

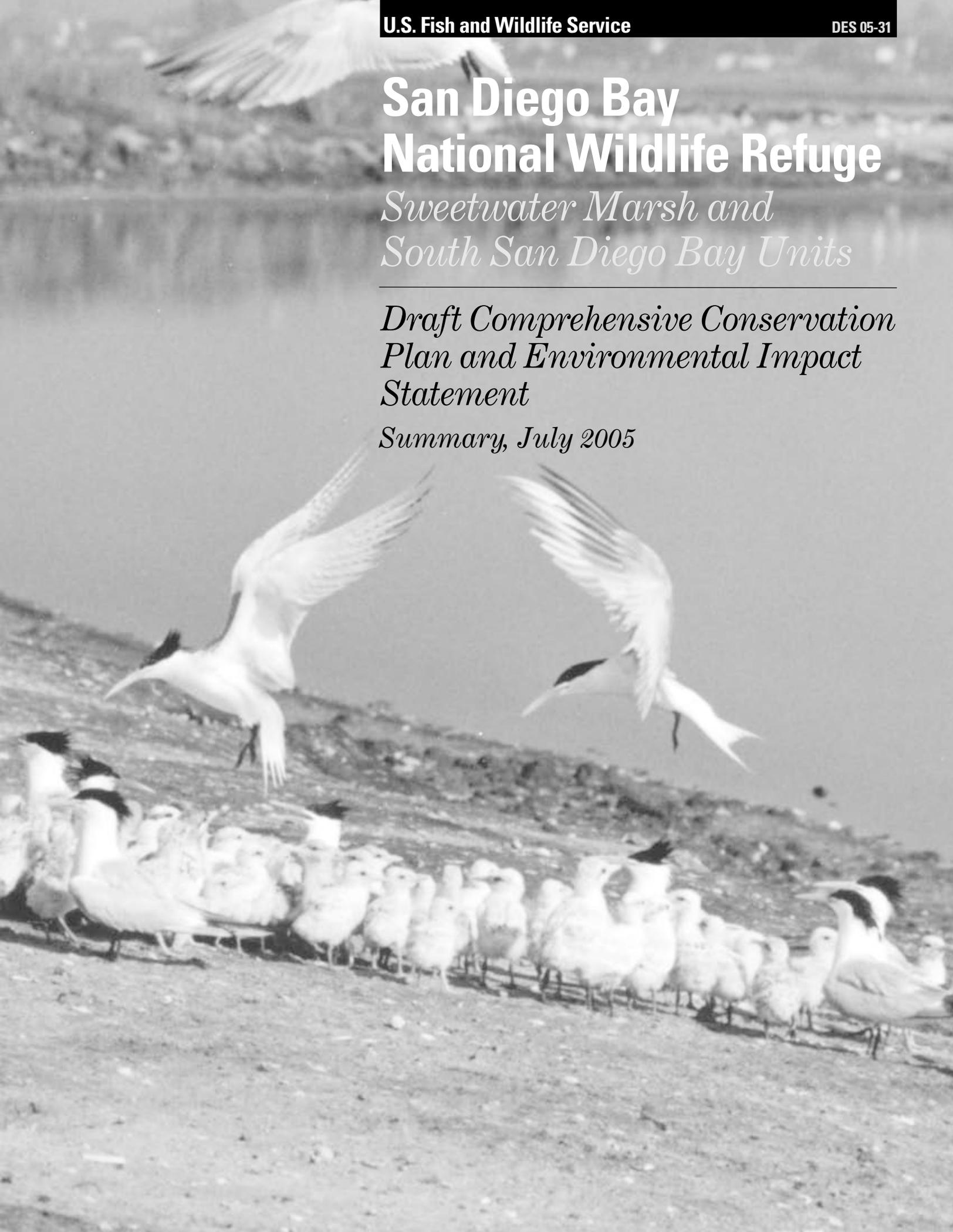
# San Diego Bay National Wildlife Refuge

*Sweetwater Marsh and  
South San Diego Bay Units*

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*Draft Comprehensive Conservation  
Plan and Environmental Impact  
Statement*

*Summary, July 2005*



Comprehensive Conservation Plans provide long-term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

# **San Diego Bay National Wildlife Refuge Sweetwater Marsh and South San Diego Bay Units**

*Draft Comprehensive Conservation Plan/  
Environmental Impact Statement  
Summary – July 2005*

## **Vision Statement**

The San Diego Bay National Wildlife Refuge functioning as an island of native habitat in a sea of urban development, protecting nesting, foraging, and resting sites for the diverse assembly of migratory birds. Shorebirds and wintering waterfowl stop here to feed and rest as they travel along the Pacific Flyway. Undisturbed expanses of cordgrass-dominated salt marsh support sustainable populations of light-footed clapper rails, while other enhanced and restored wetlands create new, high quality habitat for salt marsh bird's beak and other rare wetland plants. Quiet nesting areas, buffered from adjacent urbanization, ensure the reproductive success of western snowy plovers, California least terns, and an array of colonial nesting seabirds.

People with diverse interests from a range of age groups participate as stewards in innovative and informative environmental education and interpretation programs. They come to the Refuge to observe wildlife, appreciate the cultural history and past uses that occurred here, and gain a deep understanding that these wild places are more than land and water; they are treasures to be enjoyed by this generation and a legacy to be protected for future generations.

*U. S. Fish and Wildlife Service  
California/Nevada Refuge Planning Office  
2800 Cottage Way, Room W-1832  
Sacramento, CA 95825*

*July 2005*

# *Summary*

## **Introduction**

The San Diego Bay National Wildlife Refuge (Refuge), consisting of the Sweetwater Marsh and South San Diego Bay Units, is located about ten miles north of the United States and Mexico border in San Diego County, California. The Refuge is situated at the south end of San Diego Bay (Figure 1) and is surrounded by urban development within the Cities of National City, Chula Vista, San Diego, Imperial Beach, and Coronado. Established to protect endangered and threatened species, the Refuge encompasses approximately 2,620 acres of land and water in and around San Diego Bay (Figure 2).

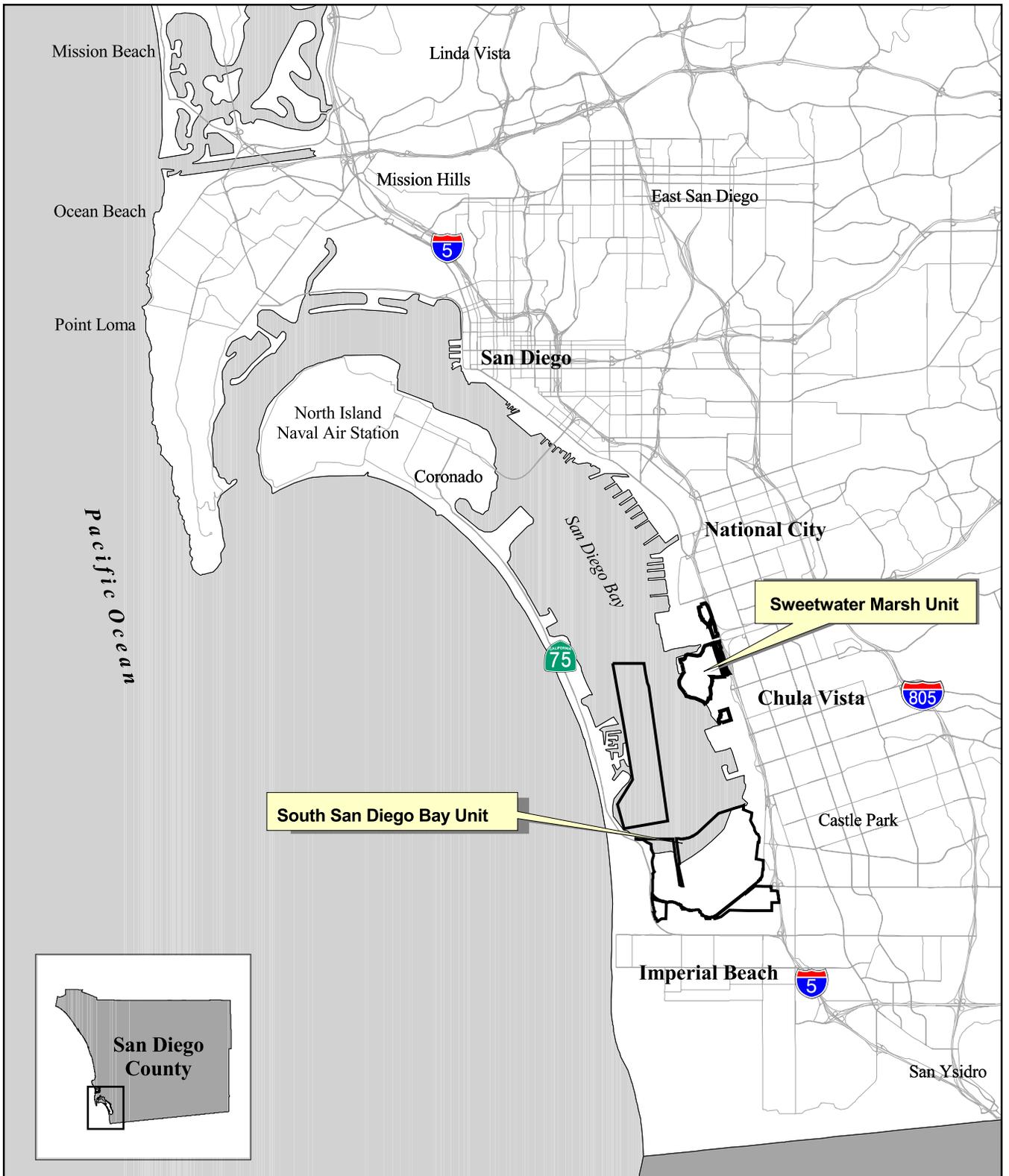
The 316-acre Sweetwater Marsh Unit (Figure 3) is located along the eastern edge of San Diego Bay and supports tidally influenced salt marsh habitat, disturbed upland habitat, and the D Street Fill, an old dredge disposal site that provides nesting habitat for terns and western snowy plovers. The South San Diego Bay Unit currently includes approximately 2,300 acres (Figure 4), most of which are leased to the U.S. Fish and Wildlife Service (Service) by the California State Lands Commission. This Refuge Unit includes portions of the open bay, active solar salt evaporation ponds (salt ponds), and the western end of the Otay River drainage basin (referred to as the Otay River floodplain).

Most of what remains of San Diego Bay's historical coastal salt marsh and intertidal mudflat habitat is preserved within these two Refuge Units. As a result, these Units support several federally listed species and tens of thousands of migratory birds.

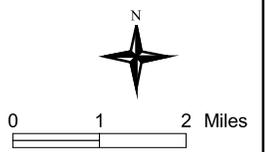
## **Comprehensive Conservation Plan Process**

A Comprehensive Conservation Plan (CCP) is prepared pursuant to the National Wildlife Refuge System Administration Act of 1966 (NWRS Administration Act), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) (Public Law 105-57) and an Environmental Impact Statement (EIS) is prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA). The Improvement Act and Part 602 (National Wildlife Refuge System Planning) of the Fish and Wildlife Service Manual provide the directives and guidance for preparing CCPs and recommends that the Draft CCP and Draft EIS be incorporated into one document. This approach, which provides for the direct integration of the provisions of NEPA into the CCP process, complies with the requirement that Federal agencies integrate the NEPA process with other planning at the earliest possible time. Once the Draft CCP/EIS completes its public review, a stand-alone Final CCP and Final EIS will be produced.

In addition to providing a clear and comprehensive statement of the desired future conditions for the Refuge, the CCP process is also intended to ensure public involvement in refuge management decisions. This process includes an extensive public involvement component that encourages public input throughout the process from initial scoping and public review of the Draft CCP to participation in refuge management decisions following formal adoption of the plan.

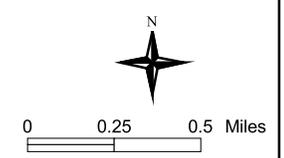


**Figure 1**  
**Location of the San Diego Bay National Wildlife Refuge**





**Figure 2**  
**San Diego Bay NWR Comprehensive Conservation Plan**  
**Project Study Area (Area of Potential Effects)**

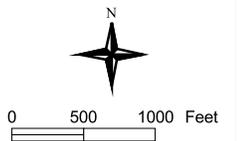


Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)



**Figure 3**  
**Aerial View of the Sweetwater Marsh Unit**

 Refuge boundary



Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

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**Figure 4**  
**South San Diego Bay Unit Current Refuge Boundary**

 South San Diego Bay Unit Existing Management Authority



0 0.25 0.5 Miles

Source: USFWS, Local Agency Partnership (2 ft imagery)

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## Public Review and Comment

The Draft CCP/EIS, which identifies and evaluates alternative approaches for managing the two Refuge Units, is available for review and comment on compact disk or in hard copy by writing to: Victoria Touchstone, Refuge Planner, San Diego National Wildlife Refuge (NWR) Complex, 6010 Hidden Valley Road, Carlsbad, CA 92011. Other contact methods include: 760-431-9440 ex. 349 (telephone); Victoria\_Touchstone@fws.gov (email); or 760-930-0256 (facsimile). The Draft CCP/EIS can also be accessed or downloaded at the following website: <http://www.fws.gov/pacific/sandiegorefuges/new/ccp/ccp.htm>.

The Draft CCP/EIS can also be reviewed at the following locations: San Diego NWR Complex (6010 Hidden Valley Road, Carlsbad); Tijuana Estuary Visitor Center (301 Caspian Way, Imperial Beach); Chula Vista Public Library, Civic Center Branch (365 F Street) and South Chula Vista Branch (389 Orange Avenue); Coronado Public Library (640 Orange Avenue, Coronado); Imperial Beach Library (810 Imperial Beach Boulevard, Imperial Beach); National City Library (200 East 12th Street, National City); and City of San Diego, Central Library (820 E Street), Logan Heights Branch Library (811 South 28th Street), Otay Mesa Branch Library (3003 Coronado Avenue), and Paradise Hills Branch Library (5922 Rancho Hills Drive, San Diego).

Written comments must be provided on or before Monday, **September 19, 2005**. Comments should be addressed to: Victoria Touchstone, Refuge Planner, San Diego National Wildlife Refuge Complex, 6010 Hidden Valley Road, Carlsbad, CA 92011. Comments may also be submitted via electronic mail to Victoria\_Touchstone@fws.gov or via fax to (760) 930-0256. Please type "San Diego Bay CCP" in the subject line.

## Purpose and Need

The purpose of developing the Comprehensive Conservation Plan (CCP) for the Refuge is to provide managers with a 15-year strategy for achieving refuge purposes and contributing toward the mission of the National Wildlife Refuge System (Refuge System), consistent with the sound principals of fish and wildlife conservation and legal mandates. The CCP is flexible; it will be revised periodically to ensure that its goals, objectives, strategies, and timetables are still valid and appropriate.

This CCP will also satisfy a condition of the Public Agency Lease between the California State Lands Commission and the Service requiring the Service to provide the State Lands Commission with a plan for managing the leased tidelands included within the boundary of the South San Diego Bay Unit. The lease condition requires that the plan "detail the Lessee's management and development plans for the Refuge," as well as "include a public access component."

Finally, the CCP is required to fulfill the Service's obligation to prepare "a holistic habitat restoration plan" for a 1,035-acre portion of the existing salt works property, as described in a Cooperative Agreement between the Service and the Unified Port of San Diego (Port), dated October 1998 and amended in March 1999.

Proposals for habitat enhancement and restoration are incorporated into several of the management alternatives presented in the Draft CCP/EIS. These proposals would implement the Service's policy for ensuring that the biological integrity, diversity and environmental health of the Refuge is maintained and, where appropriate, restored and would provide the guidance necessary to ensure that sensitive coastal habitats receive the highest priority for protection and maintenance on the Refuge. A guiding principal in developing the CCP was to identify opportunities for reversing the trend of historical wetland loss in San Diego Bay.

