

**U.S. FISH AND WILDLIFE SERVICE  
San Diego National Wildlife Refuge Complex**

**PUBLIC NOTICE**

**Notice of Availability  
of a  
Draft Environmental Assessment**

**NOTICE IS HEREBY GIVEN** that a Draft Environmental Assessment (EA) has been prepared by the U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex and is available for a 30-day public review period. The 30-day public review period begins on April 14, 2009 and **ends on May 14, 2009**.

**Project Title:** Construction, Operation, and Maintenance of the San Diego National Wildlife Refuge Complex Administrative Facility and Service Building, Chula Vista, California

**Lead Agency and Project Proponent:**

U.S. Fish and Wildlife Service  
San Diego National Wildlife Refuge Complex  
6010 Hidden Valley Road, Suite 101, Carlsbad, CA 92011  
Contact: Andrew Yuen (760) 930-0168

**Project Location:** The project site is located on the Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge, Chula Vista, California. The proposed administrative facility and service building would be constructed on uplands located on Gunpowder Point. The proposed administrative facility would be next to the Chula Vista Nature Center.

**Project Description:** The U.S. Fish and Wildlife Service proposes to construct, operate, and maintain a new administrative facility and service building for the San Diego National Wildlife Refuge Complex (Refuge Complex) on Federal land located within the San Diego Bay National Wildlife Refuge (NWR)-Sweetwater Marsh Unit. The proposed action is subject to funding and final approval by the Department of the Interior. The proposed single-story administrative facility would be approximately 4,800 square feet in size and would provide offices, conference room, restrooms, storage, and visitor contact station. The proposed single-story service building would be approximately 2,600 square feet in size and would provide a work area for Refuge maintenance activities and storage. A parking area would also be provided in the general vicinity of the administrative facility. The purpose of the new facility is to increase the effectiveness of the Refuge Complex to meet the growing challenges of managing migratory birds, recovering endangered and threatened species, conserving and restoring terrestrial and aquatic habitats, and protecting human life and property in one of the most biologically diverse and densely populated regions of the United States.

The EA is part of the Service's decision-making process in accordance with the National Environmental Policy Act of 1969. The EA describes the purpose and need for the proposed administrative facility and service building; potential issues and concerns; alternative site locations for the facility; parking; and environmental consequences of each alternative. The EA will determine whether the proposed action will result in a Finding of No Significant Impact or require the need for an environmental impact statement.

**Review and Comment Period:** Comments on the EA must be provided in writing to Andrew Yuen, Project Leader, U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex, 6010 Hidden Valley Road, Suite 101, Carlsbad, California 92011, via email to [Andy\\_Yuen@fws.gov](mailto:Andy_Yuen@fws.gov), or via fax to 760-930-0256 no later than 5:00 PM PST on **May 14, 2009**. Questions regarding this document or the proposed project can be directed to Andrew Yuen at 760-930-0168.

**Report Availability:** Copies of the EA are available for public review at the following locations:

Tijuana Estuary Visitor Center  
301 Caspian Way  
Imperial Beach, CA 91932

Chula Vista Public Library, Civic Center Branch  
365 F Street  
Chula Vista, CA 91910

The document can also be viewed electronically at the San Diego National Wildlife Complex Website at <http://www.fws.gov/sandiegorefuges/> and click on "What's New" in Site Navigation column.

**Draft  
Environmental Assessment**

**Construction, Operation, and Maintenance of the  
San Diego National Wildlife Refuge Complex  
Administrative Facility and Service Building  
and  
Minor Amendment  
to the San Diego Bay National Wildlife Refuge  
Comprehensive Conservation Plan**

**San Diego Bay National Wildlife Refuge, Sweetwater Marsh Unit  
Chula Vista, California**

April 14, 2009

Prepared by  
U.S. Fish and Wildlife Service  
San Diego National Wildlife Refuge Complex  
6010 Hidden Valley Road, Suite 101  
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# CHAPTER 1. PURPOSE AND NEED FOR ACTION

## 1.1 Introduction

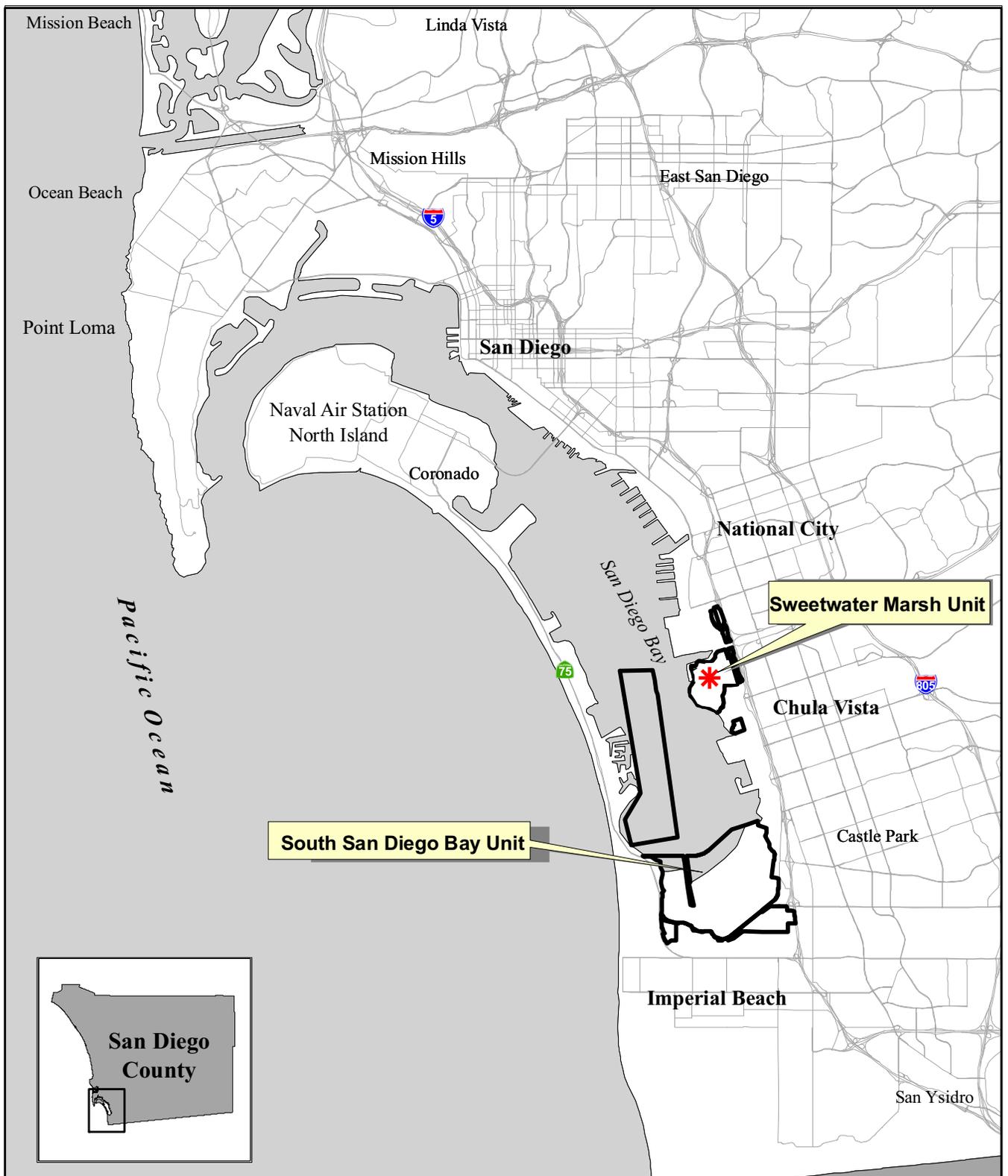
The U.S. Fish and Wildlife Service (Service) proposes to construct, operate, and maintain a new administrative facility and service building for the San Diego National Wildlife Refuge Complex (Refuge Complex) on Federal land located within the San Diego Bay National Wildlife Refuge (NWR)-Sweetwater Marsh Unit, Chula Vista, California (Figure 1 – Vicinity Map). The proposed action is subject to funding and final approval by the Department of the Interior. The administrative facility and service building would be located on Gunpowder Point, in the vicinity of the Chula Vista Nature Center, situated to the west of Interstate 5 (I-5) and accessible via the E Street exit of I-5 in southwestern San Diego County (Figure 2 – Location Map).

The proposed single-story administrative facility would be approximately 4,800 square feet in size and would provide offices, conference room, restrooms, storage, and a visitor contact station. The proposed single-story service building would be approximately 2,600 square feet in size and would provide a work area for Refuge maintenance activities and storage. The combined footprint of the new buildings would be approximately 7,500 square feet. The new buildings would consolidate Refuge Complex-level administrative, resource management, and maintenance operations. The new administrative facility would also provide offices for the staff currently located at the Sweetwater Marsh Unit. A parking area would also be provided in the general vicinity of the administrative facility. The administrative facility and service building would be constructed on previously developed lands (such as the abandoned concrete kelp liquor reservoir and concrete slabs) and on disturbed upland habitat on Gunpowder Point.

Implementation of this proposal would facilitate increased coordination among the San Diego Bay, Tijuana Slough, and San Diego National Wildlife Refuges by locating the administrative facility closer to on-the-ground management and habitat restoration projects; enhance opportunities to develop partnerships and working relationships with communities in south San Diego County; conserve annual funding by eliminating lease payments for office space; and stimulate the economy of San Diego County by the construction of the new buildings.

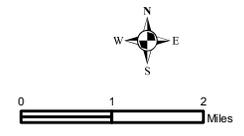
This action also represents a minor amendment to the San Diego Bay NWR Comprehensive Conservation Plan (CCP), which currently identifies a 0.71-acre parcel to the south of the Bayshore Bikeway and the east of 12<sup>th</sup> Street in Imperial Beach as a potential location for a new Refuge Complex office. We propose to amend the CCP by removing any reference to potentially locating an office on the South San Diego Bay Unit and instead identifying Gunpowder Point on the Sweetwater Marsh Unit as the proposed location for a new Refuge Complex administrative facility and service building.

This Environmental Assessment (EA) is part of the Service's decision-making process in accordance with the National Environmental Policy Act of 1969 (NEPA). The EA describes the purpose and need for the proposed administrative facility and service building; potential issues and concerns; alternative site locations for the facility; parking; and environmental consequences of each alternative. The EA will determine whether the proposed action will result in a Finding of No Significant Impact or require the need for an environmental impact statement.



**Figure 1**

**\*** Approximate Location of the Proposed San Diego NWR Complex Administrative Facility, Visitor Contact Station, and Service Building





**Figure 2. Location Map**

-  Gunpowder Point Boundary
-  General Location of the Proposed Administrative Facility and Workshop

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## 1.2 Purpose and Need

The purpose of the new facility is to increase the effectiveness of the Refuge Complex to meet the growing challenges of managing migratory birds, recovering endangered and threatened species, conserving and restoring terrestrial and aquatic habitats, and protecting human life and property in one of the most biologically diverse and densely populated regions of the United States. The new facility is needed so we can provide for greater opportunities for collaboration and coordinated management between Refuges and our partners. We also need the new administrative facility in southern San Diego County so that we can build stronger relationships and partnerships with the communities that neighbor our Refuges. In the long term, the new administrative facility will conserve Federal funding by eliminating annual lease payments for office space.

The existing Refuge Complex headquarters is co-located with the Carlsbad Fish and Wildlife Office in General Services Administration (GSA) leased office space in Carlsbad, California. The Refuge headquarters would relocate approximately 41 miles to the south to a Service-owned and operated facility that would be constructed on Refuge lands at the Sweetwater Marsh Unit. The San Diego Bay Refuge staff would move from the existing trailer located at the Sweetwater Marsh Unit to the new offices. The existing Refuge trailer office at the Sweetwater Marsh Unit would be demolished and removed. The proposed service building would be constructed at the location of the Refuge trailer office.

The existing Refuge Complex headquarters is approximately 47 miles north of the Tijuana Slough NWR, 41 miles north of the San Diego Bay NWR-Sweetwater Marsh Unit, 42 miles north of the San Diego Bay NWR-South San Diego Bay Unit, 51 miles north of the San Diego NWR, and 70 miles south of the Seal Beach NWR. The new Refuge headquarters would be approximately seven miles north of the Tijuana Slough NWR, four miles north of the San Diego Bay NWR-South San Diego Bay Unit, 21 miles west of the San Diego NWR, and 107 miles south of the Seal Beach NWR. The current office in Carlsbad is inconveniently located away from all of the Refuges within the Refuge Complex (Table 1). The new Refuge Complex headquarters, while approximately 37 miles further away from the Seal Beach NWR, would be significantly closer and centralized to the Refuges in south San Diego County.

The Refuge Complex does not have a service building that can be used for maintenance work and storing equipment and materials. Nearly all maintenance work conducted on the individual Refuges is performed by Refuge staff or under private contract. As the Refuge Complex has grown in the last several years, the benefits of a dedicated maintenance staff and service building would increase the efficiency of the Refuge Complex.

The visitor contact station would be located within the administrative facility, and would serve as the bridge to bring visitors from the Chula Vista Nature Center onto the Refuge to explore the trails, observe wildlife, and connect people with nature. Displays that interpret the historic resources of Gunpowder Point and Sweetwater Marsh would also be located in the visitor contact station.

<b>Table 1 Current and Future Distances from Headquarters (in miles)</b>					
	<b>Tijuana Slough NWR</b>	<b>South San Diego Bay Unit</b>	<b>Sweetwater Marsh Unit</b>	<b>San Diego NWR</b>	<b>Seal Beach NWR</b>
<b>Current Headquarters (Carlsbad)</b>	47	42	41	51	70
<b>Proposed Headquarters (Gunpowder Point)</b>	7	4	0	21	107
<b>Difference between Current and Proposed Locations</b>	40 miles closer	38 miles closer	41 miles closer	30 miles closer	37 miles further away

### **1.3 Decisions to be Made and Authorities**

The Service, like other Federal agencies, must comply with NEPA. An EA is required under NEPA to evaluate the potential effects of a reasonable range of alternatives that if implemented would meet the purpose and need for the proposed action. The Service will use the EA as the basis for determining whether the proposed action to construct, operate, and maintain a new Refuge administrative facility and service building would constitute a major Federal action significantly affecting the quality of the human environment or would result in a Finding of No Significant Impact. The EA facilitates the involvement of government agencies and the public in the decision making process.

The authorities for the proposed action are the American Recovery and Reinvestment Act and the National Wildlife Refuge Administration Act, as amended (16 U.S.C. 668 dd et seq.). This project is not yet approved for funding by the Department of the Interior under the American Recovery and Reinvestment Act.

Project implementation will require the following approvals and/or actions:

- U.S. Fish and Wildlife Service - Funding for and Implementation of the Project
- U.S. Fish and Wildlife Service - Minor Amendment to the San Diego Bay NWR CCP
- U.S. Fish and Wildlife Service - Compliance with Section 7 of the Endangered Species Act
- Regional Water Quality Control Board - Notice of Intent to comply with a General Permit for Storm Water Discharges Associated with Construction Activity
- California Coastal Commission - Coastal Consistency Determination
- State Historic Preservation Office (SHPO) - Concurrence on compliance with Section 106 of the National Historic Preservation Act

A programmatic Environmental Impact Statement (EIS) was prepared for the San Diego Bay NWR Comprehensive Conservation Plan (CCP) that addressed the lands affected by the current proposal. The EIS was circulated for public review in 2006. A Record of Decision was signed in September 2006. The Final San Diego Bay NWR CCP/EIS (*USFWS 2006*) is incorporated by reference into this document and is available for review at the Complex Office (760-930-0168), located at 6010 Hidden Valley Rd., Suite 101, Carlsbad, CA, or online at <http://www.fws.gov/sandiegorefuges/new/ccp/ccp.htm>.

