San Diego Region as a whole, except for the City of Coronado.

Table 20
Ethnic Composite of the Cities in the Vicinity of the Project Site[1]

Ethnic Group	Coronado	Chula Vista	Imperial Beach	Otay Mesa Nestor (San Diego)[2]	San Diego Region
American Indian	5%	< 1%	< 1%	1%	< 1%
Asian	< 1%	11%	6%	15%	9%
Black	4%	4%	5%	7%	5%
Hawaiian & Pacific Islander	< 1%	< 1%	< 1%	1%	< 1%
Hispanic	10%	50%	40%	51%	27%
White	79%	32%	43%	20%	55%
Other	< 1%	< 1%	< 1%	< 1%	< 1%
2 or More Races	2%	3%	4%	5%	3%

[1]Source: (*SANDAG 2002*, except as noted for Otay Mesa Nestor)
[2]Source: (*U.S. Census Bureau 2002*)

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

The discussion included in this section, as well as the issues addressed in the Initial Study Checklist (Appendix A), provide information needed by the decision makers to make an informed decision regarding the proposed action and various project alternatives. The topics addressed under the Environment Consequences section include direct, indirect, and cumulative effects to the environment as a result of implementing the proposed action, which includes Alternatives 1A, 2A(1), and 3A, or project alternatives. Only those issues that are potentially affected by the proposed project are discussed in detail in this section. The Initial Study Checklist (Appendix A) provides documentation of our consideration of all potential environmental effects resulting from the proposed action. The criteria used to determine if a particular impact represents a significant adverse effect (i.e., significance criteria or threshold determination) are present below for each topic.

4.1 Effects to Topography/Visual Quality

Significance Criteria

1. An adverse topographic effect is considered significant if grading is proposed in a highly scenic area or would alter a locally or regionally important topographic landmark, or proposed grading would substantially alter the existing landform by creating manufactured slopes higher than ten feet or steeper than 2:1 (50 percent).

2. Substantial alteration of the natural landform or blockage of public views to a public resource (such as San Diego Bay) from designated open space areas or public roads would be considered a significant adverse effect on visual quality.

Effect Analysis

Proposed Action. The existing elevations within Ponds 10 and 11 would be altered to achieve elevations suitable for supporting cordgrass-dominated salt marsh habitat and to create subtidal channels within the salt marsh habitat. The desired elevations would be achieved by dredging material from higher areas of the ponds and moving it to lower elevations. In addition, 50,000 cubic yards of material would be transported to Pond 11 to further raise the elevations to support cordgrass. The proposed elevational changes within the ponds will in most cases be less than a foot and will not be discernable from outside the ponds. The outer levee of Pond 10 and Pond 11 will be breached to facilitate tidal exchange. These breaches will occur at the northeast corner of Pond 11 and at the current site of the tide gate in Pond 10. The alteration of these existing unnatural landforms (salt ponds and levees) would represent relatively minor topographic changes as viewed from the surrounding area, and would represent neither an adverse nor a beneficial effect on the existing landform.

The appearance of the western ponds following restoration would be changed from that of water-filled ponds to intertidal mudflats or cordgrass-dominated salt marsh covered by water only during periods of tidal inundation. This change in appearance would be most apparent when

viewed from SR-75, the Bayshore Bikeway, and the homes immediately to the south of Pond 10 and to the south and east of Pond 10A.

Hydraulic modeling of the tidal exchange into Pond 10A under Option 1 (part of the proposed action), which would retain the existing culvert system between Ponds 10 and 10A, indicates that tidal exchange in Pond 10A will be muted during both high and low tides (*Everest International 2009*). The lowest water elevation in the pond will be controlled by the ground elevation in the pond, which is +4.0 feet NAVD88 and the highest elevation will be controlled by the top of the culverts. Under these conditions, subtidal habitat (always inundated) would range from +4.0 feet NAVD88 to +4.3 NAVD88 and would include an area of approximately 9.5 acres. Another 7.4 acres would experience daily periods of inundation and exposed vegetation, and 6.8 acres of high marsh would experience inundation only during the higher high tides. Under existing conditions, approximately 25 acres of ponded water is present when Pond 10A is full, however, there are also periods under current conditions when the water levels in Pond 10A are very low water. Therefore, the visual conditions under the proposed action would not be that much different than current conditions, except that inundation and exposure would coincide with the tides and therefore be more predictable.

Under Option 2, by expanding the opening under the bike path, no muting of the high tides would occur, but there would still be muting at the low tides (*Everest International 2009*). The habitat elevation under Option 2 for subtidal habitat (always inundated) would be +4.0 feet NAVD88 and would include an area of approximately 3.0 acres. Another 7.0 acres would experience daily periods of inundation and exposed vegetation, and 22.4 acres of high marsh would experience inundation only during the higher high tides.

The construction of a 10-foot-wide, 1.5 to 2.0-foot high berm with 4:1 (horizontal to vertical) along the eastern property line of Pond 10A would not significantly alter the topography character of the site. The berm, which would not block any views from the adjacent residences, would be planted with native vegetation, mimicking the appearance of the native upland vegetation that currently exists in the area. Therefore, the appearance of the berm would not represent an adverse visual effect.

The effect to the visual quality and aesthetics as a result of opening the western ponds to tidal action could be viewed as adverse by some observers, while others might consider returning the area to a more historical landscape to be a beneficial visual effect of restoration. In either case, the proposed change would not significantly change the open nature of the area and would not create an adverse visual effect; therefore, the impact to visual quality from restoring the western salt ponds under either Option 1 or Option 2 is less than significant.

The excavation proposed within the CVWR would lower the existing elevations within the west and east basins, but once again, the elevational changes from a topographic and visual perspective are minor and would not be visible to the public from outside the boundaries of the CVWR. No substantive grading is proposed at the Emory Cove site. Only the removal of invasive plants, trash, and other debris and the reestablishment of native vegetation are proposed at this location. Therefore, impacts related to topography and visual quality associated with implementing the proposed action at the CVWR and Emory Cove would be less than significant.

The proposed action, as well as the No Import Alternative includes future plans to install a maximum six-foot-high, black vinyl chain linked fence along portions of the western boundary of the ponds. In some cases, the fence could be installed below the grade of the adjacent highway near the base of the slopes that extend down to the ponds. This would reduce or fully obscure the visibility of the fence from SR-75. The fence would be installed if needed in locations where trespass into the marsh is resulting in degradation of habitat and impacts to sensitive species. The placement of the fence below the grade of the road, the installation of vegetation adjacent to the fence where it is visible, and the use of black vinyl to reduce the visibility of the fence will reduce any visible impacts to below a level of significance.

No Import Alternative. All aspects of this alternative would be same as those of the proposed action except that under the No Import Alternative, the additional 50,000 cubic yards of material to be imported to Pond 11 from the CVWR would be disposed of in an alternate method. One proposal would be to dispose of the material onsite by raising the least tern nesting area by approximately 5.7 feet above the existing terrain. The least tern nesting site is a considerable distance from any public viewing areas, therefore, increasing the height of the site would not adversely affect public views, and would therefore, not represent a significant visual impact. No impacts to the natural topography would result because the CVWR is not a natural landform.

No Action Alternative. Under the No Action Alternative, grading or dredging would occur within the western salt ponds or at the CVWR. In addition, open water would continue to be present in Ponds 10 and 11, and variable water levels would continue to be experienced within Pond 10A. No changes to the existing topography or visual conditions would result.

4.2 Effects to Geology and Soils

Significance Criteria

1. Impacts related to geology and soils would be considered significant if the project would trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion affecting onsite facilities or adjacent facilities, such as roadway and railway embankments and bridge abutments and pilings.

2. Impacts would also be considered significant if the project increased the susceptibility to geohazards, such as liquefaction, settlement, ground rupture, or lateral spreading.

Effect Analysis

Proposed Action. According to previous geotechnical investigations, the potential for deep-seated failure of submerged slopes within the salt ponds, such as those that would be created when a levee is breached, could be minimized by ensuring that all submerged slopes maintain a slope gradient of 3:1 or flatter (*GEOCON 1985*). Based on this information and tidal hydraulic modeling conducted to determine the size (length, depth, and width) of the levee breaches necessary to achieve the desired habitat distribution (*Everest International 2009*), all levee breaches would have a slope gradient of 4:1. Adherence to this design recommendation would minimize the potential for deep-seated failure of the submerged slopes.

Prior to the completion of final engineering plans for the new tide gate in Pond 12, additional geotechnical analysis will be conducted to ensure that current soil conditions within and below the levee are adequate to support the new construction, or that adequate design features are incorporated into the final design to ensure the long term stability of the tide gate. No other structures are proposed for the western salt ponds and no structures are proposed at the CVWR under this alternative, therefore, no impacts related to subsidence, ground failure, or erosion affecting onsite facilities or adjacent facilities would result from the implementation of the proposed action. Impacts related to geology and soils would be less than significant.

No Import Alternative. Using the material excavated from the CVWR to raise the site's least tern nesting area by approximately 5.7 feet above the existing terrain would create potential erosion problems along the side slopes that would be create. Measures to reduce the potential for erosion would include providing slope gradients of 4:1 or greater and planting the slopes with native vegetation to stabilize the soils. These measures would reduce impacts related to geology and soils, but could result in impacts to other resources, as will be discussed below.

No Action Alternative. No adverse affects related to geology or soils would be expected under this alternative.

4.3 Effects Related to Hydrology

Significance Criteria

An adverse hydrologic effect is considered significant if an action would result in:

a. increased flooding on- or off-site in the event of substantial rainfall;
b. increased flooding in the event of tidal action; and
c. changes in tidal circulation that would trigger or accelerate slope instability or erosion affecting onsite facilities or adjacent facilities, such as roadways, railway embankments, and culverts.

Effect Analysis

Proposed Action. The activities proposed at the CVWR and Emory Cove as part of the proposed action should have no effect on the hydrology of San Diego Bay. Changes to the western salt ponds, including the proposal to breach the outer levee of Pond 11, would create a hydraulic connection between the pond and the bay. Additionally, a breach in the outer levee of Pond 10, at the current location of the existing tide gate, would provide a hydraulic connection between the pond and the Otay River channel. The effects of creating these connections on surrounding properties, as well as the effect on the existing connection between Ponds 10 and 10A, were analyzed to determine if these changes have the potential to change the hydrology within the Otay River channel and in the ponds that could impact adjacent properties. Such changes could relate to tidal inundation and/or flooding during storm events.

To conduct this analysis, a model was selected that accounts for all the necessary analysis components including tidal fluctuations, flood flows, grading changes, and water control structures (e.g., open channels, culverts, pipes, and weirs) (*Everest International 2009*). The

flood hydrographs for the Otay River and Nester Creek are also incorporated into the model. The 100-year peak floods were assumed to occur 12 hours after flow initiation, returning to no flow after 24 hours. This is a simplified method originally applied to the salt ponds by PWA (*2003*) as part of the analysis conducted for the San Diego Bay NWR Final CCP/EIS (*USFWS 2006).* The method was also adopted for an earlier study evaluating flooding effect in the Otay River floodplain as a result of restoration (*Everest International 2007*). The floods were timed so that the peak of the flow would coincide with MHHW to simulate high water flooding conditions.

The model evaluated potential impacts during the typical tidal cycle and during a flow event. To analyze potential effects during a typical tidal cycle, it was important that the tidal series used to assess the tidal response in the restored western ponds represent long-term conditions since the habitat distribution in the ponds will become established based on the long-term trends as opposed to extreme tide ranges (e.g., spring and neap tides). A tidal epoch analysis tide was created for use in the model to represent the long-term tidal characteristics of San Diego Bay. The tidal epoch analysis tide is a synthetic 30-day tidal series developed statistically to match the cumulative distribution of water levels over a 19-year tidal epoch (1983-2001). It includes both spring and neap tidal ranges. By using the tidal epoch analysis tide for hydrodynamic modeling, long-term tidal variations can be modeled with relatively small computation times (*Everest International 2009*).

The model was used to simulate water levels in the western ponds in response to the tidal epoch analysis tide and the corresponding frequencies of tidal inundation at the ponds. The frequency of tidal inundation indicates the percent of time when a specific elevation is inundated by water. As proposed, there will be no tidal muting in Ponds 10 and 11 while Pond 10A with existing culvert connections (Option 1) would have the most tidal muting. Expanding the opening under the bike path (Option 2) would result in no muting of the high tides but there would still be muting of the low tides.

The extent to which extreme high tide levels inundate areas surrounding the western salt ponds under existing conditions is unknown, but anecdotal evidence indicates that during very high tides properties adjacent to Pond 10A can experience tidal inundation. To determine project-induced impacts to tidal flooding it is important to consider the full tide range in the western salt ponds under project conditions. In the case with the greatest possible impact, the project-induced change in tidal inundation would be from no tide without project to a full tide with project. In conducting the analysis, only Option 2 for the connection between Pond 10 and 10A was modeled because this option would have higher water elevations in Pond 10A compared to Option 1.

An analysis was conducted of the maximum water levels in the western salt ponds and along the Otay River for two scenarios – MHHW at San Diego Bay (5.29 feet NAVD88) and the maximum observed tide at San Diego Bay for the 1983 – 2001 tide epoch (7.71 feet NAVD88). Under existing conditions, there is no tidal connection between the ponds and San Diego Bay so tidal waters in the Otay River will overtop the levees to reach the ponds only during extreme high tides (*Everest International 2009*). The analysis showed that there is no difference in water

levels in the western ponds under existing and with project conditions; hence, there would be no impact of the proposed project to tidal flooding of the adjacent neighborhood.

Although the proposed project would not influence water levels during periods of very high tide, the water levels in the western salt ponds and along the Otay River were compared to the invert elevations of the storm drains surrounding the western salt ponds to show when and where the storm drains may be submerged during high tides and thereby pose a potential for flooding within adjacent neighborhoods. Figure 15 indicates the locations of the storm drains surrounding the western ponds. Elevations of both the pond side and upstream (street) side of the storm drains, as well as elevations for nearby SR-75, the mobile home park to the south of Pond 10A, and existing homes to the east of Pond 10A, were considered. The difference between the invert elevations for these storm drains and the existing elevations of the other areas and the maximum water elevations of the western salt ponds indicate that the storm drain invert elevations are lower than the maximum water elevation. As a result, the storm drains would be submerged when high tide elevations exceed MHHW in San Diego Bay and hence may cause minor flooding of the adjacent streets. In general, all the storm drains are submerged during extreme high tide, consistent with anecdotal evidence and observation during a recent site visit that some area of the neighborhood east of Pond 10A has flooded during very high tides (*Everest International 2009*).

The current findings are based on an analysis of a very high tide. Lower high tides could increase the frequency of higher water levels in Pond 10A, which could lead to increased flooding within the existing storm drain system. These conditions occur with or without the proposed action and the proposed restoration of the western salt ponds would not exacerbate current conditions. Therefore, no adverse effects related to tidal flooding would occur as a result of this proposal.

Although there would no significant adverse effect as a result of the proposed action, as part of the final design, analysis of lower high tides will be conducted and if it is determined that lower high tides could increase the frequency of higher water levels in Pond 10A, the Service will coordinate with the City of Imperial Beach and Caltrans to determine what if any measures (e.g., water control structures, sump pumps) might be implemented to address existing tidal flooding issues.

The modeling conducted to determine the effects of the proposed restoration under a storm event indicates that water levels in the Otay River simply follow the tide before the arrival of the flood flows (*Everest International 2009*). After the arrival of the flood flows, water levels in Otay River continue to rise until reaching peak elevations of 7.5 and 9.8 feet NAVD88 for the area between Ponds 11 and 12 and for the area near the bend in the river just to the south of the existing tide gate, respectively. Under existing conditions, since there is no tidal connection between the western salt ponds and San Diego Bay, the water levels in the ponds stay at the initial water levels until flood water levels in the adjacent Otay River start to overtop the levees at around Hour 42. Water levels in the three ponds rise to a maximum of approximately 8.7 feet NAVD88 then recede to the elevation of the levee at approximately 7 feet NAVD88.