## Required Permits and Approvals

Depending upon the alternatives that are ultimately selected as the proposed project, the following permits and/or approvals may be required to implement the Final CCP's objectives and strategies:

- **California Coastal Commission** – Concurrence with the Service's Consistency Determination for the CCP.
- **U.S. Army Corps of Engineers** – Clean Water Act 404 Permit and Rivers and Harbors Act Section 10 Permit for wetland restoration projects.
- **Regional Water Quality Control Board** – 401 Certification for wetland restoration projects and possibly a discharge permit for breaching the salt pond levees.
- **San Diego County Air Pollution Control Board** – Compliance with Rule 1501 of the Air Pollution Control District's Rules and Regulations.
- **Caltrans, District 11** – Encroachment Permit, which would be required if any activities would occur within the right-of-way of Interstate 5.
- **City of San Diego** – Encroachment Permit and/or other approvals, which would be required if restoration is proposed on properties owned by the City of San Diego.
- **Section 7 Consultation** – Internal consultation under the authorities of the Endangered Species Act (ESA) would occur prior to the implementation of any action proposed in the CCP that may affect listed species.

## The National Wildlife Refuge System

The Refuge System is the largest collection of lands and waters specifically managed for fish and wildlife conservation in the nation. Unlike other Federal lands that are managed under a multiple-use mandate (e.g., lands administered by the U.S. Bureau of Land Management and the U.S. Forest Service), the Refuge System is managed for the benefit of fish, wildlife, plant resources, and their habitats.

Operated and managed by the Service, the Refuge System comprises more than 540 national wildlife refuges with a combined area of more than 95 million acres. The majority of refuge lands (approximately 77 million acres) are in Alaska. The remaining acres are spread across the other 49 states and several island territories.

The mission of the Refuge System is *"To administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans"* (16 USC 668dd et seq.).

## Vision Statement for the Refuge

Our vision for the San Diego Bay National Wildlife Refuge is that of an island of native habitat in a sea of urban development, protecting nesting, foraging, and resting sites for the diverse assembly of migratory birds. Shorebirds and wintering waterfowl stop here to feed and rest as they travel along the Pacific Flyway. Undisturbed expanses of cordgrass-dominated salt marsh support sustainable populations of light-footed clapper rails, while other enhanced and restored wetlands create new, high quality habitat for salt marsh bird's beak and other rare wetland plants. Quiet nesting areas, buffered from adjacent urbanization, ensure the reproductive success of western snowy plovers, California least terns, and an array of colonial nesting seabirds.

People with diverse interests from a range of age groups participate as stewards in innovative and informative environmental education and interpretation programs. They come to the Refuge to

observe wildlife, appreciate the cultural history and past uses that occurred here, and gain a deep understanding that these wild places are more than land and water; they are treasures to be enjoyed by this generation and a legacy to be protected for future generations.

## **Refuge Goals**

Goals and objectives established for a Refuge are the unifying element of Refuge management, intended to identify and focus management priorities and to provide a link between management actions, Refuge purposes, and NWRS mission and goals.

### **Sweetwater Marsh Unit**

The following goals provide guiding principles for the Sweetwater Marsh Unit:

- Goal 1: Protect, manage, enhance, and restore coastal wetland and upland habitats to benefit native fish, wildlife, and plant species within the Sweetwater Marsh Unit.
- Goal 2: Support recovery and protection efforts for the federally and state listed threatened and endangered species and species of concern that occur within the Sweetwater Marsh Unit.
- Goal 3: Protect and restore the environmental health of the Refuge's coastal salt marsh and upland habitats by making contaminants remediation a priority for Refuge lands, adjacent properties, and upstream developments.
- Goal 4: Provide outstanding environmental education programs for all ages in partnership with the Chula Vista Nature Center and other public agencies and non-governmental organizations.
- Goal 5: Provide quality wildlife-dependent recreation, interpretation, and outreach opportunities to enhance public appreciation, understanding, and enjoyment of the Refuge's biological and cultural resources.

### **South San Diego Bay Unit**

The following goals provide guiding principles for the South San Diego Bay Unit:

- Goal 1: Protect, manage, enhance, and restore open water, coastal wetlands, and native upland habitat to benefit the native fish, wildlife, and plant species supported within the South San Diego Bay Unit.
- Goal 2: Support recovery and protection efforts for the federally and state listed threatened and endangered species and species of concern that occur within the South San Diego Bay Unit.
- Goal 3: Provide high quality foraging, resting, and breeding habitat for colonial nesting seabirds, migratory shorebirds and waterfowl, and salt marsh-dependent species.
- Goal 4: Provide opportunities for compatible wildlife-dependent recreation and interpretation that foster public appreciation of the unique natural and cultural heritage of South San Diego Bay.

## Background

The Sweetwater Marsh Unit was established as a National Wildlife Refuge in 1988 following the United States District Court (Southern District of California) approval of a stipulated settlement agreement among the U.S. Army Corps of Engineers, Federal Highway Administration, Sierra Club, League of Coastal Protection, Caltrans, County of San Diego, and the private landowner, Santa Fe Land Improvement Company. The lands included within the Refuge were acquired to protect the federally listed endangered light-footed clapper, salt marsh bird's beak, and California least tern. From 1988 to 2004, the Refuge was referred to as the Sweetwater Marsh National Wildlife Refuge. In 2004, this Refuge was incorporated into the San Diego Bay NWR. The refuge lands around Sweetwater Marsh are now referred to as the Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge.

The South San Diego Bay Unit was established in 1999 as a Unit of the San Diego National Wildlife Refuge following the execution of a lease from the California State Lands Commission to the Service for 2,209 acres of State Tidelands. An additional 91 acres of land in the Otay River floodplain was acquired by the Service for inclusion in this Refuge Unit in January 2000.

On July 13, 2004, the acreage in the South San Diego Bay Unit was added to the Sweetwater Marsh National Wildlife Refuge and both areas were renamed the "San Diego Bay National Wildlife Refuge." This change was made to streamline management and facilitate public understanding and recognition of the two Refuge areas.

The purposes of the San Diego Bay National Wildlife Refuge include:

"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ..." 16 U.S.C. § 1534 (Endangered Species Act of 1973);

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. § 742f(a)(4);

"... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956); and

"... shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements ... and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon, ..." 16 U.S.C. § 664 (Fish and Wildlife Coordination Act).

## Issues

Planning issues were identified through discussions with planning team members and workshop participants, and through the public scoping process. From these discussions and input provided during scoping, key issues were identified for both the Sweetwater Marsh Unit and the South San Diego Bay Unit. The following issues, as well as a variety of other issues related to wildlife and habitat management and public use, were considered during the development of management alternatives for each Refuge Unit.

### **Sweetwater Marsh Unit**

- Consider expanding the Refuge boundary to include the intertidal mudflats that occur immediately to the west of the Sweetwater Marsh Unit.
- Improved tidal circulation in the marsh.
- Identify and remediate contaminants known or suspected to occur on the Refuge Unit.
- Determine the appropriate balance of intertidal habitat and nesting area on the D Street Fill.
- Manage invasive species to protect the biological value of the Refuge's important coastal resources.
- Describe predator management strategies that will improve the reproductive success of the Unit's endangered and threatened avian species.
- Develop management actions that will better address existing and future impacts to Refuge resources for adjacent development.

### **South San Diego Bay Unit**

- Develop a strategy for pursuing management authority for all of the areas within the approved acquisition boundary for the South San Diego Bay Unit.
- Evaluate the potential for and appropriateness of restoring the salt ponds.
- In developing restoration proposals for the Otay River floodplain, evaluate the existing flood hazards in the Otay River floodplain and determine how habitat restoration could affect existing upstream and downstream flood flow characteristics.
- Consider the conflicts between gull-billed terns and listed species and identify management actions that could assist in the recovery and conservation of California least terns, western snowy plovers, and gull-billed terns.
- Expand wildlife-dependent recreation uses that would satisfy the needs of the surrounding community, while conserving the Refuge's trust resources.
- Evaluate the potential for implementing a waterfowl hunting program within this Unit.

### **Refuge Setting**

The Sweetwater Marsh and South San Diego Bay Units encompass approximately 2,620 acres of land and water located in the southern portion of San Diego Bay. Refuge habitats offer resting and foraging areas for a diverse assemblage of birds, fish, and marine and terrestrial invertebrates, and a smaller array of amphibians, reptiles, and mammals.

Approximately 2,100 acres of open water within San Diego Bay are included within the acquisition boundary of the South San Diego Bay Unit, of which approximately 1,500 acres are currently managed as part of the Refuge System. San Diego Bay is a natural, nearly enclosed embayment with a water surface area of approximately 17 square miles at mean lower low water (MLLW) and a total length of approximately 15 miles. The natural characteristics of the bay have been significantly altered over the years as portions of the bay were dredge to facilitate commercial and military ship operations, and the adjacent wetlands were filled to accommodate urban development. Today, deep subtidal habitat accounts for 28 percent (4,443 acres) of the total acreage in the bay, an increase of 16 percent from 1859, while 41 percent of the historic shallow subtidal habitat within the bay has been lost.

In the vicinity of what is today the Sweetwater Marsh Unit, human activity has resulted in significant disturbance to coastal wetlands and surrounding native upland habitat. Historically, a network of tidal channels connected the marshes of the Sweetwater wetlands complex to San Diego Bay, and Paradise Creek and the Sweetwater River provided freshwater flows into the marsh in

the winter months. Over the decades, the marsh complex's tidal network has been extensively altered as a result of filling and dredging. In addition, the construction of two dams on the Sweetwater River and a flood control channel at the western end of the river have resulted in a dramatic reduction in the volume of freshwater flows entering the marsh complex.

Although spared the impact of extensive dredging, the south end of the bay has nevertheless experienced significant habitat loss. These losses began in the 1870s with the construction of the La Punta Salt Works, a small-scale solar salt evaporation facility. Between 1900 and 1916, the area utilized for solar salt production was expanded to include most of the south end of the bay. The salt marsh and intertidal mudflat habitats that had historically occupied this area were eliminated by the formation of the diked evaporation ponds.

The native upland and wetland habitat of the Otay River floodplain was all but eliminated during the twentieth century as a result of industrial, agricultural, and municipal activities. Maps dating back to 1916 depict the Otay River in its present channelized configuration. A narrow corridor of salt marsh, freshwater marsh, and native riparian habitat are supported within the river channel, and remnant maritime succulent scrub habitat can still be found in the vicinity of the railroad right-of-way that extends between the salt ponds and the Otay River channel.

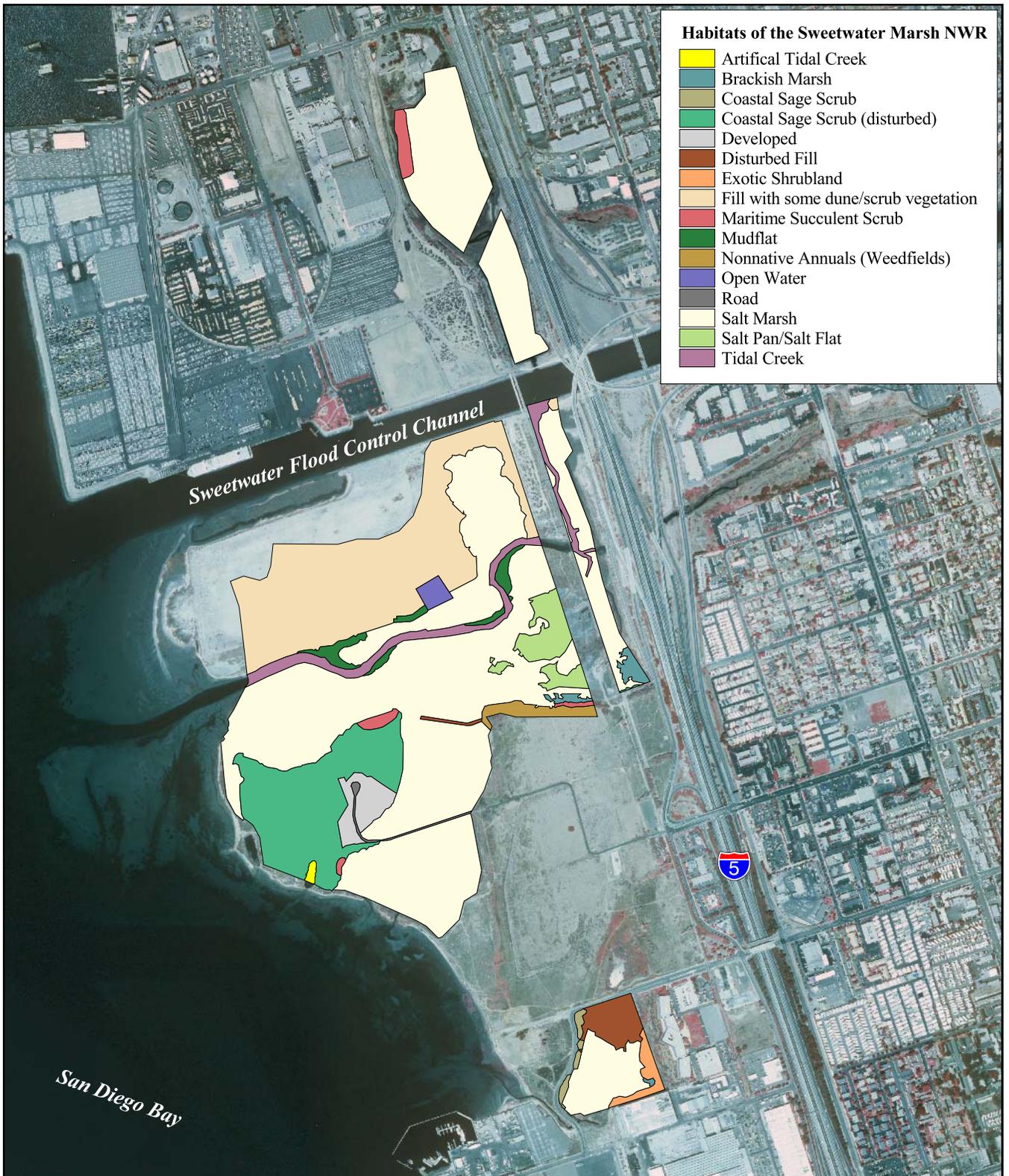
Despite the effects of human disturbance, there remain important coastal wetland habitats within these Refuge Units, as well as numerous opportunities for restoring those habitats lost to development over the years. The native coastal wetlands protected within the Sweetwater Marsh and South San Diego Bay Units represent two of the 23 coastal wetland systems remaining in San Diego County. More importantly, much of what remains of San Diego Bay's historical shallow subtidal, intertidal mudflat, and salt marsh habitats are preserved within this Refuge. As such, the Refuge protects habitats essential to the migratory birds of the Pacific Flyway. In recognition of the importance of the habitats protected within this Refuge and the specific species these habitats support, this area has been designated as a Western Hemisphere Shorebird Reserve Network Site and each Refuge Unit is also recognized as a Globally Important Bird Area.

### **Habitats, Fish, and Wildlife Sweetwater Marsh Unit**

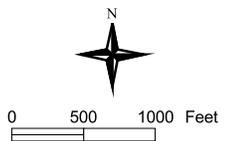
The habitats supported on this Refuge Unit are illustrated in Figure 5 and the estimated acreage of each habitat type is presented in Table 1.

The most significant habitat present on this Refuge Unit is coastal salt marsh. This habitat supports an array of invertebrates and juvenile fish, and provides nesting, foraging, and high-water refuge for many species of birds. Some notable species include the federally listed endangered light-footed clapper rail and the State endangered Belding's savannah sparrow. The clapper rail depends almost entirely on salt marsh habitat, and in particular dense patches of cordgrass, for feeding,

<b>Habitat Type</b>	<b>Approximate Acres</b>
Artificial Tidal Creek	0.5
Brackish Marsh	1.5
Coastal Sage Scrub	1.0
Coastal Sage Scrub (disturbed)	31.5
Developed/Fill	11.5
Exotic Shrubland	2.0
Fill w/ dune and scrub vegetation	56.5
Maritime Succulent Scrub	3.5
Mudflat	3.5
Nonnative Annuals	3.0
Open Water	1.5
Salt Marsh	184.0
Salt Pan/Salt Flat	7.0
Tidal Creek	9.0



**Figure 5**  
**Habitats of Sweetwater Marsh Unit**



Source: James Thiede, Local Agency Partnership 2000 (2 ft imagery)

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resting, and nesting. Belding's savannah sparrows are found throughout the coastal salt marsh areas of the Refuge Unit and forage within salt marsh and intertidal mudflat habitat. The federal endangered plant, salt marsh bird's beak, also occurs within this habitat.