#### **1.4 Public Scoping and Community Involvement**

The Service will solicit comments on the draft EA from other local, state, and federal government agencies, Tribal governments, non-governmental organizations, and the public during a 30-day comment period. The Service will consider agency and public comments when analyzing the proposed action and alternatives, determining the effects to the human environment, and selecting the alternatives for implementation.

## **CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES**

### **2.1 Introduction**

This EA evaluates three alternatives including a no action alternative (Alternative A) and two alternative locations (Alternatives B and C) for the proposed administrative facility and service building (Figure 3 – Site Map). Both alternative locations share the same common dimensions for the proposed administrative facility and service building and are located generally to the northwest of the Chula Vista Nature Center and in the vicinity of what remains of the concrete kelp liquor reservoir that was once part of the Hercules Powder Company facility, which operated on Gunpowder Point between 1916 and 1919. Alternatives B and C differ in their impacts to coastal views and historical and biological resources. Under the no action alternative, an administrative facility and service building would not be constructed on Gunpowder Point and the existing refuge office trailer would continue to provide office space for two full time Refuge employees. Additionally, the CCP would not be amended to address a new location for a future Refuge Complex headquarters. The no action alternative represents the baseline from which the other “action” alternatives will be evaluated.

### **2.2 Proposed Action**

The Service proposes to construct, operate, and maintain a new single-story administrative facility that would be approximately 4,800 square feet in size and a new single-story service building that would be approximately 2,600 square feet in size. The new administrative facility would provide offices for current and projected staff located at the Refuge Complex in Carlsbad, as well as offices for the staff of the San Diego Bay NWR-Sweetwater Marsh Unit. It would also include a conference room, restrooms, storage, and a visitor contact station. The proposed service building would provide a work area to maintain and repair Refuge equipment and property. In order to analyze the potential impact of the proposed administrative facility, we used the worst-case scenario of a facility footprint of approximately 10,000 square feet to include



**Figure 3. Site Map for the Proposed San Diego NWR Complex  
Administrative Facility, Visitor Contact Station, and Service Building**



Alternative B



Alternative C



Parking



Service Building



0 100 200 Feet

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room for associated walkways, landscaping, and construction lay-down and working areas. Similarly, we used the worst case scenario of a service building with approximately 5,500 square feet to include walkways, landscaping, and construction lay-down and working areas. The combined footprint for the new administrative facility and service building and associated walkways, landscaping, and construction lay-down and working areas would encompass up to 15,500 square feet of Federal land on the San Diego Bay NWR-Sweetwater Marsh Unit. An additional 6,000 square feet of land would be needed to provide parking for Refuge Complex and Chula Vista Nature Center staff. The proposed facility would meet Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ requirements to meet the Silver standard. Twenty parking spaces would be provided to accommodate parking for Refuge Complex, Chula Vista Nature Center, and visiting staff. Visitors would park at the main Chula Vista Nature Center parking lot at E Street and would be transported to the site via the Nature Center shuttle bus. The existing Refuge trailer office, built in 1988, would be demolished and removed. The proposed service building would be constructed at the location of the Refuge trailer office.

The administrative facility would be approximately 120 feet long, 40 feet wide, and have a height of 26 feet. The service building would be approximately 65 feet long, 40 feet wide, and have a height of 25 feet. The color of the exterior walls of the proposed administrative facility would be gray and cream and the roof would be brown to harmonize with the existing exterior of the neighboring Chula Vista Nature Center.

Electrical power lines, water lines, and telephone cables would be located underground within the roadbed of Gunpowder Point Drive. Wastewater would be handled by installing an underground holding tank that would then be emptied by tank truck on a monthly or more frequent basis as needed and taken to an appropriate municipal wastewater facility for processing. Both the Chula Vista Nature Center and existing Refuge Office use underground holding tanks to temporarily hold sewage. In the future when connections become available, the new facilities would tie into the municipal sewer system.

### **2.2.1 Alternative A (No Action)**

Under the no action alternative, the Refuge administrative facility would remain in Carlsbad; Refuge staff would continue to be housed in the trailer office at the Sweetwater Marsh Unit; no Refuge service building would be constructed; and no visitor contact station would be provided. The no action alternative reflects the status quo condition.

### **2.2.2 Alternative B (Within the Concrete Kelp Liquor Reservoir Alternative)**

Under Alternative B, the administrative facility would be located within the historic concrete kelp liquor reservoir (refer to Figure 3). The historic concrete kelp liquor reservoir would be demolished and the area would be graded to match the elevation of the adjacent parking lot of the Chula Vista Nature Center. In order to provide a more appealing and visitor friendly transition from the Chula Vista Nature Center to the administrative facility (which includes the visitor contact station and future walking trail), this parking lot and associated driveway would be paved with concrete to extend the existing plaza. The six parking spaces lost as a result of the plaza extension would be replaced within the new parking area to be located adjacent to site of the existing Refuge

trailer office. The graded area would measure approximately 10,000 square feet (0.23 acre) and would be large enough to accommodate the proposed building, walkways, and other potential ancillary structures, such as a trash enclosure and utility meters. Grading would be accomplished in a manner that would allow the site to drain away from the adjacent wetland area to the north. The historic context of the concrete kelp liquor reservoir along with the remaining historic features on Gunpowder Point related to the Hercules Powder Company would be interpreted in the visitor contact station and along the interpretive trail on Gunpowder Point.

The proposed facility and construction footprint is located in an area previously disturbed by the Hercules Powder Company and does not contain any wildlife habitat. The proposed site is currently paved with concrete. A small amount of vegetation occurs in the southern end of the reservoir. Along the western berm of the concrete reservoir, the area is dominated by invasive non-native species, with some native upland vegetation.

### **2.2.3 Alternative C (East of the Concrete Kelp Liquor Reservoir Alternative)**

Under Alternative C, the proposed facilities would be located east of the concrete kelp liquor reservoir on disturbed upland habitat and would require a construction footprint of approximately 10,000 square feet (0.23 acres) (refer to Figure 3). This location, which is to the north of the Chula Vista Nature Center, is situated at an elevation of approximately 16 feet NAVD88, which is about the same grade as the Nature Center. In order to provide a more appealing and visitor friendly transition from the Chula Vista Nature Center to the administrative facility (which includes the visitor contact station and future walking trail), this parking lot and associated driveway would be paved with concrete to extend the existing plaza. A portion of the southern end of the kelp liquor reservoir would be filled to provide access from the extended plaza to the administrative facility. This site is nearly flat with a narrow dirt road running along the length of the site.

The proposed facility and construction footprint, which is located in an area previously disturbed by farming, is dominated by invasive non-native species. The large stand of non-native scrubs, *Acacia* sp., located just outside the proposed building footprint, would be removed as part of the project. Approximately 0.46 acres of previously developed and disturbed upland habitat located adjacent to the proposed building footprint would be restored to native upland vegetation, consisting of a mix of the coastal sage scrub and maritime succulent scrub species that occur elsewhere on Gunpowder Point. Grading and site preparation would occur in a manner that would direct drainage from the site away from adjacent wetland areas.

### **2.2.4 Parking**

Parking to accommodate either action alternative would be provided within the existing unpaved parking area located immediately to the east of the existing Refuge trailer office. The existing parking area would be expanded to accommodate twenty vehicles (refer to Figure 3). Grading to accommodate the expanded parking area would impact approximately 6,000 square feet of disturbed, relatively flat land. The site would be graded in a manner that would direct runoff away from adjacent wetland areas and disturbed areas outside the footprint of the parking lot would be revegetated with native

shrubs to soften the view of the parking area from Gunpowder Point Drive. The parking area would have a permeable surface.

### **2.3 Alternatives Considered But Not Further Evaluated**

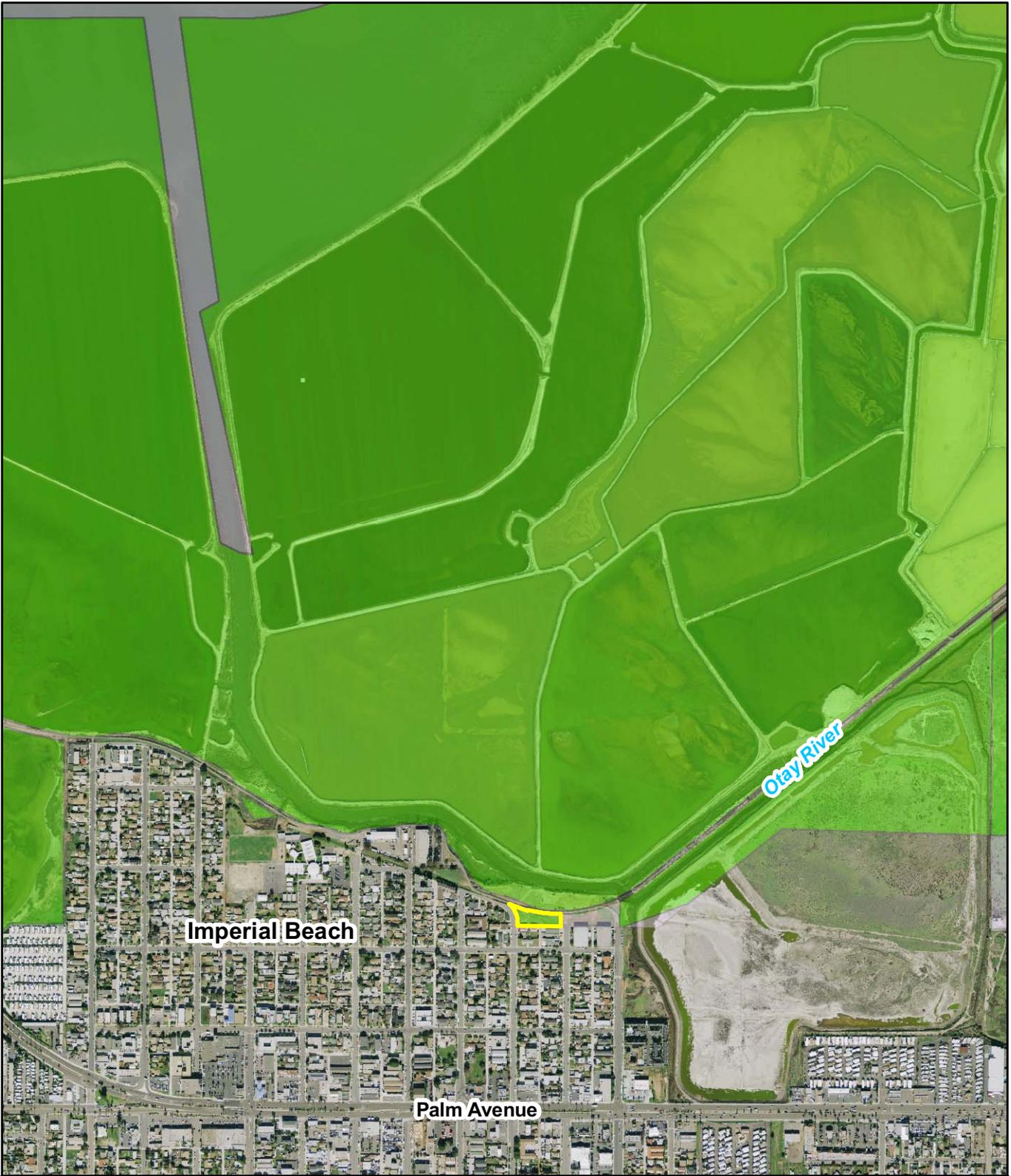
Several other locations for the proposed facility and service building on Gunpowder Point were evaluated in addition to the two sites described above. We initially considered an alignment further to the north of the Alternative B site, but rejected that location because the facility would have been located too close to the edge of Sweetwater Marsh, potentially resulting in disturbance to wildlife, particularly migratory birds and resident marsh-dependent species.

We also considered constructing the administrative facility and the service building at the site of the existing Refuge office on the south side of Gunpowder Point (refer to Figure 3). While this location would not directly affect any properties potentially eligible for nomination to the National Register of Historic Places (Feature 12 is not considered eligible for nomination), this alignment could affect the significance of the other eligible properties by interfering with the view plains of Gunpowder Point. Further, the construction of approximately 7,500 square feet of buildings in this location would be much more visible from areas surrounding the Sweetwater Marsh Unit than would the construction of the smaller 2,600-square-foot service building proposed to be located at this site and the larger 4,800-square-foot building constructed to the north of the Nature Center. Thus, we rejected locating both facilities at this location because of the potential impact to coastal views.

Constructing a two-story office building and an attached single-story service building at either of the two alternative locations was also considered. While this alternative building design would reduce the overall footprint of the project, the addition of a two-story building on Gunpowder Point would adversely affect the visual quality of the area as viewed from within the Refuge, as well as from areas located outside the Refuge. Moreover, a two-story office building would conflict with the iconic design of the Chula Vista Nature Center. Thus, we rejected a two-story office building as a viable alternative.

Use of the Chula Vista Nature Center for the Refuge Complex's administrative offices was not considered because it is not owned by the Service. The Nature Center, which is maintained and operated by the City of Chula Vista as a fully functional nature interpretive facility, is located on a 3.33-acre easement that came with the property when the Refuge was established via a Stipulated Settlement Agreement. Additionally, there is no vacant space within the existing facility to accommodate administrative offices for the Refuge Complex and no service building facilities exist or could be provided within the existing structure.

Following further analysis of the site proposed in the Final San Diego Bay NWR CCP/EIS for a Refuge Complex headquarters on South San Diego Bay Unit, we determined that the configuration of this parcel was not adequate to accommodate the current proposal (Figure 4). There were also concerns about placing an office facility immediately adjacent to single family residential development. Access to the site would have to be taken through a primarily residential neighborhood and overall accessibility to the site from major transportation corridors



**Figure 4. Headquarters Site Identified in CCP**

-  Potential Headquarters Site per San Diego Bay NWR CCP
-  San Diego Bay NWR



is poor. Finally, the distance from the site to public transit would likely discourage public transit use by staff and visitors. The site was therefore rejected from further consideration.

We also did not consider an alternative that provided a fewer number of offices or a smaller service building. This alternative would not meet the purpose and need of the Refuge Complex.

## **CHAPTER 3. AFFECTED ENVIRONMENT**

### **3.1 Introduction**

This section describes the environment that may be affected by the construction, operation, and maintenance of the new administrative facility and service building at the Sweetwater Marsh Unit of the San Diego Bay NWR. The affected environment includes important habitats and resources within and around the westernmost reaches of the Sweetwater River and Gunpowder Point. The Sweetwater Marsh Unit is made up of five distinct areas, including the F&G Street Marsh, Sweetwater Marsh, Gunpowder Point, D Street Fill, and Paradise Marsh (see Figure 2).

The construction sites under consideration for the proposed facility and service building on Gunpowder Point would be located approximately 3,500 feet north of F&G Street Marsh and approximately 4,000 feet to the southwest of Paradise Marsh. The proposed facility and service building would not be visible from either of these locations and given the distance of these areas from Gunpowder Point, none of the sensitive biological resources supported within F&G Street Marsh and Paradise Marsh would be affected.