Figure 15

With the proposed project condition, some of the flood flows are able to pass through the western salt ponds, and then discharge to San Diego Bay. This effectively provides better flood conveyance for the Otay River, hence maximum flood elevations in the Otay River, at the two locations described previously, drop to 7.2 and 9.4 feet NAVD88 compared to 7.5 and 9.8 feet NAVD88 for the existing condition. Subsequently, maximum flood levels in Ponds 10 and 11 also drop to approximately 7.8 feet NAVD88 compared to 8.7 feet NAVD88 under existing conditions. For Pond 10A, under Option 1, the maximum flood elevation only reaches 7.2 feet NAVD88 due to the restricted connection between Pond 10 and Pond 10A. With the expanded connection between Pond 10 and Pond 10A, under Option 2, the maximum flood elevation in Pond 10A will reach 7.8 feet NAVD88 (*Everest International 2009*).

Based on the results of the modeling, the proposed action would not result in increased flooding on- or off-site in the event of substantial rainfall or flooding in the event of tidal action, nor would it result in changes in tidal circulation that would affect adjacent properties. Therefore, the proposed action would not have a significant adverse affect related to hydrology.

No Import Alternative. Under the No Import Alternative, the additional 50,000 cubic yards of material proposed for use in Pond 11 would not be imported to the site. All other aspects of the project would remain unchanged. The elimination of this material from the project design would have no discernable effect on the modeling results described above, therefore, the conclusions presented above related to tidal inundation and storm flows would be the same for either alternative.

No Action Alternative. Under the No Action Alternative, the levees would not be breached, therefore, as described above, flood flows would be conveyed between the outer levees of the western and eastern ponds, resulting in peak elevations of 7.5 and 9.8 feet NAVD88 for the area between Ponds 11 and 12 and for the area near the bend in the river just to the south of the existing tide gate, respectively, while peak elevations under the proposed action would be drop to 7.2 and 9.4 feet NAVD88. With respect to tidal inundation, anecdotal evidence indicates that during very high tides properties adjacent to Pond 10A can experience tidal inundation, and modeling indicates that flooding will occur as a result of tidal flows entering existing storm drains during higher high tides. This situation would continue under the No Action Alternative.

4.4 Effects Related to Water Quality

Significance Criteria

Adverse impacts to water quality would be considered significant if the action would violate any water quality standards or waste discharge requirements, substantially increase downstream sedimentation or turbidity levels in the bay, introduce contaminants (non-point source pollution) into the watershed, or otherwise substantially degrade water quality.

Effect Analysis

Proposed Action. Temporary increases in turbidity within south San Diego Bay could occur as a result of the resuspension of sediments within the ponds during initial breaching. Based on the

2009 soil characterization analysis (*Anchor QEA 2009*), the character of the sediments consists of dense clays and some sand, therefore, the potential for short-term turbidity following initial breaching is expected to be low. To ensure that the turbidity levels in the ponds are acceptable for discharge into the bay, a Secchi disc would be used to measure the transparency of the standing water in the ponds. Water would only be discharged from the ponds when transparency levels in the ponds meet acceptable transparency levels per the San Diego Regional Water Quality Control Board (SDRWQCB), as established in the Water Quality Control Plan for the San Diego Basin (*SDRWQCB 1994*). In general, SDRWQCB requires that turbidity levels resulting from dredging operations in San Diego Bay not exceed 20 percent of the turbidity levels in a control area of the bay outside the influence of the current dredging operation. If turbidity levels in the ponds exceed the 20 percent threshold, measures such as temporary retention ponds and silt curtains could be used to reduce turbidity to acceptable levels for breaching.

The sediment conditions within the ponds appear to be similar to the overall characteristics of the sediments within south San Diego Bay, therefore, the potential for increases in turbidity following breaching would be expected to be similar to the increases in turbidity experienced in south San Diego Bay as a result of normal tidal action and wave action generated by afternoon winds. Under current conditions in the bay, suspended sediments may take several hours to several days to settle depending upon the grain size of the sediments (*Merkel & Associates 2000*). The effects of this resuspension of sediments as a result of the proposed action would be temporary and impacts to the overall water quality within the bay would be less than significant.

If 50,000 cubic yards of material from the CVWR is delivered as slurry pumped across the bay, baffles and silt curtains could be used to settle sediments prior to decanting desilted water back to the Bay through siphons or temporary flashboard weirs constructed through the outer levee. By using a baffling system and silt curtains, the large pond volume would allow for release of water that would not result in substantial changes in ambient turbidity levels within the Bay during or following marsh construction. If the sediment is delivered by truck, the material would be drier and fewer measures would be required to ensure proper settlement of sediments prior to releasing any remaining water into the bay. In either case, waters would not be released until acceptable turbidity levels have been achieved.

The use of a pipeline to transport slurried material across the bay could result in some loss of sediment through the connecting joints in the pipe. To reduce the potential for increased turbidity within the bay as a result of this activity; the line will be periodically monitored to ensure that any loss is minimal. If a substantial leak is identified, additional measures, such as pipeline repairs then the installation of a silt curtain, will be employed to capture and retain any sediment at the source of the leak.

Throughout the project site, BMPs, such as silt curtains, silt fencing, temporary flashboards, and slope stability measures, would be implemented to ensure that sediment from adjacent construction activity does not enter the bay or adjacent wetland areas.

Prior to excavating the western salt ponds, the majority of the water within the ponds is proposed to be drained into Pond 12 on the east side of the Otay River through an existing siphon drain

that connects Pond 10 and Pond 12. Draining the majority of the existing water from Pond 10 and 11 into Pond 12 prior to breaching would minimize the effect of introducing water with increased salinities into the bay. However, even if the pond water were to be released into the bay instead of moving it to Pond 12, the existing salinity levels are relatively low, ranging from 11 to 40 ppt depending upon the time of year. Salinity levels in the sediment would be comparable to the salinity levels in the water. These salinity levels when introduced into the bay would quickly be diluted within the bay, resulting in only temporary localized increases in salinity. The overall effect to the south bay would be minimal and no significant adverse effects to the water quality within the bay would be anticipated as a result of breaching.

Based on the results of the sediment sampling and laboratory analysis (*Anchor QEA 2009*) conducted to characterize the sediment chemistry and physical properties of the sediments in the western ponds, the sediment chemistry within the ponds would not result in the release of any chemical constituents into the bay that would represent cause for concern. Although some samples contained elevated arsenic concentrations compared to the effects range low screening levels, overall levels were significantly less than the effect range low and the southern California regional background level of arsenic in the soil. Therefore, these levels of arsenic are to be expected in native material. Opening the ponds to tidal influence would not result in any effects to water quality as a result of the existing sediment chemistry in the ponds; therefore, effects to water quality as a result of current sediment conditions in the western salt ponds would be less than significant.

Sediment characterization has not yet been conducted for the materials that will be excavated from the CVWR. Therefore, to avoid any adverse effects to water quality in the bay as a result of using this material in Pond 11, prior to Service acceptance of the material, the sediment chemistry and physical properties of the sediments to be excavated must be characterized and the results of this characterization submitted to the Service's Contaminants Division for review. If the Contaminants Division determines based on the results of the chemical and physical analyses of the sediment samples, that the average grain size of the sediments is suitable for salt marsh restoration and the sediments do not contain contaminants of concern with levels that significantly exceed effects range low screening levels, then the 50,000 cubic yards of material could be imported to the western salt ponds to increase elevations in Pond 11 to achieve desired habitat elevations. The implementation of mitigation measure #1, which has been incorporated into the scope of the project, would reduce the potential for adverse effects to water quality from the transfer of 50,000 cubic yards of material from the CVWR to Pond 11 to below a level of significance.

> ***Mitigation Measure #1 (Water Quality)*** *- Prior to Service acceptance of the 50,000 cubic yards of material from the Chula Vista Wildlife Reserve (CVWR), the Port shall characterize the sediment chemistry and physical properties of the sediments to be excavated at the CVWR and submit the results of the characterization to the Service's Contaminants Division for review. The Service will accept the material for placement in Pond 11 only if the Service determines that the sediment properties will not result in adverse effects to the bay's water quality or biological processes within in the bay and/or restored salt ponds.*

No Import Alternative. The potential effects to water quality described for the proposed action would be same for this alternative, which the exception of any potential concerns related to imported material to Pond 11. If the material is not suitable for disposal in or near the bay, it will be transported to an appropriate landfill site.

No Action Alternative. No adverse effects related to water quality would occur under the No Action Alternative.

4.5 Effects Related to Climate Change, Greenhouse Gas Emissions, and Sea Level Rise

4.5.1 Effects Related to Greenhouse Gas Emissions

Significance Criteria

The project is not anticipated to have any GHG emissions after excavation of the restored wetlands is completed. The project will generate GHG emissions as a result of construction activities. Neither the State of California nor the lead agencies have adopted a quantitative non-zero threshold for determining whether a project's GHG emissions will have a significant effect on the environment. Several thresholds that have been suggested, including those recommended in California Air Pollution Officers Association's (CAPCOA) Threshold 2.3, CARB Reporting Threshold (*CAPCOA 2008*), do not address GHG emissions from construction. At least one air quality management district, the Bay Area Air Quality Management District (BAAQMD), has proposed performance standards as a significance threshold for construction GHG emissions in its California Environmental Quality Act Draft Air Quality Guidelines, dated September 2009 (*BAAQMD 2009*). The staff at CARB also suggest performance standards as a significance threshold for construction emissions in its preliminary draft staff proposal "Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act" dated October 24, 2008. The construction GHG emissions from this project will be considered less than significant if reasonable efforts are made to reduce the GHG emissions.

Effect Analysis

Proposed Action. Unlike a residential or commercial development, the proposed action will not generate additional traffic trips or directly emit air pollutants following the construction. In addition, mobile source GHG emissions will not increase because traffic volumes and volumes per metric ton will not be different after the project is constructed. Thus, the proposed action will not directly result in GHG emissions in the long-term. In fact, by restoring and enhancing approximately 280 acres of coastal habitat, the project will increase the ability of the site to sequester carbon and mitigate CO_2 emissions. Therefore, in the long-term, the project will help the state achieve its goal of reducing CO_2 emissions.

With respect to construction, as presented in Table 21, the proposed action, which includes slurrying the 50,000 cubic yards of material from the CVWR to Pond 11, would result in 30.74

$MTCO_2eq$/year in the year 2009, as a result of tide gate construction and 305.61 $MTCO_2eq$/year of GHG emissions during the habitat restoration phase (2010 – 2011).

Table 21 Estimated Greenhouse Gas Emissions (Proposed Action, Pumping Option)					
Source	**CO_2**	**N_2O**		**CH_4**	
	Metric tons/year	**Metric tons/year**	**Metric tons of CO_2eq[2]**	**Metric tons/year**	**Metric tons of CO_2eq[2]**
Construction Emissions[1]					
Year 2009	29.08	0.01	1.64	0.00	0.02
Total Project-Related Emissions ($MTCO_2eq$/year)[3]	***30.74***				
Source	**CO_2**	**N_2O**		**CH_4**	
	Metric tons/year	**Metric tons/year**	**Metric tons of CO_2eq[2]**	**Metric tons/year**	**Metric tons of CO_2eq[2]**
Year 2010	292.18	0.04	13.24	0.01	0.19
Total Project-Related Emissions ($MTCO_2eq$/year)[3]	***305.61***				

1. Emissions calculated using CARB's Construction Equipment Emissions Table and the Emissions were calculated using the URBEMIS 2007, Version 9.2.4, as recommended by the SDAPCD. Emissions are presented as a total aggregate of emissions from all construction sources.
2. CO_2 Equivalent values calculated using the U.S. Environmental Protection Agency Website 2008.
3. Totals may be slightly off due to rounding.

Source: (*RBF 2009a*)

If the 50,000 cubic yards of material is trucked to Pond 11 rather than transported via pipeline, the project would result in 30.74 $MTCO_2eq$/year in the year 2009 and 3,014.26 $MTCO_2eq$/year in the year 2010, as presented in Table 22.

In order to reduce construction GHGs under either the slurrying or the trucking alternative, the proposed project will incorporate the following measures:

- The pumping option will be the preferred alternative for transporting excavated material from the CVWR to the salt ponds. The pumping option will create approximately 3,000 fewer metric tons per year of CO_2 than the trucking option (Tables 21 and 22);
- The contractor will use best efforts to utilize an electric pump during the pumping phase;
- If the trucking option is necessary, the contractor will use best efforts to utilize alternative fuel vehicles to the extent possible;
- The contractor will utilize an electric dredge for excavation at the salt ponds and the CVWR to the extent possible; and
- The employees and contractors working on the project will carpool and drive alternative fuel vehicles to the project site to the extent possible.

By incorporating the above reasonable measures to reduce construction GHG emissions, the GHG emissions will be less than significant.

Table 22 Estimated Greenhouse Gas Emissions (Proposed Action, Trucking Option)					
Source	**CO_2**	**N_2O**		**CH_4**	
	Metric tons/year	**Metric tons/year**	**Metric tons of CO_2eq[2]**	**Metric tons/year**	**Metric tons of CO_2eq[2]**
Construction Emissions[1]					
Year 2009	29.08	0.01	1.64	0.00	0.02
Total Project-Related Emissions ($MTCO_2eq/year$)[3]	***30.74***				
Year 2010					
Construction	406.65	0.04	13.24	0.01	0.19
Truck Operations	2,387.93	0.66	204.50	0.08	1.75
Total Project-Related Emissions ($MTCO_2eq/year$)[3]	***3,014.26***				

1. Emissions calculated using CARB's Construction Equipment Emissions Table and the Emissions were calculated using the URBEMIS 2007, Version 9.2.4, as recommended by the SDAPCD. Emissions are presented as a total aggregate of emissions from all construction sources.
2. CO_2 Equivalent values calculated using the U.S. Environmental Protection Agency Website, 2008.
3. Totals may be slightly off due to rounding.

Source: (*RBF 2009a*)

No Import Alternative. If no import of soil to Pond 11 from the CVWR is proposed, it is likely that GHG emissions would still be similar to those described for the trucking alternative (Table 21) because this material would have to be disposed of in some manner. Trucking the material to the Otay Landfill would only require a slightly longer trip (2 to 3 miles). The above described measures for reducing GHGs will be incorporated into this alternative. Therefore GHG emissions will be less than significant.

No Action Alternative. Under the No Action Alternative, restoration would not occur at the CVWR or the western salt ponds, therefore, no construction GHG emissions would be generated and the site's ability to sequester carbon would not be increased.

4.5.2 Effects Related to Sea Level Rise

Significance Criteria

Adverse effects related to sea level rise are considered significant if:

a) an action would result in increased flooding on- or off-site in the event of substantial rainfall or flooding in the event of tidal action, changes in tidal circulation that would trigger or accelerate slope instability or erosion affecting onsite facilities or adjacent facilities, such as roadways, railway embankments, and culverts, when analyzed in association with future sea level rise; or

b) an action proposes structures, facilities, improvements, or enhancements that would be inundated as a result of predicted sea level rise.

Effect Analysis

Proposed Action. To understand the impacts of sea level rise on the proposed action, modeling was conducted to determine the effect of future sea level rise on habitat distribution in Ponds 10, 10A and 11 and the corresponding potential effects of flooding to adjacent structures (*Everest International 2009*). The model assumed the sea level rise scenarios of 16 inches (1.33 ft) by 2050, and 55 inches (4.58 ft) by 2100, which is based on adopted Conservancy guidelines for sea level rise (*Conservancy 2009*). Modeling was conducted to simulate water levels in the western ponds in response to future tides in Year 2050 and 2100 (*Everest International 2009*). These future tides were assumed to have similar distribution as the tidal epoch analysis tide, which was created for the modeling to represent the long-term characteristics of San Diego Bay, but for the sea level rise analysis 16 and 55 inches was added to the original tidal epoch analysis tide time series for Year 2050 and 2100, respectively.