The intertidal mudflat and coastal salt marsh habitats of the Sweetwater Marsh Unit are also important wintering areas for many species of shorebirds, such as long-billed curlews, whimbrels, and red knots. Other significant habitats, which occupy a much smaller portion of the Refuge Unit, include wetland/upland transition areas and maritime succulent scrub habitat, both of which support several sensitive plant species. The D Street Fill, a tideland area that was filled with dredge spoils in the 1960s, provides nesting habitat for the federally listed endangered California least tern and the threatened western snowy plover.

### South San Diego Bay Unit

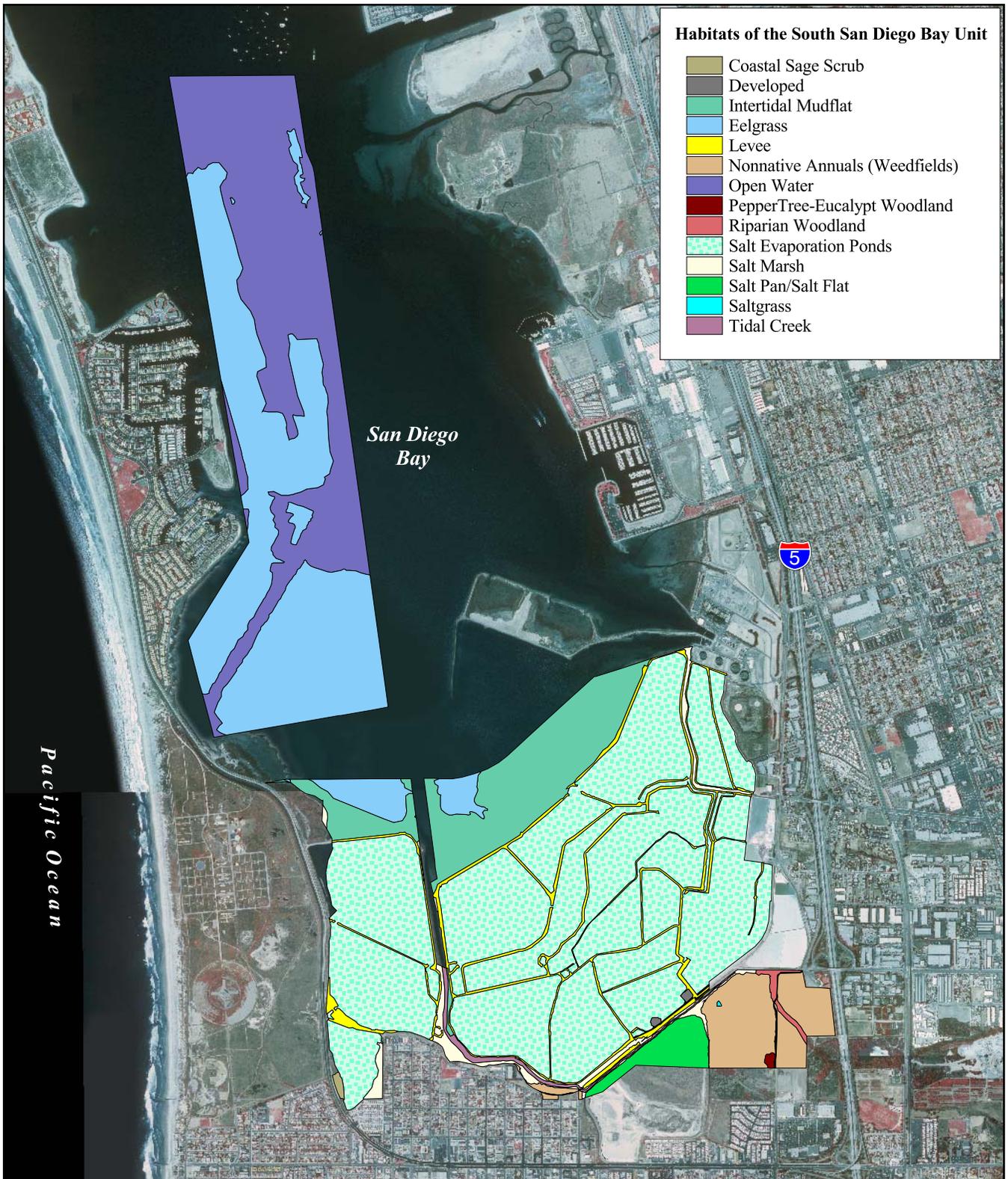
The predominant native habitats within the South San Diego Bay Unit include shallow subtidal habitat and intertidal mudflats. In San Diego Bay, shallow subtidal habitat supports an abundance of fish, and bird abundance and diversity is higher in this habitat than in any other subtidal habitats in the bay. The location of this and the other habitats supported on this Refuge Unit are illustrated in Figure 6 and the estimated acreage of each habitat type is presented in Table 2.

Within the boundaries of the South San Diego Bay Unit, there are areas of vegetated and unvegetated shallow subtidal habitat. Eelgrass beds, which make up much of the vegetated areas within this habitat, also occur within the Refuge boundary (Figure 7). Eelgrass beds provide highly productive microhabitats for a wide variety of invertebrates and small fish.

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 fish-eating birds, or be consumed directly by birds, such as black brant, gadwall, and northern pintail. The bay's small population of Pacific green sea turtles also relies on eelgrass as an important food source. The density and biomass of the South 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.

The South Bay's shallow subtidal habitat also supports a group of twelve species of fish that are indigenous to the bays and estuaries of the Southern California Bight. The extensive shallow water habitat and eelgrass beds of the South Bay provide important habitat for these and a variety of other fish, including midwater, schooling fishes, such as northern anchovies, slough anchovies, and topsmelt. These species, in turn, represent a major forage resource for predatory fish and avian species. The warmer, hypersaline waters of the South Bay also offer shelter for a number of fish species commonly encountered further south in the Eastern Subtropical and Tropical Pacific. The south

Habitat Type	Approximate Acres
Coastal Sage Scrub	2.0
Developed	2.0
Eel Grass	440.0
Intertidal Mudflat	220.0
Levee	85.0
Nonnative Annuals	98.0
Open Water	410.0
Eucalyptus Woodland	1.0
Riparian Woodland	5.0
Road	2.0
Salt Ponds	964.0
Salt Marsh	30.0
Salt Pan/Salt Flat	30.0
Tidal Creek	11.0

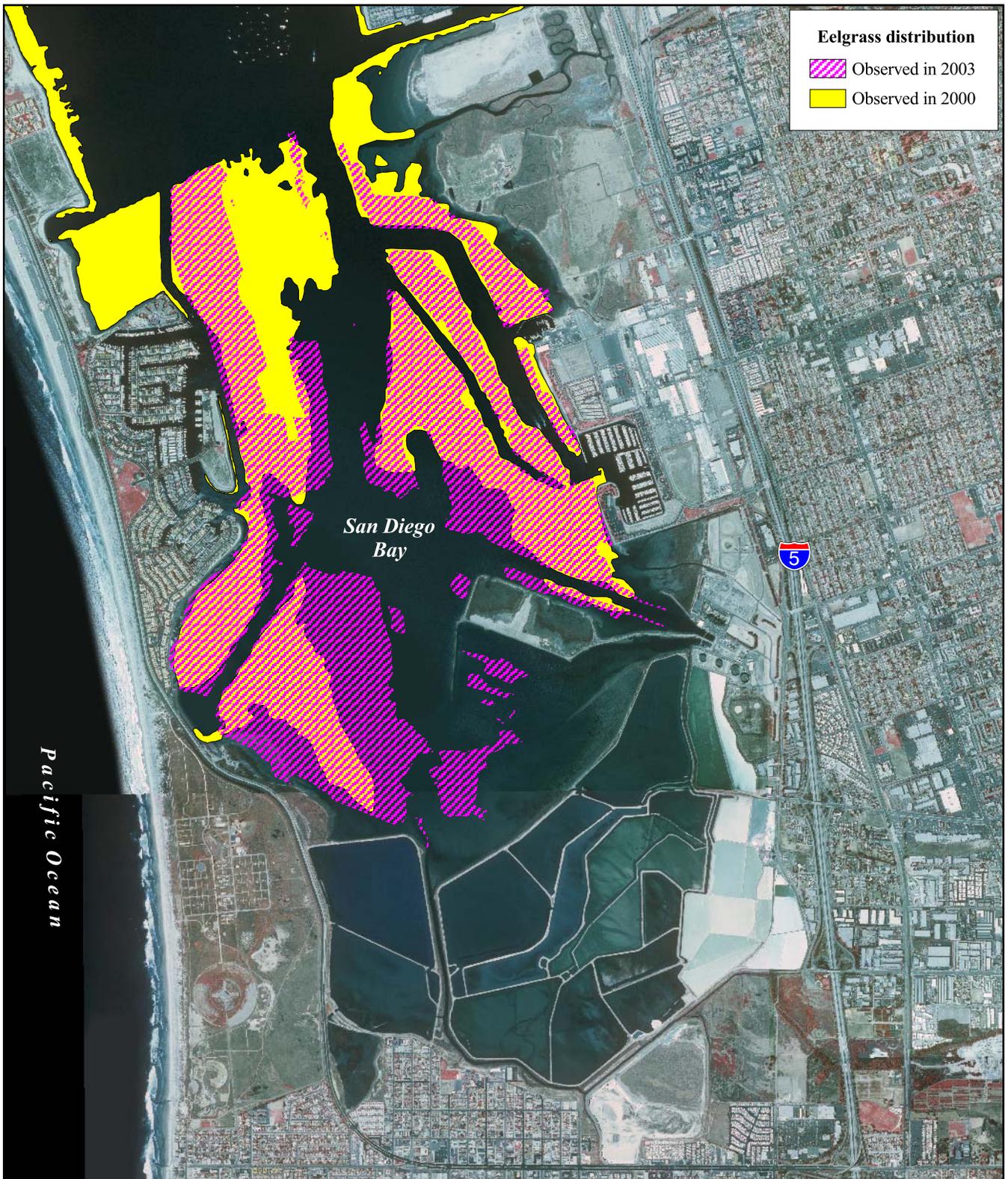


**Figure 6**  
**Existing Habitats of the South San Diego Bay Unit**



0 1000 2000 Feet

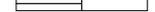




**Figure 7**  
**Eelgrass Distribution in South San Diego Bay**



0 1000 2000 Feet



Source: Merkel & Associates, Inc., San Diego Port Authority,  
 Local Agency Partnership 2000 (2 ft imagery)

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end of San Diego Bay also appears to function as an important nursery area for juvenile California halibut and young spotted and barred sand bass.

Intertidal mudflats provide foraging habitat for fish during high tide, while at low tide, great numbers of shorebirds assemble to forage on the many invertebrates available on the exposed flats. In addition to foraging, shorebirds also depend upon the mudflats for roosting and resting. The most extensive mudflats within the South Bay are those that lie to the north of the salt ponds within the Refuge Unit. The Service observed tens of thousands of birds, representing 67 species, in this area during a year-long survey conducted in 1993 and 1994. The majority of the birds observed were shorebirds and seabirds.

Smaller areas of coastal salt marsh occur in the few natural drainages that flow through the Refuge Unit, as well as along the bayside of the outer levees of the salt ponds. This habitat provides the Belding's savannah sparrow with nesting and foraging opportunities. Within the lower reach of the Otay River, this habitat as well as some brackish and freshwater marsh areas, provide habitat for the endangered light-footed clapper, various shorebirds, and wintering and breeding waterfowl.

Although not considered a natural habitat, the salt evaporation ponds located within the South San Diego Bay Unit provide relatively isolated nesting and resting habitat for a wide range of avian species, as well as some unique foraging habitat for several species of birds. Solar salt production has occurred in this location for over 100 years. During this time, the salt ponds have been an important stopover point for large numbers of migratory and wintering birds. In addition, the salt pond levees provide regionally important nesting habitat for seven species of colonial seabirds.

Due to the hypersaline nature of the ponds, native wetland vegetation and bay invertebrates are essentially absent from the majority of the ponds. The only fish in the ponds are those that come in with the initial intake of tidal water. Once in the system, they can only survive in the lowest salinity primary ponds, cannot escape back into the bay, and do not reproduce. The ponds do however support several species of brine invertebrates that are preyed upon by a variety of birds, particularly eared grebes and phalaropes.

The Otay River floodplain is dominated by invasive weeds and smaller areas of non-native grasses. The primary native vegetation in this area is the wetland vegetation that occurs along the edges of the narrow Otay River channel.

### **Federally Listed Species and Other Species of Concern**

The Refuge provides habitat for seven federally listed endangered and threatened species: the endangered California least tern (*Sterna antillarum browni*), light-footed clapper rail (*Rallus longirostris levipes*), California brown pelican (*Pelecanus occidentalis californicus*), and salt marsh bird's beak (*Cordylanthus maritimus maritimus*) and the threatened western snowy plover (*Charadrius alexandrinus nivosus*), Pacific green sea turtle (*Chelonia mydas*), and California gnatcatcher (*Polioptila californica californica*). Of these species, the least tern, clapper rail, and snowy plover all nest on the Refuge.

Four of the federally listed endangered species supported by these Refuges, including salt marsh bird's beak, California least tern, light-footed clapper rail, and California brown pelican, are also listed as endangered by the State of California. The salt marsh habitat within these Refuges also supports the Belding's savannah sparrow, another species listed by the State as endangered.

The Refuge also supports 26 species identified by the Service as Birds of Conservation Concern. Of these species, the gull-billed tern, elegant tern, and black skimmer nest at the salt works.

### **Current Public Use**

The Refuge System considers wildlife first when deciding whether to allow a public use. Because of the sensitivity of the habitats, public access onto the Refuge is restricted to Gunpowder Point on the Sweetwater Marsh Unit and to the open waters of the Bay on the South San Diego Bay Unit. Occasional guided nature tours of the salt works are also conducted during the non-breeding season. Permitted uses on the Sweetwater Marsh Unit include wildlife observation and photography and environmental education and interpretation. The Chula Vista Nature Center, operated by the City of Chula Vista, also occupies a 3.3-acre lease site within the Sweetwater Marsh Unit. Public access onto the Refuge is only permitted via a shuttle bus operated by the Nature Center that picks up and drops off visitors near E Street and Interstate 5.

Uses permitted on the South San Diego Bay Unit include fishing and boating in the bay, wildlife observation, and environmental education. No fishing is permitted in the salt ponds and public access onto the salt works is restricted.

### **Management Alternatives**

An important step in the CCP process is the development and analysis of alternatives. Alternatives are developed to explore and analyze different ways to achieve Refuge purposes, contribute to the mission of the Refuge System, meet Refuge goals, and resolve issues identified during scoping and throughout the CCP process. The alternatives developed for each Refuge Unit are summarized below and the graphics depicting the various alternatives are provided in Appendix A (Figures A-1 through A-13).

Two elements common to all of the alternatives for the San Diego Bay National Wildlife Refuge are a proposed fire management plan and predator management plan.

#### **Sweetwater Marsh Unit**

**Alternative A, No Action (Figure A-1)** – The Sweetwater Marsh Unit currently operates without an official management plan. Under the no action alternative, the current management activities would be incorporated into the CCP to formally establish ongoing management direction for this Refuge Unit for the next 15 years. This alternative, which assumes no change to past and present management activities on the Refuge Unit, represents the baseline from which other “action” alternatives have been evaluated.

Under this alternative, wildlife and habitat management activities would continue to focus on the protection and recovery of the federally listed endangered and threatened species supported on this Unit. Such activities include invasive weed management within the upland transition areas, endangered species monitoring, and annual site preparation of the least tern and snowy plover nesting area on the D Street Fill. The latter activity is conducted in partnership with the Port, which manages nesting habitat on the D Street Fill located outside the Refuge boundary.

Predator management would continue to be implemented to reduce the loss of California least tern, western snowy plover, and light-footed clapper adults, chicks, and eggs to mammalian and avian predation. Predator management is addressed in a step-down draft predator management plan that accompanies the Draft CCP/EIS.

Implementation of the predator management plan is proposed pursuant to the Service's endangered species management responsibilities and would occur on the Refuge in conjunction with other wildlife and habitat management activities. Under the plan, predator management would be conducted as a comprehensive wildlife damage control program that addresses a range of management actions from vegetation control and nesting habitat enhancement to non-lethal and lethal control of both mammalian and avian predators. The most effective, selective, and humane techniques available to deter or remove individual predators or species that threaten nesting, breeding, or foraging California least terns, western snowy plovers, or light-footed clapper rails would be implemented.

