

U.S. Fish & Wildlife Service

California Department of Fish & Game

Draft Environmental Impact Statement/ Environmental Impact Report

*Bair Island Restoration and Management Plan
Don Edwards San Francisco Bay National
Wildlife Refuge
Bair Island Ecological Reserve*

San Mateo County, California



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APPENDIX E	Responses to Notices of Intent/Preparation

Note: Volume Two is bound separately from the main EIS/EIR text and Appendices A and B. Volume Two is available for public review at the libraries and locations listed in Section 5 of the EIS/EIR.

EIS/EIR SUMMARY

BAIR ISLAND RESTORATION AND MANAGEMENT PLAN

INTRODUCTION

Bair Island is a former tidal salt marsh that is located adjacent to the San Francisco Bay in Redwood City, San Mateo County, California. The Bair Island complex is divided into three distinct areas separated by slough channels: Inner, Middle and Outer Bair Islands. Inner Bair Island is connected to the mainland and can be reached directly by land from Whipple Avenue. Inner Bair Island is separated from Middle Bair Island by Smith Slough, which in turn is separated from Outer Bair Island by Corkscrew Slough.

Historically, Bair Island was part of a large complex of tidal marshes and mudflats within the drainage of the San Francisco Bay and Belmont Sloughs. Bair Island was diked in the late 1800s and early 1900s for agricultural uses, including cattle grazing. Bair Island was converted to salt evaporation ponds starting in 1946, and remained in active salt production until 1965. The lands were subsequently drained and eventually sold to a series of real estate development companies. A local referendum in the City of Redwood City finally halted development plans for Bair Island. The California Department of Fish and Game (CDFG) and the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) both acquired portions of Bair Island over time. The Peninsula Open Space Trust (POST) purchased most of Bair Island that remained in private ownership and turned over their interests in the property to the two agencies. The lands owned by the CDFG are included in the Bair Island Ecological Reserve. A Memorandum of Understanding (MOU) was signed in 1997 by CDFG and the Refuge agreeing that all CDFG lands on Bair Island would be operated and managed by the Refuge as a part of the Don Edwards San Francisco Bay National Wildlife Refuge. This restoration and management plan would be implemented by the Refuge on CDFG and Refuge owned lands in accordance with the MOU.

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

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

Purpose and Need

The U.S. Fish and Wildlife Service, Don Edwards San Francisco Bay National Wildlife Refuge (federal lead agency), and the California Department of Fish and Game (state lead agency) are proposing adoption of a restoration and management plan for the approximately 2,600-acre Bair Island complex in order to restore Bair Island to tidal salt marsh. The lead agencies have prepared a

Draft EIS/EIR, which describes and analyzes the potential environmental effects of the proposed restoration and management project.

National Environmental Policy Act (NEPA) implementing regulations require that each Environmental Impact Statement (EIS) briefly specify the purpose and need to which the agency is responding in proposing the various alternatives, including the proposed action. Similarly, the California Environmental Quality Act (CEQA) requires that each Environmental Impact Report (EIR) include a statement of the objectives for the proposed project. The objectives are intended to help the implementing agency develop a reasonable range of alternatives and to aid decision-makers in preparing findings or a statement of overriding considerations, if necessary. This EIS/EIR addresses the environmental impacts (effects) of five possible restoration and management alternatives.

The purpose and objective of the proposed Bair Island Restoration and Management Plan includes the following elements:

- Restore high quality tidal salt marsh habitat to Inner, Middle and Outer Bair Island in San Francisco Bay;
- Maximize the function and values of tidal salt marsh habitats in a timely manner;
- Provide habitat for endangered species and other native wildlife; and
- Enhance the public's appreciation and awareness of the unique resources of Bair Island.

The Bair Island site is a large complex of former salt evaporators, and has been a major priority for addition to the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) since the boundaries of the Refuge were expanded in 1990. The restoration of tidal habitats at Bair Island is ecologically important to South San Francisco Bay. Following restoration, Bair Island will become an integral part of the extensive wetland complex within the Refuge, as shown in Figure 3. This site, once restored, can assist with the preservation and perhaps recovery of both the California Clapper Rail and salt marsh harvest mouse. The California Clapper Rail and the salt marsh harvest mouse were listed by the US Fish and Wildlife Service as endangered species on October 13, 1970 (Federal Register 35:1604).