Effects on Habitat Distribution within the Western Salt Ponds

The frequency of inundation for the western salt ponds was modeled for the Year 2050 tide. The tidal epoch analysis tide illustrated a shift of water levels as a result of future sea level rise. Even with these increased water levels, the model still indicated no tidal muting at Ponds 10 and 11. However, muting would still occur at Pond 10A under both existing culvert connections (Option 1) and with a wider opening under the bike path (Option 2). With the shift of water levels upward by 16 inches in Year 2050, there would be a corresponding shift in habitat elevations and habitat distributions. The Year 2050 habitat elevations and habitat distribution acreages are shown in Table 23. Figure 16 shows the projected habitat map for Year 2050 for Pond 10A under Option 1 and Pond 10A under Option 2.

The frequency of inundation for the western salt ponds was also modeled for the Year 2100. Once again, the model showed no tidal muting for Ponds 10 and 11. There would be less muting in Pond 10A in Year 2100. The Year 2100 habitat elevations and habitat distributions are shown in presented in Table 23. Figure 17 shows the projected habitat map for Year 2100 for Pond 10A under Option 1 and Pond 10A under Option 2.

A comparison between the projected Year 2050 and Year 2100 habitat distributions in Ponds 10, 10A and 11 and the proposed project conditions are also presented in Table 23. As shown in the table, the future rise of sea level will push some of the upland habitat into intertidal habitat, and some of the intertidal habitat into subtidal habitat. For example, for Pond 11, the upland habitat area of the proposed restoration plan would be decreased from 1.2 acres to 0.6 and 0.2 acres in Years 2050 and 2100, respectively. Similarly, the intertidal area would be decreased from 84.1 acres to 78.8 and 8.5 acres while the subtidal areas would be increased from 21.6 acres to 27.5 and 98.3 acres.

There would be similar changes in habitat distribution in Pond 11, i.e. a shift from upland habitat to intertidal, and from intertidal to subtidal. However, for Pond 10A under Option 1

Figure 16

Figure 17

which is muted under the proposed condition, the rise in sea level would shift more upland habitat to intertidal habitat then from intertidal to subtidal, resulting in a net increase of intertidal habitat from 14.3 acres to 15.2 acres. Under Option 2, which is less muted to start with, there would still be a net decrease of intertidal habitat from 30.2 acres under the proposed condition to 27.7 acres in Year 2050.

Table 23
Changes in Habitat Distributions due to Sea Level Rise

		HABITAT DISTRIBUTION (ACRES)							
		UPLAND	INTERTIDAL					SUB-TIDAL	TOTAL
			HM[1]	MM[2]	LM[3]	NV[4]	TOTAL		
Pond 11	Proposed Restoration	1.2	2.5	5.1	63.8	12.7	84.1	21.6	106.9
	Year 2050	0.6	0.9	2.6	6.5	68.8	78.8	27.5	106.9
	Year 2100	0.2	0.2	0.3	0.7	7.3	8.5	98.3	106.9
Pond 10	Proposed Restoration	2.5	5	14.7	57.8	3.1	80.7	3.3	86.6
	Year 2050	1.5	2.2	4.3	43.5	30.3	80.3	4.7	86.6
	Year 2100	0.3	0.5	0.7	1.3	18.9	21.4	64.8	86.6
Pond 10A (Option 1)	Proposed Restoration	12.8	6.8	2.5	1.2	3.7	14.3	9.5	36.6
	Year 2050	5.3	6.1	2.0	0.7	6.8	15.6	15.7	36.6
	Year 2100	1.3	0.4	0.5	1.7	1.8	4.3	30.9	36.6
Pond 10A (Option 2)	Proposed Restoration	3.4	22.4	2.5	1.5	3.8	30.2	3.0	36.6
	Year 2050	2.1	2.5	17.5	3.7	4.0	27.7	6.8	36.6
	Year 2100	1.3	0.4	0.5	1.7	5.6	8.1	27.2	36.6

[1]*High Marsh;* [2]*Mid Marsh;* [3]*Low Marsh;* [4]*Non-Vegetated*

Source: (*Everest International 2009*)

The results of this modeling indicate that over the next 40 years, the current emphasis on cordgrass-dominated salt marsh habitat would gradually be converted to mudflat habitat particularly in Pond 11. Over this time period however there would be sufficient opportunity for the light-footed clapper rail to reestablish a viable population in the western salt ponds

and these individuals could then slowly shift over to new areas of suitable habitat in the south bay as sea level rises. Plans for future restoration of the eastern salt ponds can be designed to take into account the changes that will be happening in the lower elevation ponds and ensure that areas with elevations suitable for mid- and high-salt marsh beyond 2100 are provided within the Refuge. The opportunity to restore habitats that can support the recovery of currently listed species should not be abandoned because conditions will change it the future. The protection of important habitats could be addressed through adaptively managing the tidal elevations within these ponds, and/or through comprehensive resource planning in the south bay where new opportunities for providing salt marsh habitat are identified in areas where tidal influence will be expanding into areas currently supporting upland vegetation.

Sea level rise modeling had not been conducted for the CVWR or Emory Cove, but similar changes in habitat would be expected.

Flood Impacts

Modeling was also conducted to simulate flood water levels in the western salt ponds in response to future tides in Year 2050 and 2100 (*Everest International 2009*). Similar to the approach used for assessing the impact of sea level rise to habitat distributions, the Year 2050 and 2100 tides for flood impact analyses were assumed to have similar distribution as the parametric mean periodic tide, which represents the mixed diurnal, semi-diurnal tide conditions found in San Diego Bay, but with 16 and 55 inches added to the original parametric mean periodic tide time series. It was assumed that there would be no change in the flood hydrographs for the Otay River and Nester Creek so the same hydrographs were used for this modeling effort as were used to determine potential flood effects of the proposed project under existing conditions.

Modeling for the year 2050 indicates that water levels in the Otay River simply follow the tide before the arrival of the flood flows. After the arrival of the flood flows, water levels in the Otay River continue to rise until reaching peak elevations of approximately 8.1 and 10.0 ft NAVD88 for the downstream end adjacent to Pond 11 and near the bend adjacent to Pond 10, respectively. Under existing conditions, since there is no tidal connection between the western ponds and San Diego Bay, the water levels in the ponds stay at the initial water levels until flood water levels in the adjacent Otay River start to overtop the levees at around Hour 42. Water levels in the three ponds rise to a maximum of approximately 9.0 ft NAVD88 then recede to the elevation of the levee at 7.0 ft NAVD88.

With the proposed project, part of the flood flows would now pass through the western ponds, effectively providing better flood conveyance for Otay River. Maximum flood elevations in the Otay River would drop to 8.0 and 9.7 ft NAVD88 as compared to 8.1and 10.0 ft NAVD88 for existing conditions. Subsequently, maximum flood levels in the three western ponds also drop to approximately 8.1 ft NAVD88 compared to 9.0 ft NAVD88 under existing conditions. There is no difference in the maximum flood elevations in Pond 10A (under Option 1 and Option 2) in Year 2050.

Modeling results for the Year 2100 shown results similar to Year 2050 results with the proposed conditions providing better conveyance for Otay River that would result in slightly lower flood elevations for the Otay River and the three western ponds.

This flood modeling analysis, which takes into account sea level rise, indicates that the proposed restoration of the western salt ponds would not exacerbate flooding condition in the adjacent neighborhood compared to existing conditions. The proposed action will not result in increased flooding on- or off-site in the event of substantial rainfall or flooding in the event of tidal action, nor will it result in changes in tidal circulation that would trigger or accelerate slope instability or erosion affecting onsite facilities or adjacent facilities, such as roadways, railway embankments, and culverts, when analyzed in association with future sea level rise; therefore, no significant adverse effects related to these aspects of sea level rise are anticipated.

No Import Alternative. The effects of sea level rise on habitat distribution within the western salt ponds would be very similar to those described for the proposed action. The primary difference would be that salt marsh habitat inundation in Pond 11 as a result of sea level rise would occur slightly sooner under this alternative because elevation levels in would be slightly lower upon completion of restoration.

No Action Alternative. Under the No Action Alternative, the effects of sea level rise on the storm drains located in proximity to the western salt ponds would continue to be inundated during very high tides per recent field observations, while the effects of lower high tides remain unknown.

4.6 Effects to Air Quality

Significance Criteria

1. Implementation of a proposed action would have a significant effect on air quality if the project:
    a) conflicts with or obstructs implementation of the applicable air quality plan;
    b) violates any air quality standard or contributes substantially to an existing or projected air quality violation;
    c) results in cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including release emissions which exceed quantitative thresholds for ozone precursors);
    d) exposes sensitive receptors to substantial pollutant concentrations, including air toxics such as diesel particulates;
    e) creates objectionable odors affecting a substantial number of people; or
    f) releases substantial quantities of air contaminants beyond the boundaries of the premises upon which the stationary source emitting the contaminants is located.

2. Implementation of a proposed action would have a significant indirect effect on air quality if the project results in the degradation of the existing level of service on adjacent roadways.

3. Implementation of a proposed Federal action would have a significant direct effect on air quality if the action would result in emissions equal to or in excess of the standards outlined in Rule 1501 of the APCD Rules and Regulations and a significant cumulative effect if the "de minimis" (minimum) thresholds developed by the EPA for proposed Federal actions in a non-attainment area are exceeded.

Effect Analysis

Proposed Action.

Short-Term Construction Impacts - To determine whether or not a significant impact would occur as a result of project construction, the SDAPCD informally recommends quantifying construction emissions and comparing them to the significance thresholds found in the SDAPCD regulations for stationary sources (pursuant to Rule 20.1, et seq.). These significance thresholds are presented in Table 24. If the emissions to be generated during project construction are expected to exceed the thresholds that apply to stationary sources, then the construction activities would have the potential to violate air quality standards or contribute substantially to existing violations.

Table 24
SDAPCD Air Quality Significance Thresholds

Pollutant	SDAPCD Thresholds (lbs/day)	SDAPCD Thresholds (tons/year)
Carbon Monoxide (CO)	550	100
Oxides of Sulfur (SO_x)	250	40
Volatile Organic Compounds (VOCs)	75[1]	40
Oxides of Nitrogen (NO_x)	250	40
Particulate Matter (PM_{10})	100	15
Particulate Matter ($PM_{2.5}$) [2]	55	Not Applicable

1. (County of San Diego 2007)
2. SDAPCD has no thresholds of significance for $PM_{2.5}$. Instead, the $PM_{2.5}$ threshold established by the South Coast Air Quality Management District (SCAQMD) was utilized (*pers. comm. Carl Selnick, SDAPCD, July 17, 2009*).

Proposed Action with Pumping Option

Construction activities for the proposed action under the pumping option were modeled to determine the extent of short-term air quality impacts that could result from implementing restoration at the CVWR and western salt ponds including the transport of 50,000 cubic yards of material across San Diego Bay from the CVWR to Pond 11. The

short-term air quality analysis considered the following temporary impacts from the proposed action:

- Dredging of the ponds, constructing the tide gate, and using heavy equipment or trucks to grade the CVWR would create fugitive dust, and thus PM_{10};
- Heavy equipment required for dredging, grading, and construction would generate and emit diesel exhaust emissions; and
- Vehicles used by commuting construction workers and trucks hauling equipment would generate and emit exhaust emissions.

The results of air quality modeling to determine short-term construction impacts associated with the proposed action are presented in Table 24. Modeling was conducted with and without consideration of the implementation of measures intended to minimize the extent of emissions generated by the project. Based on the results of the modeling (*RBF 2009a*), the PM_{10} emissions generated during project construction would exceed the established threshold if appropriate mitigation measures are not implemented during project construction. To avoid this impact, the following mitigation measures have been incorporated into the scope of the project:

Mitigation Measure #2 (Air Quality) *- The final construction plans and specifications for restoration at the CVWR and the western salt ponds shall include requirements for the implementation of measures to prevent visible dust emissions from leaving the project site boundary, including, but not limited to, watering prior to and during any earth movement, watering exposed soil three times per day, installing wind fencing, covering excavated materials to prevent erosion, and stopping work during high wind conditions. Erosion control within each of the project limits shall also be required as part of the standard project specifications.*

Mitigation Measure #3(Air Quality) *- The final construction plans and specifications for restoration at the CVWR and the western salt ponds shall include the requirement that the construction contractor cover all haul vehicles to reduce fugitive dust generated during the transport of materials.*

Air Quality Mitigation Measure #4 (Air Quality) *- The final construction plans and specifications for restoration at the CVWR and the western salt ponds shall include the requirement that the construction contractor not allow construction equipment and vehicles to track dirt and dust onto public roads. Equipment and tires shall be washed/swept prior to leaving the project site.*

Air Quality Mitigation Measure #5 (Air Quality) *- The final construction plans and specifications for restoration at the CVWR and the western salt ponds shall include the requirement that the construction contractor shall use Best Management Practices to fuel and maintain construction equipment and construction facilities. Additionally, all equipment shall meet APCD standards.*

As indicated in Table 25, with the implementation of these measures the proposed action would not exceed SDAPCD thresholds; therefore, short-term construction impacts would be considered less than significant.

Proposed Action with Trucking Option

The primary restoration-related construction activities and construction schedule associated with proposed action under the trucking option are the same as the proposed action with the pumping option. The only difference between the two options is the method by which excavated material is transported from the CVWR to Pond 11. Under the trucking option, 50,000 cubic yards of excavated material would be transported via trucks around the south end of the bay.

Table 25
Short-Term Construction Air Emissions (Proposed Action, Pumping Option)

Emissions Source	Pollutant (pounds/day)[1]				
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
2009 Construction Emissions	3.64	29.14	15.98	24.79	6.30
2009 Mitigated Construction Emissions	3.64	29.14	15.98	6.85	2.56
SDAPCD Threshold	*75*	*250*	*550*	*100*	*55*[2]
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***
2010 Construction Emissions	6.89	53.44	31.36	423.82	90.70
2010 Mitigated Construction Emissions	6.89	53.44	31.36	98.49	22.76
SDAPCD Threshold	*75*	*250*	*550*	*100*	*55*[2]
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***

1. Emissions are presented as a total aggregate of emissions from all construction sources.
2. The SDAPCD does not have thresholds of significance for $PM_{2.5}$. As such, the $PM_{2.5}$ threshold from the SCAQMD was utilized.

The results of air quality modeling to determine short-term construction impacts under the trucking option are presented in Table 26. Modeling was once again conducted with and without consideration of the implementation of measures intended to minimize the extent of emissions generated by the project. Based on the results of the modeling (*RBF 2009a*), the PM_{10} and $PM_{2.5}$ emissions generated during project construction would exceed the established thresholds if appropriate mitigation measures are not implemented during project construction. To avoid this impact, mitigation measure #2 through #5, as previously described, would be incorporated into the scope of the project.

Implementation of these mitigation measures would reduce emissions from the trucking option to above established threshold levels. Therefore with the incorporation of the required mitigation measures, short-term construction impacts resulting from the trucking option would have a less than significant impact on air quality.

Fugitive Dust and Equipment Exhaust Emissions - Fugitive dust (PM_{10} and $PM_{2.5}$) from grading and construction is expected to be short-term and would cease following completion of the proposed action or trucking alternative. Most of this material is composed of inert silicates, which are less harmful to health than the complex organic particulates released from combustion sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and SO_X combining with ammonia. The estimated amount of fugitive dust that would be generated under the proposed action is provided in Table 25, above.

As indicated in Table 25, the proposed action under the pumping option would exceed SDAPCD thresholds of significance for PM_{10} and under the trucking option (Table 26) would exceed SDAPCD thresholds of significance for both PM_{10} and $PM_{2.5}$, if appropriate mitigation measures are not implemented. Compliance with SDAPCD regional rules, Rule 55 *Fugitive Dust,* Rule 50 *Visible Emissions,* and Rule 51 *Nuisance* during construction would reduce to some extent the project's impacts related to fugitive dust and particulate matter. With the incorporation of the air quality mitigation measures presented above (measure #2 through #5) would reduce air quality impacts related to fugitive dust and particulate matter to below a level of significance.