The San Diego National Wildlife Refuge Complex (Complex), consistent with the requirements of the National Fire Plan, has developed a fire management plan for all of the Refuges within the Complex. This plan outlines the fire management objectives for the Complex, describes the Complex's wildland fire management situation, and presents the Complex's fire management strategies. With respect to the San Diego Bay National Wildlife Refuge, the plan focuses on preparedness, wildland fire operations, prevention, and detection. Prescribed and wildlife fire use are not proposed as a strategy for achieving land management objectives on this Refuge.

**Alternative B, Implement Habitat Enhancement (Figure A-2)** – Under this alternative, management activities would focus on enhancing the Refuge's coastal salt marsh habitat for the benefit of a variety of species, particularly the endangered light-footed clapper rail and salt marsh bird's beak. In addition to the activities described under Alternative A, this alternative also includes proposals to enhance tidal circulation and improve marsh management.

Historic tidal channels in Sweetwater Marsh (channels that were blocked when fill was placed in the marsh to provide access to Gunpowder Point) would be reconnected to increase tidal circulation over approximately 60 to 80 acres of the main marsh complex. In addition, the feasibility of lowering or removing an existing weir at the south end of Paradise Marsh to improve tidal circulation within that portion of the Refuge Unit would also be explored.

Opportunities for wildlife observation and environmental education would remain unchanged; however, new opportunities for environmental interpretation are proposed, particularly for Paradise Marsh and the F&G Street Marsh. This alternative also proposes to expand current cultural resource management activities.

**Alternative C (the preferred alternative), Implement Habitat Enhancement and Restoration and Improve Existing Public Uses (Figure A-3)** – Under Alternative C, various restoration projects are proposed that would increase the total acreage and habitat quality of the Unit's salt marsh habitat in Sweetwater Marsh and the F&G Street Marsh, and restore native upland habitat on Gunpowder Point. These proposals would be implemented in addition to the enhancement proposals described in Alternative B. The anticipated acreages of restored habitat under this alternative are provided in Table 3.

Under Alternative C, the existing opportunities for wildlife-dependent recreational uses on the Sweetwater Marsh Unit would be improved and in some cases expanded. No new public uses are proposed. Uses that would be provided under this alternative include wildlife observation, photography, environmental education, and interpretation.

Table 3 Habitats Restoration Proposals Under Alternative C for the Sweetwater Marsh Unit		
Location	Proposed Habitat Type	Estimated Acres to be Restored
Sweetwater Marsh	Possible conversion of high marsh to low marsh habitat	To be determined
D Street Fill	Restore intertidal wetlands	13.0 acres
	Preserve nesting habitat	33.0 acres
Gunpowder Point	Native uplands (coastal sage scrub/maritime succulent scrub)	25.0 acres
	Intertidal wetlands	2.0 acres
F&G Street Marsh	Intertidal wetlands (salt marsh)	6.0 acres

The existing half-mile trail system on Gunpowder Point would be redesigned to improve the quality of the trail experience, improve overall accessibility, and reduce potential impacts to adjacent sensitive habitats. Where possible, the trail would be designed to loop around an area, rather than bring a visitor out to the edge of a habitat and then terminate. The proposed realignments could involve the closure of some trail segments and/or the creation of one or more new segments. Although the redesigned trail system would be created primarily to facilitate environmental education and interpretive programs, it would also improve opportunities for wildlife observation and photography. In addition, the interpretive elements on Gunpowder Point would be designed to complement existing environmental education and interpretation programs.

#### Description of the Goals, Objectives and Strategies for Sweetwater Marsh Unit

Although the goals are the same for each of the three alternatives described for the Sweetwater Marsh Unit there are a variety of ways in which to achieve these goals. Therefore, the objectives and strategies for each goal vary among alternatives. The objective statements and associated strategies for each Refuge goal are presented in Chapter 2 of the Draft CCP/EIS. The objectives have been written to address the preferred alternative (Alternative C), however, the various strategies that would implement the objective in whole or in part are also presented and the specific alternative that would implement a particular strategy is identified. Specific acreage figures, time frames, and other measurable elements presented for each objective may change depending upon which alternative is finally selected for implementation.

#### **South San Diego Bay Unit**

**Alternative A, No Action (Figure A-4)** – At present, this Refuge Unit operates without a comprehensive management plan; therefore, under this alternative, the management practices identified as necessary when the Unit was established would continue to be implemented. No changes to present management would occur and the current management activities would be incorporated into the CCP to formally establish management direction for the next 15 years.

Current management activities include enhancement of nesting and foraging opportunities for the California least tern, using funds provided by the Port in accordance with the agreement that resulted in the establishment of the Refuge Unit; endangered species monitoring; predator

management; invasive plant species control, and law enforcement to address unauthorized activities on Refuge lands, including trespass, transient encampments, and illegal dumping.

The current opportunities of public use, involving fishing, wildlife observation, environmental education, and boating, would be retained, but no new uses would be initiated. In addition, commercial solar salt production would continue to operate under a Refuge Special Use Permit.

**Alternative B, Expand Habitat Management and Enhance Nesting Opportunities (Figure A-5)** – Under this alternative, habitat values for California least tern, western snowy plover, and colonial nesting seabirds would be improved by enhancing the nesting substrate on various salt pond levees, recontouring levee surfaces to improve access from nesting areas to the edge of the ponds, and expanding nesting habitat within the salt ponds. A minimum of 20 acres of new nesting area would be created within the primary ponds, requiring the importation of approximately 200,000 cubic yards of appropriate fill material and a minimum of 18,000 cubic yards of clean, light-colored sand. This alternative also proposes the creation of additional roosting habitat within the salt ponds for California brown pelicans and the initiation of a public outreach program to address the problems associated with improperly discarded fishing line and other debris in the bay.

Under this alternative, no change to the existing public use programs, as described in Alternative A, would occur and commercial solar salt production would continue at present levels.

**Alternative C, Expand Habitat Management, Enhance Nesting Opportunities, Implement Habitat Restoration, and Expand Existing Public Use Opportunities (Figure A-6)** – Under Alternative C, management activities would be increased to include several habitat restoration proposals. These proposals reflect the need to restore the variety of coastal habitats that have been lost to development in California, and particularly in San Diego Bay, over the past 140 years. Specific proposals include restoring some salt ponds to tidal influence and excavating portions of the Otay River floodplain to restore intertidal habitat, which historically occurred here. The restoration of intertidal habitat, particularly cordgrass-dominated salt marsh habitat, is intended to benefit the light-footed clapper rail and other avian species, while also expanding the area available to support a variety of fish and benthic invertebrate species.

This alternative also proposes to restore native upland and freshwater wetland habitats in the eastern portion of the Otay River floodplain. If implemented, this alternative would result in the restoration of up to 140 acres of intertidal salt marsh, freshwater wetland, and coastal sage scrub habitat within the Otay River floodplain. In addition, up to 410 acres of salt ponds would be restored to intertidal salt marsh habitat. The seabird nesting and pelican roosting enhancements described under Alternative B would also be implemented under this alternative.

This alternative includes two restoration options for the Otay River floodplain (Figures A-7 and A-8) and two restoration options for the salt ponds (Figures A-9 and A-10). These options were developed to allow the Service to fully evaluate the opportunities and constraints of restoring these areas, as well as to present a range of feasible alternatives for evaluation under NEPA. The acreage of each habitat to be restored under these options is presented in Tables 4 and 5. To achieve the desired habitat types within the restored salt ponds, the elevations in the bottom of the ponds would be adjusted by adding fill to raise the elevation on the bottom of the pond or by removing sediment to lower the elevation. The objective of recontouring the pond elevations is to achieve elevations known to support specific habitat types in San Diego Bay. For instance, to support cordgrass-dominated salt marsh habitat the elevations of the sediments in the ponds should range from between +3.5 feet and +4.5 feet MLLW. Achieving the desired elevation would require importing fill. If the material excavated from the Otay River floodplain is suitable for

Table 4 Habitat Acreages for the Otay River Floodplain Restoration Options Under Alternative C for the South San Diego Bay Unit						
Otay River Floodplain Restoration Options	Habitat Type (Acres)					
	Tidally Influenced Wetlands			Freshwater Wetlands		Restored Upland
	Intertidal Mudflat (50%) <sup>1</sup>	Cordgrass (30%)	Pickleweed (20%)	Marsh	Riparian	
Option 1 – Expanded River Channel	31	19	13	6 (30%) <sup>2</sup>	13 (70%) <sup>2</sup>	61
Option 2 – Expanded Tidal Wetlands	44	26	18	12 (70%) <sup>2</sup>	5 (30%) <sup>2</sup>	38

<sup>1</sup> Percent of total area to be restored to tidally influenced wetlands.

<sup>2</sup> Percent of total area to be restored to freshwater wetland.

placement in the ponds, this material would be used to achieve the desired elevations. The only changes to the current configuration of the pond levees as a result of restoration would be breaches in the levees to facilitate tidal exchange. Levees would be monitored and maintained to support seabird nesting and shorebird and other waterbird roosting.

Table 5 Habitat Acreages for the Salt Works Restoration Options Under Alternative C for the South San Diego Bay Unit							
Alt. C – Salt Works Restoration Options	Habitat Type (Acres)						
	Shallow Subtidal Habitat	Intertidal Mudflat	Salt Marsh (Cordgrass- dominated)	Salt Marsh (Pickleweed- dominated)	Potential Nesting Area		Active Salt Pond
					New	Enhanced Levees <sup>1</sup>	
Option 1 - Restored Western Ponds	13	11	163	10	18	variable	815
Option 2 - Restored Primary Ponds	32	95	297	16	18	variable	519

<sup>1</sup>The actual acreage of enhanced levees would be determined during final restoration planning.

The estimated volumes of cut and fill material associated with the grading necessary to restore habitat under one or more of the restoration options proposed for this Alternative are presented in Table 6. The fill volumes shown for the Otay River floodplain represent the maximum amount of fill that would be placed within the areas designated for upland restoration. The maximum depth of this fill on each area would be eight feet. The volumes presented in this table are estimates based on very preliminary grading plans and do not take into consideration existing soil characteristics. These cut and fill figures would be refined and the existing soils characterized as part of final restoration planning.

**Table 6**  
**Various Restoration Scenarios<sup>1</sup> Under Alternative C**  
**with Estimated Net Grading Requirements for Each Scenario**

Estimated Net Grading Volumes (cubic yards)	Otay Option 1	Otay Option 1 + Salt Works Option 1	Otay Option 1 + Salt Works Option 2	Otay Option 2	Otay Option 2 + Salt Works Option 1	Otay Option 2 + Salt Works Option 2	Salt Works Option 1	Salt Works Option 2
<b>Otay Floodplain – Cut</b>	723,000	723,000	723,000	970,000	970,000	970,000	0	0
Otay Floodplain – Fill	565,600	400,400	97,500	460,600	460,600	344,500	0	0
Salt Works – Cut	0	0	0	0	0	0	0	0
Salt Works – Fill	0	165,200	468,100	0	165,200	468,100	165,200	468,100
Nesting Enhancements - Fill	157,400	157,400	157,400	157,400	157,400	157,400	157,400	157,400
Imported Nesting Substrate	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000
Fill Material to be Imported	0	0	0	0	0	0	322,600	625,500
Fill Material to be Exported	0	0	0	352,000	186,800	0	0	0
Grading Balanced On Site <sup>2</sup>	Yes	Yes	Yes	No	No	Yes	No	No

<sup>1</sup> Each scenario includes the nesting enhancements described in Alternative B.

<sup>2</sup> Clean, light-colored sand would be imported to the site under any of these scenarios.

Sources: (Ducks Unlimited 2004) and (David Cannon, Everest International Consulting, per. comm. 12/03)

In addition to the uses currently occurring on this Refuge Unit, Alternative C proposes to include additional opportunities for fishing and wildlife observation by opening the northern levee of Pond 11 to public access. Fishing would be permitted from the bayside of the levee. The number of guided nature tours currently conducted within the salt works would increase; a boardwalk would be designed and constructed immediately to the north of the Bayshore Bikeway in the vicinity of Ponds 10 and 23; and a proposed alignment for the westernmost portion of the Otay Valley Regional Trail would be designated along the eastern edge of the Refuge Unit. Solar salt production would continue, but within a reduced footprint.

**Alternative D (the preferred alternative): Expand Habitat Management, Enhance Nesting Opportunities, Maximize Habitat Restoration, and Provide Additional Public Use Opportunities (Figure A-11)** – Alternative D proposes to enhance opportunities for seabird nesting, restore native habitat in the Otay River floodplain, and restore tidal circulation within the majority of the salt ponds. Those ponds that are not breached would be maintained in their current configuration and the water in the ponds would be managed to support a variety of migratory birds and wintering waterfowl. The implementation of this alternative, which would maximize the habitat potential of the salt ponds, would result in the restoration of approximately 650 acres of existing salt ponds to tidal influence, with much of the restoration targeted for cordgrass-dominated salt marsh habitat (Figure A-12). In those ponds to be restored, the only proposed changes to the levees are the openings required to facilitate tidal circulation. The majority of the levee system would be retained in its current configuration to accommodate seabird nesting and shorebird roosting. Approximately 33 acres of new seabird nesting habitat would also be created. A managed water area of approximately 275 acres would be maintained within those ponds that are too high to benefit from tidal circulation. Bay water would circulate through these ponds and the water levels in the ponds would be regulated to meet the seasonal needs of migratory birds, wintering waterfowl, and seabird and shorebird nesting. About 45 acres of this managed water system would be devoted to the production of brine invertebrates, a resource currently exploited by certain avian species, including phalaropes and eared grebes. The nesting and roosting enhancements described in Alternative B and the restoration options for the Otay River floodplain described in Alternative C would also be implemented under this alternative. The acreage of each habitat to be restored under this alternative is presented in Table 7.

Habitat Types (Acres)							
Shallow subtidal	Intertidal mudflat	Cordgrass-dominated salt marsh	Pickleweed-dominated salt marsh	Active salt ponds	Managed water area	Brine production area	New nesting habitat
44	124	447	32	0	229	44	36

Alternative D includes three implementation scenarios for this alternative, all of which would ultimately result in the elimination of solar salt production. The first scenario would involve restoring the salt works in a single action, while the preferred scenario, scenario 2, would involve a phased approach to restoration. The third scenario would involve breaching the ponds either in a single action or a phased approach without reconfiguring the pond elevations. The acreages of the habitat types that would be achieved under Scenario 3 are presented in Table 8 and illustrated in Figure A-13.

Table 8 Habitat Acreages Expected Within the Salt Ponds Under Phasing Scenario 3					
Habitat Types (in Acres)					
Shallow subtidal	Intertidal mudflat	Cordgrass-dominated salt marsh	Pickleweed-dominated salt marsh	Uplands (areas above MHHW)	New nesting habitat
45	370	70	235	200	36

The preliminary estimates of the volume of cut and fill material needed to implement the various restoration options proposed for this Alternative are presented in Table 9. The volumes are based on very preliminary grading plans and would be refined during final restoration planning.

The existing public uses on the South San Diego Bay Unit would be expanded to include opportunities for environmental interpretation at the south end of the bay along existing and proposed public access routes and around Pond 28 through the development of a 1.5-mile interpretive trail. Opportunities for wildlife observation and photography would be expanded to include increased numbers of guided tours within the salt pond complex, construction of the boardwalk described under Alternative C, and design and development of observation points and an observation platform around the southern and eastern perimeter of the Refuge Unit. Fishing and boating activities would continue, but the proposal to provide an opportunity for shoreline fishing, as described in Alternative C, would not be implemented under this alternative. Existing environmental education programs would continue.

Description of the Goals, Objectives and Strategies for South San Diego Bay Unit

Although the goals are the same for each of the four alternatives described for the South San Diego Bay Unit there are a variety of ways in which to achieve these goals. Therefore, the objectives and strategies for each goal vary among alternatives. The objective statements and associated strategies for each Refuge goal are presented in Chapter 2 of the Draft CCP/EIS. The objectives have been written to address the preferred alternative (Alternative D), however, the various strategies that would implement the objective in whole or in part are also presented and the specific alternative that would implement a particular strategy is identified. Specific acreage figures, time frames, and other measurable elements presented in the objectives may change depending upon which alternative is finally selected for implementation.