The proposed facility and service building would be located approximately 1,600 feet south of the D Street Fill nesting site. While the new facility and service building would be visible from D Street Fill, the physical separation of these sites would result in little to no effect on the sensitive biological resources at D Street Fill. Thus, no rigorous analysis of the effects of the proposed action on F&G Street Marsh, D Street Fill, and Paradise Marsh is provided in this draft EA.

### **3.2 Regional and Historic Setting**

The Sweetwater Marsh Unit encompasses approximately 316 acres of land and water located in the southern portion of San Diego Bay in San Diego County, California. The lands and waters included within the Sweetwater Marsh Unit abut the urbanized communities of National City and Chula Vista. Refuge habitats offer resting, foraging, and nesting areas for an abundant and diverse assemblage of birds, as well as habitats that support a variety of fish and marine and terrestrial invertebrates, and a smaller array of amphibians, reptiles, and mammals.

San Diego Bay is a natural, nearly enclosed crescent-shaped embayment that originated from alluvial plains of the Otay, Sweetwater, and San Diego Rivers. The bay has a water surface area of approximately 17 square miles at mean lower low water (MLLW) and a total length of approximately 15 miles (*U.S. Navy 2000*). San Diego Bay receives minimal freshwater input and has a high evaporation rate. Freshwater contributions come primarily from the Otay and Sweetwater Rivers, with some minor input provided by several small creeks. Historically, the

bay floor and margins were characterized by sand, silt, clay, mud, and mudstone. Today, sand particles dominate the sediments at the mouth of the bay, while finer mud and silt deposits occur in the South Bay.

A significant area of historic coastal salt marsh habitat is protected along the eastern edge of the south bay within the Sweetwater Marsh Unit. This habitat supports a variety of migratory shorebirds and wintering waterfowl, as well as the endangered light-footed clapper rail, (*Rallus longirostris levipes*), a year-round resident of the marsh. The natural upland areas on this Unit, including Gunpowder Point, have experienced extensive human disturbance. The Sweetwater Marsh Unit provides habitat for two federally endangered bird species, the California least tern (*Sternula antillarum browni*) and light-footed clapper rail, one threatened species of bird, the western snowy plover (*Charadrius alexandrinus nivosus*), and one endangered plant species, salt marsh bird's beak (*Cordylanthus maritimus maritimus*). The American Bird Conservancy has designated this Refuge Unit as a Globally Important Bird Area.

### **3.3 Physical Environment**

Elements of the physical environment include climate, geology, soils, agricultural resources, topography/visual quality, hydrology/water quality, contaminants and noise.

#### **3.3.1 Climate**

Coastal San Diego County's mild, year-round climate is characterized as subtropical Mediterranean, with dry, warm summers and wet, cool winters. The average annual temperature is 60.4 °F, with an average high temperature of 67.3 ° F and an average low temperature of 53.4 ° F (*USFWS 1991*).

Along the coast, fog is common in the summer and seasonal rainfall averages 10 inches (25.4 centimeters) between November and March. Upstream in the coastal drainages the mean annual precipitation is closer to 19 inches (48.26 centimeters). Annual precipitation is extremely variable in this region. For example, over the past century annual precipitation has ranged from 3.02 inches (7.67 centimeters) to 26 inches (66.04 centimeters) at the San Diego gauge (*City of San Diego 2001*). The 3.02 inches of rainfall received in San Diego between July 1, 2001 and June 30, 2002 represents the driest year on record (*NOAA 2002*).

Winds over the bay are usually breezy (about 10 knots), although the area also experiences stronger seasonal and diurnal winds. During much of the year, westerly winds increase in the afternoon as cool air moves inland. Calmer evening and early morning easterly winds are common in the winter. Stronger winds, associated with cold fronts moving through the region, are also likely at times during the winter months. Easterly Santa Ana winds may be quite strong in the fall, driven by high pressure over inland deserts. Winds are generally greater south of the Coronado Bridge than north of it, with the greatest wind speeds in the central South Bay, west of the Sweetwater Channel (*U.S. Navy 2000*).

### 3.3.2 Climate Change and Sea Level Rise

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

These changes in climate patterns have been attributed to the accumulation of greenhouse gases in the atmosphere. Greenhouse gases trap heat in the atmosphere, which in turn heats the surface of the Earth. Some greenhouse gases occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of greenhouse gases through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities, appears to be closely associated with global warming (*State of California Office of Planning and Research 2008*).

The Intergovernmental Panel on Climate Change (IPCC) suggests that human activity affecting the atmosphere is “very likely” an important driving factor in the warming of the Earth’s climate. The earth has warmed by between 0.6 and 0.9 degrees Celsius over the past century. The IPCC’s Fourth Assessment Report (Summary for Policymakers) states, “Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.” The Report further states, “The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone (*IPCC 2007*).”

The principal greenhouse gases that enter the atmosphere because of human activities are: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and fluorinated gases (e.g., hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). Greenhouse gases emitted within the United State are derived primarily from the combustion of fossil fuels in energy use (*Energy Information Administration 2008*). Specifically, energy-related carbon dioxide emissions, resulting from the combustion of petroleum, coal, and natural gas, represented 82 percent of total U.S. anthropogenic greenhouse gas emissions in 2006 (*Energy Information Administration 2008*). Methane, which comes from landfills, coal mines, oil and natural gas operations, and agriculture, represented nine percent of total emissions; nitrous oxide represented five percent of total emissions; and the human-made gases, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride represented two percent of total emissions in 2006 (*Energy Information Administration 2008*).

In California, the State Assembly has implemented measures to avert the consequences of climate change. California Assembly Bill 32 establishes a state goal of reducing greenhouse gas emissions to 1990 levels by the year 2020 (a reduction of approximately 25 percent from forecast emission levels) with further reductions to follow. The State's plan proposes to reduce annual emissions of 14 tons of carbon dioxide equivalent per person down to about 10 tons per person by 2020. The Service has prepared a draft Climate Change Strategic Plan and Five-Year Action Plan that will include actions for reducing our carbon footprint. A draft goal of the Five-Year Action Plan is to achieve carbon neutrality by 2020, which would require a Service-wide reduction in our carbon footprint of 10 percent per year through 2019.

Current greenhouse gas emissions related to the project include travel by staff between refuge offices and headquarters, and the energy required for office related activities at the headquarters and existing Sweetwater Marsh Refuge office. Staff trips between the Carlsbad office and refuge offices in southwestern San Diego County occur approximately four to six times per week on average and approximately once per week to from the Carlsbad office to Seal Beach NWR.

Sea Level Rise. The IPCC reports that global average sea level has risen since 1961 at an average rate of 1.8 [1.3 to 2.3] millimeters per year (mm/yr) and since 1993 at 3.1 [2.4 to 3.8] mm/yr. The factors contributing to these rises in sea level include thermal expansion and melting glaciers, ice caps, and polar ice sheets. IPCC states that it is unclear whether the faster rate for 1993 to 2003 reflects decadal variation or an increase in the longer-term trend (*IPCC 2007*). Global sea level rise is a well-documented phenomenon and the rate of sea level rise is increasing (*CALFED 2007*). The CALFED Independent Science Board (*CALFED 2007*) believes the rate of sea level rise is indeed increasing, stating "the most recent empirical models project a mid-range rise this century of 70-100 centimeters (cm) (28-39 inches) with a full range of variability of 50-140 cm (20-55 inches)." This is based on modeling conducted by Rahmstorf (*2007*), who considered the relationship between global mean surface temperature and global sea-level rise in projecting sea level rise for the period 1990 through 2100. We used a projection of 1-meter of sea level rise over the next 100 years in our analysis (*IPCC 2007*).

Water levels in San Diego Bay vary with the astronomical tides and these tides are of the mixed, semi-diurnal type, with two highs and two lows of unequal height occurring each lunar day (an average duration of 24.4 hours). To date, the highest measured water level in San Diego Bay is 7.70 feet NAVD88. Current elevations on the project site range from approximately 16 feet NAVD88 near the northeast corner of the concrete reservoir to approximately 13 feet NAVD88 to the west of the concrete reservoir.

### **3.3.3 Topography/Visual Quality**

The wetlands and uplands of the Sweetwater Marsh Unit occur on a gentle westerly-sloping wave-cut abrasion terrace. The overall inclination is about 1 foot per 100 feet (*Keller 1991*). Gunpowder Point, situated higher than the surrounding marsh at about 10 to 16 feet NAVD88, is the most prominent natural upland area within the Unit. Within

the project site itself, the natural elevations range from 13 to 16 feet NAVD88 and the highest point along the existing concrete vault is approximately 23 feet NAVD88.

Gunpowder Point and Sweetwater Marsh are visible from I-5, portions of E Street in Chula Vista, Pepper Park in National City, and from across the bay along the Silver Strand. The most prominent visual features on the site as viewed from outside the Refuge include the Chula Vista Nature Center. Other features visible from within and outside the Refuge include the existing Sweetwater Marsh Refuge office trailer, interpretive elements along the public trail system, and a few non-native trees planted prior to the establishment of the Sweetwater Marsh Unit.

### **3.3.4 Geology and Soils**

Geologically, the Sweetwater Marsh Unit is situated on the westerly-sloping Nestor Terrace, one of a series of well-defined wave-cut abrasion terraces created during the Pleistocene glacial episodes (*Keller 1991*). This Unit is underlain by the Bay Point Formation, which dates to approximately 120,000 years. This geologic formation is exposed on Gunpowder Point. Overall, Gunpowder Point consists of a combination of Bay Point Formation and unnamed, nearshore, marine sandstone (*Kennedy and Tan 1977*). The lower portions of the Refuge Unit, particularly the wetland areas, consist of undifferentiated alluvium and slope wash.

Upland areas on Gunpowder Point are overlain by Huerhuero loam (*USDA 1973*). Huerhuero loam consists of sandy to clay loam and is characterized by very slow permeability and slow to medium runoff. The erosion hazard is considered slight to moderate.

### **3.3.5 Agricultural Resources**

None of the soils within this Refuge Unit are identified as having agricultural importance on the 1998 San Diego County Important Farmland Map (*California Department of Conservation 2000*). Gunpowder Point and the area to the southeast of the Refuge were farmed from about 1946 to 1986. Hothouse tomatoes were the largest crop produced on the site, although some additional row crops were planted in the 1970s and 1980s. No agricultural activities have occurred on the site since 1986.

### **3.3.6 Hydrology**

The hydrological conditions within the Refuge are influenced by tidal processes and surface water runoff (freshwater flows entering the Refuge from various rivers, creeks, and minor drainages). Tidal inundation is essential to the coastal wetland habitats supported on this Refuge. The ebb and flow of tides within the bay circulate and mix ocean and bay waters and produce currents that influence salinity levels and temperatures throughout the bay (*U.S. Navy 2000*).

The tidal conditions in San Diego Bay are measured by the National Oceanographic and Atmospheric Administration (NOAA), which operates and maintains a long-term primary tide gage at Navy Pier near downtown San Diego. This gage has been in operation since 1900. The highest observed water level in the bay, 8.35 feet MLLW (7.7 feet NAVD88), was recorded on January 27, 1983, and the lowest observed water level, -2.88 feet

MLLW, was recorded on December 17, 1973 (*National Ocean Service Data, publication data 06/03/1991*).

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

Those Refuge habitats that are located within the lowest reach of the watershed are also influenced by the quality and quantity of freshwater flows that pass through the Refuge and ultimately flow into the Bay. The Sweetwater Marsh Unit is located at the western terminus of the Sweetwater watershed and the Pueblo San Diego watershed. The Sweetwater watershed encompasses approximately 230 square miles and extends from the Bay to the Laguna Mountains. The primary tributary within this watershed is the Sweetwater River, which has undergone significant changes over the past 100 years. Changes to the historic river system include the construction of the Sweetwater Reservoir in 1888 and Loveland Reservoir in 1945. The construction of these dams has significantly reduced the volume of freshwater flowing from the watershed into the Bay. The Sweetwater Reservoir controls approximately 84 square miles of the drainage basin, while the Loveland Reservoir controls about 98 square miles of the basin. Major discharges of freshwater flows from the Sweetwater and Loveland Reservoirs occur only when the water levels in the reservoirs are high enough to permit flow over the dam spillways.

Freshwater flows from the Pueblo San Diego watershed, the smaller of the two watersheds, flows into Paradise Marsh via Paradise Creek and Bannister Creek. The drainage basin for Paradise Creek is approximately six square miles. Bannister Creek has a drainage basin of approximately 0.75 square miles. The watershed is heavily urbanized.

### **3.3.7 Contaminants**

Gunpowder Point was the site of various industrial and agricultural activities over the decades, therefore, contaminants such as metals, hydrocarbons, pesticides, and fertilizers could be present in the soil and/or the groundwater. The Service recently initiated a contaminant survey of Gunpowder Point. Preliminary results indicate the potential for arsenic in the soils, possibly from previous agricultural activities and perchlorate in the groundwater. Contaminant investigations on Gunpowder Point are ongoing.

### **3.3.8 Noise**

Existing sensitive noise receptors within the Refuge include the Chula Vista Nature Center and the Refuge's nature trails located on Gunpowder Point. The land to the east and southeast of the Refuge, referred to as the Mid-Bayfront area, is currently vacant and no development is expected to occur during the construction period for the proposed

project. Any residential development that may occur on the developable lands to the east of the Refuge in the future would be separated by more than 1,000 feet of refuge land and would be located well outside the range of audible noises expected to be generated by the project.

### 3.4 Biological Resources

#### 3.4.1 Historical and Regional Context

Historically, a network of tidal channels connected the marshes of the Sweetwater wetlands complex. This interconnected wetland complex extended from the marsh's current southern boundary northward to Paradise Creek and eastward into much of what is now National City. In addition, seasonal freshwater flows entered the marsh complex from Paradise Creek and the Sweetwater River. Over the decades, the marsh complex's tidal network has been severely altered as a result of filling for roadways and development and dredging to create shipping and flood control channels. These natural wetland systems, particularly those included in the Sweetwater Marsh Unit, are also of regional significance because they are permanently open to tidal flushing.

The native vegetation on Gunpowder Point, a natural upland area within the Sweetwater Marsh Unit, was continuously disturbed by industrial and agricultural uses from at least 1916 to 1988. As a result, only remnants of native upland vegetation still occur here.

#### 3.4.2 Habitat and Vegetation

The various habitats present within the Sweetwater Marsh Unit were determined based on information provided by in-field observations and aerial photographs. The approximate acreage of each habitat type is presented in Table 2.

<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

Source: (USFWS 2006)

The following text summarizes the predominant habitat types within the Sweetwater Marsh Unit.

#### Open Water

Little open water habitat occurs within the boundaries of the Sweetwater Marsh Unit.

#### Intertidal

Intertidal habitat includes the area between the high and low tides (+7.8 feet to -2.2 feet MLLW) and is subject to varying degrees of tidal submergence. Both intertidal mudflat and coastal salt marsh are included in this habitat type. The predominant habitat type within the Sweetwater Marsh Unit is intertidal.

#### Intertidal Flats

Intertidal flats include mudflats, sand flats, and salt flats. These flats occur between the highest high and lowest low tide zones, or generally between the lowest cordgrass and the highest eelgrass habitat areas, at approximately 3 to 0 feet MLLW in San Diego Bay. Within the Sweetwater Marsh Unit, intertidal mudflats occur along the margins of the historic Sweetwater River channel and the margins of the various tidal channels that wind through the Refuge's salt marsh habitat. Significant areas of intertidal mudflat habitat also occur immediately to the west of the Refuge boundary.