The project is needed because of:

- Historical losses of tidal salt marsh ecosystems and habitats in San Francisco Bay;
- Deterioration of levees, which could lead to flooding, and velocity safety issues and increased sedimentation along the Redwood Creek Shipping Channel;
- The disturbance to sensitive species including the California Clapper Rail;
- Lack of control over undesirable species including invasive plants, undesirable predators and mosquitoes;
- Increasing restoration costs associated with site deterioration;
- Increasing operation and maintenance costs; and
- Limited opportunities in South San Francisco Bay for wildlife-oriented recreation.

ALTERNATIVES

Based upon the existing site conditions, objectives, constraints and the public concerns identified during preparation of the Bair Island Restoration and Management Plan, a range of alternatives were

identified. Five alternatives were ultimately selected for full evaluation, including the No Action Alternative. Each alternative assumes a 50-year planning horizon, consistent with that used by other bayland restoration projects in the San Francisco Bay Area. The four project levels or “action” alternatives differ in the restoration approach and degree of public access. The following descriptions briefly summarize the alternatives. A more detailed discussion can be found in *Section 2* of this document.

- **No Action Alternative**

The No Action Alternative would restore tidal action to, and create tidal salt marsh habitat at Middle and Outer Bair Islands. On Inner Bair Island, the Refuge would only undertake minor repairs to the existing levee to protect the South Bayside System Authority (SBSA) sewer line and the San Carlos Airport safety zone. The Refuge would work with the Airport and the SBSA to protect their infrastructure. There would be no tidal action occurring on Inner Bair Island; therefore, no tidal marsh habitat would be created.

On-going levee maintenance at Middle and Outer Bair Islands would be discontinued. More frequent dredging would be required in Redwood Creek Shipping Channel to maintain the same channel depth for deep-draft navigation. Also, high tidal flows through Smith Slough at Pete’s Outer Harbor would increase current velocities above those recommended for small water craft navigation.

In the short-term, (approximately five years) public access for pedestrians, bicyclists and pets (dogs only on six-foot leash) would be allowed to continue on Inner Bair Island along the existing 3.3-mile levee trail and 0.5-mile connector trail from parking lot to Inner Bair Island trailhead. The Refuge would not maintain the existing trails, signs, and gates as they deteriorate. Therefore, after approximately five years, no trails would be accessible to the public because it is predicted that the lack of maintenance would result in unsafe trail conditions.

In the long term, no public access to Inner, Middle or Outer Bair Islands would be allowed.

Fishing and boating would not change in the short term. However, as the levees of Middle and Outer Bair Islands wear down and breach, the tidal prism would increase, leading to an increase in peak current velocities. This could result in exceeding safe navigation requirements for small water craft which would be unsuitable for fishing and boating.

The Refuge’s Bair Island parking lot near Pete’s Harbor would be closed, once public access is no longer allowed. No trail improvements would be made. No additional public access infrastructure would be constructed.

- **Alternative A: Tidal Marsh Restoration and Moderate Public Access (*Proposed Action*)**

The following list briefly summarizes the restoration and recreation access approach for Alternative A.

Restoration Approach

- Restores full tidal inundation to Inner, Middle, and Outer Bair Island through systematic breaching.

- Channel modifications would be made at Smith and Corkscrew Sloughs including the installation of a flow-blockage control structure in Smith Slough in order to restore its historic meander through Inner Bair Island, and a flow restrictor in Corkscrew Slough that would partially block the slough in order to reduce unsafe flow velocities during tidal changes and prevent increased in sedimentation rates in the Redwood Creek Shipping Channel.
- Dredged material would be used to raise the marshplain elevation on Inner Bair Island prior to breaching in order to reduce bird strike hazards for the San Carlos Airport and to protect the South Bayside System Authority (SBSA) sewer line.

Recreation Approach

- Public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 2.7-mile levee trail and 0.5-mile connector trail from the parking lot to Inner Bair Island trailhead.
- Pets (dogs only) would be allowed on Inner Bair Island on a six-foot leash and on designated trails for a test period to determine compliance with refuge regulations designed to protect wildlife.
- Public access would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and by boat to a viewing platform on Middle Bair.
- Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land.
- In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph.
- Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.