**Environmental Consequences**

The Service has conducted an analysis and evaluation of the environmental consequences of implementing the various alternatives described for each Refuge Unit. This impact evaluation has considered all aspects of the affected environment, including physical, biological, cultural, and socio-economic resources. A summary of potential effects from implementing the alternatives proposed for the Sweetwater Marsh and South San Diego Bay Units are presented in Tables 10 and 11, respectively.

**Table 9**  
**Various Restoration Scenarios<sup>1</sup> Under Alternative D**  
**with Estimated Net Grading Requirements for Each Scenario**

Estimated Net Grading Volumes (cubic yards)	Restored Salt Ponds (Modified)	Otay Option 1 + Restored Salt Ponds (Modified)	Otay Option 2 + Restored Salt Ponds (Modified)	Restored Salt Ponds (Breach Only)	Otay Option 1 + Restored Salt Ponds (Breach Only)	Otay Option 2 + Restored Salt Ponds (Breach Only)
<b>Otay Floodplain – Cut</b>	0	723,000	970,000	0	723,000	970,000
Otay Floodplain – Fill	0	723,000	460,600	0	549,700	460,600
Salt Works – Cut	165,700	165,700	165,700	0	0	0
Salt Works – Fill	0	0	0	0	0	0
Nesting Enhancements - Fill	173,300	173,300	173,300	173,300	173,300	173,300
Imported Nesting Substrate	127,400	127,400	127,400	127,400	127,400	127,400
Fill Material to be Imported	7,600	7,600	0	173,300	0	0
Fill Material to be Exported	0	0	501,800	0	0	336,100
Grading Balanced On Site <sup>2</sup>	N <sup>3</sup>	N <sup>3</sup>	N	N	Y	N

<sup>1</sup> Each scenario includes the nesting enhancements described in Alternative B, as well as the proposal to convert Pond 44 to a nesting site.

<sup>2</sup> Clean, light-colored sand would be imported to the site under any of these scenarios.

<sup>3</sup> As described previously, the grading estimates for modifying the pond elevations can be increased or decreased to achieve a balanced grading plan without compromising the desired habitat types, therefore, it is likely that the final restoration plan for this scenario would result in a grading plan that balances the cut and fill quantities on site.

Sources: (Ducks Unlimited 2004) and (David Cannon, Everest International Consulting, per. comm. 12/03)

<p align="center"><b>Table 10</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, or C for the Sweetwater Marsh Unit</b></p>			
Resource	Alternative A	Alternative B	Alternative C
<b>Physical Environment</b>			
Topography/Visual Quality	No change in existing conditions	No change in existing conditions	No adverse effects, but moderate benefits to visual quality would result from replacing weedy, nonnative vegetation on Gunpowder Point with native habitat.
Agricultural Resources	No change in existing conditions	No change in existing conditions	No adverse effects.
Hydrology	No change in existing conditions	Various impediments to tidal and freshwater circulation in the marsh would be removed representing a moderate benefit to overall habitat quality in the marsh.	Similar benefits to those described for Alternative B, with some additional benefits related to increases in the tidal prism as a result of intertidal restoration.
Water Quality	No change in existing conditions	Implementation of Best Management Practices would reduce the potential for adverse effects from grading to less than significant. Additional analysis of contaminants issues in Paradise Marsh would be required prior to implementing enhancements in this area.	Same as Alternative B and additional analysis of contaminants issues in the F& G Street Marsh would be required prior to implementing restoration in this area.
<b>Habitat</b>			
Coastal Salt Marsh	No change in existing conditions	Minor temporary adverse effects could result during implementation of tidal circulation improvements, but these would be offset by the moderate benefits to habitat quality resulting from improvements in tidal circulation.	Minor temporary adverse effects could result from construction activities during restoration and enhancement, but these would be more than offset by the significant benefits resulting from improved circulation and the restoration of 25 acres of intertidal wetlands.

Table 10 (continued) Summary of Potential Effects of Implementing Alternatives A, B, or C for the Sweetwater Marsh Unit			
Resource	Alternative A	Alternative B	Alternative C
<b><i>Habitat(continued)</i></b>			
Native Uplands	No change in existing conditions	Slight benefits to uplands habitat would result from increased control of nonnative invasive plant species.	Restoring 20 acres of native upland habitat on Gunpowder Point would represent a significant benefit.
Least Tern and Snowy Plover Nesting Habitat	No change in existing conditions	Moderate benefits would result from expanded management at the D Street Fill.	Retaining ten additional acres of nesting habitat on D Street Fill would provide moderate benefits.
<b><i>Wildlife and Fisheries</i></b>			
All Birds	No change in existing conditions	Expanding management of salt marsh habitat, improving tidal and freshwater circulation; and enhancing seabird nesting habitat on D Street Fill would provide moderate benefits to birds.	Combining the benefits described for Alternative B with the restoration of 25 acres of salt marsh habitat and 20 acres of upland habitat and the designation of 33 acres on D Street Fill for seabird nesting would result in be significant benefits to birds.
Waterfowl	No change in existing conditions	Action described above would provide slight benefits for waterfowl.	Same as Alternative B
Seabirds	No change in existing conditions	Action described above would provide moderate benefits for seabirds.	Actions described above would provide slightly greater benefits for seabirds than those provided by Alternative B.
Shorebirds and Other Waterbirds	No change in existing conditions	Action described above would provide moderate benefits for shorebirds and other waterbirds.	Actions described above would provide slightly greater benefits for shorebirds and other waterbirds than those provided by Alternative B.

<p align="center"><b>Table 10 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, or C for the Sweetwater Marsh Unit</b></p>			
Resource	Alternative A	Alternative B	Alternative C
<b><i>Wildlife and Fisheries (continued)</i></b>			
Raptors	No change in existing conditions	No change in existing conditions	No change in existing conditions
Other Land Birds	No change in existing conditions	No change in existing conditions	Restoring 20 acres of native upland would significantly benefit land birds, particularly those associated with coastal sage scrub and maritime succulent scrub habitat.
Mammals	No change in existing conditions	No change in existing conditions	No adverse effects or benefits.
Reptiles/Amphibians	No change in existing conditions	No change in existing conditions	Minor benefits following restoration of Gunpowder Point.
Invertebrates	No change in existing conditions	Slight benefit as a result of improved tidal circulation within the marsh.	Moderate benefit as a result of improved tidal circulation and restored habitat.
Fish	No change in existing conditions	Slight benefit as a result of improved tidal circulation within the marsh.	Moderate benefit as a result of improved tidal circulation and restored intertidal habitat.
<b><i>Endangered &amp; Threatened Species</i></b>			
California least tern	No change in existing conditions	Enhancing existing nesting habitat would provide slight benefits.	Enhancing existing nesting habitat and retaining an additional 10 acres of potential nesting area at D Street Fill would provide moderate benefits.
Light-footed clapper rail	No change in existing conditions	Moderate benefits are anticipated as a result of higher quality cordgrass stands following improvements in tidal circulation.	Benefits beyond those provided under Alternative B would result from the restoration of 25 acres of intertidal habitat at D Street Fill.
Salt marsh bird's beak	No change in existing conditions	Moderate benefits due to expanded management of high marsh and improved tidal and freshwater circulation within the marsh.	Same as Alternative B.

<b>Table 10 (continued)</b>			
<b>Summary of Potential Effects of Implementing Alternatives A, B, or C for the Sweetwater Marsh Unit</b>			
Resource	Alternative A	Alternative B	Alternative C
<b><i>Endangered &amp; Threatened Species (continued)</i></b>			
California brown pelican	No change in existing conditions	Slight benefits could result from improvements to fisheries related to improved tidal circulation.	Same as Alternative B.
Western snowy plover	No change in existing conditions	Enhancing nesting habitat and improving chick access to foraging habitat would provide moderate benefits.	The benefits described for Alternative B as well as slightly greater benefits from retaining an additional 10 acres of potential nesting area at D Street Fill would be realized under this alternative.
California gnatcatcher	No change in existing conditions	No change in existing conditions	Moderate benefits would result from the restoration of coastal sage scrub habitat on Gunpowder Point.
<b><i>Public Use</i></b>			
Hunting/Fishing	No change in existing conditions (Unit closed to hunting/fishing.)	No change in existing conditions	No change in existing conditions
Wildlife Observation/Photography	No change in existing conditions (Opportunities for these uses are provided at Gunpowder Point.)	No change in existing conditions	Realigning the trail system and restoring upland habitat on Gunpowder Point would provide moderate benefits related to wildlife observation/photography.
Environmental Education	No change in existing conditions (Opportunities for this use are provided at Gunpowder Point.)	No change in existing conditions	Realigned trail system and new interpretive elements would significantly benefit environmental education programs.
Environmental Interpretation	No change in existing conditions	Moderate benefits would result from new interpretive elements near Paradise Marsh and the F&G Street Marsh.	Realigned trail system and new interpretive elements would significantly improve opportunities for interpretation on the Refuge.
Chula Vista Nature Center	No change in existing conditions	No change in existing conditions	New interpretive elements would complement exhibits at the Nature Center.

<p align="center"><b>Table 10 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, or C for the Sweetwater Marsh Unit</b></p>			
Resource	Alternative A	Alternative B	Alternative C
<b><i>Cultural Resources</i></b>			
Historic	No change in existing conditions	No change in existing conditions	Modifications to the site of the Hercules Powder Company during habitat restoration could result in an adverse effect, which would require mitigation.
Archaeological	No change in existing conditions	No change in existing conditions	There is a potential for impacts to subsurface deposits. Mitigation would be implemented if resources are discovered that could be impacted by proposed actions.
<b><i>Socioeconomic</i></b>			
Land Use/Public Utilities	No change in existing conditions	No change in existing conditions	No change in existing conditions
Traffic/Parking	No change in existing conditions	No change in existing conditions	Slight increases in the demand for parking would not adversely affect current parking availability.
Access/Education/Recreation	No change in existing conditions	No change in existing conditions	Redesigning the existing trail and upgrading the interpretive elements would provide significant benefits to education programs.
Vectors/Odors	No change in existing conditions	Improved tidal circulation would provide slight benefits related to odors and vectors.	Same as Alternative B
Economics/Employment	No change in existing conditions	Several one-time construction projects would provide minor benefits to the economy through the use of private contractors.	Same as Alternative B, plus slight increase in visitors would benefit the local economy.
Environmental Justice	No change in existing conditions	No change in existing conditions	New interpretation would provide moderate benefits.

**Table 11  
Summary of Potential Effects of Implementing  
Alternatives A, B, C, or D for the South San Diego Bay Unit**

Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Physical Environment</i></b>				
Topography/Visual Quality of the Otay River Floodplain	No change in existing conditions	No change in existing conditions	<p>Moderate changes in the landform would result from filling within the floodplain in areas designated for upland restoration. Limiting the depth of the fill to no more than eight feet would retain public views of the restored floodplain and distance views of the bay and ocean, thus avoiding significant adverse effects to visual quality.</p> <p>Restoring weedy fields with native upland and wetland habitat would provide moderate benefits to the area's visual quality.</p>	Same as Alternative C
Topography/Visual Quality within San Diego Bay	No change in existing conditions	Nesting area enhancements involving minor changes to the levees and filling small portions of the ponds to create new nesting habitat would not represent an adverse or beneficial effect to topography or visual quality.	Converting 200 to 440 acres of salt ponds to intertidal wetlands would alter existing views in the Bay by replacing open water with habitat that is only inundated during high tides. This could be viewed by some as an adverse effect, while others may view this change as inconsequential. Returning the ponds to conditions that better reflect the historic conditions in the bay would not be considered a significant adverse effect to visual quality.	Under this alternative, 650 acres of open water would be converted to intertidal habitat. The conclusions regarding effects to visual quality that are presented for Alternative C would also apply to this alternative.

<p align="center"><b>Table 11 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b></p>				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Physical Environment(continued)</i></b>				
Agricultural Lands	No alteration of the existing soils would occur; therefore, no adverse effects to prime farmland would be expected.	Same as Alternative A	Although restoring the Otay River floodplain to native habitat would irreversibly commit Prime Farmland to nonagricultural use, considering the limited economic feasibility of farming this area combined with the limited size of the parcel, the conversion of these lands to native habitat is not considered a significant adverse effect to agricultural resources.	Same as Alternative C
Noise	No change in existing conditions	No change in existing conditions	Grading associated with restoration could result in short-term noise impacts to adjacent homes. Appropriate noise attenuating measures would be included in the final restoration plans to reduce potentially significant adverse effects to below a level of significance.	Same as Alternative C
Upstream Flood Characteristics (Otay River Floodplain)	No change in existing conditions	No change in existing conditions	Preliminary modeling result of the Otay River flood characteristics post restoration indicate a slight reduction in upstream backwater effects during a 100-year flood and somewhat lower (1 to 2 feet lower) peak water surface elevations near adjacent development. Therefore, restoration is not expected to exacerbate predicted flood levels upstream of this Refuge Unit.	Same as Alternative C

Table 11 (continued)				
Summary of Potential Effects of Implementing Alternatives A, B, C, or D for the South San Diego Bay Unit				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Physical Environment(continued)</i></b>				
Downstream Flood Characteristics (Otay River Floodplain)	No change in existing conditions	No change in existing conditions	Preliminary modeling results of Otay River flood characteristics indicate that under existing conditions the peak water surface elevation at the railroad bridge, which is located at approximately 14.3 feet NAVD88, is 13 feet NAVD88. Under restored conditions, the elevation would be 1 to 2 feet higher. Therefore, the predicted increase in the peak water surface elevation at the railroad bridge could adversely affect the structural integrity of the bridge. Potential adverse effects would be avoided through the implementation of appropriate measures, identified in coordination with the City of San Diego, to protect the integrity of the bridge during a flood event.	Same as Alternative C
Water Quality (Effects of grading)	No change in existing conditions	Grading would be confined to the salt ponds; therefore, no adverse effects to the water quality in the bay are anticipated.	Grading in and around wetland areas could result in increases in siltation and erosion within the watershed. To avoid significant adverse effects to water quality, appropriate Best Management Practices would be incorporated into the final restoration design and implemented during restoration.	Same as Alternative C

<p align="center"><b>Table 11 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b></p>				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Physical Environment(continued)</b>				
Water Quality (Effects of breaching salt pond levees)	No change in existing conditions	No change in existing conditions	Preliminary modeling indicates that temporary increases in turbidity and salinity levels in the south end of the bay are not expected to adversely affect water quality in the bay.	Short term adverse effects (lasting less than a month) could result from breaching the salt ponds; however, the effects to water quality bay wide would be less than significant.
<b>Habitats</b>				
Shallow Subtidal	No change in existing conditions	All enhancement activities would be confined to the salt ponds, which do not support shallow subtidal habitat; therefore, this alternative would have no effect on shallow subtidal habitat.	Short-term, relatively low increases in salinity (approximately 50 ppt during the first ebb tide) would occur immediately to the north of the ponds following pond breaching. These conditions are not expected to adversely impact organisms supported by the adjacent shallow subtidal habitat.	Temporary increases in salinity from pond breaching would be substantially higher (120 ppt) than ambient levels (33 to 40 ppt). Potentially significant short term impacts to shallow subtidal and intertidal mudflat habitat in proximity to the salt ponds could occur. Pre- and post-project monitoring would determine the extent of impact. Most impacts would be more than offset by the conversion of the salt ponds to intertidal habitat.  Mitigation for any impacts to eelgrass would be provided in accordance with the Southern California Eelgrass Mitigation Policy.