Great numbers of shorebirds assemble on the intertidal flats during low tide 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. Further, shorebirds represent a significant portion of the bird use on the mudflats during the nonbreeding period.

#### Coastal Salt Marsh

Coastal salt marsh is composed of salt tolerant vegetation and occurs in the upper intertidal zone above the mudflats and above MSL. It is within the range of regular (daily) to irregular (less than daily) tidal inundation and is exposed more than inundated. The region's semi-arid Mediterranean climate yields only limited rainfall; therefore tidal circulation is the most important water and nutrient source for this habitat. In San Diego Bay, coastal salt marsh habitat occurs between approximately +7.8 feet to +2.3 feet MLLW (*U.S. Navy 2000*). Today, the largest remaining salt marsh habitat in San Diego Bay is preserved within the Sweetwater Marsh Unit.

Coastal salt marsh habitat occurs immediately to the north, east, and south of Gunpowder Point. The closest this habitat occurs to the potential project site is approximately 271 feet to the north of Alternative B and 284 feet to north of Alternative C. This habitat provides nesting, foraging, and high-water refuge areas for a variety of resident and migratory birds, including 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, resting, and nesting. Belding's savannah sparrows are found throughout the coastal salt marsh areas of Sweetwater Marsh. Savannah sparrows

nest in patches of pickleweed and boxthorn and forage within salt marsh and intertidal mudflat habitat. This habitat also provides year-round foraging habitat for resident shorebirds, waders, and a variety of birds of prey, including northern harrier (*Circus cyaneus hudsonius*), osprey (*Pandion haliaetus carolinensis*), and an occasional peregrine falcon (*Falco peregrinus*). Other bird species characteristic of the Sweetwater Marsh Unit coastal salt marsh habitat include the great blue heron, great egret (*Ardea alba egretta*), black-crown night heron (*Nycticorax nycticorax hoactli*), willet, marbled godwit, and long-billed curlew.

Upland Transition. The highest elevations of the high marsh zone are often referred to as upland transition or upland transition marsh. This habitat zone is not considered a distinct community; rather it represents a gradient between the upper marsh and the native upland habitats of coastal sage scrub and maritime succulent scrub (*U.S. Navy 2000*). The width of the transition area is narrow and the presence of native plant species, particularly native upland species, is limited.

In the upland transition areas that still exist around the northern perimeter of Gunpowder Point, native plant species include California sagebrush, broom baccharis, bladderpod (*Isomeris arborea*), goldenbush (*Isacoma menziessi*), and lemonadeberry (*Rhus integrifolia*).

### Uplands

Upland habitat adjacent to San Diego Bay generally occurs above the areas influenced by tidal action, or above +7.8 feet MLLW. The majority of the native upland habitats that once occurred around San Diego Bay have long since been replaced by development. The few undeveloped areas that remain, including those on Gunpowder Point, have been severely impacted by years of disturbance. As a result, undeveloped uplands around the bay consist primarily of nonnative grasslands and disturbed, weedy areas. Only a few small areas of historic native vegetation remain along the edges of Gunpowder Point. Gunpowder Point does however provide opportunities for reestablishing native upland habitat adjacent to the bay's intertidal habitats.

Maritime Succulent Scrub/Coastal Sage Scrub. Despite the extent of habitat disturbance that has occurred within the upland areas of the Sweetwater Marsh Unit, remnants of maritime succulent scrub and coastal sage scrub habitat persist in several areas. Two patches of maritime succulent scrub can be observed on Gunpowder Point; one along the northeastern bluff located just to the north of the potential project sites and the other at the southeastern tip. A thin ribbon of this habitat also persists along the southern edge of Sweetwater Marsh where it abuts the northern edge of the Mid-Bayfront property. These areas are dominated by flat-top buckwheat, coast cholla (*Opuntia prolifera*), and California sagebrush. Coastal barrel cactus (*Ferocactus viridescens*) and snake cholla (*Opuntia parryi serpentina*) are also present.

The portion of Gunpowder Point located to immediately to the north and northwest of the Nature Center supports a mix of disturbed coastal sage scrub, consisting primarily of broom baccharis (*Baccharis sarothroides*), bush sunflower (*Encelia californica* and California sagebrush (*Artemisia californica*), and a variety of weedy, nonnative plants, as

described in the next section. Immediately to the west of the Alternative B site, the vegetation consists of 60 percent non-native species and 40 percent native shrubs, including bush sunflower and isolated stands of California sagebrush, broom baccharis, bladderpod (*Isomeris arborea*), goldenbush (*Isacoma menziessi*), lemonadeberry (*Rhus integrifolia*), and prickly-pear cactus (*Opuntia littoralis*). Within the Alternative B site, a small area of non-native vegetation occurs within the southern end of the abandoned concrete reservoir where soil is present to support vegetation. The vegetation present within the Alternative C site consists of approximately 75 percent non-native species and approximately 25 percent native species, including California sagebrush, and smaller amounts of bush sunflower, California buckwheat (*Eriogonum fasciculatum*), and goldenbush.

Weedy, Nonnative Upland Habitat. The non-native species located within the Alternative B site include crystalline iceplant (*Mesembryanthemum crystallinum*) and smaller stands of horehound (*Marrubium vulgare*), black mustard (*Brassica nigra*), and stinging nettle (*Urtica urens*). On the Alternative C site, the most abundant non-native species is stinging nettle, which is found in a near monotypic stand, with much smaller patches of crystalline iceplant and black and Oriental mustard (*Sisymbrium orientale*). A mix of planted native vegetation and non-native vegetation, as well as unvegetated soil occurs around the site of the existing Refuge trailer office.

### **3.4.3 Plants**

#### **Endangered, Threatened, and Rare Plants**

The Sweetwater Marsh Unit supports populations of the federally listed endangered salt marsh bird's beak, which is generally found at the upper edges of the salt marsh habitat. No populations of this species occur in proximity to the proposed project sites. The rare plant, yerba reuma (*Frankenia grandiflora*) also occurs within the Sweetwater Marsh Unit. Although common in some coastal marshes in Baja California, yerba reuma is only known to occur naturally in the United States at this location. The populations of yerba reuma that occur within the Sweetwater Marsh Unit do not occur in proximity to the proposed project sites.

#### **Exotic Plant Species**

The exotic plant species that occur on this Refuge represent remnants of past human disturbance. Exotic trees and shrubs were planted as ornamental landscape specimens and do not appear to be spreading. On the Sweetwater Marsh Unit, these exotic plants include *Acacia* sp., *Myoporum* sp., and California pepper tree (*Schinus molle*).

### **3.4.4 Wildlife**

#### **Birds**

Migratory Bird Use in Sweetwater Marsh. The coastal wetlands and aquatic habitats of southern California provide essential foraging and resting areas for a multitude of birds migrating in the Pacific Flyway. In San Diego Bay, the intertidal mudflats and coastal salt marsh habitats of Sweetwater Marsh are vital stopover areas for birds traveling along the Pacific Flyway. These habitats also provide important wintering areas for many species of shorebirds, such as long-billed curlews (*Numenius americanus*), whimbrels

(*Numenius phaeopus*), and red knots (*Calidris canutus*), and waterfowl such as black brant (*Branta bernicla*).

Breeding Birds. Within the Sweetwater Marsh Unit, the D Street Fill provides nesting habitat for the federally listed endangered California least tern. This area is currently managed to provide about 35 to 40 acres of unvegetated, sandy substrate on both Refuge and Port lands to support least tern nesting. Since 1994, least terns have regularly nested here, with nesting pair numbers fluctuating between six and 38 pairs.

The federally listed threatened western snowy plover is another ground nesting species that has historically nested on the D Street Fill. Although snowy plovers have nested here in the past, nesting attempts have been limited and sporadic. Two nests were identified in 1999 and one in 2000. No nests have been observed here since 2000 (*Patton 2006*). Recent enhancements of the habitat on D Street Fill have been completed in an effort to reestablish plover nesting on this site.

The federally listed endangered light-footed clapper and State listed endangered Belding's savannah sparrow both nest within the salt marsh habitat of the Sweetwater Marsh Unit. Neither of these species is expected to nest within the footprints of Alternatives B and C because these areas do not support salt marsh habitats. The upland areas may rarely be used the light-footed clapper rail as it moves along Gunpowder Point.

The upland areas on the Sweetwater Marsh Unit also provide nesting habitat for various hummingbird species, as well as horned larks (*Eremophila alpestris*), loggerhead shrikes (*Lanius ludovicianus*), and various other passerine species.

Birds of Prey. The northern harrier (*Circus cyaneus*) is the most common bird of prey observed on the Sweetwater Marsh Unit where it occurs year round, hunting over salt marsh and upland areas within the Refuge. Other birds of prey frequently observed include the Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and osprey (*Pandion haliaetus*). Less common, but predictable visitors to the Refuge include the American peregrine falcon (*Falco peregrinus anatum*), sharp-shinned hawk (*Accipiter striatus*), red-shouldered hawk (*Buteo lineatus*), white-tailed kite (*Elanus leucurus*), and prairie falcon (*Falco mexicanus*). Occasional visitors include the Swainson's hawk (*Buteo swainsoni*) and merlin (*Falco columbarius*). The short-eared owl (*Asio flammeus*) is a rare winter visitor to salt marsh habitat (*Unitt 2004*) and is occasionally sighted at Sweetwater Marsh. Although rare, there are also documented sightings of ferruginous hawk (*Buteo regalis*), long-eared owl (*Asio otus*) and golden eagle (*Aquila chrysaetos*). Recent observations by Refuge staff indicate that two pairs of burrowing owls (*Athene cunicularia*) have reestablished a presence on the Sweetwater Marsh Unit.

Passerines and Other Birds. Some of the passerines commonly observed on the Sweetwater Marsh Unit include the Belding's savannah sparrow, western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), western meadowlark (*Sturnella neglecta*), and California towhee (*Pipilo crissalis*). In addition, a number of

nonpasserines, including mourning doves (*Zenaida macroura*) and a variety of hummingbirds, are commonly observed. At the Sweetwater Marsh Unit, it is not uncommon to observe a belted kingfisher (*Ceryle alcyon*) in the marsh to the southwest of the Nature Center. The threatened coastal California gnatcatcher has been rarely observed in the disturbed coastal sage scrub habitat at Alternative C, but no gnatcatcher nesting has been observed on Gunpowder Point.

**Mammals**

A list of the mammal observed on the Sweetwater Marsh Unit is provided in Table 3.

**Reptiles and Amphibians**

One previous survey, conducted in 1990, included the uplands within and adjacent to the Sweetwater Marsh Unit (*Pacific Southwest Biological Services, Inc 1990*). This survey identified one native amphibian, the Pacific treefrog (*Hyla regilla*) and one exotic amphibian, the African clawed frog (*Xenopus laevis*). The African clawed frog was located in a brackish marsh, located near I-5. In addition, twelve native reptiles and one introduced lizard were identified. There were two notable reptiles, the California legless lizard (*Aniella pulchra*) and the coast horned lizard (*Phrynosoma coronatum blainvillei*). On the Sweetwater Marsh Unit, suitable habitat for the horned lizard is limited to Gunpowder Point; however, none have been observed there in recent years.

<b>Table 3 Mammals Observed on the Sweetwater Marsh Unit</b>	
<b>Common Name</b>	<b>Scientific Name</b>
Virginia opossum	<i>Didelphis virginiana</i>
Brush rabbit	<i>Sylvilagus bachmani</i>
Desert cottontail	<i>Sylvilagus audubonii</i>
San Diego Black-tailed Jackrabbit	<i>Lepus californicus bennettii</i>
California ground squirrel	<i>Spermophilus beecheyi</i>
Botta's pocket gopher	<i>Thomomys bottae</i>
San Diego pocket mouse	<i>Perognathus fallax</i>
California pocket mouse	<i>Perognathus californicus</i>
Pacific kangaroo rat	<i>Dipodomys agilis</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Dusky-footed woodrat	<i>Neotoma fuscipes</i>
Black rat	<i>Rattus rattus</i>
House mouse	<i>Mus musculus</i>
Coyote	<i>Canus latrans</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Domestic dog	<i>Canus familiaris</i>
Raccoon	<i>Procyon lotor</i>
Long-tailed weasel	<i>Mustela frenata</i>
Striped Skunk	<i>Mephitis mephitis</i>

Source: (*USFWS 2006*)

### 3.4.5 Species Assemblages in the Bay's Marine Community

#### Marine Invertebrates

A study, conducted by the Pacific Estuarine Research Laboratory in June and October of 1989, identified 27 taxa of benthic (muddy bottom dwelling) invertebrates within the intertidal areas of the Sweetwater Marsh Unit. The dominant benthic invertebrate fauna observed during this survey were species of gastropods, polychaetes, and bivalves, of which the most abundant species were barrel shell (*Acteocina incluata*), a species of polychate worm (*Polydora* sp.), and the jackknife clam (*Tagelus californianus*).

#### Fishes

The San Diego Bay NWR includes areas identified as Essential Fish Habitat for various life stages of fish species managed under the Coastal Pelagics and the Pacific Groundfish Fishery Management Plans, as defined in the Magnuson-Stevens Fishery Conservation and Management Act (the Magnuson-Stevens Act). The waters within or adjacent to the Refuge are utilized by six species addressed in these Fisheries Management Plans (FMPs), including four of the five fish managed under the Coastal Pelagics FMP (northern anchovy (*Engraulis mordax*), pacific sardine (*Sardinops sagax*), pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*)) and two of the three species managed under the Pacific Groundfish FMP (California scorpionfish (*Scorpena guttata*) and English sole (*Parophrys vetulus*)).

### 3.4.6 Endangered and Threatened Species

#### Federally-Listed Species

The federally-listed endangered and threatened species that utilize the habitats within the Sweetwater Marsh Unit of the San Diego Bay NWR are described below, with additional details in the San Diego Bay NWR CCP/EIS (*USFWS 2006*). No critical habitat has been designated on the Sweetwater Marsh Unit.

California Least Tern (*Sternula antillarum browni*). Around San Diego Bay, there are six areas where least terns nest: Lindbergh Field, Naval Air Station North Island, NBC (NAS North Island, NBC), NAB Coronado, NBC (delta beach and ocean beach), D Street Fill (Sweetwater Marsh Unit), Chula Vista Nature Reserve, and the salt pond levees within the South San Diego Bay Unit.

The closest nesting site to the proposed project is at the D Street Fill, which is located approximately 1,600 feet to the north. Use of the nesting sites at D Street Fill is regular; however, the number of least tern pairs has varied over the years. Despite increasing nest numbers, fledgling production has been fair to poor. In 2008, approximately 148 nests and 17 to 24 fledglings were documented on the site.

Light-footed Clapper Rail (*Rallus longirostris levipes*). Light-footed clapper rails inhabit coastal marshes from the Carpinteria Marsh in Santa Barbara County, California, to Bahia de San Quintin, Baja California, Mexico. These rails use coastal salt marshes, lagoons, and their maritime environs for food, shelter, and nesting. The birds nest in the lower littoral zone of coastal salt marshes where dense stands of cordgrass are present. They also occasionally build nests in pickleweed. They require shallow water and

mudflats for foraging, with adjacent higher vegetation for cover during high water (Massey et al. 1984).