Table 26
Short-Term Construction Air Emissions (Proposed Action, Trucking Option)

Emissions Source	Pollutant (pounds/day)[1]				
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
2009 Construction Emissions	3.64	29.14	15.98	24.79	6.30
2009 Mitigated Construction Emissions	3.64	29.14	15.98	6.85	2.56
SDAPCD Threshold	*75*	*250*	*550*	*100*	*55*[2]
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***
2010 Construction Emissions	7.98	67.60	36.80	424.46	91.25
2010 Mitigated Construction Emissions	7.98	67.60	36.80	99.13	23.31
SDAPCD Threshold	*75*	*250*	*550*	*100*	*55*[2]
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***

1. Emissions are presented as a total aggregate of emissions from all construction sources.
2. The SDAPCD does not have thresholds of significance for $PM_{2.5}$. As such, the $PM_{2.5}$ threshold from the SCAQMD was utilized.

Source: (*RBF 2009a*)

Asbestos – According to the Department of Conservation Division of Mines and Geology (*2000*), the proposed action is not located in an area where naturally occurring asbestos is likely to be present. Therefore, impacts related to the release of asbestos into the atmosphere from the implementation of the proposed action under either the pumping or trucking option, as well as the implementation of any of the other alternatives, would be considered less than significant.

Long-Term Air Emissions - Long-term air emission impacts are those associated with stationary sources and new mobile sources resulting from the implementation of a proposed project. The current action, to restore habitat would not produce stationary source emissions, nor would it

result in new operational activities that could generate additional vehicle trips. Therefore, neither the proposed action nor any of the alternatives would generate long-term air emission.

Cumulative Short-Term Emissions – Through the implementation of air quality mitigation measure #2 through #5 and adherence to SDAPCD Rules 50, 51, and 55, the proposed action, as well as the various alternatives, short-term emissions generated as a result of the proposed restoration would not contribute significantly to a cumulative increase in short-term emissions.

Cumulative Long-Term Emissions – The proposed action, as well as the other alternatives addressed herein, would not result in any long-term air emission, therefore, the proposed restoration project would not result in any significant cumulative long-term air quality impacts.

Rule 1501, Federal Conformity Analysis - The Rule 1501 Federal Conformity Analysis has been structured to illustrate how a proposed action would meet the requirements of the FCAA General Conformity, as well as those set forth by the SDAPCD. In this case, the project site is located within the SDAB, which is designated non-attainment under Federal standard for O_3. Atmospheric concentrations of the other criteria pollutants do not exceed Federal standards.

The following outlines the screening level analysis consistent with the Rule 1501 General Conformity process:

i) *If the applicant's project is located in a nonattainment area or an attainment area subject to a maintenance plan (maintenance area) the environmental document should include a description of the air quality status for each criteria pollutant for which an area has been designated nonattainment or maintenance. Provide an estimate of the annual emissions that are expected from both the construction and operation of the project for each criteria pollutant. Projects in an attainment area not under a maintenance plan or in an unclassified area are not subject to a conformity analysis.*

The majority of ozone formation occurs when NO_X and volatile organic compounds (VOCs) or commonly referred to as reactive organic gases (ROGs), react in the atmosphere in the presence of sunlight. NO_X and VOCs are called ozone precursors. Therefore, the URBEMIS 2007 model quantifies NO_X and VOCs to determine annual emissions of ozone.

Proposed Action with Pumping Option

Table 27, which presents the modeling results for the proposed action under the pumping option, demonstrates that estimated annual emissions resulting from construction-related activities for this option would not result in emissions that would exceed the de minimis levels in 2009, when the tide gate would be constructed, or in 2010, when the bulk of the restoration activity would be conducted. As the ozone precursor compounds (VOCs and NO_X) combine in the troposphere and are not necessarily additive, predicted ozone levels are not expected to exceed the de minimis thresholds.

Proposed Action with Trucking Option

As illustrated in Table 28, estimated annual emissions resulting from construction-related activities under the proposed action with the trucking option would not result in emissions that would exceed the de minimis levels in 2009 or in 2010. As the ozone precursor compounds (VOCs and NO_X) combine in the troposphere and are not necessarily additive, predicted ozone levels are not expected to exceed the de minimis thresholds (*RBF 2009a*).

ii) Compare these emissions to the de minimis (applicability) levels specified for each nonattainment or maintenance area pollutant (40 C.F.R. Section 93.153(b) (Applicability)).

Per Rule 1501, the de minimis concentrations of ozone are limited to 100 tons/year (100 tons/year of VOC and 100 tons/year of NO_X). Implementation of the proposed action under either option would not alter the existing operations, and therefore would only introduce an increase in emissions during construction activities; refer to Table 27 for the proposed action with pumping option and Table 28 for the proposed action with trucking option.

Table 27
Clean Air Act Conformity – Step A (Proposed Action, Pumping Option)

Criteria	Non-Attainment Pollutants (tons/year)	
	Ozone[3]	
	VOC	NO_X
2009[1]	0.05	0.36
De Minimus Levels[2]	100	100
Are De Minimus Levels Exceeded?	**No**	**No**
2010[1]	0.45	3.50
De Minimus Levels[2]	100	100
Are De Minimus Levels Exceeded?	**No**	**No**

1. Emissions have been quantified for "worst case" construction scenarios. Operational emissions would not be altered from existing conditions as a result of the proposed action. Therefore, they are not presented in this table.
2. De minimus levels are established within SDAPCD Rule 1501.
3. The majority of ozone formation occurs when NO_X and (VOCs) react in the atmosphere in the presence of sunlight, therefore, NO_X and VOCs are quantified to determine ozone impacts.
4. A worst-case scenario would be if construction was delayed and all emissions occurred in one year, under which scenario thresholds would still not be exceeded.

iii) If the project's emissions are below the appropriate de minimis level, compare the emissions to the emissions inventory for the nonattainment or maintenance area to ensure the project's emissions are less than 10% of the inventory (40 C.F.R. Section 93.153(i) (Regional Significance)). Emissions inventories can be obtained from the local air pollution control agency.

The predicted emissions are compared to the *2008 Estimated Annual Average Emissions* for the SDAB (*pers. comm. Carl Selnick 2009*).

Proposed Action with Pumping Option
As shown in Table 29, the emissions for the non-attainment pollutant under the proposed action with pumping option would be below ten percent of the emissions inventory. Therefore, emissions generated under this option would be less than significant.

Proposed Action with Trucking Option
As shown in Table 30, the project emissions under the proposed action with the trucking option for the non-attainment pollutant would be below ten percent of the emissions inventory. Therefore, emissions generated under this option would be less than significant.

Table 28
Clean Air Act Conformity – Step A (Proposed Action, Trucking Option)

Criteria	Non-Attainment Pollutants (tons/year)	
	Ozone[3]	
	VOC	NO_X
2009[1]	0.05	0.36
De Minimus Levels[2]	50	100
Are De Minimus Levels Exceeded?	**No**	**No**
2010[1]	0.52	4.43
De Minimus Levels[2]	50	100
Are De Minimus Levels Exceeded?	**No**	**No**

Emissions have been quantified for "worst case" construction scenarios. Operational emissions would not be altered from existing conditions as a result of the proposed action. Therefore, they are not presented in this table.
2. De minimus levels are established within SDAPCD Rule 1501.
3. The majority of ozone formation occurs when NO_X and VOCs react in the atmosphere in the presence of sunlight, therefore, NO_X and VOCs are quantified to determine ozone impacts.
4. A worst-case scenario would be if construction was delayed and all emissions occurred in one year, under which scenario thresholds would still not be exceeded.

Table 29
Clean Air Act Conformity – Step B (Proposed Action, Pumping Option)

SDAB Non-Attainment Pollutants	SDAB Emission Inventory (tons/year)[1]	2009 Project Emissions (tons/year)[2]	Project Exceed Ten Percent of Inventory?	2010 Project Emissions (tons/year)[2]	Project Exceed Ten Percent of Inventory?
VOC	56,977	0.05	No	0.45	No
NO_X	61,612	0.36	No	3.50	

1. (*CARB 2009*)
2. (*RBF 2009a*). Emissions have been quantified for "worst case" construction scenarios. A worst-case scenario would be if construction was delayed and all emissions occurred in one year, under which scenario thresholds would still not be exceeded.

Table 30 Clean Air Act Conformity – Step B (Proposed Action, Trucking Option)					
SDAB Non-Attainment Pollutants	**SDAB Emission Inventory (tons/year)[1]**	**2009 Project Emissions (tons/year)[2]**	**Project Exceed Ten Percent of Inventory?**	**2010 Project Emissions (tons/year)[2]**	**Project Exceed Ten Percent of Inventory?**
VOC	56,977	0.05	No	0.52	No
NO_X	61,612	0.36	No	4.43	No

1. (*CARB 2009*)
2. (*RBF 2009a*). Emissions have been quantified for "worst case" construction scenarios. A worst-case scenario would be if construction was delayed and all emissions occurred in one year, under which scenario thresholds would still not be exceeded.

iv) If emissions are below the de minimis levels and are less than 10% of the area's inventory the project is not subject to any further general conformity analysis.

The URBEMIS 2007 model was also utilized to estimate emissions of air pollutants associated with short-term construction under the trucking alternative. Default values representative of the pumping option and the trucking option, as appropriate, were used when specific data was not available. As discussed above, both the pumping and trucking option would be less than significant in relation to the SDAPCD thresholds and Federal de minimis levels, and less than ten percent of the emissions inventory for the SDAB. Refer to Tables 27 and 29 for the pumping option and Tables 28 and 30 for the trucking option. Therefore, the proposed action under either option would not be subject to a further general conformity analysis.

No Import Alternative. The No Import Alternative would generate emission levels similar to those anticipated under the proposed action, trucking option. Based on the results of the modeling conducted for the proposed action with the trucking option, implementation of the No Import Alternative would require the implementation of air quality mitigation measure #2 through #5, as presented above, to reduce short-term construction impacts to air quality to below the level of significance. Implementation of the No Import Alternative would exceed SDAPCD thresholds of significance for PM_{10} and $PM_{2.5}$, but compliance with SDAPCD regional rules, Rule 50, Rule 51, and Rule 55 and the implementation of the air quality mitigation measures presented above, short-term construction-related air quality impacts related to PM_{10} and $PM_{2.5}$ would be reduced to below a level of significance. Compliance with SDAPCD rules and regulations, as well as the implementation of the air quality mitigation measures described previously, would reduce air emission impacts to the point that implementation of this alternative would not contribute considerably to a cumulative increase in emissions. Finally, this alternative would not exceed SDAPCD thresholds and Federal de minimis levels, and would not be subject to a further general conformity analysis.

No Action Alternative. No air quality impacts would result from the implementation of the No Action Alternative.

4.7 Effects Related to Noise

Significance Criteria

An action that generates noise levels at the property line in excess of the affected city's noise standards would be considered a significant adverse effect. Indirect noise impacts to sensitive wildlife are addressed under Effects to Biological Resources.

Effect Analysis

Proposed Action. Construction activities associated with the proposed action would involve the use of a number of construction vehicles at the CVWR and within the western salt ponds, primarily Pond 10 and 11. Construction noise would also be generated during the installation of the new tide gate in Pond 12. Activity in Pond 12 would occur between September 2009 and February 2010, while construction activity associated with the restoration of the western salt ponds would occur between September 2010 and February 2011.

High ground-borne noise levels and other miscellaneous noise levels created by the operation of heavy-duty trucks, backhoes, bulldozers, excavators, dredges, tractors, graders, and other heavy-duty construction equipment and generated during project implementation was only considered as a potential effect in association with the restoration of the western salt ponds. The CVWR is physically isolated by distance and water from any potentially sensitive noise receptor. The closet development to the site is the South Bay Power Plant and noise generated from restoration activities on the CVWR would have no effect on activities occurring within the power plant.

Noise levels generated by construction equipment, as presented in Table 31, could affect properties located in proximity to the western salt ponds if construction activity occurs close enough to existing residences. Operating cycles for the types of construction equipment presented in Table 31 may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Construction activities associated with the installation of the new tide gate could include the use of a pile driver to install a temporary steel sheet cofferdam around the tide gate installation site. The pile driver would operate between the hours of 7:00 a.m. and 5:00 p.m. and it would take eight to ten days to complete the installation of the temporary cofferdams. This activity would occur approximately 2,400 feet (0.45 miles) away from the nearest residence, therefore, it would not result in excessive noise levels at the property line of any nearby homes. Although the noise generated by the pile driver would represent a temporary nuisance to adjacent residents, overall the noise impacts related to this activity would be less than significant. The noises levels generated from other activities associated with the tide gate installation are presented in Table 31. To prepare the site, install the tide gate, and clean up the site after tide gate installation would take approximately two to four weeks. The noise impacts to nearby residential properties as a result of tide gate installation would be minimal, resulting less than significant effects.

Table 31 Maximum Noise Levels Generated by Construction Equipment		
Type of Equipment	**Acoustical Use Factor[1]**	**L_{max} at 50 Feet (dBA)**
Backhoe	40	78
Tractor	40	84
Water Truck	40	70
Excavator	40	81
Cement and Mortar Mixer	40	79
Impact Pile Driver	20	101
Crane	16	81
Dozer	40	82
Forklift	40	70
Grader	40	85
Paver	50	77
Roller	20	80

1. Acoustical Use Factor (percent): estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: (*Federal Highway Administration 2006*)

Table 32 presents a description of construction noise levels during the specific construction stages of the project. The average noise levels presented in Table 32 are based on the quantity, type, and acoustical use factor for each type of equipment that could be used during each construction stage.

Table 32 Proposed Action: Construction Average L_{eq} Noise Levels by Distance and Construction Stage						
	Receptor Locations		**Estimated Exterior Construction Noise Level [3, 4]**	**Estimated Interior Construction Noise Level [3, 4]**	**Speech Interference Criteria**	**Potentially Significant Impact?**
Description	**Direction[1]**	**Distance[2]**				
Dredging/ Grading	North	N/A	N/A	N/A	65 dBA	***No***
	South	250	69.2	49.2	65 dBA	***No***
	East	250	69.2	49.2	65 dBA	***No***
	West	NA	N/A	N/A	65 dBA	***No***

1. Noise-sensitive uses to the south and east are predominately residential.
2. Distance is from the nearest receptor to the construction activity area of the project site, in feet.
3. (*Federal Highway Administration 2006*).
4. A typical building can reduce noise levels by 20 dBA with the windows closed. This assumes all windows and doors are closed, thereby attenuating the exterior noise levels by 20 dBA (*U.S. Department of Housing and Urban Development undated*).

Construction activities that would occur within the western salt ponds under the proposed action would expose residential areas located to the south and east of Pond 10A to exterior peak noise levels of 69.2 dBA during installation of the low berm in Pond 10A and dredging and grading in

Pond 10 (*RBF 2009b*). As seen in Table 32, with the windows and doors closed, nearby sensitive receptors would not experience excessive noise levels. Therefore, construction noise associated with the proposed project would not expose surrounding sensitive receptors to construction noise levels in excess of the Speech Interference Criteria (65 dBA) during construction. Additionally, construction activities would comply with the City of Imperial Beach Municipal Code, in which noise generated from an adjacent property cannot exceed 75 dBA between 10:00 p.m. and 7:00 a.m. (It should be noted that construction is prohibited Monday through Friday from 10:00 p.m. to 7:00 a.m. and from 10:00 p.m. to 8:00 a.m. on Saturdays and Sundays). To reduce noise levels to below a level of significance and ensure that excess noise levels are not impacting adjacent residences, the following mitigation measure would be incorporated into the scope of the salt pond restoration project:

Mitigation Measure #6 (Noise) - *Prior to site mobilization, a construction management plan shall be prepared which includes the following:*

- *All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers;*
- *Construction noise reduction methods such as shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and use of electric air compressors and similar power tools, rather than diesel equipment, shall be used where feasible;*
- *During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers;*
- *During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise sensitive receptors;*
- *Operate earthmoving equipment on the construction site, as far away from vibration sensitive sites as possible.*

Although, construction-related short-term noise levels would be higher than existing ambient noise levels in the project area today, these levels would no longer occur once project construction is completed. Noise impacts to these residential areas would be considered less than significant with compliance to the construction hours specified in the City of Imperial Beach Municipal Code Noise Ordinance and implementation of noise mitigation measure #6.