- **Alternative B: Tidal Marsh Restoration and Restricted Public Access**

The restoration approach for Alternative B is the same as discussed under Alternative A. The following list briefly summarizes the restoration and recreation access approach for Alternative B.

Restoration Approach

- Restores full tidal inundation to Inner, Middle, and Outer Bair Island through systematic breaching.
- Channel modifications would be made at Smith and Corkscrew Sloughs including the installation of a flow-blockage control structure in Smith Slough in order to restore its historic meander through Inner Bair Island, and a flow restrictor in Corkscrew Slough that would partially block the slough in order to reduce unsafe flow velocities during tidal changes and prevent increased in sedimentation rates in the Redwood Creek Shipping Channel.
- Dredged material would be used to raise the marshplain elevation on Inner Bair Island prior to breaching in order to reduce bird strike hazards for the San Carlos Airport and to protect the South Bayside System Authority (SBSA) sewer line.

Recreation Approach

- Public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 1.8-mile levee trail and 0.5-mile connector trail from parking lot to Inner Bair Island trailhead.
- No pets would be allowed on Bair Island.

- Public access would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and by boat to a viewing platform on Middle Bair.
 - Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land.
 - In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph.
 - Seasonal closure to all boat access would be implemented to protect sensitive species (harbor seals).
 - Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.
- **Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access**

The recreational access approach for Alternative C is the same as discussed under Alternative A. The following list briefly summarizes the restoration and recreation access approach for Alternative C.

Restoration Approach

- Restores full tidal inundation to Middle, and Outer Bair Island through systematic breaching.
- Creates managed wetlands at Inner Bair Island.
- Channel modifications would be made at Corkscrew Slough and Smith Slough involving the installation of a flow restrictor that would partially block the sloughs in order to reduce unsafe flow velocities during tidal changes and prevent increased in sedimentation rates in the Redwood Creek Shipping Channel.
- Smith Slough would not be restored to its historic meander through Inner Bair Island.
- Hydraulic control structures (*i.e.*, slide-flap gates, float-activated gates) would be installed on Inner Bair Island to allow water management within Inner Bair.
- A managed complex of diked salt marsh, uplands and shallow seasonal wetlands is planned.
- Regular maintenance would be required to maintain the hydraulic structures in working order. Maintaining public access would require periodic levee repair.
- A low berm would be built around the Airport property to prevent flooding and the levee containing the SBSA sewer line would be widened as necessary to prevent erosion.

Recreation Approach

- Public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 2.7-mile levee trail and 0.5-mile connector trail from parking lot to Inner Bair Island trailhead.
- Pets (dogs only) would be allowed on Inner Bair Island on a six-foot leash and on designated trails for a test period to determine compliance with refuge regulations designed to protect wildlife.
- Public access would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and by boat to a viewing platform on Middle Bair.
- Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land.
- In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph.

- Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.
- **Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access**

The restoration approach for Alternative D is the same as discussed under the Alternative C. The recreational access approach for Alternative D is the same as discussed under the Alternative B. The following list briefly summarizes the restoration and recreation access approach for Alternative D.

Restoration Approach

- Restores full tidal inundation to Middle, and Outer Bair Island through systematic breaching.
- Creates managed wetlands at Inner Bair Island.
- Channel modifications would be made at Corkscrew Slough and Smith Slough involving the installation of a flow restrictor that would partially block the sloughs in order to reduce unsafe flow velocities during tidal changes and prevent increased in sedimentation rates in the Redwood Creek Shipping Channel.
- Smith Slough would not be restored to its historic meander through Inner Bair Island.
- Hydraulic control structures (*i.e.*, slide-flap gates, float-activated gates) would be installed on Inner Bair Island to allow water management within Inner Bair.
- A managed complex of diked salt marsh, uplands and shallow seasonal wetlands is planned.
- Regular maintenance would be required to maintain the hydraulic structures in working order. Maintaining public access after breaching would require periodic levee repair.
- A low berm would be built around the Airport property to prevent flooding and the levee containing the SBSA sewer line would be widened as necessary to prevent erosion.