Light-footed clapper rails forage in all parts of the salt marsh, concentrating their efforts in the lower marsh when the tide is out, and moving into the higher marsh as the tide advances. Foraging activity is greatest in the early morning, while vocalizing shows a strong peak just before dark. Activities are also tide-dependent. The rails are omnivorous and opportunistic foragers. They rely mostly on salt marsh invertebrates, such as beetles (*Coleoptera*), garden snails (*Helix* spp.), California hornsnailed, salt marsh snails (*Melampus olivaceus*), fiddler and hermit crabs (including *Pachygrapsus crassipes*, *Hemigrapsus oregonensis*, and probably *Uca crenulata*), crayfish, isopods, and decapods. This species may also forage on frog tadpoles (*Hyla* spp.), California killifish, and even California meadow mice (*Microtus californicus*). The rails ingest some vegetable matter, including cordgrass stems and pickleweed tips, but this is uncommon.

The light-footed clapper rail has been able to sustain a regular breeding presence in one or several of the areas of tidal salt marsh that are near or part of the Sweetwater Marsh Unit. Since the footprints of Alternatives B and C are in previously developed areas and disturbed upland habitats, no nesting by the endangered light-footed clapper rail is expected to occur.

California Brown Pelican (*Pelecanus occidentalis californicus*). The San Diego Bay NWR provides year-round foraging and roosting habitat for non-breeding pelicans. These birds can occasionally be observed foraging along the tidal channels within the Sweetwater Marsh Unit, and more often foraging over the open waters of the South Bay.

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

Salt marsh bird's beak has an upright, branched growth form with an abundance of purple pigment in its tissues. The plants of San Diego County have bare pale cream-colored flowers. A hemiparasitic plant, salt marsh bird's beak is believed to derive water and perhaps nutrients through specialized root connections with other species (USFWS 1985). It is often found in association with pickleweed, shore grass, salt grass, Frankenia, and sea lavender. The plant occurs in well-drained/well-aerated soils that dry during the summer and where the only freshwater input is rainfall. Studies indicate that freshwater influence in the spring encourages germination and that salinities at the time of germination usually cannot exceed 12 ppt. Germination and flowering usually spans May to October but can sometimes occur during the winter. Pollination by upland, native bees is considered important to seed production, and yearly population numbers depend directly on seed dispersal and a site that provides the precise conditions required for germination.

Colonies of salt marsh bird's beak are found in only a few scattered salt marsh habitats between Santa Barbara and San Diego Counties. It is currently surviving at Carpinteria Marsh, Mugu Lagoon/Ormand Beach, Upper Newport Bay, Sweetwater Marsh, Naval Radio Receiving Facility (YMCA Surf Camp site), and Tijuana Slough. This species was listed as endangered in 1970 due to destruction and degradation of southern California's coastal salt marsh systems.

Within the Sweetwater Marsh Unit, salt marsh bird's beak has been observed in Paradise Marsh and Sweetwater Marsh. No populations of this species occur in proximity to the proposed project sites.

Western Snowy Plover (*Charadrius alexandrinus nivosus*). There are only a handful of snowy plover breeding locations currently used in southern California. Well used locations include Bolsa Chica (Orange County), Camp Pendleton, Batiquitos Lagoon, NAB Coronado, Silver Strand State Beach, Naval Radio Receiving Facility, and Tijuana Estuary in San Diego County. Within the San Diego Bay NWR, snowy plover nesting occurs most years at the salt works, but typically in very low numbers and with poor success. Snowy plover nesting has also been documented on the D Street Fill in the past; however, plover nesting has not occurred there since 2000, when one nest was identified. Disturbance, predation, and inadequate access to foraging areas are the most likely reasons for this history of low nesting numbers and poor reproductive success. The footprint of Alternatives B and C are in disturbed upland habitats, no foraging habitat for the western snowy plover is present.

California Gnatcatcher (*Polioptila californica californica*). The coastal California gnatcatcher is one of three subspecies of the California gnatcatcher and is restricted to coastal southern California and northwestern Baja California, Mexico, from Los Angeles County (formerly Ventura and San Bernardino Counties) south to El Rosario. The coastal California gnatcatcher occurs almost exclusively in the coastal sage scrub, although it is also occasionally found in chaparral.

Over the past two years, one to two California gnatcatchers have been observed vocalizing in the disturbed coastal sage scrub habitat occurring on Gunpowder Point within the Sweetwater Marsh Unit. No nests have been observed. Coastal California gnatcatchers have been recorded in the vicinity of Alternative C.

### **State-Listed Species**

Four of the federally listed endangered species supported by this Refuge, 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 Sweetwater Marsh also supports the Belding's savannah sparrow, another species listed by the State of California as endangered.

Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*). The Belding's savannah sparrow is unique in that it represents one of only two wetland-dependant avian species that reside year-round in the coastal salt marshes of southern California (*Powell*

and Collier 1998). This salt marsh species is reliant upon coastal salt marsh habitat for all of its life history requirements. This subspecies ranges along the southern California coast from Santa Barbara County (Goleta Slough) in the north to El Rosario, Baja California, Mexico in the south (James and Stadtlander 1991).

Belding's surveys conducted every five years since 1986 show a regular presence, but fluctuating numbers, within the San Diego Bay NWR. Habitat fragmentation, disturbance/predation, and changing conditions within the marsh are contributors to these fluctuations. During the 2001 survey (Zemba and Hoffman 2002) identified 109 territories within the Sweetwater Marsh Unit, including seven in Paradise Marsh, 93 in Sweetwater Marsh, and nine at the F&G Street Marsh. Belding's savannah sparrows occur along the edge between Gunpowder Point and Sweetwater Marsh. The nearest suitable habitat for this species is approximately 270 feet from the proposed project footprint.

### **Species of Concern and Other Special Status Species**

**Birds of Conservation Concern.** The Sweetwater Marsh Unit supports approximately 33 avian species that have been identified as Birds of Conservation Concern by the Service (USFWS 2008). These species are included in the BCR 32 (Coastal California) List, USFWS Region 8 List, and/or the National List. Of these species, 11 species are seabirds or shorebirds; two species are raptors, including Swainson's hawk (*Buteo swainsoni*) and peregrine falcon (*Falco peregrine*); and 20 species are primarily upland species.

**Species Covered by the Multiple Species Conservation Program (MSCP).** Of the 85 species covered by the San Diego and Chula Vista MSCP Subarea Plans, 27 have been observed or have the potential to occur within the Sweetwater Marsh Unit.

## **3.5 Cultural Resources**

### **3.5.1 Introduction**

As part of the CCP process for the San Diego Bay NWR, a preliminary overview of cultural resources within the Sweetwater Marsh Unit was prepared by the Service's Cultural Resources Team (Speulda 2002). This overview was prepared to assemble known information about the cultural resources located within and near the Refuge, to identify gaps in the existing data base, and to establish procedures for ensuring compliance with all applicable cultural resource regulations.

As part of this overview, several cultural resources were identified within the Sweetwater Marsh Unit on Gunpowder Point. These resources are described below.

### **3.5.2 Archaeological Resources**

A review of the records at the South Coastal Information Center identified several archaeological investigations that have taken place within the boundaries of and on parcels adjacent to the Sweetwater Marsh Unit. The two alternative site locations (Alternatives B and C) were both surveyed as part of these previous investigations. Three recorded prehistoric archaeological sites are located within the Sweetwater Marsh Unit. These sites consist of a temporary camp (CA-SDI-4958), a lithic scatter (CA-SDI-

5512), and shell midden (CA-SDI-7454). The age of the prehistoric sites seem to relate to the early Archaic period through the ethnographic period. One of these sites, CA-SDI-4958, is located on Gunpowder Point, but the site boundaries are outside the potential area of effect of Alternatives B and C. All of the sites within the Sweetwater Marsh Unit were previously tested and evaluated for significance and none were determined to be eligible for the National Register of Historic Places (NRHP) (*Speulda 2002*).

### **3.5.3 Historic Resources**

Historic research for the San Diego Bay NWR CCP included an examination of various repositories and a review of the current listings for San Diego County on the National Register of Historic Places' website. Additionally, the California Inventory of Historic Resources (State of California), California Point of Historical Interest, and the California Historical Landmarks were consulted and historic photographs, historic maps, and vertical files of the San Diego County Historical Society Museum were examined.

Within the Sweetwater Marsh Unit, two sites containing historic artifacts have been recorded on Gunpowder Point. One of these sites contains both prehistoric and historic-period artifacts. This site was previously tested and was determined not to be eligible for the NRHP. A historic resource evaluation of the Hercules Powder Company site in Chula Vista, California was conducted in 2008 (*ICF Jones and Stokes 2008*). The study was completed in compliance with NEPA, the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470 et seq.), and the requirements set forth in Protection of Historic Properties (36 CFR 800), implementing regulations of the NHPA. The cultural resource evaluation is consistent with U.S. Fish and Wildlife Service policy 614 FW 1.

The historic resource evaluation for the Hercules Powder Company Site includes a historical overview of the Hercules plant operations, a description of the features present on the property, a clarification of the associated industrial activities for each remaining feature, and an assessment of the integrity and significance of the resource as a whole. As part of this evaluation, thirteen features were identified on Gunpowder Point, nine of which appear to be associated with the 1916-1919 Hercules Powder Company processing operation. The plant harvested kelp and processed it to produce potash and acetone to support gunpowder production during World War I. For more information about this site, refer to the Historic Resource Evaluation Report for the Hercules Powder Company Site, Chula Vista, California P-37-030176 (*ICF Jones and Stokes 2008*), available for review at the San Diego NWR Complex Office, 6010 Hidden Valley Road, Suite 101, Carlsbad, CA).

Evaluated as an archaeological site whose character-defining features are the location, setting, and association of its various visible surface components, the Hercules Powder Company site at Gunpowder Point is considered eligible for the National Register of Historic Places under Criteria A and D. The industrial activities that occurred during World War I at the Hercules Powder Company plant in Chula Vista comprised a unique and short-lived phenomenon important to the successful conclusion of the war, and the site itself has continued potential to yield additional historical information. The features

are generally in fair condition, despite the lack of a clear representation of prior function and appearance.

The Hercules Powder Company was a short-lived industry on the shores of San Diego Bay that developed quickly with a large production facility between 1916 and 1919. The processing of sea kelp into potash and acetone requires massive holding tanks, settling basins, a power plant, pipes, and storage buildings. Shortly after the plant closed many buildings and structures were demolished. Between 1926 and the 1940s a cottonseed products company operated on the property and built additional structures.

Thirteen features were identified during the survey, nine of which are associated with the original functions of gunpowder processing. Four features were found to be unrelated to the gunpowder plant. The remaining nine above ground features include: Feature 1, a concrete reservoir that measures approximately 225 feet by 100 feet; Feature 2, a settlement basin and railway spur; Feature 3, a narrow, multi-leveled concrete foundation; Feature 4, concrete screening surface vaults; Feature 5, lime additive machinery concrete foundations; Feature 7, the crystallizing kettles building foundation; Feature 10, a fusing furnace concrete shell; Feature 11, a concrete foundation of an evaporation building; and Feature 13, a pier for kelp harvest boats. However, Feature 13 is located on land managed by the Port of San Diego.

The Service recently recommended to SHPO that the eight features associated with the Hercules Powder Company that are located on the Sweetwater Marsh Unit of the San Diego Bay NWR are eligible to the NRHP based on their historic associations with a unique war-time industry and potential for additional information regarding the industrial and technological innovations developed at the plant. We are awaiting concurrence from SHPO on this recommendation.

The Area of Potential Effect (APE) for the current proposal includes Feature 1 (Concrete Kelp Liquor Reservoir) and is identified as part of the Hercules Powder Company. Less than 100 feet north-northwest of the Nature Center is Feature 1, a large concrete-lined earthen reservoir with sloped sides currently being used as staff parking and staging for the Nature Center. This feature was constructed by Hercules for storage of weak kelp liquor, the liquid portion of the fermented kelp, and wash water. Based on historic photographs, the feature was uncovered with the property fence at the east side; on the west side sat large tanks along with a two-story building and a large open, uncovered rectangular subsurface vault. The large tanks may have been the nine storage tanks that each held a capacity of 400,000 gallons. During Pacific Cottonseed's cottonseed oil operations the reservoir was covered. Referred to as the cottonseed house, it was likely in use into the 1940s (*ICF Jones and Stokes 2008*).

The existing portion of the reservoir is approximately 225 feet long and 100 feet wide, though the south end is missing. The original length appears to have been approximately 300 feet, and the reservoir was recorded to have held 2 million gallons. The interior walls slope outward and the exterior walls are exposed earth. The reservoir originally had a flat lip around its perimeter. Today, numerous two-foot square wood-formed

concrete pillars that once supported the lip are all that remain. At least fourteen pillars remain on the east side and eleven pillars remain on the west side. Six pillars are visible at the north end while the south end has been demolished. Many cracks are evident in the concrete (*ICF Jones and Stokes 2008*).

## **3.6 Social and Economic Environment**

### **3.6.1 Land Use**

The uplands of Gunpowder Point historically supported industrial and agricultural uses. Today, the primary use in this area involves the conservation of open space and wildlife habitat and the Chula Vista Nature Center. The lands and waters within the approved Refuge boundary for the Sweetwater Marsh Unit, including all of Gunpowder Point, are in Federal ownership and are managed as part of the National Wildlife Refuge System.

Gunpowder Point also supports several wildlife-dependent recreational uses, a 1,500 square-foot Refuge office trailer, and the Chula Vista Nature Center. A gated road, which extends from the terminus of E Street through undeveloped private land, and onto the Refuge, provides access to the Refuge office and the Chula Vista Nature Center. This roadway crosses through the marsh on a narrow road. No public access is permitted on the road except via a shuttle bus operated by the Nature Center. The shuttle bus transports visitors from a parking lot located near the E Street/I-5 interchange to the Nature Center, where they can explore the Nature Center and access the series of trails that extend across Gunpowder Point to the edge of the bay.

The Chula Vista Nature Center itself is situated on a 3.33-acre easement that was granted to the Redevelopment Agency of the City of Chula Vista in 1986 by the Santa Fe Improvement Company (the previous landowner of Gunpowder Point) for the purpose of constructing, operating, and maintaining a nature interpretive center. A license was also granted for access and utility purposes on the levee road. In 1988, as part of the Stipulated Settlement, the Court acknowledged the existing easement and license and required that the Santa Fe Land Investment Company convey Gunpowder Point to the Service subject to the easement and license previously granted to the City of Chula Vista.

The Nature Center includes indoor and outdoor exhibits that provide visitors with a unique opportunity to learn about the history, geology, ecology, and natural history of San Diego Bay and the Sweetwater Marsh Unit. Interactive exhibits describe the biodiversity of the marsh, surrounding wetlands, and the bay, from intertidal mudflats to uplands. Interior exhibits are provided within a 12,000-square-foot facility. Exterior exhibits include a burrowing owl aviary, bird of prey enclosures, and an enclosed shorebird exhibit that includes two breeding pairs of light-footed clapper rails. The center also includes bird-watching platforms and gardens that focus on drought-tolerant plants. An eagle enclosure and a shark and ray exhibit are recent additions to the Center.