**Table 11 (continued)**  
**Summary of Potential Effects of Implementing**  
**Alternatives A, B, C, or D for the South San Diego Bay Unit**

Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Habitats (continued)</i></b>				
Intertidal (Mudflats and Salt Marsh)	No change in existing conditions	No change in existing conditions	Within the Otay River floodplain, restoration could result in temporary impacts to about 6 acres of intertidal habitat. Four additional acres of high marsh habitat could be lost to implement public use proposals. These impacts would be more than offset by the restoration of between 260 to 525 acres of intertidal wetlands. The proposed restoration would represent a significant benefit to intertidal habitat.	Temporary impacts of up to 6 acres of intertidal habitat could result within the Otay River floodplain and another 2 acres could be impacted as a result of restoration at the salt works. These impacts would be more than offset by the restoration of over 700 acres of intertidal wetlands. The proposed restoration would represent a significant benefit to intertidal habitat.
Freshwater Wetlands	No change in existing conditions	No change in existing conditions	Within the Otay River floodplain, restoration could result in temporary impacts to about 3 acres of freshwater wetland habitat. This impact would be more than offset by the restoration of at least 16 acres of freshwater wetlands. Restoration would represent a moderate benefit to freshwater wetlands.	Same as Alternative C
Upland Habitat	No change in existing conditions	No change in existing conditions	Between 40 and 60 acres of disturbed non-native uplands, dominated by garland chrysanthemum, would be restored to native upland habitat, representing a significant benefit.	Same as Alternative C

<p style="text-align: center;"><b>Table 11 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b></p>				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Wildlife and Fisheries</b>				
All Birds	No change in existing conditions	Expanded management within the open bay and a public outreach program to reduce the accumulation of discarded fishing line would provide moderate benefits by reducing the effects of human disturbance on bird species supported on this Refuge Unit.	Human disturbance in the vicinity of Pond 11 could result from opening the northern levee to public access. Activities would be monitored and if necessary, changes (e.g., initiating seasonal closures) would be implemented to reduce unanticipated impacts to below a level of significance.	The impacts related to public uses at Pond 11 would not occur under this alternative. Potential disturbances to birds could however occur as a result of creating an interpretive trail around Pond 28. Mitigation would be the same as that described for Alternative C.
Waterfowl	No change in existing conditions	Same as above.	Restoration of coastal wetlands would provide additional foraging habitat for waterfowl. The conversion of some ponds to intertidal habitat could alter current rafting patterns, but the overall effect of restoration is expected to be beneficial.	Same as Alternative C.
Seabirds	No change in existing conditions	Proposals to enhance nesting habitat and provide about 20 acres of new nesting area within the salt ponds would produce moderate benefits for seabirds.	Seabirds would benefit from enhanced and newly created nesting habitat; however, salt pond restoration would eliminate open water areas around traditional nest sites, which could alter nesting patterns for some species. Monitoring and adaptive management is proposed to ensure that existing nesting colonies are not adversely affected.	Same as Alternative C.

Table 11 (continued) Summary of Potential Effects of Implementing Alternatives A, B, C, or D for the South San Diego Bay Unit				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Wildlife and Fisheries (continued)</b>				
Shorebirds	No change in existing conditions	Recontouring of the levee slopes would improve foraging access along the pond edges. In addition, shorebirds that nest at the salt works could benefit from nesting enhancements.	Restoration of coastal wetlands within the Otay River floodplain and the salt ponds would provide additional foraging habitat for shorebirds, representing a significant benefit.	Same as Alternative C
Phalaropes/Eared Grebes	No change in existing conditions	No change in existing conditions	A reduction in the availability of brine invertebrates within the salt ponds could cause phalaropes and grebes to abandon the use of this area during migration. Although this would reduce the diversity and abundance of shorebirds at the salt works, this would not result in significant adverse effects to these species range wide.	Although salt production would be eliminated under this alternative, a managed brine water component has been incorporated into the restoration proposal to ensure the continued availability of brine invertebrates for these species, albeit at a reduced density. The consequences of reducing the availability of brine invertebrates would be the same as described in Alternative C.
Other Waterbirds	No change in existing conditions	No change in existing conditions	Restoration of foraging habitat would represent a significant benefit.	Same as Alternative C

<p align="center"><b>Table 11 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b></p>				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Wildlife and Fisheries (continued)</i></b>				
Raptors	No change in existing conditions (some individual raptors could be removed through predator management)	Same as Alternative A	Non-native upland habitat would be replaced with coastal wetlands and native upland habitat, which could reduce the availability of some prey species for raptors. Because the existing habitat is so degraded, restoration is not expected to adversely affect raptors.	Same as Alternative C
Other Land Birds	No change in existing conditions	No change in existing conditions	Restoration of freshwater wetlands and native uplands is expected to benefit a variety of native land birds.	Same as Alternative C
Mammals	No change in existing conditions (some mammals could be removed through predator management)	Same as Alternative A	Conversion of non-native uplands to coastal wetlands would eliminate habitat that supports mammals, but impacts to individual species would be minimal and no adverse affects to overall population size are anticipated.	Same as Alternative C
Reptiles/Amphibians	No change in existing conditions	No change in existing conditions	Grading associated with restoration in the Otay River floodplain could result in the loss of some individuals; however, improved habitat quality following restoration is expected to provide moderate benefits to these organisms.	Same as Alternative C

<p align="center"><b>Table 11 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b></p>				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Wildlife and Fisheries (continued)</b>				
Invertebrates	No change in existing conditions	<p>No change in existing conditions for terrestrial invertebrates.</p> <p>With the exception of the few invertebrates that tolerate hypersaline conditions, suitable habitat for native invertebrates is not available within the salt ponds. The changes in the ponds to accommodate additional nesting habitat and pelican platforms would have no adverse effects on invertebrates.</p>	<p>Impacts to terrestrial invertebrates due to habitat restoration would be less than significant.</p> <p>The restoration of the salt ponds and Otay River floodplain would provide significant new habitat for many native invertebrates, while habitat for brine invertebrates would be significantly reduced under this alternative.</p>	<p>Impacts to terrestrial invertebrates due to habitat restoration would be less than significant.</p> <p>High salinities present in the south bay after salt pond breaching could result in short term impacts to invertebrates. Restoration of tidal influence within the salt ponds, as well as within the Otay River floodplain, would provide significant new habitat for native invertebrates, which would more than offset short term adverse effects. Areas currently supporting brine invertebrates would be lost, but 44 acres of new habitat to support brine invertebrates would be created.</p>
Fish	No change in existing conditions	No habitat for fish is provided within the salt ponds. Therefore, pelican platforms and nesting enhancements would not adversely affect fish.	The restoration of the salt ponds and Otay River floodplain would provide new habitat for fish representing a moderate benefit to the bay's fish populations.	Pond breaching is not expected to adversely affect fish populations. Moderate benefits to fish would result from pond restoration. Screening would reduce losses associated with bay water intake.

Table 11 (continued)				
Summary of Potential Effects of Implementing Alternatives A, B, C, or D for the South San Diego Bay Unit				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Endangered &amp; Threatened Species</i></b>				
California least tern	No change in existing conditions	Proposed enhancements in nesting substrate and expansion of available nesting sites would provide moderate benefits.	Improvements in available nesting habitat and increased opportunities for foraging in the restored ponds would provide significant benefits.	Similar to Alternative C, but with potentially greater benefits.
Light-footed clapper rail	No change in existing conditions	No change in existing conditions	Significant benefits would result from the restoration of cordgrass-dominated salt marsh habitat in the salt ponds and the overall restoration of coastal wetlands in the Otay River floodplain.	Similar to Alternative C, but with potentially greater benefits.
California brown pelican	No change in existing conditions	Expanded management in the open waters of the bay could reduce disturbance and public outreach to reduce discarded fishing line accumulation would reduce potential losses from entanglement.	Restoration of Ponds 10 and 11 could impact roosting areas if human disturbance increases on pond levees. To reduce the potential for such impacts, monitoring of these roosting areas would be conducted and if necessary fencing or other barriers would be installed to reduce access to these areas. Slight foraging benefits could result from improved fish habitat in the South Bay.	Same as Alternative C.
Western snowy plover	No change in existing conditions	Nesting enhancements, controlling water levels in Pond 20 for nesting, and improving access to foraging areas would provide moderate benefits.	Expanded nesting and foraging opportunities would provide significant benefits.	Same as Alternative C.

Table 11 (continued)				
Summary of Potential Effects of Implementing Alternatives A, B, C, or D for the South San Diego Bay Unit				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Endangered &amp; Threatened Species (continued)</i></b>				
Pacific green sea turtle	No change in existing conditions	No change in existing conditions	Slight benefits could be realized as a result of the restoration of some intertidal habitat in the South Bay.	Potential short term adverse effects to eelgrass, which provides habitat for the sea turtles, would be mitigated in accordance with the South California Eelgrass Mitigation Policy. Moderate benefits could be realized as a result of expanded intertidal habitat in the South Bay.
<b><i>Solar Salt Production</i></b>				
Solar Salt Production	No change in existing conditions	Slight changes in the operation would result from the construction of new nesting habitat. Production would continue.	Slight to moderate changes in the current operation would occur under this alternative. Production is proposed to continue within a reduced footprint.	This alternative would result in the elimination of solar salt production. Production could be reduced in phases or in one action.
<b><i>Public Use</i></b>				
Hunting	No change in existing conditions (The Refuge Unit is closed to hunting.)	No change in existing conditions	No change in existing conditions	No change in existing conditions
Fishing	No change in existing conditions (Fishing is allowed in the bay.)	No change in existing conditions	Onshore fishing in the bay would be permitted from the northern levee of Pond 11.	No change in existing conditions
Wildlife Observation/ Photography	No change in existing conditions (Guided tours are provided on occasion.)	No change in existing conditions	Expanded opportunities for wildlife observation would be provided around the perimeter of the bay and along Pond 11's northern levee.	Expanded opportunities for wildlife observation would be provided around the perimeter of the bay and around Pond 28.

<p align="center"><b>Table 11 (continued)</b>  <b>Summary of Potential Effects of Implementing</b>  <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b></p>				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b>Public Use (continued)</b>				
Environmental Education	No change in existing conditions (The Habitat Heroes Program)	No change in existing conditions	No change in existing conditions	No change in existing conditions
Environmental Interpretation	No change in existing conditions (no program is currently implement)	No change in existing conditions	No change in existing conditions	Interpretive signage and other elements will be provided along the Bayshore Bikeway, an interpretive trail would be developed around Pond 28, an interpretive program describing the history of hunting on the south bay would be provided seasonally, and an interpretive program to document the significance of solar salt production in the south bay would be developed.
<b>Cultural Resources</b>				
Historic	No change in existing conditions	Minor modifications to the South Bay Salt Works would result in no adverse effects to this resource.	Historic character and function of the South Bay Salt Works would be significantly altered under Salt Works Option 2, representing an adverse effect and requiring mitigation.	Eliminating historic salt production would represent an adverse effect and would require mitigation.
Archaeological	No change in existing conditions	No change in existing conditions	Potential for impacts to subsurface deposits. Mitigation would be implemented if resources are discovered that could be impacted.	Same as Alternative C

Table 11 (continued)				
Summary of Potential Effects of Implementing Alternatives A, B, C, or D for the South San Diego Bay Unit				
Resource	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Socioeconomic</i></b>				
Land Use	No change in existing conditions	No change in existing conditions	No change in existing conditions	No change in existing conditions
Traffic/Parking	No change in existing conditions	No change in existing conditions	Opening the northern levee of Pond 11 to fishing and wildlife observation would increase the parking demand at the Biological Study Area. Coordination with the San Diego County Parks Department would be required.	No increase in parking demands at the Biological Study Area would occur, however, there would be a slight increase in the demand for on-street parking in Imperial Beach associated with new opportunities for wildlife observation and environmental interpretation.
Public Utilities	No change in existing conditions	No change in existing conditions	Coordination with the City of San Diego is required prior to restoration of the Otay River floodplain to ensure protection of existing sewer and water utilities. The temporary relocation of the bicycle path along the Saturn Boulevard right-of-way may be required during restoration.	Same as Alternative C
Access/Education/Recreation	No change in existing conditions	No change in existing conditions	The western segment of the Otay Valley Regional Park Trail would be accommodated if needed; a boardwalk would be constructed adjacent to the Bayshore Bikeway near Ponds 10 and 23 to improve opportunities for wildlife observation. No existing uses would be eliminated.	Accommodates the regional trail and provides a boardwalk to improve access for wildlife observation. No existing uses would be eliminated.

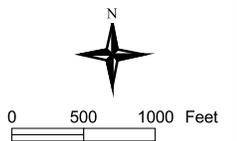
<b>Table 11 (continued)</b> <b>Summary of Potential Effects of Implementing</b> <b>Alternatives A, B, C, or D for the South San Diego Bay Unit</b>				
Resource Issue or Concern	Alternative A	Alternative B	Alternative C	Alternative D
<b><i>Socioeconomic (continued)</i></b>				
Vectors/Odors	No change in existing conditions	No change in existing conditions	Improved water circulation and new habitat restoration would reduce the availability of breeding areas for freshwater mosquitoes. New habitat for salt marsh mosquitoes would be provided, but the effects are not considered significant. There would also be some potential for occasional odors from the restored wetlands.	Same as Alternative C
Economics/Employment	No change in existing conditions	Slight benefits would result from short term construction work required to implement the nesting enhancements.	Moderate benefits would result from short term construction jobs, but some of these benefits would be offset by reduced employment at the salt works.	Moderate benefits would result from short term contraction jobs, but these benefits would be offset by the loss of 22 jobs at the salt works
Environmental Justice	No change in existing conditions	No change in existing conditions	Increased accessibility to the Refuge would provide moderate benefits to the surrounding underserved communities.	Same as Alternative C