Construction crew commutes and the transport of construction equipment and materials to the site for the proposed action would incrementally increase noise levels on access roads leading to the site. The traffic noise associated with the proposed action is anticipated to be associated with construction crew trips entering and exiting the site. For the western salt ponds, this activity would occur primarily from SR-75 near Pond 11; however, some limited construction activity could also occur along 7th and 8th Street in Imperial Beach. Although there would be a relatively high single-event noise exposure resulting in intermittent noise nuisance, the effect on longer term (hourly or daily) ambient noise levels would be minimal. As a result, sensitive receptors would not be exposed to significant construction noise levels over an extended period of time. Construction noise impacts would cease upon completion of the construction phase, and impacts would be less than significant.

There are no operational activities that would be introduced with implementation of the proposed action. Therefore, no long-term noise impacts would occur in this regard.

Proposed Action with Trucking Option

If trucks are used to transport material from the CVWR to Pond 11, than impacts related to construction traffic noise must also be considered. Trucking the 50,000 cubic yards of material along existing highways and public streets would result in a temporary increase in noise levels along the access route. Adherence to the standards provided by the Cities of Chula Vista, San Diego, and Imperial Beach, as well as compliance with the noise mitigation measure #6, would reduce short-term construction noise impacts to below a level of significance.

Table 33, provides a description of construction noise levels during the specific construction stages and incorporates the added noise from trucking to determine the overall noise impacts for the project when the trucking option is factored into the analysis. The average noise levels presented in Table 33 are based on the quantity, type, and acoustical use factor for each type of equipment that would be used during each construction stage. Short-term construction-related noise impacts would be the same as the proposed action, however, additional short-term noise impacts related to trucking the excavated material along public roads in proximity to sensitive noise receptors would also occur. Construction activities under the trucking alternative would expose adjacent receptors to exterior peak noise levels of: 77.2 dBA during truck hauling activities and 69.2 dBA during grading in Pond 10A and dredging and grading in Pond 10.

As seen in Table 33, with the windows and doors closed, nearby sensitive receptors would not experience excessive noise levels. Therefore, construction noise associated with the proposed project would not expose surrounding sensitive receptors to construction noise levels in excess of the Speech Interference Criteria (65 dBA) during construction. Additionally, construction activities would comply with the City Noise Ordinance, in which construction is prohibited Monday through Friday from 10:00 P.M. to 7:00 a.m., and from 10:00 p.m. to 8:00 a.m. on Saturdays and Sundays. Furthermore, implementation of noise mitigation measure #6 (i.e., engine muffling, placement of construction equipment, and strategic stockpiling and staging of construction vehicles), would further reduce exposure. Although, construction-related short-term noise levels would be higher than ambient noise levels in the project area today, they would no longer occur once construction of the project is completed. Noise impacts to these residential areas would be considered less than significant with compliance to the construction hours specified in the City Noise Ordinance and implementation of noise mitigation measure #6.

Noise impacts can be described in three categories. The first is audible impact, which refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally require a change of 3 dB or greater, since this level has been found to be barely perceptible in an exterior environment. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be

noticeable only in laboratory environments. The last category is changes in noise levels of less than 1.0 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Table 33
Trucking Alternative: Construction Average L_{eq} Noise Levels by Distance and Construction Stage

Description	Receptor Locations		Estimated Exterior Construction Noise Level [3, 4]	Estimated Interior Construction Noise Level [3, 4]	Speech Interference Criteria	Potentially Significant Impact?
	Direction[1]	Distance[2]				
Dredging/ Grading	North	100	77.2	57.2	65 dBA	***No***
	South	250	69.2	49.2	65 dBA	***No***
	East	250	69.2	49.2	65 dBA	***No***
	West	100	77.2	57.2	65 dBA	***No***

1. Noise-sensitive uses to the south and east of Ponds 10 and 10A are predominately residential, and noise sensitive uses along the trucking route to the north and west, include miscellaneous uses, such as hotels, parks, and places of worship.
2. Distance is from the nearest receptor to the construction activity area of the project site, in feet.
3. Derived from the Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006; refer to Appendix A, Noise Data.
4. A typical building can reduce noise levels by 20 dBA with the windows closed. This assumes all windows and doors are closed, thereby attenuating the exterior noise levels by 20 dBA. (United States Department of Housing and Urban Development, *The Noise Guidebook*, undated, page 14)

Source: (*Federal Highway Administration 2006)*

Roadways are the primary existing noise source in the project area. Traffic on Bay Boulevard, Interstate 5, SR-75, and other local streets create a steady source of ambient noise in the project vicinity. The existing traffic volumes were obtained from the South San Diego Bay Wetland Restoration Project Truck Haul Study (*RBF 2009c*). Traffic noise was modeled using the Federal Highway Administration RD-77-108, Traffic Noise Prediction Model (CALVENO). The existing traffic on SR-75 ranges from 66,000 Average Daily Trips (ADT) on the segment from Interstate 5 (I-5) to Saturn Boulevard to 16,000 ADT on the segment from 7th Street to Rainbow Drive. The addition of the 432 heavy trucks traveling to SR-75 was adjusted using a passenger car equivalency (PCE) and conservatively identified in the modeling as three axel with a PCE factor of 3.0. Due to the high ADT on the segments of the truck hauling route, the increase in construction traffic and related noise levels associated with the trucking alternative would be nominal (less than 0.1 dBA) and a less than significant impact would occur. Therefore, noise impacts associated with temporary increases in truck traffic in the vicinity of the project would be less than significant. Additionally, no operational activities would be introduced with implementation of the trucking alternative; therefore, no long-term noise impacts would occur.

No Import Alternative. The elimination of the proposal to transport 50,000 cubic yards of material to Pond 11 from the CVWR would avoid the potential for increases in truck traffic noise along Palm Avenue and SR-75. However, if the 50,000 cubic yards of material is not deposited

on site, it would have to be transported to the landfill or other approved location. Based on the analysis conducted for the proposed action and the route that would be used to transport material to the landfill, the increase in truck traffic along the major roadways between the CVWR and the Otay Landfill and the related noise levels associated with the truck traffic would be nominal (less than 0.1 dBA) because of the level of traffic already using the route. Therefore, noise impacts related to truck traffic under the No Import Alternative would be less than significant. The effects of construction related noise within the western ponds would be similar to those addressed for the proposed action and would implement mitigation measure #6 to reduce construction impacts to below a level of significance.

No Action. Under the No Action Alternative, no noise would be generated from within the project site; therefore, no impacts to adjacent sensitive noise receptors would occur.

4.8 Effects to Biological Resources

Significance Criteria

1. An adverse effect to habitat or vegetation resources would be considered significant if:

    a. A substantial portion of native habitat would be removed or otherwise modified to accommodate a proposed action;
    b. An action would result in the direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation of a sensitive or narrow endemic plant species;
    c. A significant cumulative effect would occur if the loss of native habitat or a sensitive or narrow endemic plant species as a result of the proposed action is minor but, when considered in light of other similar losses or gains within the region, would be considerable;
    d. An action would result in a substantial change in the amount or quality of available habitat of a fish or wildlife species (for wintering waterfowl, migrant and wintering shorebirds, or special status species, a substantial reduction in habitat resulting in a significant adverse impact would be defined as a reduction of 30 percent or more of the available acreage or quality of habitat for these species);
    e. There would be a permanent loss of occupied listed or sensitive species habitat or the direct mortality of individuals of a listed or sensitive species as a result of a proposed action; and
    f. An action would substantially interfere with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites for longer than two weeks.

2. A significant cumulative impact would result from habitat modifications affecting wildlife and/or fish that would be considered minor for the proposed action but when considered in light of other similar losses within the region would be considerable.

Effect Analysis

4.8.1 Effects to Habitat

Proposed Action (Pumping Option). Impacts to existing habitat within the project footprint will occur as a result of the following actions:

1) excavating fill at the CVWR to restore low and mid marsh habitat and enhance tidal circulation;
2) cutting a temporary 10-foot-wide intake channel through the CVWR's southern armored shoreline to connect with an adjacent channel the runs along the south edge of the CVWR;
3) laying a temporary pipeline across the floor of San Diego Bay between the CVWR and Pond 11;
4) converting the currently active salt ponds (non-tidal, open water areas) to intertidal and subtidal habitat;
4) cutting breaches in the outer levees of Ponds 10 and 11;
5) constructing a berm along the eastern edge of Pond 10A; and
6) installing a new tide gate within the outer levee of Pond 12.

Habitat acreages to be affected under the proposed action are described below.

Western Salt Ponds

- 223.0 acres of non-tidal salt ponds would be converted to subtidal and intertidal habitat
- 0.05 acres of intertidal wetland would be temporarily lost to create levee breaches
- 0.15 acre of subtidal and intertidal habitat would be temporarily impacted by the construction of a cofferdam on the river side of the tide gate site
- 200 square feet of coastal wetland habitat would be permanently impacted as a result of tide gate construction
- 1.6 acres of high marsh and disturbed upland habitat would be lost as a result of the construction of the 1.5-foot berm to be constructed along the eastern side of Pond 10A

Chula Vista Wildlife Reserve

- 0.4 acre of an unvegetated upland berm would be excavated to create a transitional slope of high elevation coastal salt marsh
- 2.9 acres of disturbed high elevation coastal salt marsh would be excavated to create low elevation coastal salt marsh and shallow subtidal habitat
- 6.2 acres of unvegetated upland would be excavated to create subtidal and intertidal habitat
- 100 square feet of low marsh and subtidal habitat would be temporarily impacted to create a channel to convey water onto the site for use in slurrying material to Pond 11

Emory Cove

- 3.8 acres of non-native and disturbed habitat would be replaced with coastal sage scrub and high and mid elevation coastal salt marsh

The proposed action is a habitat restoration and enhancement project, therefore most of the habitat losses associated with the project would involve either temporary loss of habitat that would be restored at the end of construction, or the replacement of one habitat type with another (e.g., open water with salt marsh habitat, degraded high salt marsh habitat with higher quality low and mid-marsh habitat, and degraded habitat dominated by invasive plants with native wetland and upland species). Net changes of habitats types resulting from each project component are presented in Table 34. There will be a net gain of each type of wetland habitat.

Any permanent loss of tidal wetland vegetation represents a significant impact that requires mitigation. The California Coastal Commission (CCC) requires that wetland mitigation in excess of 1:1 (i.e., one wetland acre must be restored or created for each acre lost through development) be provided for losses to wetland habitat. Typically, a mitigation ratio of 4:1 is required by the CCC to compensate for wetland acreage and functional capacity lost during the reestablishment and maturation of the mitigation area. Further, enhancement of degraded habitat may be included as a component of a mitigation plan if the total package results in an acceptable mitigation ratio. The mitigation ratio of 4:1 is also required for impacts to salt marsh habitat in the Chula Vista Multiple Species Conservation Program Subarea Plan (*Chula Vista 2003*).

Table 34
Anticipated Changes in Habitat Acreages by Project Component

Habitat Type	Chula Vista Wildlife Reserve	Western Salt Ponds[1]	Emory Cove	Total
Tidal Open Water / Shallow Subtidal	+0.7	+34.7	0.0	+35.4
Salt Evaporation Ponds	n/a	-223.0	n/a	-223.0
Mudflats	0.0	+19.5	0.0	+19.5
Coastal Salt Marsh (low)	+8.8	+123.3	0.0	+132.1
Coastal Salt Marsh (mid)	0.0	+21.7	+0.1	+21.8
Coastal Salt Marsh (high)	-2.9	+14.3	+1.1	+12.5
Salt Pan	n/a	n/a	0.0	0.0
Southern Willow Scrub	n/a	n/a	0.0	0.0
Coastal Sage Scrub	n/a	n/a	+2.5	+2.5
Least Tern Nesting Area	0.0	n/a	n/a	0.0
Levees (unvegetated/high marsh)	n/a	-0.05	n/a	-0.05
Berms (unvegetated)	-0.4	n/a	n/a	-0.4
Unvegetated/Disturbed Upland	-6.2	n/a	-3.8	-10.0

[1]Assumes no change to the existing culverts that connect Ponds 10 and 10A.

Table 34 indicates a loss of 2.9 acres of high salt marsh habitat within the CVWR. This habitat, which is highly degraded due to presence of non-native upland vegetation, including iceplant, non-native grasses, and salt tolerant weeds, would be converted to low and mid salt marsh and subtidal habitat. Thus, these degraded wetlands will be converted to higher quality coastal wetland habitat. Further, the project will create 14.3 acres of high salt marsh habitat in the closed salt ponds, which represents a greater than 4:1 replacement ratio for high salt marsh

habitat. Impacts related to the loss of high salt marsh habitat as a result of restoration will be mitigated to below a level of significance with the implementation of mitigation measure #7

> ***Mitigation Measure #7(Biological Resources)*** *- The loss of high salt marsh habitat at the CVWR and on the levees of the western salt ponds is offset by the restoration of more than 15.4 acres of high salt marsh habitat throughout the project.*

Impacts for the loss of 2.9 acres of salt marsh habitat at the CVWR would be less than significant based on the total benefits to salt marsh habitat that would be realized as a result of project implementation, as described in mitigation measure #7.

The loss of 10.4 acres of disturbed non-native and unvegetated upland habitat is not considered a significant adverse effect; therefore, no mitigation is required. The conversion of 223 acres of non-tidal salt ponds to subtidal and intertidal habitat is discussed in detail in the San Diego Bay NWR Final CCP/EIS (*USFWS 2006*), and was determined not to represent a significant adverse effect. Converting these ponds from closed systems to tidally influenced habitat could displace some avian species, while other avian species would benefit from expanded foraging opportunities. A review of the various species observed within these ponds suggests that the guild of birds mostly likely to be displaced as a result of converting these ponds from open water to a tidal regime would be waterfowl. Waterfowl would still be expected to occur in these ponds, but not at the numbers observed during the year long bird surveys conducted in 1993/1994 at the salt works (*Stadtlander and Konecny 1994*). Waterfowl that presently raft in these ponds would most likely move to other ponds in the system or to the adjoining open bay, where they were also observed in very large numbers during the 1993/1994 surveys.

The current roosting opportunities available to gulls, pelicans, cormorants, and terns along the levee that separates Ponds 10 and 11 would be slightly altered by the project. The levee currently measures approximately 2,400 linear feet from the current opening in the levee at its western end and an opening located near its eastern end. To facilitate adequate tide circulation within the restored pond, a 110-linear-foot section would be removed at the center of the levee to accommodate a proposed subtidal channel. Additionally, the current eastern opening in the levee would be filled. These changes to the levee would not significantly alter current roosting opportunities; however, the conditions surrounding this levee would change from an open water environment to a tidal regime. It is not known if the current roosting habits of these birds would be affected by replacing the open water conditions around the levee with salt marsh habitat. Therefore, to better understand the effect, if any, on the roosting habits of these birds, the monitoring program for the restoration project will include pre- and post-project monitoring of avian use on this internal levee.