Gunpowder Point is completely surrounded by coastal salt marsh habitat protected within the Sweetwater Marsh Unit. Beyond the marsh is D Street Fill to the north, also located within the Refuge; vacant, privately-owned uplands to the east within the jurisdictional boundaries of the City of Chula Vista; and lands and waters managed by the Port of San

Diego to the south and west. The lands and waters in and around the bay, including those within the Refuge boundary, are located within the California Coastal Zone.

### **3.6.2 Traffic Circulation/Parking**

Access to the proposed facilities would be via E Street in Chula Vista. Staff would drive into the Refuge, while visitors would use a shuttle bus to access the site. Parking for the bus is located at the western terminus of E Street. The parking area can be accessed via local streets in Chula Vista and several regional transportation corridors, including I-5 and State Highway 54. The site is also accessible via the San Diego Trolley, which stops just off of E Street to the east of I-5. The shuttle bus that serves the Nature Center parking lot also provides access to the Refuge from the trolley stop.

Information regarding current and future traffic volumes and parking availability is provided to facilitate the evaluation of how changes in current uses and activities on the Refuge could affect traffic circulation and parking in the vicinity of the Refuge.

#### **Traffic Circulation**

The current vehicle trips generated as a result of refuge-related management and public use activities, as well as the Chula Vista Nature Center, are estimated at approximately 100 trips per day. This is based on an estimated 35,000 visitors per year to the Nature Center, of which approximately 5,000 are students who arrive via a school bus, and an estimate of the number of employee, volunteer, and service related trips that are generated by both the Nature Center and the Refuge. Table 4 provides the current street classifications, design capacity at Level of Service (LOS) C, and current average daily traffic volumes (ADT) for those roadway segments that provide access to the Sweetwater Marsh Unit.

The term Level of Service is used to describe the operational conditions of a particular roadway segment or intersection. LOS is a qualitative measure that generally describes these conditions in terms of speed, travel time, freedom to maneuver, comfort and convenience, and safety (*Whitson 2000*). LOS A is typically described as free flowing; LOS B, free to stable flow with light to moderate volumes; LOS C, moderate volumes, freedom to maneuver noticeably restricted; LOS D, approaches unstable flow with heavy volumes and limited freedom to maneuver; LOS E, extremely unstable flow with maneuverability and psychological comfort extremely poor; and LOS F, heavy congestion with stop and go traffic and delays of greater than one minute per vehicle at signalized intersections.

In San Diego, the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is "D;" however, local jurisdictions, as well as Caltrans, have slightly different LOS objectives. For example, the City of Chula Vista currently has an established threshold standard of LOS C at all intersections, except for two hours per day when LOS D is permitted (*City of Chula Vista 1993*).

**Table 4  
Existing Traffic Volumes and Street Capacities  
in the Vicinity of the Sweetwater Marsh Unit**

<b>Street Segment</b>	<b>Classification</b>	<b>Capacity (thousands)</b>	<b>ADT<sup>1</sup> (thousands)</b>
<b>City of National City<sup>2</sup></b>			
24th Street (I-5 to Harrison Ave.)	2 Lane Collector w/ Dedicated Turn Lanes	20.0	10.0
Harrison Ave. (24th St. to 32nd St.)	2 Lane Collector	7.5	4.8
<b>City of Chula Vista<sup>3</sup></b>			
E Street (Bay Blvd. to I-5)	4 Lane Major	30.0	14.5
E Street (I-5 to Woodlawn Ave.)	4 Lane Major	30.0	32.2
E Street (Woodlawn Ave. to Broadway)	4 Lane Major	30.0	23.6
Bay Blvd. (E St. to F St.)	2 Lane Class II Collector	12.0	6.5
Bay Blvd. (F St. to G St.)	2 Lane Class II Collector	12.0	2.8

<sup>1</sup>SANDAG (1996 – 2000) Average Daily Trip Volumes

<sup>2</sup>Source for Classifications and Capacity, City of National City (1998)

<sup>3</sup>Chula Vista data provided by Michael Maston (pers. comm.) and David Kaplan (pers. comm.)

Based on the design capacities and current traffic volumes for the various roadway segments in the vicinity of the Refuge, the portion of E Street just to the east of I-5 is currently operating at LOS D, while the remaining segments are operating at LOS C or better. According to the San Diego Association of Governments (SANDAG) 20/30 Regional Transportation Plan (2002), I-5 is currently operating at LOS F north of Highway 54 and LOS D south of Highway 54 during peak traffic hours. Available traffic volumes on various segments of this freeway include 196.9 ADT between 24<sup>th</sup> Street and Highway 54, 146.3 ADT between Highway 54 and E Street, and 171.6 ADT between E Street and H Street (SANDAG 1996 – 2000).

**Parking**

Refuge visitors who wish to park in order to participate in wildlife dependent recreational uses in the vicinity of Sweetwater Marsh and Gunpowder Point currently use a parking lot located at the terminus of E Street, near the E Street/I-5 interchange. This parking lot, which is maintained by the City of Chula Vista for the Chula Vista Nature Center, consists of 50 marked parking spaces; however, if needed, the parking lot can be configured to accommodate 75 to 80 vehicles. The public is transported from the parking lot to the Nature Center via a transit bus. The property on which this parking lot is located is part of the Midbayfront development site. If this area is ultimately developed for urban uses, the parking lot would most likely be relocated to an area closer to the Refuge boundary. It is anticipated that a similar number of parking spaces would be provided within the new lot.

Parking is provided for Refuge employees and Service vehicles in a small, unpaved lot located across the primary access road to the east of the Refuge Office. Approximately 10 vehicles can be accommodated in this lot. Parking for an additional two to three vehicles is available immediately to the east of the Refuge office and another two or three

vehicles can be accommodated about 50 yards to the south of the Refuge office. Nine parking spaces located adjacent to the Nature Center are designated for Nature Center employees. Access for bus loading and unloading is also provided in front of the Nature Center to accommodate Nature Center visitors, as well as students participating in the various educational programs conducted by the Nature Center.

### **3.6.3 Public Utilities/Easements**

The only public utilities currently extended onto Gunpowder Point are a 12 kilovolt (kV) electrical distribution line that extends onto the Refuge within an underground conduit and a potable water distribution line. Both of these utility lines provide services to the Nature Center and Refuge office. No operational gas or sewer lines are present on the Refuge. Sewage generated at the Nature Center and Refuge office is stored in holding tanks until the sewage is pumped into a transport truck and taken to an appropriate off-site treatment facility.

### **3.6.4 Recreation**

According to the San Diego Convention and Visitors Bureau, it is estimated the San Diego region registered 26.4 million visitors in 2002. No specific data is available regarding the number of tourists and residents who visit the attractions and open space areas around San Diego Bay each year. San Diego Bay represents one of many established tourist destinations in the San Diego region. In addition to over 250 acres of open space, the bay also provides 27 miles of waterfront, 10 miles of pathways that front the bay, 22 marinas, three museums and a nature center, numerous restaurants and hotels, and a variety of unique shopping experiences. In the southern end of the bay there are opportunities to participate in a variety of recreational activities, including boating, fishing, wildlife observation, biking, hiking, and some forms of organized sports.

Although boating and fishing are permitted within San Diego Bay, these uses are not permitted on the Sweetwater Marsh Unit. Public uses that do occur on Gunpowder Point include wildlife observation, photography, interpretation, and environmental education. Trails and a bird observation area are also available for use by the public.

### **3.6.5 Economics/Employment**

San Diego has a diverse economic base that includes a strong government sector (due in part to the presence of U.S. Navy and Marines installations throughout the area) and active tourism-related industries. The service industry, which includes both personal and business services, employs the largest percentage of people in the region. The population, area, and leading industry of each community are presented in Table 6.

### **3.6.6 Environmental Justice**

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) requires each Federal agency to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its program, policies, and activities on minority and low-income populations. The U.S. Department of Housing and Urban Development (HUD) defines low income as 80

percent of the median family income for the area, subject to adjustment for areas with unusually high or low incomes or housing costs. According to the 2000 Census, the median household income in 1999 dollars was \$44,861 in the City of Chula Vista, \$66,544 in the City of Coronado, \$35,882 in the City of Imperial Beach, \$29,826 in National City, and \$44,124 in the Otay Mesa Nestor Community of the City of San Diego (*SANDAG 2002*). This compares with an estimated countywide median household income of \$47,067. An income of \$37,650 would represent 80 percent of the median family income for the region; therefore, based on the figures available, several of the communities that surround the Refuges would meet the definition of low income. For purposes of comparison, the percentage of minorities in the communities surrounding the Refuge is higher than the San Diego Region as a whole.

## **CHAPTER 4. ENVIRONMENTAL CONSEQUENCES**

### **4.1 Introduction**

This chapter provides an analysis and evaluation of the environmental consequences of implementing the alternatives described in Chapter 2 – Proposed Action and Alternatives. Impact evaluation has been conducted for each aspect of the environments described in Chapter 3 – Affected Environment, including physical, biological, historical, and socio-economic resources. The effects of implementing each alternative are described in this section.

### **4.2 Effects to Topography/Visual Quality, Agricultural Resources, and Hydrology/Water Quality**

Topics addressed under the physical environment section include direct and indirect effects to topography, visual quality, geology, soils, agricultural resources, air quality, noise, hydrology, and water quality. Cumulative effects to the physical environment are addressed in Section 4.9.2.1. The criteria used in this document to determine if a particular impact represents a significant adverse effect are present below for each topic.

- Topography – An adverse topographic effect is considered significant if grading is proposed in a highly scenic area or would alter a locally or regionally important topographic landmark, or proposed grading would substantially alter the existing landform by creating manufactured slopes higher than ten feet or steeper than 2:1 (50 percent).
- Visual Quality – A proposal that would substantially alter the natural landform or block public views to a public resource (such as San Diego Bay) from designated open space areas or public roads would be considered a significant adverse effect on visual quality.
- Geology/Soils – Impacts related to geology and soils would be considered significant if a proposed action would trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion affecting onsite facilities or adjacent facilities, such as roadway and railway embankments and bridge abutments and pilings. Impacts would also be

considered significant if a project design were more susceptible to geohazards, such as liquefaction, settlement, ground rupture, or lateral spreading.

- Agricultural Resources – A significant adverse effect on agricultural resources would occur if a Refuge action would result in the conversion of Prime Farmland or Farmland of Statewide Importance to non-agricultural use.
- Hydrology – An adverse hydrologic effect is considered significant if an action would result in increased flooding on- or off-site, a net deficit in the aquifer volume, or a reduction in the local groundwater table.
- Water Quality – Adverse impacts to water quality would be considered significant if the action would violate any water quality standards or waste discharge requirements, substantially increase downstream sedimentation, introduce contaminants (non-point source pollution) into the watershed, or otherwise substantially degrade water quality.
- Noise – An action that generates noise levels at the property line in excess of the affected city's noise standards would be considered a significant adverse effect.

#### **4.2.1 Alternative A (No Action)**

Retaining the Refuge Complex headquarters in Carlsbad will have no effect on the physical environment on Gunpowder Point. The existing Refuge office at the south end of Gunpowder Point would be retained and the areas around the trailer would continue to be used for parking.

#### **4.2.2 Alternative B**

Topography/Visual Quality. The building would be constructed on a pile foundation and structural slab. All of the excavated material from the project will be redistributed onsite and/or incorporated into the proposed landscaping plan for the site. No significant changes to the natural topographic character of the site would result from project implementation under Alternative B or as a result of expanding the parking area.

Under Alternative B, the proposed structure would be at or near a similar grade to the adjacent Chula Vista Nature Center. The proposed facility would also be visible from northern (D Street nesting area), western (Silver Strand), and eastern (I-5) vantage points but views from the south would be obscured by existing structures and vegetation located at the south end of Gunpowder Point. The Chula Vista Nature Center will continue to be the most significant visual feature in the vicinity of the project because of the considerable height of the Nature Center building. From a distance, the new structure would simply appear as a minor extension of the Nature Center. To reduce the potential for visual impacts as a result of project construction, the building would be designed to architecturally blend with the character of the area, be less than 30 feet in height, and incorporate materials and color schemes that blend with the environment and existing Nature Center structures. The current view from the Nature Center's observation deck of the concrete reservoir and cars parked on the associated concrete slab would be changed to a view of the new facility. Native landscaping would be installed around the building

to further reduce the visual effects of the building on the surrounding environment. The incorporation of these measures into the project design would reduce the potential for adverse visual effects to below a level of significance.

Replacement of Refuge trailer office with a 2,600-square-foot service building, which would be about 60 percent larger than the existing structure, would not change the already developed character to the site, but the building itself would have greater visibility from Gunpowder Point Drive. Native shrubs to be planted around the new building would help to obscure the view of the structure from surrounding areas, reducing the visual impact of the larger building to below a level of significance.

Geology/Soils. The geologic formation underlying the site and soils present on Gunpowder Point do not represent a hazard to future development on the site.

Agricultural Resources. No lands having agricultural importance would be affected by the construction, operation, and maintenance of Alternative B.

Hydrology/Water Quality. The implementation of the proposed project, including grading and site preparation, construction of the building, installation of utilities, and the provision of parking will result in the exposure of disturbed soil during construction and will require the presence of construction equipment within the project boundary. These activities could adversely affect water quality if appropriate measures are not implemented to avoid and minimize impacts to adjacent wetland areas. Potentially significant environmental effects include: 1) increased sedimentation during and immediately following grading, and 2) the generation and release of pollutants from construction equipment.

To minimize the potential for erosion and to avoid the introduction of sediment into the adjacent marsh, best management practices (BMPs), developed during final project design, will be implemented during project construction. At a minimum, the final design will incorporate the following BMPs: 1) installation of silt fencing, and if necessary fiber rolls, along the northern perimeter of the project site prior to initiating any ground disturbance; 3) minimizing ground disturbance outside the footprint of the proposed facilities to the extent feasible; 4) establishing construction staging areas and storage areas well away from wetland areas and providing appropriate barriers to ensure that no runoff from these staging areas will drain into adjacent wetland areas; 5) all disturbed areas that are not developed will be revegetated with native species within 60 days of project completion to minimize the potential for erosion.

To avoid the release of pollutants into adjacent natural areas, the following additional BMPs would be implemented: 1) construction equipment will not be stored nor will it be fueled or repaired in areas that drain into wetlands or other natural areas; 2) all equipment will be inspected for leaks immediately prior to the start of project activities and regularly inspected during construction; 3) an emergency spill response plan will be developed prior to initiation of project construction; and 4) a spill kit will be maintained on-site throughout the duration of the proposed project.

To avoid impacts following construction, the facility will be designed to direct runoff from the structure and associated parking areas away from the adjacent wetlands in Sweetwater Marsh. Runoff would be directed to south and west where it would percolate into the surrounding upland habitat. The proposed facility would be operated and maintained in a manner that will ensure that runoff continues to be directed to upland habitats and does not discharge directly into Sweetwater Marsh. In addition, the combination of dry wells to capture runoff from buildings and careful landscaping with native plants would result in minimal drainage effects and no soil erosion. All areas disturbed as a result of project implementation, with the exception of the parking lot and building pad, would be revegetated with native plants within 60 days of project completion.

The BMPs to be implemented during and after construction, including measures related to construction equipment and material and equipment staging, would reduce potential impacts related to hydrology and water quality to below a level of significance.

#### **4.2.3 Alternative C**

Topography/Visual Quality. Since this location is relatively flat, little earthwork would be necessary to provide a flat foundation pad. The structure would be constructed on a pile foundation and structural slab.