*Summary*

*Appendix A: Alternatives Graphics*

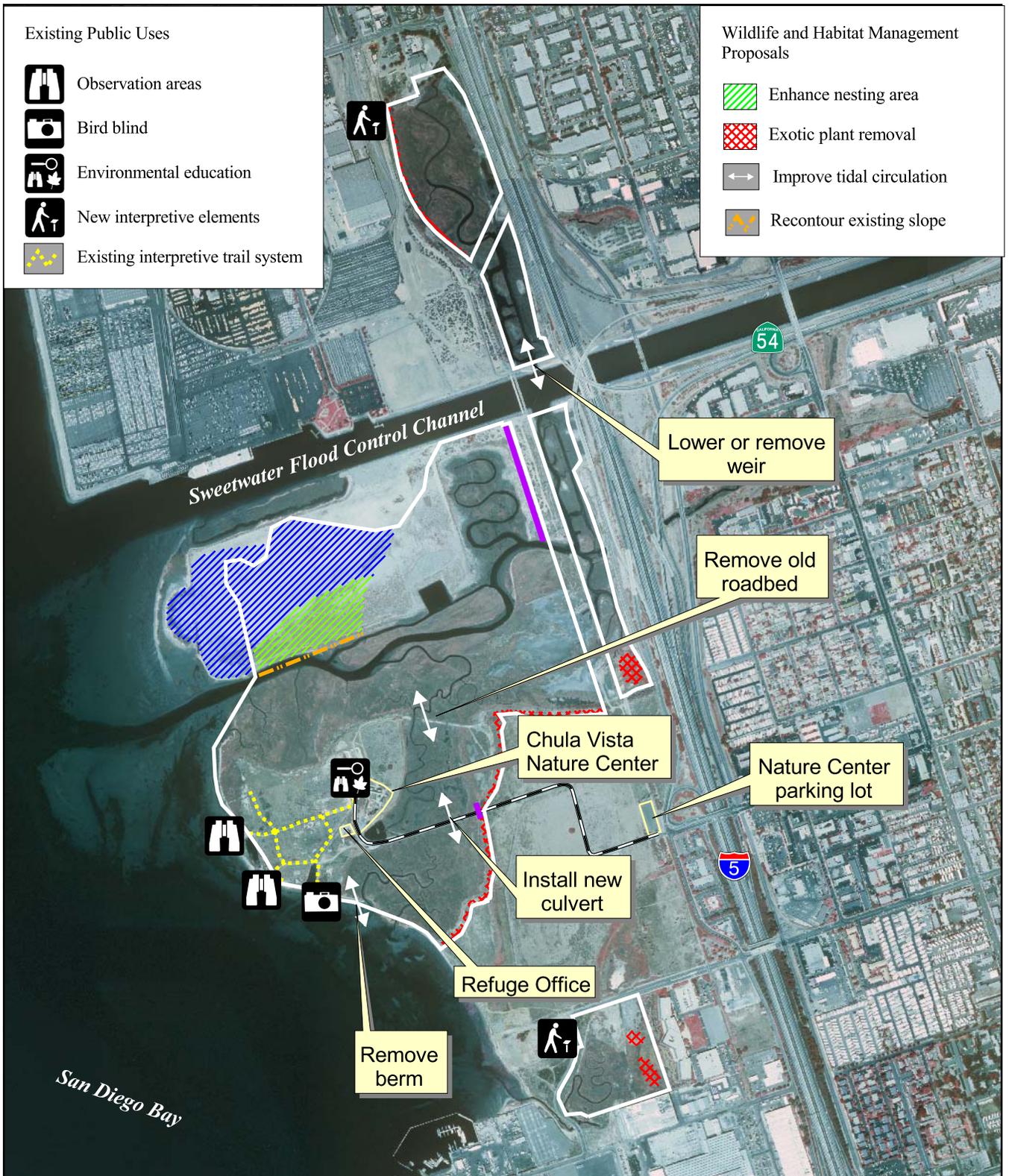


**Figure A-1 Sweetwater Marsh Unit, Alternative A**

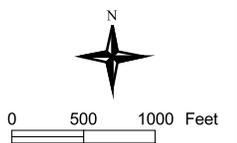


Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

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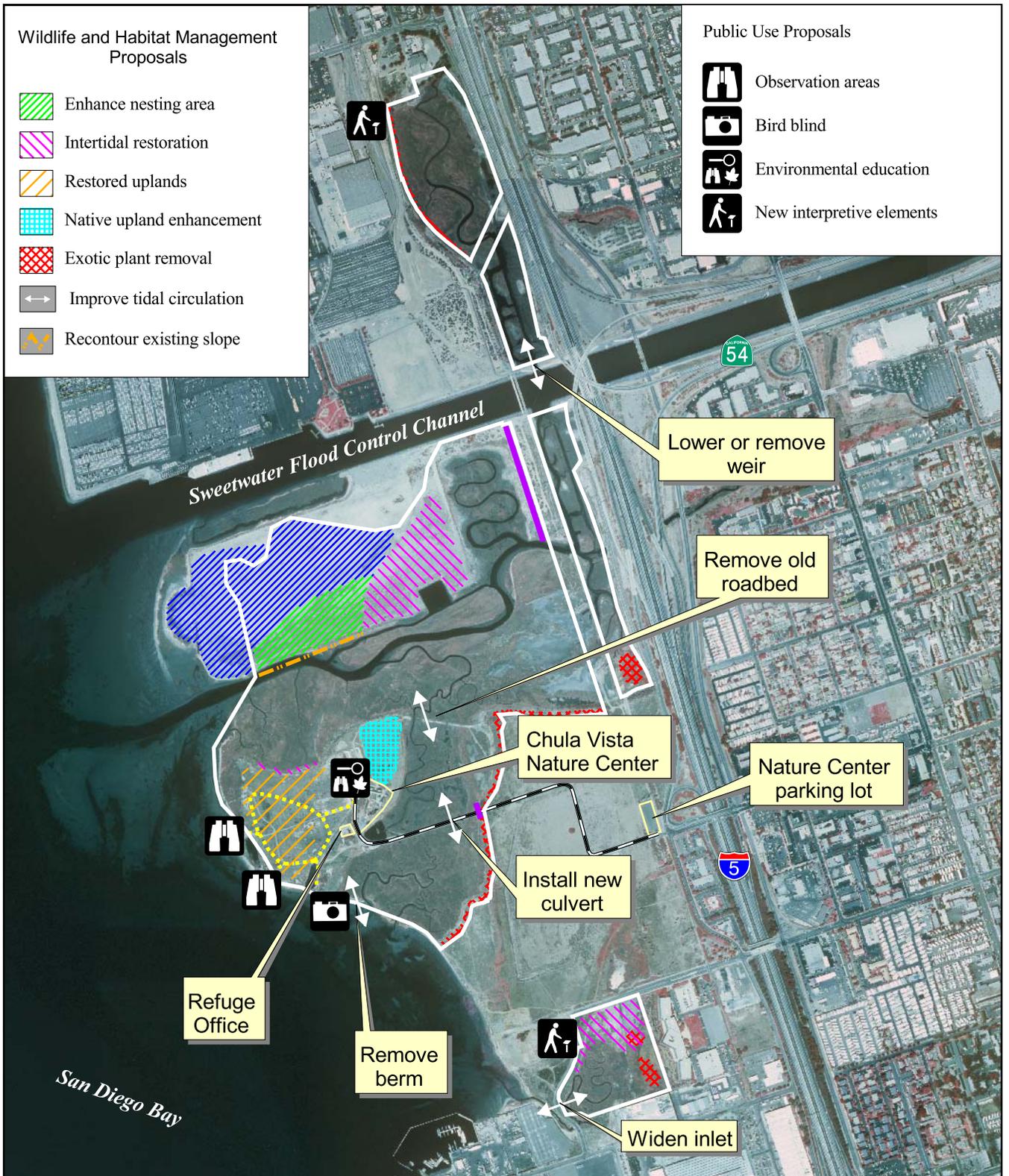


**Figure A-2 Sweetwater Marsh Unit, Alternative B**



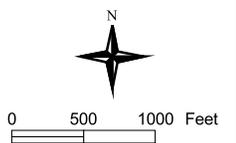
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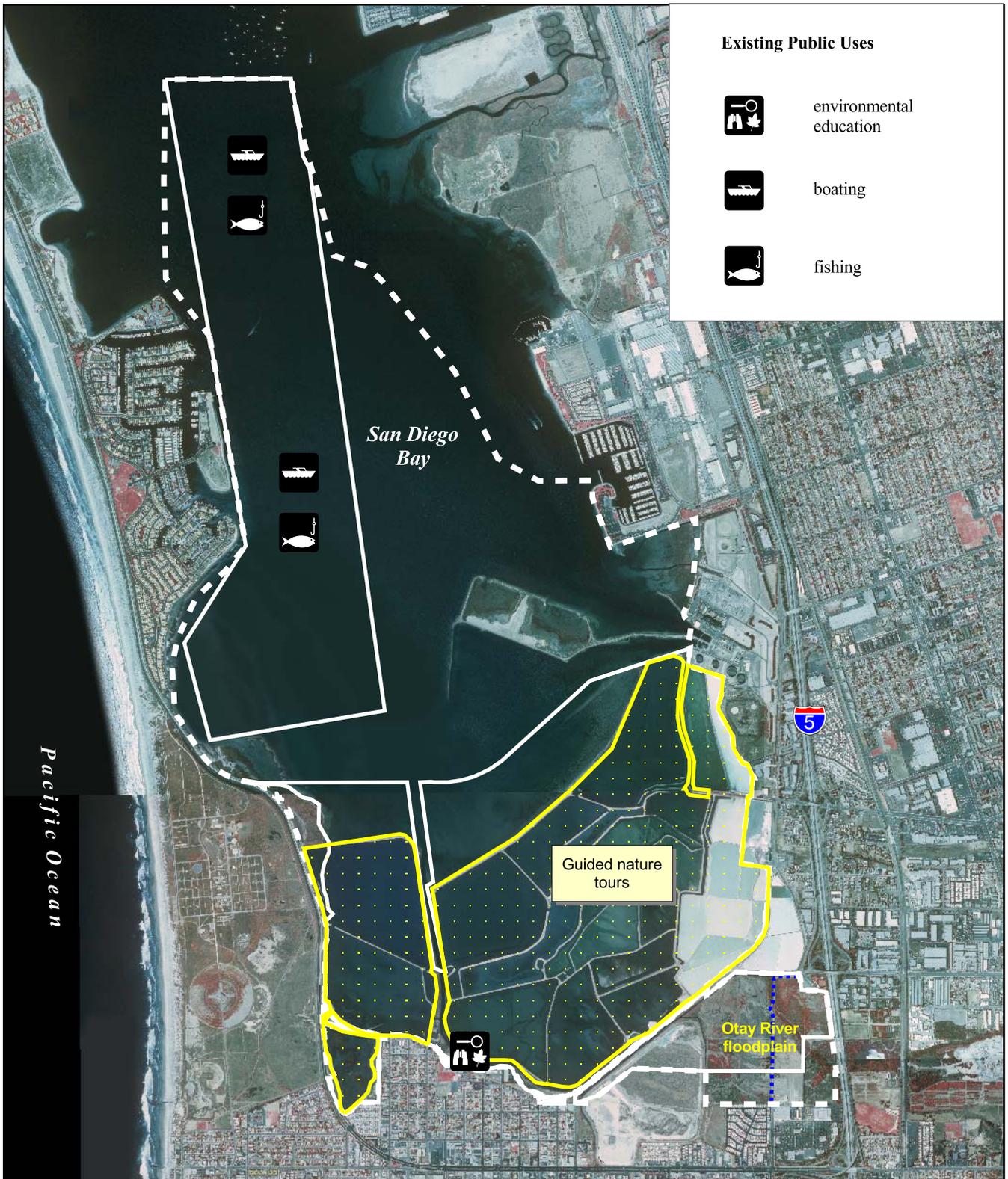
**Figure A-3 Sweetwater Marsh Unit, Alternative C**

- Refuge boundary
- Redesign interpretive trail system (Exact alignment to be determined)
- Gate/Fencing
- Access road
- Jointly managed least tern nesting site



Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

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**Figure A-4 South San Diego Bay Unit, Alternative A**

-  South San Diego Bay Unit  
Approved Land Acquisition Boundary
-  Solar salt production
-  Bike path
-  South San Diego Bay Unit  
Existing Management Authority

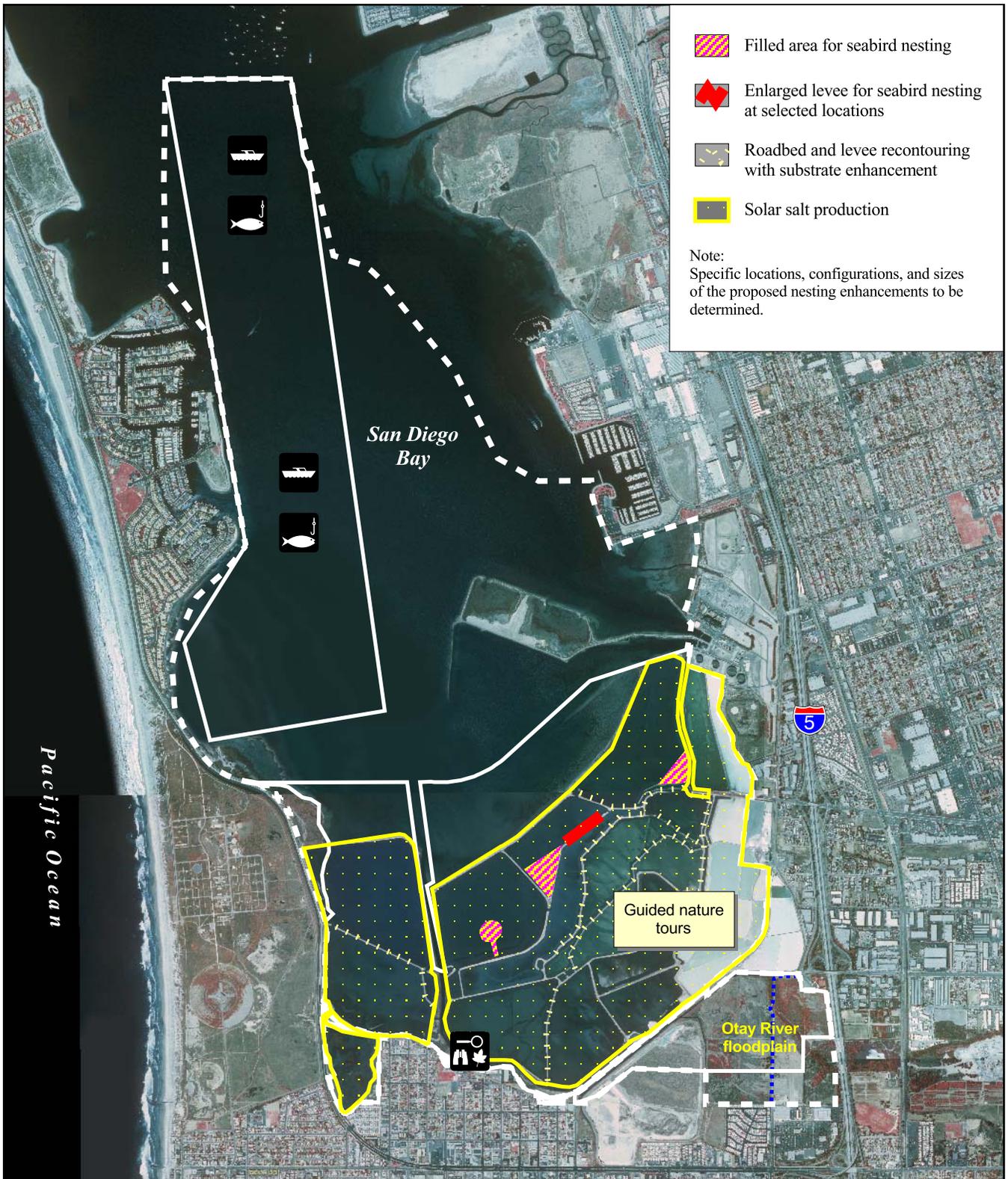


0 0.25 0.5 Miles



Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

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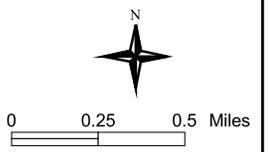


-  Filled area for seabird nesting
-  Enlarged levee for seabird nesting at selected locations
-  Roadbed and levee recontouring with substrate enhancement
-  Solar salt production

Note:  
Specific locations, configurations, and sizes of the proposed nesting enhancements to be determined.

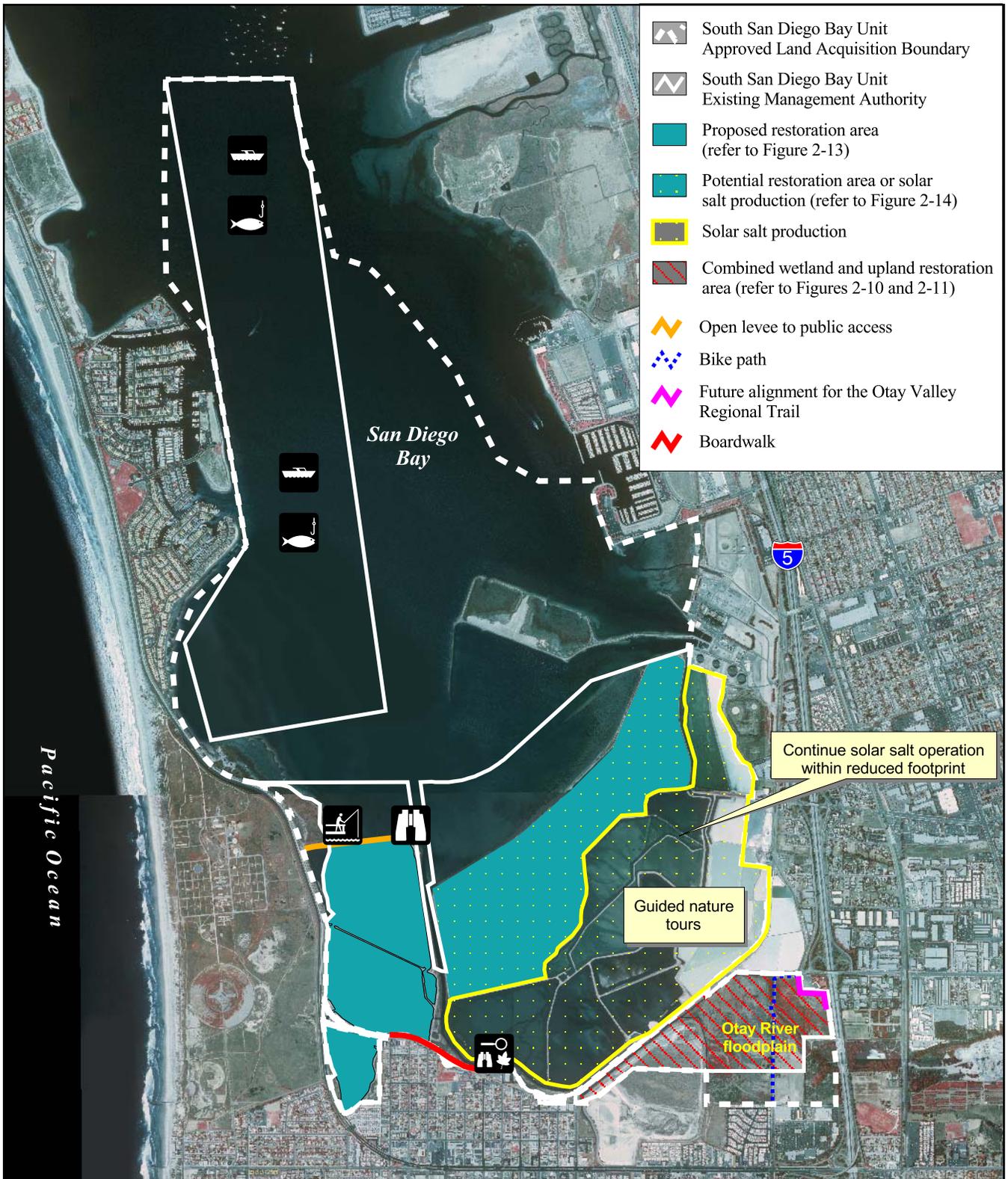
**Figure A-5 South San Diego Bay Unit, Alternative B**