> ***Mitigation Measure #8(Biological Resources)*** *– The monitoring plan for the overall project shall include monthly pre- and post-project monitoring of the internal levee between Ponds 10 and 11 to record avian roosting activity by species. Upon completion of the monitoring program, the monitoring results should be analyzed and described in a report to be provided to the Service's Carlsbad Fish and Wildlife Office, USFWS Region 8's Division of Migratory Bird Management, and other interested agencies and individuals for future reference in evaluating similar projects.*

Installation of the tide gate in Pond 12, which is being processed independently from the larger restoration project, will result in the disturbance of approximately 0.37 acres, of which 0.18 acres would not adversely affect sensitive habitat because these impacts would occur within Pond 12, which does not support any tidally influenced habitat. Of the 0.37 acres to be disturbed, 0.19 acres would occur along the west side of the levee and along the eastern edge of the Otay River channel. Approximately 0.15 acres of the total disturbance on the west side of the levee would represent temporary impacts associated with the construction of a temporary cofferdam at the site of the future tide gate. Approximately 0.04 acres of the area to be disturbed by tide gate construction would be subject to intertidal influence following the installation of the tide gate and are expected to once again support intertidal habitat as a result of natural recruitment. Approximately 204 square feet of intertidal habitat within the project area could be permanently lost. Of this, about 60 square feet of wetland habitat would be replaced with the concrete apron of the tide gate, and up to an additional 140 square feet of habitat, depending on the final design, would be covered with rip rap to protect the structure from erosion. If not adequately mitigated, the loss of 204 square feet of coastal wetlands would represent a significant adverse effect. The following mitigation measure has been incorporated into the scope of the tide gate project to reduce impacts to intertidal habitat to below a level of significance:

> ***Mitigation Measure #9 (Biological Resources)*** *– Prior to completion of tide gate construction, the Service shall restore and enhance approximately 820 square feet of intertidal habitat at a site located on the Refuge along the south side of the Otay River channel, upstream of the proposed tide gate project. The specific size of the area to be restored within the proposed restoration site will be determined once the final construction drawings for the tide gate have been completed and the total area of impact can be determined. The total area of mitigation will be based on a replacement ratio of 4:1 (i.e., four square feet of restoration/enhancement for every one square foot of habitat lost).*

As indicated in Figure 18, the restoration site has experienced significant disturbance in the past as a result of the illegal construction of a dirt bike path through this area. The restoration proposal would involve excavating an 820-square-foot area of illegal fill to an elevation that will once again support low to mid-salt marsh vegetation. Once excavation is completed, the site is expected to revegetate with native salt marsh vegetation through natural recruitment. The site will be maintained and monitored for three years, or until habitat quality on the site is consistent with the adjacent salt marsh habitat, which ever comes first.

Essential Fish Habitat

Subtidal Unvegetated Bottom. No permanent impacts to essential fish habitat are anticipated. The project will permanently benefit essential fish habitat with the restoration and enhancement of tidal habitat at the CVWR, western salt ponds, and Emory Cove. In total, the project will restore or enhance 35.4 acres of shallow subtidal habitat, 19.5 acres of mudflat, and 166.4 acres of coastal salt marsh.

Temporary effects on the bare soft bottom community of the bay may result from placement of the pipe and potential leakage of the slurry as it is transported through the pipe from the CVWR to Pond 11, a distance of approximately 6,200 feet. Associated impacts could include localized

Figure 18

increases in turbidity and sedimentation, along with lowered dissolved oxygen levels associated with disturbance of anoxic sulfidic sediments. These may reduce foraging and respiration ability, causing fish to move from the area. Recovery of the benthic invertebrates following construction would be expected to be rapid. It is not anticipated that the pipe would leak and turbidity generated from the pipe moving from the sediment surface to the water with the tides is expected to be insignificant. However, to ensure that no significant adverse effects to fish would occur as a result of any leaks or pipe movement, the pipeline will be routinely monitoring for leaks and if any are identified, immediate action would be taken to address the problem.

Subtidal Vegetated Bottom (Eelgrass). Based on the results of the 2008 San Diego Bay eelgrass surveys (*Merkel & Associates 2009*), no eelgrass has been documented within the alignment of the proposed pipeline. A large area of eelgrass does occur immediately to the north of Pond 11, although not along the northeast corner of the pond where the levee would be breached. Although none of the activities associated with the proposed action are expected to impact eelgrass based on the results of the 2008 survey, eelgrass habitat fluctuates naturally on a seasonal and annual basis. Therefore, the current coverage within the south bay may change in amount or distribution prior to construction.

To avoid any adverse impacts to eelgrass habitat, pre- and post-construction eelgrass surveys will be conducted along the alignment of the pipeline, as well as around the proposed site of the outer levee breaches in Ponds 10 and 11 and the proposed site of the new tide gate in Pond 12. Surveys will be conducted in accordance with the Southern California Eelgrass Mitigation Policy (*SCEMP, Revision 11; NMFS 1991; Appendix B*). This policy, which was developed by the Federal and State resource agencies (NMFS, USFWS, and CDFG), offers specific guidelines for appropriate responses and mitigation measures for activities that threaten eelgrass vegetated habitats. As dictated by the SCEMP, pre- and post-construction surveys are required within 30 days of project commencement and completion, and will be used to determine what if any mitigation is required as a result of project actions. The SCEMP requires that impacts to eelgrass be mitigated by restoration at a 1.2: 1 area ratio (*NMFS 1991*). As part of the restoration proposal, approximately 34.7 acres of shallow subtidal habitat would be created in the restored salt ponds and 0.7 acres of additional shallow subtidal habitat would be created at the CVWR. These restored shallow, subtidal areas would provide potential habitat for the natural recruitment of eelgrass.

With the incorporation of biological mitigation measure #10 into the scope of the project will reduce potential impacts to eelgrass would be reduced to below a level of significance.

> ***Mitigation Measure #10 (Biological Resources)*** *- To mitigate the potential loss of eelgrass habitat as a result of temporarily installing a pipe across the bay, breaching the levees in Ponds 10 and 11, and installing a new tide gate in Pond 12, the Service and/or the Port will conduct pre- and post-construction eelgrass surveys in the vicinity of the proposed construction sites within 30 days of project commencement and completion to determine what mitigation, if any, is required as dictated by the Southern California Eelgrass Mitigation Policy (SCEMP, Revision 11; NMFS 1991). In accordance with the SCEMP, loss of eelgrass will be mitigated with restoration at a 1.2:1 area ratio.*

Proposed Action (Trucking Option). The effects to existing habitat under this alternative would be similar to those described above for the pumping option. The major difference between the two options is that no potential impacts related to transporting material to Pond 11 across the bay would occur (e.g., a pipeline would not be installed across the bay, a channel would not be cut through the armored shoreline of the CVWR). Temporary use of the CVWR's upland area, including the existing least tern nesting site, for truck loading could result in some disturbance to surface substrate, but any such impacts to the least tern nesting area would be remediated prior to the nesting season. Biological mitigation measures #7 through #10 would also apply to this alternative.

No Import Alternative. The impacts associated with this alternative would be similar to those described for the trucking option. Biological mitigation measures #7 through #10 would also apply to this alternative.

No Action. No impacts to existing habitat would occur under this alternative.

4.8.2 Effects to Fish and Wildlife

Overview

The effects to fisheries and wildlife as a result of implementing the various alternatives are described below. Once again, potential impacts to these resources are characterized by evaluating direct, indirect, and cumulative effects. Direct impacts involve the primary effect of implementing an action, such as permanent loss of habitat that supports nesting of listed bird species. Indirect impacts include habitat modifications that result in a change in abundance or breeding success of a species (or group of species), such as increasing the availability of fish in the vicinity of seabird nesting areas following levee breaching. Cumulative impacts would occur when the incremental direct or indirect impact of an action is added to other related actions that would affect the same species (or group of species), such as the effect of modifying a habitat that provides foraging opportunities for shorebirds combined with the modification of the same habitat elsewhere in the region.

Proposed Action (Pumping Option).

Fishes of Concern

Significant benefits to fish would result from the restoration and enhancement of tidal habitat. The vegetated areas would provide foraging habitat for adult and juvenile fish, protected spawning areas, and cover from predators.

The project may temporarily increase salinity and/or turbidity levels in south San Diego Bay, but as addressed in the water quality section (Section 4.4), increases in salinity and turbidity as a result of project construction would be temporary and less than significant. Therefore, potential impacts to managed fish species are also expected to be minimal and temporary.

Impacts from the project would be minor for the pelagic fish species (i.e., northern anchovy and pacific sardine) observed in South San Diego Bay. The coastal pelagics by nature have low site fidelity. Given the small area to be temporarily affected, any interruptions related to

the project that cause pelagics to move to other areas would not result in biologically significant increases in competition. The project would not impede the spawning success of the coastal pelagics nor cause disturbances that increase predation.

An existing condition within the project site is the intake of fish into the salt pond system during times when the tide gate is opened to fill the ponds. Once fish enter the ponds, there is no escape and the fish are either eaten by birds or eventually die due to hypersaline conditions or the lack of food. Although no studies have been conducted to quantify the numbers, sizes, or species of fish that enter the pond system through the Pond 10 tide gate, observations within the western salt ponds during avian surveys and contaminant studies indicate that a variety of species become trapped in the ponds from juvenile topsmelt to large striped mullet, (*Mugil cephalus*). Moving the tide gate from Pond 10 to Pond 12 would not change the current condition, although the volume of water annually entering the 20 percent smaller solar salt operation would be reduced. This reduction in water intake coupled with the creation of 35.4 acres of new subtidal habitat and 186 acres of restored and enhanced intertidal habitat would provide adequate offsets for the fish that are lost through the tide gate.

Impacts to California scorpionfish would be probable but minimal. The placement and operation of the pipe to transport slurry material could cause fish to flee the immediate disturbance. Yet the fish would likely remain in the area to capitalize on the exposure of forage resources by the disturbance. Prey species would be exposed when the bottom is disturbed and others would fall to the bottom due to abrasion and disruption from the pipe moving with the tide. Spawning success would not be affected due to the pelagic spawning and buoyancy of the eggs.

Temporary salinity increases in south San Diego Bay could occur as a result of breaching the ponds and releasing water, which can range from 11.5 ppt in Pond 10 during the winter to 40 ppt in Pond 11 during the hottest summer months, into San Diego Bay. Based on these salinity levels, salinity increases would be relatively minor and short in duration. Therefore, these changes are not expected to adversely affect the Bay's fish population. Although few studies have been conducted to determine the salinity tolerances of the fish species that occur in San Diego Bay, a study of salinity tolerances in a number of fish species in Los Penasquitos Lagoon provides some observations regarding the salinity tolerances of several of the more abundant fish species in the south bay. Specifically, California killifish and topsmelt were observed to be thriving in Los Penasquitos Lagoon at salinity levels as high as 63 ppt, while California halibut appear to tolerate salinities of between 50 and 55 ppt (*Carpelan 1961*). In this same study, the upper limit for pipefish appeared to be about 50 ppt and 55 ppt for Shiner surf perch. Based on these observations, it would appear that these species would be unaffected by the short-term increase in salinity that would occur as a result of pond breaching. Other species that may be less tolerant of salinity increases could swim north to areas of the bay that would not be impacted by this temporary increase in salinity levels. The temporarily displacement of these fish would not adversely affect fish diversity or abundance within the South Bay.

Migratory Birds

As described in the Final EIS for the South San Diego Bay NWR CCP, the existing salt ponds, including the western ponds, currently provide roosting and foraging habitat for a variety of migratory birds. Following restoration, the habitat functionality within Pond 10A is projected to be similar to existing conditions with one significant difference, the area will experience more frequent tidal exchange due to the reintroduction of regular, diurnal tidal influence. This change is expected to enhance migratory bird foraging and roosting within this area.

Together the three projects would provide more than 160 acres of restored or enhancement tidal mudflat and coastal salt marsh habitat. Shorebird species in particular would benefit from the restoration of salt marsh and exposed mudflat habitats. This conclusion is supported by observations made in 1984 when a large salt pond adjacent to Elkhorn Slough was inadvertently exposed to tidal action. Following the failure of a dike and the introduction of tidal action into the pond, shorebirds that had not been previously observed feeding within the pond began to feed on the new intertidal mudflat (*Ramer, Page, and Yoklavich 1991*). Under current conditions, Ponds 10 and 11 are used primarily for roosting. Available foraging is limited because the pond levels are generally too deep to support shorebird foraging.

Some changes in bird usage are expected in specific areas (e.g., Ponds 10 and 11) following restoration. For example, rafting birds such as scaup and scoters would be displaced into other wetland locations in south bay including the remaining hypersaline pond management area. These changes are not however considered adverse effects that would significantly impact existing avian resources.

Habitat functionality within the remaining solar salt evaporation system (the eastern ponds) following restoration of Ponds 10 and 11 will largely mimic existing conditions.

While the western salt ponds do not support nesting by migratory birds, they are utilized as foraging habitat. Similarly, California least terns and other terns that nest in the area likely forage in the subtidal habitat between the CVWR and the western salt ponds. To reduce impacts to migratory birds foraging during the nesting season, construction will be conducted outside the bird breeding season between September 15 and April 1.

> ***Mitigation Measure #11(Biological Resources)*** *– Construction within the CVWR and the western salt ponds will occur during the non-nesting season between September 15 and April 1.*

Proposed Action (Trucking Option). The effects to fish and wildlife would be similar to those described above for the pumping option. The major difference between the two options is that no potential impacts related to transporting material to Pond 11 across the bay would occur (e.g., a pipeline would not be installed across the bay, a channel would not be cut through the armored shoreline of the CVWR). Biological mitigation measures #10 and #11 would also apply to this alternative.

No Import Alternative. The impacts associated with this alternative would be similar to those described for the trucking option. Biological mitigation measures #10 through #11 would also apply to this alternative.

No Action. No impacts to fish and wildlife would occur under this alternative.

4.8.3 Endangered and Threatened Species and Other Species of Concern

Proposed Action (Pumping Option).

California Least Tern

California least terns nest that the CVWR on 6.5 acres of managed habitat along the southern edge of the site. No California least tern nesting occurs on the western salt pond levees or at Emory Cove, but they do nest on the salt pond levees to the east of the Otay River channel. Construction activities associated with the restoration project could adversely affect California least tern nesting at the CVWR and least tern foraging throughout the larger project site if conducted during the nesting season. Biological resources mitigation measure #11 has been incorporated into the scope of the project, which would prohibit construction during the nesting season, reducing potential impacts to the least tern to below a level of significance. In addition, any disturbance to the designated nesting site on the CVWR as a result of the restoration efforts would be repaired prior to the nesting season.

Light-footed Clapper Rail

It is anticipated that the light-footed clapper rail will ultimately benefit with the restoration of 130 acres of cordgrass-dominated salt marsh in the western salt ponds. The intent of this restoration option is to create sufficient acres of relatively secure clapper rail habitat to significantly benefit the region's clapper rail population.

Light-footed clapper rails have been observed breeding along the Otay River. However, they have not been observed nesting along the Otay River adjacent to the western salt ponds. Therefore restoration of the western salt ponds is not anticipated to adversely disturb nesting light-footed clapper rails.

Light-footed clapper rail has been observed in the salt marsh habitat of the South Bay Biological Study Area south of Emory Cove. As such, there is the potential that they could utilize the marsh in Emory Cove. Project activities in Emory Cove are proposed outside tidal areas or when the area is dry. As such, no adverse impacts to clapper rails are anticipated.

California Brown Pelican

Non-breeding brown pelicans utilize the salt pond levees for roosting and are periodically observed roosting on the levee between Ponds 10 and 11. The proposed project would breach this levee near its center, slightly reducing the area available for roosting. This impact is not anticipated to be significant as adequate areas would continue to be available for roosting along this levee, as well as in the ponds to the east.

Eastern Pacific Green Turtle

All dredging activity proposed in Ponds 10 and 11 will occur within the confines of the pond levees, therefore, this component of the project would have no affect on sea turtles. In addition, levee breaching would occur during low tide, making the breach areas inaccessible to turtles during the construction period.

Excavation within the CVWR basins would occur within the interior of the site, which is inaccessible to sea turtles; therefore, the proposed excavation would have no affect on the Bay's turtle population. Measure would however have to be implemented if material excavated from the site is transported via a slurry pipeline to Pond 11.

Eastern Pacific green turtles are anticipated to be present within the cooling water effluent channel of the South Bay Power Plant during the full period of project construction. Because CVWR construction must occur on an existing and highly productive least tern nesting site, construction work is restricted to the winter months. These turtles are seasonally concentrated within the channel during winter periods when the temperature of the Bay drops to levels below those most suited to turtle presence. Only during the warmest summer months when the remainder of the Bay is well suited to occupancy by turtles and the temperatures of the power plant are at their peak do turtles move away from the inner areas of the effluent channel. Even then, the vertical temperature gradient set up by higher water column outflow from the plant's cooling system and inflow of tidal waters near the bottom can foster some use of the area by turtles.