The proposed structure would be at or near the same grade as the adjacent Chula Vista Nature Center. While the new facility would be at the same grade, the roofline would be lower than the existing primary roofline profile of the Chula Vista Nature Center. The proposed facility would be visible from northern (D Street Fill), western (Silver Strand), and eastern (I-5) vantage points. Views from southern (Chula Vista boat yard) vantage points would be obscured by the Nature Center and other structures and vegetation present at the southern end of Gunpowder Point. Similar to the analysis provided for Alternative B, the Chula Vista Nature Center will continue to be the most significant visual feature in the vicinity of the project because of the considerable height of the Nature Center building. The proposed structure would be more visible from the east and north than would Alternative B. Nevertheless, from a distance, a new structure in this location would appear as a minor extension of the Nature Center. To reduce the potential for visual impacts as a result of project construction, the building would be designed to architecturally blend with the character of the area, be less than 30 feet in height, and incorporate materials and color schemes that blend with the environment and existing Nature Center structures. Native landscaping would be installed around the building to further reduce the visual effects of the building on the surrounding environment. The incorporation of these measures into the project design would reduce the potential for adverse visual effects to below a level of significance. Once constructed, no impacts to visual quality would result from the operation and maintenance of the proposed facility.

Geology/Soils. The geologic formation underlying the site and soils present on Gunpowder Point do not represent a hazard to future development on the site.

Agricultural Resources. No lands having agricultural importance would be affected by the construction, operation, and maintenance of Alternative C.

Hydrology/Water Quality. The BMPs to be implemented during construction and facility design and long-term maintenance described for Alternative B would also be implemented under Alternative C, therefore, no significant adverse effects related to hydrology and water quality are anticipated.

### **4.3 Effects Related to Climate Change and Sea Level Rise**

#### **4.3.1 Alternative A (No Action)**

Under the no action alternative, work related travel to the various refuge offices from the Carlsbad office averages about 683 miles per week and would be unchanged. No issues related to sea level rise would occur under the no action alternative.

#### **4.3.2 Alternatives B and C**

On a weekly basis, the miles driven between the headquarters office in Carlsbad to the other Refuges would reduce from approximately 683 miles to 298 miles for both Alternatives B and C. Relocation of the office would result in a 385 mile per week decrease in the amount of driving related to Refuge management, resulting in a decrease in the carbon footprint of the administrative operations of the Refuge Complex. In addition, the proposed construction would be implemented using sustainable green building and development practices and would be certified at the silver level of the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, which would further reduce the energy needs and consequently the greenhouse gas emissions associated with the project.

The highest recorded sea level in San Diego Bay is 7.71 NAVD88. Using the IPCC estimate of 1 meter (3.3 feet) of sea level rise over the next 100 years, we project a new sea level condition of approximately 11 feet NAVD88. The existing ground elevations in the vicinity of Alternatives B and C is 13 feet to 16 feet (NAVD88), which would be above the projected rise in sea level over the next 100 years. Therefore, based on currently accepted estimates, the proposed administrative facility and service building would not be directly affected by sea level rise over the anticipated life of the buildings.

### **4.4 Effects Related to Contaminants**

Contaminants investigations are ongoing at Gunpowder Point. Preliminary results indicate the potential for low levels of arsenic in the soils, possibly from previous agricultural activities, and perchlorate in the groundwater, however, no adverse effects to future occupants of the buildings are anticipated under either Alternative B or C.

Small volumes of hazardous materials and other chemicals, such as paints, petroleum-based products, solvents, herbicides, and pesticides, would be stored and used within the service building. All of these materials would be used, stored, and disposed of according to their individual Material Safety Data Sheet requirements as designated by the Occupational Safety and

Health Act. Thus, impacts from storage or use of chemicals are not expected to occur under either Alternative B or C.

## **4.5 Effects to Biological Resources**

### **4.5.1 Alternative A**

Under the No Action Alternative, no impacts to the existing biological resources on Gunpowder Point area are anticipated.

### **4.5.2 Alternative B**

The site of the proposed project under this alternative would occur in a previously developed area of considerable disturbance with minimal vegetation. We anticipate that the new administrative facility would be nearly entirely contained within the footprint of the abandoned kelp liquor reservoir. In the event minimal grading occurs to the west of the reservoir, the vegetation consists primarily of non-native species dominated by crystalline iceplant and smaller stands of horehound, black mustard, and stinging nettle. The remaining plant cover (40 percent) consists primarily of bush sunflower with a scattering of California sagebrush, broom baccharis, bladderpod, goldenbush, lemonadeberry, and prickly-pear cactus.

The level of disturbance within the project site as a result of past industrial and agricultural activity provides little to no habitat for native wildlife. Therefore, the loss of the concrete lined reservoir would not result in any significant adverse effects to wildlife, including small mammals, reptiles, amphibians, and passerine birds. The development of this site would not remove potential foraging habitat for raptors on Gunpowder Point. In the event that vegetation is removed, we would provide mitigation for the loss of disturbed upland habitat at a 2:1 ratio (enhanced habitat:impacted habitat), reducing any potential impacts related to native vegetation to below a level of significance.

The implementation and operation of the proposed facilities would not result in any impacts to sensitive plant species, including yerba reuma, which occurs at the southern most end of Gunpowder Point.

Under this alternative, the proposed facility would be located approximately 82 meters (271 feet) to the south of the wetlands in Sweetwater Marsh. Given the distance of the proposed facility from the edge of wetlands and the avoidance of any water quality impacts to the adjacent wetlands through the implementation of BMPs, the construction, operation, and maintenance of the proposed facility and service building would have no adverse effects on salt marsh dependent species, nor would the project impact any Essential Fish Habitat within San Diego Bay.

The construction, operation, and maintenance of the proposed administrative facility, service building, and expanded parking lot would have no effect on the endangered California least tern, endangered California brown pelican, threatened western snowy plover, or the threatened coastal California gnatcatcher. The proposed site does not provide any nesting, loafing, or feeding habitats for any of these federally listed species.

To reduce the potential for disturbance related impacts during the nesting season to light-footed clapper rails and Belding's savannah sparrow, major construction activities associated with the administrative facility including excavation, demolition, and pile driving, would be restricted to the non-breeding season (September 15 – February 15). The implementation of this measure would reduce the potential impacts to light-footed clapper rails and Belding's savannah sparrows during project construction to below a level of significance. The project site and all future activities associated with the project site are adequately separated from the edge of the marsh to avoid any potential direct or indirect impacts to the light-footed clapper rail and Belding's savannah sparrow following project construction.

The proposed facilities would not be located in proximity to any suitable habitat or known populations of the endangered salt marsh bird's-beak. Therefore, the implementation of this alternative would have no effect on this endangered plant.

Under Alternative B, some wildlife, such as (passerines, small mammals, and reptiles) would be disturbed and temporarily displaced during periods of construction activity. For the most part, these species would temporarily relocate on other, nearby areas of the Refuge and many should return to the site when construction is completed. The building will be designed to take into consideration the need to reduce the potential for bird strikes and trash and recycling containers will be designed to remain closed when not in use to avoid attracting potential avian predators to the area. Outdoor lighting on the site will be limited to that needed for safety and security and all light features will be fully shield to avoid the potential for light to spill into sensitive areas and contributions to night glow.

#### **4.5.3 Alternative C**

Under Alternative C, non-native and disturbed coastal sage scrub vegetation would be impacted by the construction of the proposed facility. Approximately 75 percent of the plant cover affected by the implementation of this alternative consists of non-native species dominated by a near monotypic stand of stinging nettle with smaller patches of crystalline iceplant and black and Oriental mustard. The remaining plant cover (approximately 25 percent) is characterized by native shrubs including California sagebrush, bush sunflower, California buckwheat, and goldenbush.

The impacts to vegetation and wildlife habitat that would result from the implementation of Alternative C would be greater than those described for Alternative B, with approximately 0.23 acres of disturbed upland habitat to be impacted. A small amount of disturbed coastal sage scrub habitat rarely used by the threatened coastal California gnatcatcher would be lost. Approximately 0.46 acres of native upland habitat, representing a mitigation ratio of 2:1, would be restored adjacent to the site to compensate for the 0.23-acre loss of native and non-native habitat. All other measures describe above for Alternative B, including building design, lighting, and design of trash and recycling enclosures, would also be implemented under this alternative.

To reduce the potential for disturbance related impacts during the nesting season to light-footed clapper rails and Belding's savannah sparrow, major construction activities such

as excavation, demolition, and pile driving, would be restricted to the non-breeding season (September 15 – February 15). The implementation of this measure would reduce the potential impacts to light-footed rails and Belding's savannah sparrows during project construction to below a level of significance. The project site and future activities associated with the project site are adequately separated from the edge of the marsh to avoid any potential direct or indirect impacts to the light-footed clapper rail and Belding's savannah sparrow following project construction.

The proposed facility would not be located in proximity to any suitable habitat for or known populations of the endangered salt marsh bird's-beak. Therefore, the implementation of this alternative would have no effect on this endangered plant.

## **4.6 Effects to Cultural Resources**

### **4.6.1 Alternative A**

Under the No Action Alternative, no impacts to the cultural resources on Gunpowder Point would occur.

### **4.6.2 Alternative B**

Neither the construction, operation, and maintenance of the service building, nor the expansion of the parking area would adversely affect any historic properties on Gunpowder Point. While the service building would be located on Feature 12 – Rectangular Foundation, a site evaluation of this feature concluded that it was most likely associated with the later Pacific Cottonseed occupation of the site and not a part of the Hercules Powder Company Plant site. Therefore, this Feature 12 is not considered to be eligible for listing on the NRHP. The construction of the administrative facility under Alternative B would adversely affect Feature 1 – Concrete Kelp Liquor Reservoir of the Hercules Powder Company Plant site. The Hercules Powder Company Plant site on Gunpowder Point and has been evaluated and determined to be eligible for listing on the NRHP based on its historic association with a unique war-time industry and potential for additional information regarding the industrial and technological innovations developed at the plant. Under this alternative, the southern portion of the concrete-lined earthen reservoir (Feature 1) would be removed and the footprint would be used for the proposed building. The northern 100-feet of the reservoir would be retained for future interpretive purposes to describe the historic resources of Gunpowder Point.

To reduce the cultural resource impacts of this project, specifically the removal of a portion of Feature 1, we propose to implement the following measures:

- 1) prior to project construction, Feature 1 will be photographically documented using 35 mm or large format black and white photographs and a detailed description of this feature and its associated construction method will be prepared and recorded as appropriate;
- 2) a copy of the historic resource evaluation for the Hercules Powder Company site will be provided to one or more local repositories (e.g., Chula Vista Heritage Museum,

San Diego Historical Society, Save Our Heritage Organisation, San Diego Archaeological Center); and

- 3) within three months of project implementation, we will develop interpretive materials including at least one interpretive panel to be installed along the Gunpowder Point Trail System that introduces the story of the Hercules Powder Company Plant, and a pamphlet or brochure, to be made available at the visitor contact station, that describes the processes associated with the Hercules Powder Company plant, the historic context of Feature 1, and the relationship of these features to the remaining features on Gunpowder Point that are associated with the historic Hercules Powder Company production facility.

Prior to project construction, we will enter into a Memorandum of Agreement with SHPO that will ensure the timely implementation of the mitigation measures described above. The implementation of these measures would reduce the impacts to cultural resources from the implementation of this alternative to below a level of significance.

#### **4.6.3 Alternative C**

The construction of the administrative facility under Alternative C would not affect Feature 1-Concrete Kelp Liquor Reservoir, or any other historic feature that has been deemed eligible for listing in the NRHP, therefore, no adverse effects to cultural resources would occur under this alternative.

### **4.7 Effects to Land Use and Ambient Noise Levels**

#### **4.7.1 Alternative A**

Under the no action alternative, no impacts to existing or future land uses on or surrounding Gunpowder Point would occur. However, implementation of the proposal to construct a refuge complex administrative facility within the South San Diego Bay Unit, as currently considered in the San Diego Bay NWR CCP (*FWS 2006*), could adversely affect adjacent residential neighborhood to the south and west of the potential site due to increases in activity levels and noise on the site following development of office and service building facilities.

#### **4.7.2 Action Alternatives (Alternative B and C)**

The proposed administrative facility and service building, whether constructed under Alternative B or C, would complement and be compatible with the ongoing activities at the Nature Center. Therefore, no impacts related to land use are anticipated as a result of implementing this proposal.

Although construction activity on either proposed building site, as well as at the proposed parking area, would generate noise above ambient levels, the anticipated noise levels outside the construction zone would not be sufficiently elevated to create unsafe noise levels for people visiting or working at the Nature Center. The noise levels would however represent a temporary nuisance that would last for approximately 12 months until initial site preparation and major building features are completed. Once these

aspects of the construction project are completed, construction noise levels would be minimal and following construction, the operation and maintenance of the building would have no discernible effect on ambient noise levels.

## **4.8 Effects to Traffic Circulation and Parking**

### **4.8.1 Alternative A**

The implementation of the no action alternative would not increase the number of trips currently generated from uses on Gunpowder Point, nor would it increase the demand for parking on Gunpowder Point or at the Chula Vista Nature Center parking lot.

### **4.8.2 Alternatives B and C**

The effects of implementing either Alternative B or C would be the same with respect to trip generation and increases in parking demand since the size of the building and number of employees it would accommodate would be identical. The proposed facility has the potential to accommodate up to fifteen staff members and one to two volunteers on a routine basis. This is an increase of thirteen individuals over current conditions, since two staff members are currently stationed on Gunpowder Point. Based on a trip generation rate of 10 trips per 1,000 square feet for a single tenant office building (*City of San Diego 2003*), a maximum of 48 trips per day on weekdays could be expected to be generated from the proposed development, with approximately 27 trips generated during peak traffic hours. Weekend and holiday trip generation would be limited to two to six trips per day. The effect of this limited increase in peak hour weekday trips on the surrounding roadways would be inconsequential. Therefore, the proposed project would not have any adverse effects on local or regional traffic circulation.

Under both alternatives, a maximum of twenty parking spaces would be required to accommodate Refuge and Chula Vista Nature Center staff. Volunteers would use the off-site Nature Center parking lot and then take the Nature Center shuttle bus to access the office. The additional parking would not interfere with the flow of traffic on Gunpowder Point.

Visitors to the administrative facility would continue to access the Refuge by parking at the Nature Center parking lot located at the eastern terminus of E Street. This parking lot consists of 50 marked parking spaces; however, if needed, the parking lot can be configured to accommodate 75 to 80 vehicles. Visitors would be transported from the parking lot to the Nature Center by the transit bus. The proposed Refuge Complex facility would not create a significant increase in demand for parking by visitors at the off-site Nature Center parking lot; therefore, no significant effects related to parking would occur.

## **4.9 Effects to Public Utilities/Easements and Recreation**

### **4.9.1 Alternative A**

The implementation of the no action alternative would have no effect on public utilities, easements, or recreational facilities.

#### **4.9.2 Alternatives B and C**

Construction of the facility under either Alternative B or C would not impact any public utilities, easements or recreational facilities. In addition, the proposed facility will be designed to be energy efficient (LEED Silver standard), which will minimize the project's effect on energy demand.

### **4.10 Effects to Economics/Employment/Environmental Justice**

#### **4.10.1 Alternative A**

The implementation of the no action alternative will have no effect on the area's economic or employment conditions, nor will it have any effect on environmental justice issues.