- |   |  |   |         |   |                            |
|---|--|---|---------|---|----------------------------|
|  | South San Diego Bay Unit<br>Approved Land Acquisition Boundary |  | Boating |  | Environmental<br>education |
|  | South San Diego Bay Unit<br>Existing Management Authority      |  | Fishing |  | Bike path                  |



Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

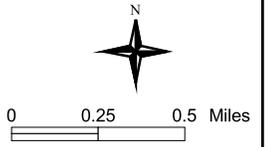
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- South San Diego Bay Unit Approved Land Acquisition Boundary
- South San Diego Bay Unit Existing Management Authority
- Proposed restoration area (refer to Figure 2-13)
- Potential restoration area or solar salt production (refer to Figure 2-14)
- Solar salt production
- Combined wetland and upland restoration area (refer to Figures 2-10 and 2-11)
- Open levee to public access
- Bike path
- Future alignment for the Otay Valley Regional Trail
- Boardwalk

**Figure A-6**  
**South San Diego Bay Unit, Alternative C**

- boating
- fishing
- shoreline fishing
- observation area
- environmental education



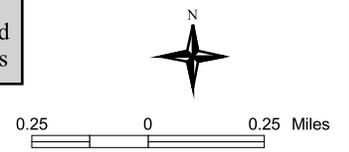
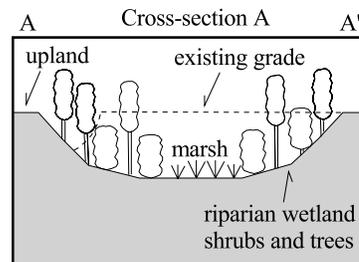
Source: Local Agency Partnership (2 ft imagery, year 2000)

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**Figure A-7**  
**South San Diego Bay Unit, Alternative C - Otay River Floodplain Restoration Option 1**

-  Refuge management boundary
-  Freshwater wetland  
(30% marsh and 70% riparian)
-  50% intertidal mudflat,  
30% cordgrass, 20% pickleweed
-  Restored uplands
-  Transition from freshwater wetland  
to salt marsh



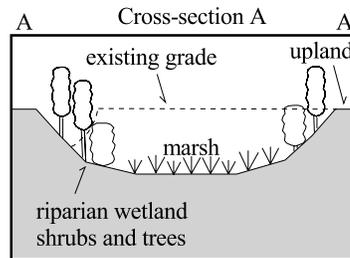
Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

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**Figure A-8**  
**South San Diego Bay Unit, Alternative C - Otay River Floodplain Restoration Option 2**

-  Refuge management boundary
-  Freshwater wetland  
(70% marsh and 30% riparian)
-  50% intertidal mudflat,  
30% cordgrass, 20% pickleweed
-  Restored uplands
-  Transition from freshwater wetland  
to salt marsh



0.25 0 0.25 Miles

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Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

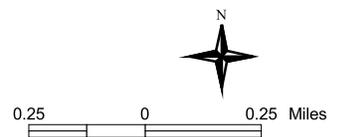


**Figure A-9**  
**South San Diego Bay Unit, Alternative C**  
**Salt Works Restoration Option 1**

- |   |   |   |                          |
|---|---|---|--------------------------|
|  | Levee breach or water control structure (subject to relocation) |  | Proposed salt production |
|  | Filled area for seabird nesting                                 |  | Intertidal mudflat       |
|  | Enlarged levee for seabird nesting at selected locations        |  | Cordgrass                |
|  | Roadbed and levee recontouring with substrate enhancement       |  | Salt marsh               |

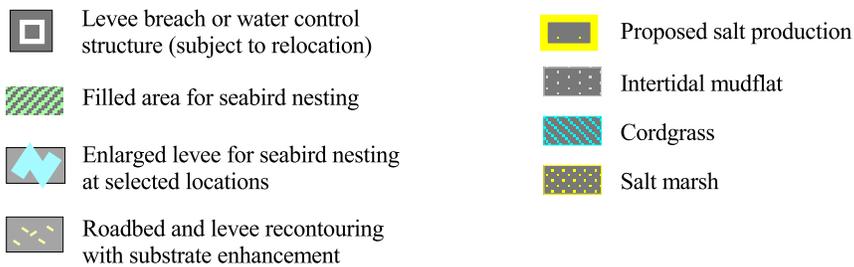
**Note:**

1. Ponds would be graded to optimize cordgrass habitat for the Light-footed Clapper Rail.
2. Specific locations and sizes of proposed seabird nesting improvements to be determined.
3. A reduction in the existing salt operation would occur.



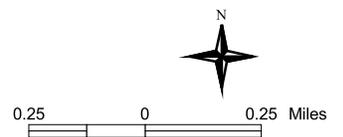


**Figure A-10**  
**South San Diego Bay Unit, Alternative C**  
**Salt Works Restoration Option 2**



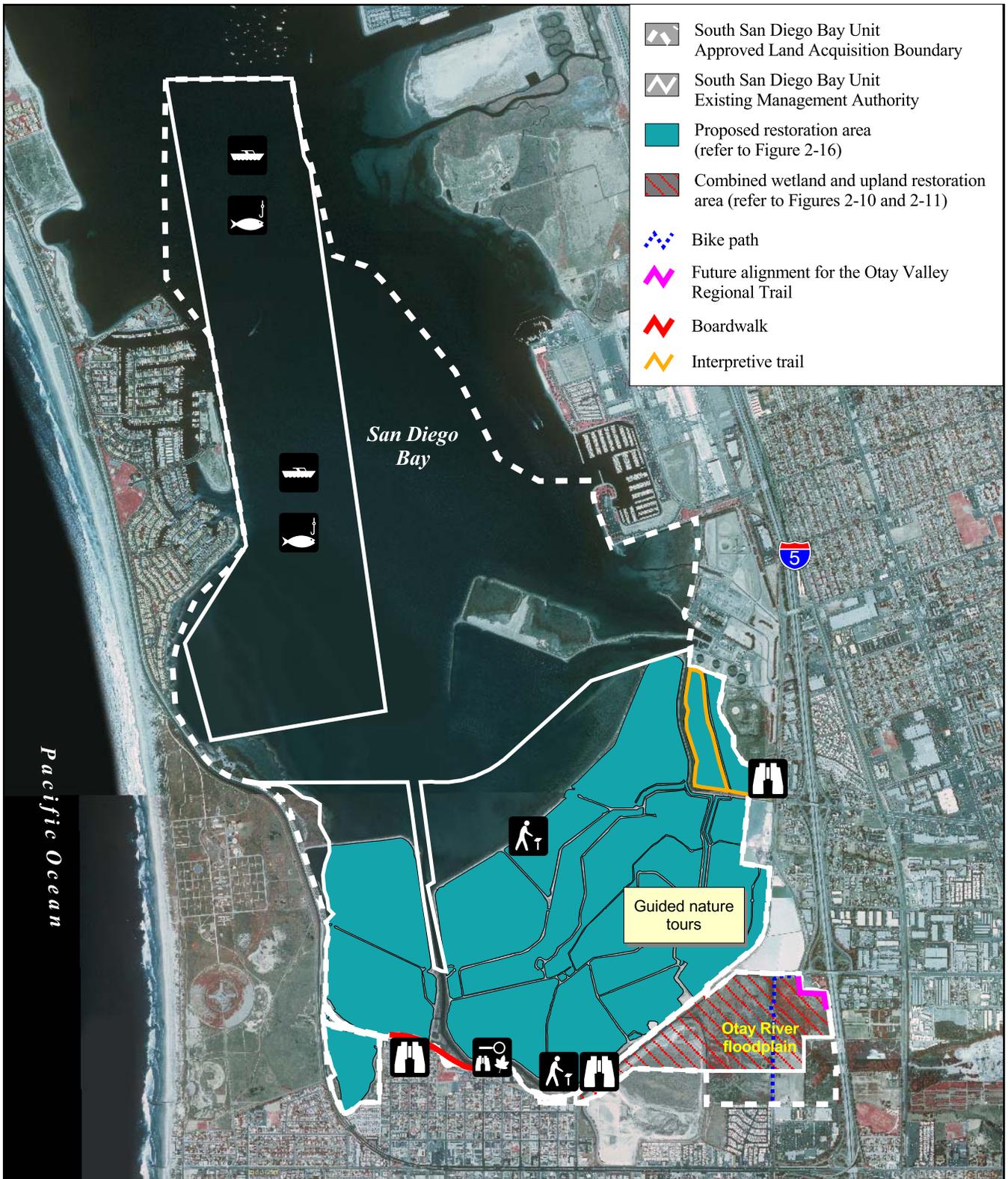
**Note:**

1. Ponds would be graded to optimize cordgrass habitat for the Light-footed Clapper Rail.
2. Existing nesting bird areas are protected and some enhancements are proposed.
3. Specific locations and sizes of proposed seabird nesting improvements to be determined.
4. A reduction in the existing salt operation would occur.
5. Reconfiguration of salt ponds may be necessary to accommodate a reduced operation.



Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)

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 /stem/stacey/ssdbay/fig\_apndx/habfigures.apr



- South San Diego Bay Unit Approved Land Acquisition Boundary
- South San Diego Bay Unit Existing Management Authority
- Proposed restoration area (refer to Figure 2-16)
- Combined wetland and upland restoration area (refer to Figures 2-10 and 2-11)
- Bike path
- Future alignment for the Otay Valley Regional Trail
- Boardwalk
- Interpretive trail

**Figure A-11**  
**South San Diego Bay Unit, Alternative D**

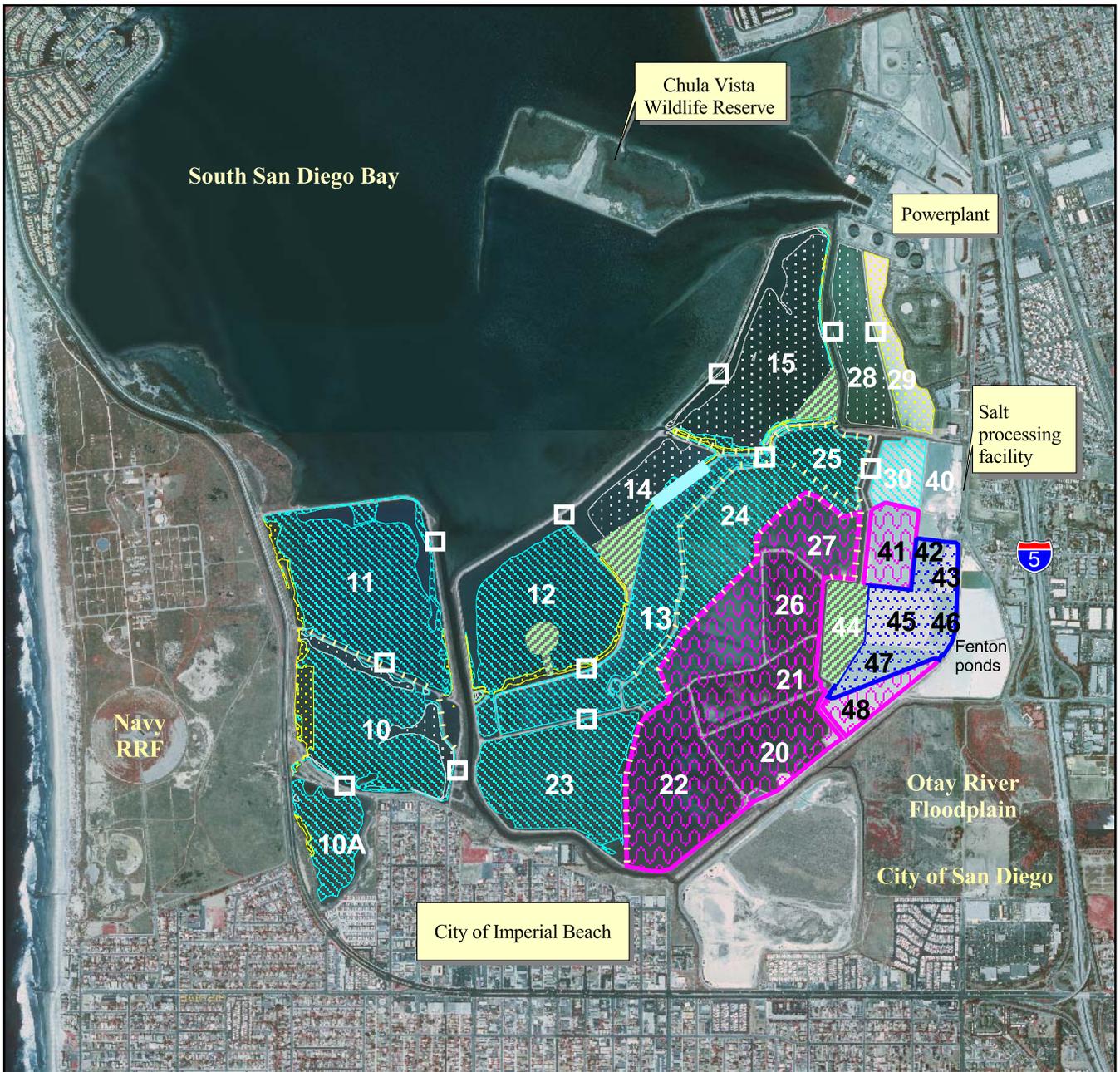
- boating
- fishing
- observation area
- environmental education
- interpretive element/program



0 0.25 0.5 Miles

Source: Local Agency Partnership (2 ft imagery, year 2000)

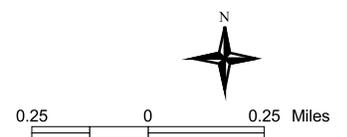
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**Figure A-12**  
**South San Diego Bay Unit, Alternative D**  
**Salt Works Restoration Proposal**

- |   |   |   |                    |
|---|---|---|--------------------|
|  | Levee breach or water control structure (subject to relocation) |  | Intertidal mudflat |
|  | Managed brine production  |  | Cordgrass          |
|  | Managed water area  |  | Salt marsh         |
|  | Filled area for seabird nesting                                 |   |                    |
|  | Enlarged levee for seabird nesting at selected locations        |   |                    |
|  | Roadbed and levee recontouring with substrate enhancement       |   |                    |

- Note:
1. Intensive water management for water birds is proposed.
  2. Ponds would be graded to optimize cordgrass habitat for the Light-footed Clapper Rail.
  3. Specific locations and sizes of proposed seabird nesting improvements to be determined.
  4. No salt production.
  5. Pond 20 managed for western snowy plover nesting.



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Source: USFWS, Local Agency Partnership 2000 (2 ft imagery)



**Figure A-13**  
**Expected Habitats within the Salt Ponds Following Levee Breaching**  
**with No Changes to the Existing Pond Elevations**

Intertidal mudflat
  Cordgrass
  Salt marsh
  Upland



500 0 500 1000 Feet



Source: USFWS, Local Agency Partnership (2 ft imagery)

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San Diego Bay National Wildlife Refuge  
San Diego Bay National Wildlife Refuge Complex  
6010 Hidden Valley Road  
Carlsbad, CA 92011  
Telephone: 760/930 0168  
Fax: 760/930 0256

California Relay Service  
TTY 1 800/735 2929  
Voice 1 800/735 2922

U.S. Fish & Wildlife Service  
<http://pacific.fws.gov>

For Refuge information  
1 800/344 WILD



July 2005

Photo: USFWS/J. Konecny