To transfer sediments from the CVWR to Pond 11, it is necessary to extend a floating or submerged pipeline from the island to the salt works pond across shallow water and mudflats during the period of construction. Approximately 97 percent of the 4,400 feet of pipeline crossing the Bay between the sites would be located over intertidal mudflats with the remaining 3 percent (140 feet) being located across the dredged discharge channel. The alignment of the proposed pipeline is perpendicular to bathymetric contours. As a result, whether the pipeline is constructed as a sunken or floating pipeline, there is no potential for accidental stranding of turtles behind the pipe if they venture onto the flats to forage at high tide. Where the pipeline crosses the deeper channel, it is to be maintained as a sunken pipeline to allow vessel and turtle passage at all tidal elevations.

Vessel collision concerns are an ongoing concern for turtle protection throughout the Bay, but most specifically within south San Diego Bay. To protect turtles and other wildlife resources, the Port has implemented a 5 mile per hour speed limit in south bay, including within the South Bay Power Plant discharge channel. Except where the channel enters the plant property and is boomed off, the waters are open to public navigation and are used sporadically and irregularly by researchers, fishermen, recreational boaters, and bird watchers. The proposed construction would similarly place vessels on the water for short durations during the construction period. This boating activity would, by necessity, occur at high tides in order to place the pipeline across the mudflats and to remove the pipeline upon project completion. Work would be expected to require approximately one week of high tide work to place the pipe and another week to remove the pipe upon completion. The contractor would be bound by both the existing speed limit as well as contract specifications

to adhere to the limit presently in place, although as a practical matter, much of the work to tow pipe segment and assemble the pipe will likely require much slower average vessel speeds. Because of the short duration of on-water work and the adherence to existing boating regulations, the activities would not alter the baseline of present vessel collision hazards to turtles in the Bay.

The pipeline, whether floating or sunken must be kept protected from significant movement as a result of wind and tidal action due to its long extent and the significant strain that would be put on the individual welds and joints if allowed to fully bow with the water movement. For this reason, anchors are to be placed along the pipeline corridor to prevent significant sweeping of the pipeline during tidal exchanges. These anchors will ensure that the pipeline does not shift significantly from a direct alignment between the CVWR pumping pit and Pond 11. Anchors may be in the form of clump weights, fluke anchors, or spuds placed along the line to control pipeline travel. The large mass of the pipeline, combined with the line anchors will preclude both large scale and rapid movement of the pipeline in response to tides, currents, and winds. The slow rate and limited extent of motion in the pipe will ensure protection of turtles in the vicinity of the pipeline and the alignment of the pipe perpendicular to the bathymetric contours will protect against stranding turtles as the tide recedes from the mudflats.

The process for withdrawing water through the temporary inlet to a pumping pit, as described in Section 2.2.2.1 (Alternative 2(A)1, would be designed to avoid impacts to turtles. The broad width, inclusion of impingement screens, and low velocity of water intake will prevent any impingement of turtles at the intake. Following construction, the intake is to be restored to preexisting conditions. These provisions are to be incorporated as project specifications in the construction documents.

To avoid impacts to turtles, the following mitigation measure has been incorporated into the scope of the project:

> ***Mitigation Measure #12(Biological Resources)*** *– The following measures have been incorporated into the scope of the CVWR project and will be included on the construction specifications: 1) contractor access within the waters of San Diego Bay shall be limited to the placement and removal of and monitoring and maintenance of the dredge material pipeline; 2) the five mile per hour boating speed limit in the south bay shall be adhered to at all times; 3) the dredge pipeline shall be floated into position and removed from its temporary position across the South Bay Power Plant cooling water discharge channel during high tides when there is adequate clearance for vessel work above the bottom; 4) the dredge pipeline shall be anchored into place for the duration of work; 5) adequate clearance for turtle research vessels and turtle passage shall be ensured by sinking the dredge pipeline within the subtidal portion of the discharge channel , 6) an impingement barrier structure or rock filter shall be installed at the temporary 10-foot-wide water intake cut to prevent adult fish and turtles entrainment, and 7) the vessel operator shall not deploy any materials into the bay that have the potential for entangling sea turtles, Additionally, the Port shall conduct a preconstruction meeting with all construction*

personnel and project managers to review all measures required to be implemented to protect sea turtles.

The provisions required for construction of the project will be included in project construction plans and specifications as environmental protection elements. These requirements are enforceable and will be enforced by the Port of San Diego and the project biologist for the marsh restoration and expansion work. With the incorporation of these provisions the proposed project, the potential for impacts to sea turtles would be reduced to below a level of significance. Although there is some limited potential for project implementation to affect sea turtles, with the implementation of these measures the project is not likely to result in any adverse effects. Based on this conclusion, consultation with NOAA will be initiated in accordance with Section 7 of the Endangered Species Act.

Belding's Savannah Sparrow

Construction of the new tide gate at Pond 12, modification of salt marsh habitat along the levees of the western salt ponds, and construction in the CVWR could adversely affect Belding's savannah sparrows as a result of increased disturbance levels during construction. To avoid disturbance to breeding Belding's savannah sparrow, construction activity will occur outside their breeding season, as described in biological resources mitigation measure #6. The implementation of this measure would reduce impacts to below a level of significance. Additionally, Belding's savannah sparrow would benefit from the 12.5-acre increase in nesting habitat that would be provided as a result of project implementation.

Birds of Conservation Concern

The conversion of the western salt ponds to intertidal habitat would not adversely affect the species listed as Birds of Conservation Concern (refer to Table 19) because those species on the list that currently forage or roost in the ponds would also be expected to forage and roost in the restored ponds. Although some disturbance to these species would occur during excavation at the CVWR and the western salt ponds, opportunities for foraging and roosting outside of the construction areas are available; therefore, temporary disturbance impacts to bird species of conservation concern would be less than significant.

Proposed Action (Trucking Option). The effects to listed species and Birds of Conservation Concern would be similar to those described above for the pumping option. The major difference between the two options is that no potential impacts related to transporting material to Pond 11 across the bay would occur (e.g., a pipeline would not be installed across the bay, a channel would not be cut through the armored shoreline of the CVWR). Potential impacts to Eastern Pacific green turtles would not occur under this alternative, so biological mitigation measure #13 would not apply to this alternative. Biological mitigation measure #12 would be implemented to reduce potential impacts to listed species during the nesting season.

No Import Alternative. The impacts and necessary mitigation measures associated with this alternative would be the same as those described for the trucking option.

No Action. No impacts to listed species or other species of concern would occur under this alternative.

4.9 Effects on Cultural Resources

Significance Criteria

An impact to cultural resources would be considered significant if it adversely affects a resource listed in or eligible for listing in the NRHP. Cumulative impacts to cultural resources could result from individually minor but collectively significant actions taking place over a period of time. Cumulative effects often occur to districts, where several minor changes to contributing properties, their landscaping, or to their setting over time could result in a significant loss of integrity.

Effect Analysis

Proposed Action and No Import Alternative. The salt pond complex and associated buildings within the South San Diego Bay Unit of the San Diego Bay NWR, including the western salt ponds, have been determined to be eligible for listing in the National Register of Historic Places (NRHP), in part because the site retains a high degree of integrity and because the facility played an important role in the solar salt industry in Southern California from 1916 to 1949. Under the Proposed Action Alternative and the No Import Alternative, the western ponds would be removed from the function portion f the solar salt operation. The outer levees would be breached in two locations, but the integrity of the remaining portions of the levees would stay in tact. In addition, a new tide gate would be installed in the outer levee of Pond 12, which would enable the remaining eastern ponds to continue to function as an active solar salt operation. Because the installation of the tide gate would facilitate the continued use, and therefore the integrity of the eastern salt pond operation, this aspect of the project would not adversely affect the historic resource and no mitigation would be required for the installation of the new tide gate.

According to historic maps prepared of San Diego Bay, the salt works was confined to the far southeast edge of San Diego Bay in 1892 and 1903 (U.S. Coast and Geodetic Survey, No. 5106, published July 1892; City of San Diego Map, April 1903). In 1916, Ponds 11, 12, and 14 were not yet constructed. Two tide gates were used in 1916, on located at the northwest corner of Pond 10, and one at the northeast corner of Pond 13. There is no evidence that the existing tide gate along the eastern edge of Pond 10 was present in 1916. The siphon that transported water from the western ponds to the eastern ponds was in place according to this 1916 map ("Map Showing Boundary Lines and Location of Evaporation Ponds of the Western Salt Company, August 19, 1916). In 1933, a tide gate was still located at the northwest corner of Pond 10 and Pond 11 had not yet been constructed. The tide gate that currently exists along the eastern edge of Pond 10 is not shown as being present in 1933 (U.S. Coast and Geodetic Survey, Air Photo Compilation, No. T-5371, December 22, 1933). In 1954, the current configuration of the salt ponds appears on a map, including the tide gate in Pond 10 (U.S. Coast and Geodetic Survey, Hydrographic Survey No. 8135, March-April, 1954). Based on this information, the eastern ponds have been in salt production for a much longer period than have the western ponds. Implementation of the proposed restoration of the western ponds would not result in the closure of the entire salt operation. The eastern ponds would continue to be used for salt

production, although overall production rates would be lower due to the loss of the western primary ponds.

Restoring the western salt ponds would change the function and general appearance of the salt ponds, although the majority of the existing levees would be retained. The proposed change would affect a historic resource that has been determined to be eligible for listing on the NRHP, representing a significant adverse effect to cultural resources. To reduce this effect to below a level of significance, the Service proposes to enter into a Memorandum of Agreement with SHPO to implement the following measures:

> ***Mitigation Measure #13 (Cultural Resources)*** *- Prior to project construction, the Service will enter into a Memorandum of Agreement with SHPO to document past, current, and post-restoration conditions within and surrounding the affected areas of the salt works. Specific tasks associated with this documentation include:*
>
> 1) *Photographically documented the existing conditions of the project site (i.e., the levee configuration in Ponds 10, 10A, and 11, the existing tide gate in Pond 10, and the western levee of Pond 12, using 35 mm or large format black and white photographs;*
> 2) *Assemble historic, current pre-restoration, and post-restoration aerial photographs of the affected ponds;*
> 3) *Prepare and record a detailed description of the affected site features and their associated construction methods; and*
> 4) *Compile the above mentioned material into a historic resource evaluation of the western salt ponds and provide copies of the evaluation to the California Office of Historic Preservation and the following local repositories: Chula Vista Heritage Museum, San Diego Historical Society, and San Diego Archaeological Center.*
>
> ***Mitigation Measure #14 (Cultural Resources)*** *- Within three months of project implementation, the Service shall develop interpretive materials including at least one interpretive panel to be installed along the Bayshore Bikeway or South Bay Birding and Walking Trail that introduces the story of the Western Salt Company.*

CA-SDI-5454/12,270, located along the SR-75 right-of-way, including along the margins of portions of Pond 10 and 11 has been determined to be eligible for listing on the NRHP. No dredging is proposed along the edge of Pond 11, and dredging proposed near the edge of Pond 10 would not occur within the upland edges of this pond, therefore, no adverse effects to this site are anticipated as a result of project implementation. Additionally, no impacts to CA-SDI-5454/12,270 are anticipated as a result of implementing the trucking option, as the proposed route for truck access between SR-75 and the northern levee of Pond 11 would occur on existing disturbed access routes. However, in order to ensure that no impacts will occur to this site as a result of the proposed restoration, the northern and eastern site boundaries will be delineated prior to completion of the final restoration plans and the following measures will be incorporated into the scope of the project:

Mitigation Measure #15 (Cultural Resources) *– Prior to completion of the final restoration plans, the western edge of Pond 10 and the potential access route for haul truck between SR-75 and the northern levee of Pond 11 shall be surveyed to determine the northern and eastern site boundary of CA-SDI-5454/12,270. If it is determined that the site boundaries do extend into the pond, the restoration plans shall exclude these areas from the construction site and the construction specifications shall clearly indicated all areas in which construction activity shall be avoided. In addition, the Service shall ensure that any portions of the site that may extend into the pond are properly fenced with temporary construction fencing to ensure that no portions of the site are inadvertently impacted by construction equipment. If the site extends into the truck access route, any surface artifacts would collected, cataloged, and properly curated in accordance with existing regulations. In addition, be the route would be capped to prevent any disturbance to subsurface deposits.*

The implementation of these measures described above would reduce the impacts to cultural resources from the implementation of this alternative to below a level of significance.

Implementation of restoration and enhancement on the CVWR and Emory Cove would not result in any adverse affects to cultural resources.

No Import Alternative. The impacts to cultural resources under this alternative would be similar to those described for the proposed action.

No Action Alternative. Under the No Action Alternative, no impacts to the Western Salt Works historical site would occur and the ponds would continue to be included within the commercial solar salt operation.

4.10 Effects on Land Use

Significance Criteria

Adverse effects related to land use would be considered significant if:

a. Substantial incompatibility between proposed uses or activities and adjacent existing uses would occur.

b. Substantial changes in use or the intensity of use are proposed, where the resulting activity or use pattern would create significant noise, traffic, public safety, or similar environment impacts that would adversely affect the existing or future the use of adjacent areas.

Effect Analysis

Proposed Action. The proposal to restore and enhancement habitat on the CVWR and at Emory Cove are consistent with the objectives of the Port Master Plan and would assist in meeting the goals of regional, state, and national conservation planning documents. There are no uses existing or proposed in the vicinity of these sites that would be adversely affected by the restored

habitat proposal, therefore, no adverse effects related to land use are anticipated for these areas under this alternative.

The proposal to restore tidal exchange in the western salt ponds is consistent with the goals and objectives of the San Diego Bay NWR CCP and would also assist in meeting the goals of regional, state, and national conservation planning documents. The conversion of the area from salt ponds to native wetland habitat would not result in any adverse affects to existing or proposed uses in proximity the project site. No impacts related to land use are therefore anticipated as a result of implementing the proposed action.

No Import Alternative. The affects to land use as a result of this alternative would be the same as those

No Action Alternative. No impacts related to land use would occur under the No Action Alternative.

4.11 Effects to Traffic Circulation

Significance Criteria

Adverse effects related to traffic would be considered significant if:

- Traffic generated by the project results in a change in operating conditions from acceptable to deficient, or

- If a segment is currently operating at a deficient LOS, the traffic generated by the project results in an increase in the volume-to-capacity (V/C) ratio on a roadway segment by 0.020 or more. (For City of San Diego, segments operating at LOS F are impacted with an increase in V/C threshold of 0.01)

Effect Analysis

Proposed Action.

Proposed Action with Pumping Option

Implementation of the proposed action with the pumping option would generate relatively few trips per day and the majority of these trips would be daily commuting trips by construction workers. The bulk of the truck and other construction vehicle trips would occur over a few days during mobilization and demobilization of the three major projects (i.e., CVWR restoration, western salt pond restoration, and tide gate installation). The total number of trips to be generated would not contribute significantly to current traffic volumes in the vicinity of the project, nor would directly or cumulatively affect existing congestion areas in the vicinity of the project. Once restoration is completed, the only trips generated by the project would be occasional trips to and from the site for monitoring, management, and law enforcement. The number of trips generated after restoration would be similar to the number of management trips already occurring at these sites. Therefore, no adverse affects

related to traffic circulation would occur as a result of implementing the proposed action with the pumping option.

Proposed Action with Trucking Option

To expand habitat suitable for restoring cordgrass habitat in Pond 11, the proposed action includes a proposal to move 50,000 cubic yards of excavated material from the CVWR to Pond 11. Under the trucking option, the 50,000 cubic yards of material would be hauled from the CVWR via the South Bay Power Plant property to the northern levee of Pond 11. Trucks would haul material from the CVWR to Pond 11, and then the empty trucks would return to the CVWR to pick up additional material for transport. The travel distance between the two sites would be approximately six miles each way or 12 miles roundtrip. The Port proposes to use eight trucks to implement this part of the project. As stated in the project scope of work, hauling would be limited to off-peak hours (9:00 a.m. to 4:00 p.m.) to avoid impacts to traffic during the peak hours. Each round trip is anticipated to take approximately 45 minutes including loading and unloading time at each end of the route. Over the seven hour haul period, each truck will complete between 8 and 9 round trips per day. With a maximum of eight trucks hauling the material per day, approximately 72 round trips per day would be completed during the hauling period.