#### **4.10.2 Alternatives B and C**

Construction, operation, and maintenance of the proposed administrative facility and service building would not cause any disproportionately high and adverse human health or environmental effects on minority and low-income populations. An anticipated outcome of the new visitor contact station is an increased use of the nature trails at the Sweetwater Marsh Unit for wildlife-dependent recreation and to connect people with nature. We anticipate that many of the visitors to the new contact station will be from the surrounding communities of Chula Vista, National City, Imperial Beach, and Otay Mesa Nestor.

### **4.11 Cumulative Effects**

Cumulative effects can result from the incremental effects of a project when added to other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor but cumulatively significant actions over a period of time. The interrelated effects of separate actions under the alternatives are also considered.

#### **4.11.1 Projects Considered in the Cumulative Effects Analysis**

Various development plans, as well as habitat management plans, have or are being considered in the south San Diego Bay area that could have an effect on visual quality, noise, biological resources, traffic circulation, and the economy. These actions, which are outlined below, have been considered in this evaluation of cumulative impacts.

**San Diego Bay National Wildlife Refuge Comprehensive Conservation Plan.** The Comprehensive Conservation Plan (CCP) provides a 15-year management plan for the conservation of fish, wildlife, and plant resources and their related habitats, while providing opportunities for compatible wildlife-dependent recreational uses for the San Diego Bay NWR, including the Sweetwater Marsh and South San Diego Bay Units. The CCP, when fully implemented, should achieve refuge purposes; help fulfill the mission of the National Wildlife Refuge System (NWRS); maintain and restore the ecological integrity of the refuge and the NWRS; and meet other mandates. The CCP identifies the overarching wildlife, public use, and management needs for the refuge and proposes various actions to conserve habitat for listed species, migratory birds, and other wildlife, fish, and plants.

The selected alternative for the Sweetwater Marsh Unit recognizes the need to provide high quality habitat for the Refuge's Federally listed species, while also maintaining, and in some cases enhancing, the habitats needed to support the overall biological diversity of the Refuge. The selected alternative also includes expanded opportunities for compatible public use including wildlife observation, environmental education, and interpretation; provisions to protect cultural resources; and proposals for establishing partnerships for the stewardship of Refuge resources.

Key management proposals of the Sweetwater Marsh Unit include: 1) enhancing and restoring tidal wetlands and native uplands, 2) expanding and improving nest site management on the D Street Fill, and 3) improving opportunities for wildlife observation, photography, environmental education, and interpretation.

**Chula Vista Bayfront Master Plan.** The Port and the City of Chula Vista are currently developing plans for the redevelopment of approximately 550 acres of land and water located along the eastern edge of San Diego Bay between the Sweetwater Marsh Unit and the South San Diego Bay Unit. The 550 acres are being considered for the development of a broad range of urban uses, including high- and mid-rise residential development, commercial and office space, hotels, restaurants, major entertainment facilities, public open space, improvements to the existing harbor, and relocation of the existing boat channel in the South Bay. Issues associated with future redevelopment of this area could include the loss and/or degradation of upland, coastal wetland, and eelgrass habitats, disturbance to wildlife in and adjacent to the bay, changes to water and air quality, effects to cultural resources, increased traffic volumes, changes in the visual quality of the area, and potential effects to human health and minority or low-income populations. The final environmental impact statement/report is being prepared by the Port of San Diego and the City of Chula Vista.

**San Diego Bay Integrated Natural Resources Management Plan.** This plan, prepared by the U.S. Navy and the Port, presents a long-term management strategy for San Diego Bay. It was prepared to provide direction for the stewardship of the Bay's natural resources, while also supporting the ability of the Navy and Port to meet their missions and continue operating within the Bay. The plan's goal is to "Ensure the long-term health, recovery, and protection of San Diego Bay's ecosystem in concert with the Bay's economic, Naval, recreational, navigational, and fisheries needs." The core strategies of the plan include managing and restoring habitats, populations, and ecosystem processes; planning and coordinating projects and activities so they are compatible with natural resources; improving information sharing, coordination, and dissemination; conducting research and long-term monitoring that supports decision-making; and creating a stakeholder's committee to ensure collaborative, ecosystem-based problem-solving. The plan contains over 1,000 strategies for achieving better management of the Bay, including the protection, enhancement, and restoration of the Bay's coastal habitats. An important objective of the plan is to improve the effectiveness and success of mitigation and enhancement projects by building a consensus of prioritized need among regulators and project proponents.

**Multiple Species Conservation Planning.** The preservation of the San Diego region's biological resources is being addressed through the implementation of regional habitat conservation plans. In southwestern San Diego County, the Multiple Species Conservation Program (MSCP) will preserve a network of habitat and open space in an effort to conserve various species and protect the region's biodiversity. The MSCP is designed to preserve native vegetation and meet the habitat needs of multiple species.

Several jurisdictions and various special districts are participating in the MSCP including the City of San Diego, City of Chula Vista, and the County of San Diego. These jurisdictions have completed subarea plans that identify core biological resource areas targeted for conservation and describe specific mechanisms for implementing the preserves. To ensure the implementation of the subarea plans and the identified habitat preserves, each jurisdiction has entered into an agreement with the Service and the California Department of Fish and Game. Impacts to biological resources are managed through the various subarea plans. Compliance with the subarea plans along with conformance to federal and state regulations is intended to reduce cumulative adverse impacts to biological resources to below a level of significance.

**Restoration and Enhancement Plan for Tidelands to Benefit the Bay's Natural Resources.** The San Diego Bay Unified Port District prepared this plan in 2008 to identify opportunities to restore and enhance habitats within San Diego Bay to ensure the success of bird, fish, and invertebrate populations and to meet the goals of the Natural Resources Management Plan (see above) and Port's Compass Plan. The Plan describes restoration and enhancement opportunities that are "beyond mitigation and compliance" that could be funded by the Port's Environmental Fund. The Plan identifies several potential projects to restore habitats throughout San Diego, including the Sweetwater Marsh Unit.

#### **4.11.2 Cumulative Effects Analysis**

**Cumulative Effects to the Physical Environment.** The majority of the projects (including habitat restoration projects) included in the cumulative effects analysis involve proposals that would alter the existing topography and visual appearance of the area. As a result of these projects, modifications to the existing landform and conversion of existing uses would represent a cumulative change in the overall appearance of the eastern edge of San Diego Bay. Whether this effect is considered adverse would vary depending upon the individual observer. Some adverse effects could be mitigated through appropriate site layout, design, and landscaping. The current proposal to construct an additional facility on Gunpowder Point would add to the new development and changes occurring or planned to occur in this area of the bay. The measures incorporated into the project to ensure visual compatibility with the Chula Vista Nature Center will reduce the visual effects of this new facility to below a level of significance. Additionally, the limited scale of this structure would not contribute cumulatively to any adverse visual changes to this area of the Bay.

**Cumulative Effects to Water Quality.** Best management practices would be implemented to avoid and minimize impacts to water quality. Run-off from the site would be managed to avoid any adverse impacts to coastal salt marsh habitats. No adverse cumulative effects to water quality within Sweetwater Marsh or San Diego Bay are expected from this project.

**Cumulative Effects to Greenhouse Gases Contribution.** The location of the new facility would reduce the amount of driving among the various Refuges (even with the added distance to Seal Beach NWR). The proximity to public transportation would also reduce the contribution to greenhouse gases. The facility would be designed to meet the Silver LEED standard and the higher energy efficiency would reduce the production of greenhouse gases.

**Cumulative Effects to Biological Resources.** Many of the projects being considered for implementation in the vicinity of the Refuge could result in disturbance to wildlife. Several alternatives for the Sweetwater Marsh Unit would also result in the restoration of habitat that would provide new habitat areas that are well removed from human disturbance. Therefore, the incremental adverse effects of introducing a new facility that will bring additional people onto the Refuge would be offset by the ongoing restoration of significant acreage of new habitat areas and therefore no significant adverse cumulative effects to biological resources are anticipated from the actions occurring on the Refuge. In addition, the habitats affected by the proposed project are dominated by non-native species and no nesting habitats for listed species would be affected. The restoration proposals included in the CCP for the Sweetwater Marsh Unit would represent a substantial incremental increase in the amount of intertidal habitat within San Diego Bay, as well as an incremental increase in the amount of wetland habitat within the Pacific Flyway, specifically the CCP proposes approximately 20 acres of intertidal wetland restoration and restoration of native upland habitat throughout Gunpowder Point.

**Cumulative Effects to Cultural Resources.** Adherence to the policies and regulations pertaining to the protection of cultural and historical resources would avoid or mitigate any significant adverse effects from constructing, operating, and maintaining the new administrative facility and service building. The loss of the southern portion of the kelp liquor reservoir would contribute to the cumulative loss or alteration of historic properties within San Diego County, but the measures being implemented to address these impacts would reduce these effects to below a level of significance.

**Cumulative Effects to Social and Economic Environment.** Several of the projects being considered for development in the vicinity of the Sweetwater Marsh Unit could generate significant traffic volumes affecting the local and regional street systems. Constructing, operating, and maintaining the new administrative facility and service building would not significantly and cumulatively contribute to localized or regional traffic impacts. The construction and operation of the visitor contact station at the Sweetwater Marsh Unit would provide additional opportunities for interpretation and recreation. The new construction would result in short term construction jobs that would represent a cumulative contribution to the regional economy. The interpretive exhibits

and trailside panels would provide outreach to underserved communities. These effects would provide incremental positive cumulative effects related to environmental justice.

#### **4.12 Irretrievable and Irreversible Commitment of Resources**

The construction of the new building would represent a commitment of funds that would then be unavailable for use on other Service projects. At some point, commitment of funds to these projects would be irreversible, and once used, these funds would be irretrievable. Non-renewable or non-recyclable resources committed to the construction, operation, and maintenance of the new building would also represent irreversible and irretrievable commitments of resources.

#### **4.13 Short-Term Uses and Long Term-Productivity**

The new building would favor long term productivity over short term uses by investing Federal funds in a facility that would contribute to the long-term improved management of the San Diego National Wildlife Refuge Complex. The new administrative facility would also be more energy efficient than the current offices.

#### **4.14 Unavoidable Adverse Effects**

The construction, operation, and management of the new facility at the Sweetwater Marsh Unit are not expected to result in unavoidable adverse environmental effects. Where the potential for such effects has been identified, appropriate mitigation measures have been incorporated into the project design to reduce the effects to below a level of significance.

## **CHAPTER 5. CONSULTATION AND COORDINATION WITH OTHERS**

### **5.1 Agency Coordination and Public Involvement**

We will coordinate and consult with Federal, Tribal, State, and local agencies, non-governmental organizations, and interested members of the public during the review period for the environmental assessment.

### **5.2 Other Federal Laws, Regulations, and Executive Orders**

In undertaking the proposed action, the Service would comply with the following Federal laws, executive orders, and legislative acts: Floodplain Management (Executive Order 11988); Intergovernmental Review of Federal Programs (Executive Order 12372); Protection of Historical, Archaeological, and Scientific Properties (Executive Order 11593); Protection of Wetlands (Executive Order 11990); Management and General Public Use of the National Wildlife Refuge System (Executive Order 12996); Environmental Justice in Minority Populations and Low-Income Populations (Executive Order 12898); Hazardous Substances Determinations (Secretarial Order 3127); Endangered Species Act of 1973, as amended; Refuge Recreation Act, as amended; National Wildlife Refuge System Administration Act of 1966, as amended; National Historic Preservation Act of 1966, as amended.

### **5.3 Distribution and Availability**

This document will be available for public comment for a period of 30 calendar days. All comments must be provided to Andrew Yuen, Project Leader, U.S. Fish and Wildlife Service, San Diego National Wildlife Refuge Complex, 6010 Hidden Valley Road, Suite 101, Carlsbad, California 92011, via email to [Andy\\_Yuen@fws.gov](mailto:Andy_Yuen@fws.gov), or via fax to 760-930-0256) no later than 5:00 PM PDT on May 14, 2009. Questions regarding this document or the proposed project can be directed to Andrew Yuen at 760-930-0168.

The EA or notice of the EA has been sent to local, state, and federal agencies, Tribes, organizations, community groups, and individuals listed in Appendix A. Additional copies of these documents are available at the address provided above. This document is also posted for electronic viewing at the following website:

San Diego National Wildlife Complex Website, go to: <http://www.fws.gov/sandiegorefuges/>, under Site Navigation click on “What’s New.”

## **CHAPTER 6. PLANNING TEAM, AUTHORS, AND REVIEWERS**

### **6.1 Planning Team**

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### **6.2 Authors**

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## APPENDIX A

### **Distribution List**

The draft EA was provided to the following agencies, organizations, and interested parties for review and comment:

### **Local Libraries**

Chula Vista Public Library

### **U.S. Congress**

Honorable Barbara Boxer, U.S. Senate

Honorable Dianne Feinstein, U.S. Senate

Congressman Bob Filner, District 51

Congresswoman Susan Davis, District 53

### **California State Legislature**

Senate, Denise Ducheny, District 40

Assembly, Mary Salas, District 79

### **City Governments**

City of Chula Vista, Mayor/City Council

City of Chula Vista, Public Works

City of Chula Vista, Community Development

City of National City, Mayor

City of National City, City Manger

City of Coronado, Community Development

### **County Government**

San Diego County, Supervisor Greg Cox

### **Federal Agencies**

NOAA Marine Fisheries, Bob Hoffman

U.S. Army, Corps of Engineers

### **California State Agencies**

California State Clearinghouse

California Coastal Commission, Federal Consistency

California Coastal Commission, San Diego Office

California Department of Parks and Recreation (San Diego Office)

State Historic Preservation Office

Department of Fish and Game, South Coast

San Diego RWQCB, Region 9

### **Other Agencies**

Unified Port of San Diego

### **Tribal Governments**

Barona Band of Mission Indians

Campo Band of Mission Indians

Ewiiapaayp Band of Kumeyaay Indians

Inaja Band of Mission Indians

Jamul Indian Village

La Jolla Band of Luiseno Indians

La Posta Band of Mission Indians

**Tribal Governments (continued)**

Los Coyotes Reservation  
Manzanita Tribe of Kumeyaay Indians  
Mesa Grande Band of Indians  
Pala Band of Mission Indians  
Pauma Band of Mission Indians  
Rincon Indian Reservation  
San Pasqual Band of Indians  
Santa Ysabel Indian Reservation  
Sycuan Band of Indians  
Viejas Reservation  
Carmen Lucas  
Kumeyaay Cult. Repatriation Committee  
Kumeyaay Cultural Heritage Preservation  
Kumeyaay Cultural Historic Committee

**Organizations**

California Native Plant Society  
Chula Vista Heritage Museum  
Chula Vista Nature Center, Board of Trustees  
Coronado Cays HOA, General Manager  
Cross Roads II  
Endangered Habitats League  
Environmental Health Coalition  
Friends of the San Diego National Wildlife Refuges  
Friends of the Chula Vista Nature Center Board  
San Diego Archaeological Society  
San Diego Audubon Society  
San Diego Baykeeper  
San Diego Historical Society  
Save Our Heritage Organisation  
SWIA  
Wild Coast

**Media**

San Diego Union-Tribune  
Star News

Copies of the draft EA were also made available for review at the following location:

Tijuana Estuary Visitor Center  
301 Caspian Way  
Imperial Beach, CA 91932

Chula Vista Library, Civic Center Branch  
365 F Street  
Chula Vista, CA 91910