Two potential truck types could be used in the hauling operation. The smaller of the two trucks can haul approximately 10 cubic yards of material per trip. The larger truck considered for this operation has a carrying capacity of 20 cubic yards per load. The travel time differences between the two truck types are minimal and a conservative estimate of 45 minutes per roundtrip was applied regardless of the vehicle type. A fleet of eight trucks (regardless of type) would yield approximately 72 round trips per day within the identified hauling hours. The type of truck selected for this operation would not affect the number to trips conducted per day, but would affect the duration of the haul period. Smaller trucks (10 cubic yards) would result in longer haul durations. To remove 50,000 cubic yards of material with the 10 cubic yard trucks, the haul activity would occur for a period of approximately 70 days (12 weeks). Increasing the capacity from 10 to 20 cubic yards reduces the total haul duration by fifty percent, resulting in approximately 35 days (six weeks) of haul activity.

Since trucks tend to have a more significant effect on roadway operations when compared to passenger vehicles, passenger car equivalency factors (PCE's) were applied to convert truck traffic to passenger vehicle equivalents. PCE's account for the length, speed and start up/lost time associated with the larger vehicles required to haul materials between sites. PCE's published by the San Bernardino Association of Governments (SANBAG) were used since local PCE factors are not available. As specified by SANBAG, heavy-duty trucks have a PCE factor of 3.0 (3 passenger vehicles to each heavy vehicle). Therefore, all truck trips calculated in this analysis were multiplied by 3.0 to derive traffic levels in PCE's. Although a lower PCE could be considered for the smaller truck, the PCE factor (3.0) was applied to both the 10 cubic yard truck and 20 cubic yard truck scenarios to remain conservative. Table 35 presents the estimated daily trip generation levels for the transport activity as well as the forecasted transport duration for each type of truck.

Table 35 Transport Truck Trip Generation						
Total Transported Material	**Material Transported Daily**	**Truck Fleet**	**Daily Loads**	**Daily Truck Trips**	**Daily PCE Trips***	**Total Transport Duration**
10-Cubic Yard Capacity Trucks						
50,000 cubic yards (cy)	720 cy	8	72	144	432	70 Days
20- Cubic Yard Capacity Trucks						
50,000 cubic yards (cy)	1,440 cy	8	72	144	432	35 Days

*Passenger Car Equivalency (PCE) factor of 3.0 applied.

Material from the CVWR would be transported from just west of the South Bay Power Plant, located to the east of Bay Boulevard. The proposed haul route would extend from the South Bay Power Plant, traveling north on Bay Boulevard to the L-Street on-ramp to southbound I-5. Trucks would travel south and exit Palm Avenue (SR-75) and travel west and then north on SR-75 to the northern levee at Pond 11. Return trips would use the same route in reverse.

Based on anticipated daily truck activity levels and an estimated eight trucks per day available to haul materials, the analysis includes the evaluation of existing and existing plus project conditions. Therefore, no new trips would be generated during the peak hour as a result of this project and peak hour intersection analysis is not necessary. The material import activity is anticipated to be completed in less than three months; therefore a long-term analysis is not included.

The following roadway segments were included in the analysis:

- Bay Boulevard: L Street to Palomar Street (Chula Vista)
- Interstate 5: L Street to Palomar Street (Caltrans)
  Palomar Street o Main Street (Caltrans)
  Main Street to Palm Avenue (Caltrans)
- SR-75/Palm Avenue: I-5 to Saturn Boulevard (San Diego)
  Saturn Boulevard to 13th Street (San Diego)
  13th Street to 9th Street (San Diego)
  9th Street to Delaware Street (Imperial Beach)
  Delaware Street to 7th Street (Imperial Beach)
  7Th Street to Rainbow Drive (Imperial Beach)
  North of Rainbow Drive (Coronado)

The haul route would traverse a number of jurisdictions including City of Chula Vista, City of San Diego, City of Imperial Beach, City of Coronado, and Caltrans. Each jurisdiction has adopted standards identifying acceptable operating conditions for their roadways and intersections. As the haul activity would not be conducted during the peak period, intersection operational analysis is not included in this assessment of impacts. This traffic

assessment evaluates the daily impact to roadway operations associated with the haul route activity.

According to the City of Chula Vista and City of Imperial Beach Circulation Elements, the acceptable service standards during daily periods is level of service (LOS) C for all roadway segments. The City of San Diego and City of Coronado capacity threshold is LOS D for all roadway segments. Roadway segment level of service criteria for each jurisdiction is included in Table 36.

Table 36
Daily Level of Service Thresholds for Roadway Segments

Classification (# of Lanes)	Level of Service				
	A	B	C	D	E
City of Chula Vista					
Collector (4)	5.000	7,000	10,000	13,000	15,000
City of San Diego					
Prime Arterial (6)	25,000	35,000	50,000	55,000	60,000
Major (6)	25,000	30,000	40,000	45,000	50,000
City of Imperial Beach (1)					
Prime Arterial (6)	25,000	35,000	50,000	55,000	60,000
Major (4)	15,000	21,000	30,000	35,000	40,000
City of Coronado					
Major (4)	15,000	21,000	30,000	35,000	40,000

(1) SANTEC level of service thresholds applied for City of Imperial Beach.

Existing traffic volume data was collected along I-5 and SR-75 in 2008 by Caltrans. The traffic volume data collected by Caltrans includes the study roadway segments located in the City of San Diego (SR-75 from I-5 to 9th Street), City of Imperial Beach (SR-75 from 9th Street to Rainbow Drive), and City of Coronado (SR-75 north of Rainbow Drive). Traffic volumes in the City of Chula Vista (Bay Boulevard from L Street to Palomar Street) were provided by the City Traffic Engineering Division staff. Unusually high traffic volumes (four times historic averages) were reported in 2009 by the City of Chula Vista for Bay Boulevard, therefore 2008 traffic volumes were used in this analysis.

Based on the proposed haul route, truck traffic that was converted to PCE's was added to existing traffic volumes to determine the impacts to surrounding roadways associated with the project related truck trips. Traffic volumes (with project truck traffic represented in PCE's) for the existing plus project conditions are presented in Table 37, which also states the roadway segment levels of service (LOS) for existing conditions without and with the forecast haul route truck traffic.

As shown in Table 37, most study roadway segments currently operate at acceptable levels of service under existing conditions. Segments of Palm Avenue between I-5 and 13th Street are currently operating at LOS F with traffic volumes exceeding the available capacity. The addition of truck traffic associated with the hauling of 50,000 cubic yards of fill material

would result in an increase in ADT of 432 PCE trips per day. Based on the forecast V/C ratios with the truck traffic, none of the segments would be significantly impacted by the haul activity.

According to the SANDAG Regional Transportation Plan (RTP) 2020, portions of I-5 through the study area currently operate at LOS D. Recent traffic counts conducted by Caltrans show that between 140,000 and 151,000 vehicles per day traverse this segment of I-5. The temporary addition of the 144 trips per day (432 trips when converted to PCE's) would not be expected to significantly impact the operating conditions along I-5 between Palomar Street and Palm Avenue (*RBF 2009c*), particularly with these trips proposed to occur during off-peak hours.

To ensure that no impacts to traffic circulation occur during peak traffic hours, the following traffic mitigation measure has been incorporated into the scope of the project:

> ***Mitigation Measure #16 (Traffic) -*** *The final construction plans and specifications for restoration at the CVWR shall state that transport of material between the CVWR and Pond 11 will only be permitted between the hours of 9:00 a.m. and 4:00 p.m. to avoid the use of roadways during peak traffic hours.*

Truck traffic related to the transport of material for the CVWR to Pond 11 under the trucking option would be a temporary condition and would not contribute to existing peak hour traffic volumes; therefore, with the implementation of traffic mitigation measure #16, the proposed action with the trucking option would have no impacts on public roadways during peak hours. In addition, the number of trips to be generated would not result in any significant adverse effects to existing levels of service on the roadways included within the proposed haul route.

<u>If the trucking option is implemented</u>, this proposal could result in significant traffic congestion along SR-75 where trucks would enter and exit the Pond 11 area to unload transported material. Access to Pond 11 would likely use the existing roadway along the northern levee of Pond 11, which would require access to and from SR-75 near the southern end of the Biological Study Area parking lot, <u>and would involve crossing over the eastern edge of SR-75 and across the Bayshore Bikeway</u>.

<u>A detailed plan for moving traffic through or around this construction zone would be developed to assure that adequate consideration is given to the safety and convenience of motorists, pedestrians, bicycles, and workers during construction. Design plans and specifications would be analyzed in consultation with Caltrans, the City of Coronado, and MTS to determine in detail the measures required to warn and guide motorists past the construction site when trucks are present. The traffic control plans should be consistent with the guidelines and standards provided in Chapter 2 of the Caltrans Construction Manual and Section 110.7 (Traffic Control Plans) of the Highway Design Manual and should cover items such as but not limited to: signing, flagging, geometrics of detours, placement and design of barriers and barricades, separation of opposing traffic streams, maximum lengths of lane closures, speed limits and enforcement, hours of work, and treatment of pavement edges.</u>

Table 37

To reduce traffic congestion impacts to below a level of significance, the following mitigation measure has been incorporated into the scope of the project:

> ***Mitigation Measure #17 (Traffic) -*** *The final construction plans and specifications for restoration at the CVWR shall require the preparation and implementation of a traffic control plan consistent with the guidelines and standards provided in Chapter 2 of the Caltrans Construction Manual and Section 110.7 (Traffic Control Plans) of the Highway Design Manual and approved by Caltrans, District 11as part of a required encroachment permit.*

No Import Alternative. Under the No Import Alternative, the 50,000 cubic yards of material could be disposed of onsite, which would not generate any additional truck traffic, or the material could be transported to a nearby landfill. Transporting material to a nearby landfill would generate traffic volumes similar to those described for the proposed action with trucking option; however, some of the traffic segments to be affected would be different. If this alternative is selected, traffic mitigation measure #16 would be implemented to avoid impacts during peak traffic hours. A traffic control plan would not be necessary if the material is transported to the landfill as the landfill facility is designed to accommodate truck ingress and egress without the potential for traffic impacts.

No Action Alternative. No construction would occur at the CVWR or the western salt ponds under this alternative; therefore, no impacts to traffic circulation would occur under this alternative.

4.12 Effects on Public Recreation

Significance Criteria

Adverse effects to recreational opportunities would be considered significant if:

a. Substantial displacement of public recreation activities or opportunities would occur as a result of a proposed action.
b. Existing public access to the bay would be substantially reduced as a result of a proposed action.

Effect Analysis

Proposed Action.

Proposed Action with Pumping Option

The proposed action has the potential to temporarily impact the limited boating activity that occurs in the south end of San Diego, as well as travel along the Bayshore Bikeway in the vicinity of Pond 11.

Impacts to boating would occur if the option to transport material to Pond 11 via a pipeline is implemented. The temporary placement of a pipeline across the south end of San Diego Bay from the CVWR to Pond 11 could impede boat travel across the pipeline particularly during

periods when tide elevations are lower. At low tide, this area is impassible with the possible exception of a channel that extends along the south side of the CVWR. Once past the CVWR and associated berms, the channel turns to the north. The following measures would be implemented if the slurry option is selected:

Mitigation Measure #18(for pumping option)(Recreation) *- The final construction plans and specifications for restoration at the CVWR shall include a requirement to connect hazard buoys and/or signage along the alignment of the pipe that cross the bay to demarcate its location for recreational boaters.*

Mitigation Measure #19 (for pumping option)(Recreation) *- The final construction plans and specifications for restoration at the CVWR shall include a requirement the Contractor to provide at least one area along the proposed temporary pipeline that is sunken within the channel located adjacent to the CVWR in order to accommodate small vessels traveling through the area.*

Mitigation Measure #20 (for pumping option)(Recreation) *- Prior to construction, the Port shall prepare and distribute notices describing the location of the pipe to all personal water craft rental business located from Pepper Park south, and shall also post notices in the Notice to Mariners.*

Implementing these measures, which would inform users of the presence of the pipeline and provide for at least one passage point over the pipeline, would reduce potential impacts to boaters to below a level of significance.

Proposed Action with Trucking Option

If the trucking alternative is implemented, trucks would have to cross over the Bayshore Bikeway at the north end of Pond 11. This would result in temporary disruptions in travel along the bike path. These impacts would occur between about 9:30 a.m. and 4:00 p.m. Monday through Friday for a period of six weeks if trucks with a hauling capacity of 20 cubic yards are used or 12 weeks if trucks with a hauling capacity of 10 cubic yards are used. To avoid potential safety issues in the area when trucks are present, the following mitigation measure would be implemented:

Recreational Mitigation Measure #21(for trucking option)(Recreation) *- The final construction plans and specifications for restoration of CVWR and western salt ponds shall include a requirement that the Contractor provide flaggers and signs when trucks are present in the area.*

The incorporation of recreational mitigation measure #21 would reduce potential impacts to bicyclists traveling along the Bayshore Bikeway to below a level of significance.

No Import Alternative. No impacts related to recreational uses in the area would occur under this alternative.

No Action Alternative. Implementation of the No Project Alternative would not result in any adverse effects to public recreation activities.

4.13 Effects Related to Environmental Justice

Significance Criteria

A proposed action would result in disproportionate adverse human health impacts or environmental effects to low-income or minority populations.

Effect Analysis

Neither the proposed action nor any of the alternatives to the proposed action would result in disproportionate adverse human health impacts or environmental effects to low-income or minority populations. Potential noise and traffic impacts would be reduced to below a level of significance and no long term adverse impacts to the surrounding community would result from project implementation.

4.14 Cumulative Impacts of the Proposed Action

All impacts related to the proposed action would be mitigated to below a level of significance through the incorporation of specific measures into the scope of the project. Of the impacts to be mitigated, the majority are temporary impacts (i.e., water quality, air quality, noise, and recreation) related to project construction. Because these impacts are temporary and would be mitigated to below a level of significance, the proposed action would significantly contribute to regional cumulative impacts related to water quality, air quality, noise, or recreation.

Construction of the tide gate would permanently impact up to 204 square feet of tidally influenced habitat that would be mitigated at a ratio of 4:1 on Refuge land located upstream of the tide gate. The proposed mitigation would offset the direct and cumulative impacts of installing the tide gate. Therefore, this action would not contribute cumulatively to the loss of wetlands in San Diego Bay.

Overall, the proposed action would provide result in the restoration of over 220 acres of tidally influenced coastal wetlands, representing a positive cumulative effect for natural resources in San Diego Bay.

4.15 Irretrievable and Irreversible Commitment of Resources

Implementation of the proposed action and the action alternative would require the commitment of non-renewable resources, particularly petroleum products, in order to complete the required site grading, redistribute excavated material, and manufacture and installation of the new tide gate. All other aspects of the restoration project are reversible, although by doing so additional non-renewable resource would be required.

4.16 Short-Term Uses and Long Term-Productivity

Implementation of the proposed action would result in ending solar salt production within the western ponds in order to establish and maintain long-term ecological productivity within the tidally restored ponds and other restored areas that constitute the proposed action. By restoring these historic bay habitats, the project contributes to the long term productivity of the bay ecosystem and the native vegetation, fish, and wildlife protected within it.

4.17 Unavoidable Adverse Effects

The proposed action would not be expected to result in unavoidable adverse environmental effects. Where the potential for such effects has been identified, appropriate mitigation measures have been incorporated into the project scope to reduce the effects to below a level of significance. In addition, monitoring during and after construction as part of the proposed action would accommodate the implementation of adaptive measures should unforeseen problems arise.

CHAPTER 5 - AUTHORS

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