Recreation Approach

- Public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 1.8-mile levee trail and 0.5-mile connector trail from parking lot to Inner Bair Island trailhead.
- No pets would be allowed on Bair Island.
- Public access would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and by boat to a viewing platform on Middle Bair.
- Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land.
- In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph.
- Seasonal closure to all boat access would be implemented to protect sensitive species (harbor seals).
- Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.

All of the alternatives including the No Action Alternative would eventually restore tidal action and create tidal salt marsh habitat, except at Inner Bair Island, where no tidal action would be restored under the No Action Alternative. The key differences between the alternatives are in how quickly tidal salt marsh habitat is created, how much is ultimately restored, and the quality of the restored habitat.

The No Action Alternative would restore the least amount of high quality salt marsh habitat in the longest amount of time. Alternative A and Alternative B would create the greatest amount of high quality tidal marsh habitat in the shortest amount of time.

The public trails for Alternative A and Alternative C would consist of approximately 3.2 miles of trails. Alternative B and D would include 2.3 miles of trails. The No Action Alternative would result in no changes to the existing 3.8 miles of trails in the short term, but the public trails would be eliminated in the long term, under the No Action Alternative. Alternatives A and C, and the No Action Alternative would allow dogs on the Inner Bair Island trails while Alternatives B and D would not allow dogs. Alternatives B and D would implement a seasonal slough closure to all boat access in order to protect sensitive species (harbor seals).

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NEPA Council on Environmental Quality (CEQ) Regulations, CEQA Guidelines, and professional judgment were used during the evaluation of environmental consequences to assess whether or not the alternatives would result in significant impacts. Both context and intensity were considered when establishing the level of significance. The context means that the significance of an action must be analyzed in several contexts, such as the locale in which the project site is located. The intensity refers to the severity of the impact.

A summary of the impacts associated with each of the alternatives, and the level of significance and mitigation measures for each is contained in Table S-1 below. None of the Action Alternatives (Alternative A, B, C and D) would result in significant adverse impacts that could not be mitigated to less than significant levels. The No Action Alternative would result in significant adverse impacts which could not be mitigated to less than significant levels (increased siltation of the Redwood Shipping Channel, increased flow velocities at Pete's Outer Harbor, and loss of recreational facilities). All the alternatives would result in significant beneficial impacts (restored tidal marsh providing habitat for wildlife including endangered species).

Environmentally Preferred/Superior Alternative

NEPA states that an EIS shall identify the environmentally preferable alternative from the range of alternatives considered. The environmentally preferable alternative is the alternative that best promotes the national environmental policy expressed in NEPA. This means the alternative that causes the least damage to the environment and best protects biological and physical resources. CEQA Guidelines state that an EIR shall identify an environmentally superior alternative. In addition, if the No Project alternative is identified as environmentally superior, then the EIR also must identify the environmentally superior alternative among the other alternatives.

As this is a restoration project, all Action Alternatives by definition would benefit the biological and physical environment and are designed to enhance the natural resources in the project area. However, Alternative B (Tidal Marsh Restoration and Restricted Public Use) is considered the environmentally preferred alternative because it would result in the highest quality tidal marsh habitat in the quickest amount of time and would cause the least amount of public disturbance to special-status species. Alternative A would have the same results in habitat restoration but would have a higher potential for disturbance to special-status species because Alternative A would allow dogs, and includes longer segments of trails adjacent to restored marsh habitats and does not include seasonal closure of sloughs to protect harbor seals. Alternatives C and D would also restore high

quality tidal marsh habitat but would not restore as much as Alternative A and Alternative B and thus would reduce available California Clapper Rail habitat in the long-term. Construction-related impacts for Alternative B would be equivalent to Alternatives A, C and D.

The No Action Alternative is not considered the environmentally preferable alternative because of the continued deterioration of the site and hydrology, land use, socio-economic, geology, recreation, and public health and safety impacts.

Issues of Known Controversy

At this time, concern has been expressed to the Refuge from the public regarding dog use and public recreation at Bair Island.

Table S-1: Summary Comparison of Impacts and Mitigation Measures

Resources, Impacts, and Mitigation Measures	Impact Level by Alternative				
	No Action	Alter. A	Alter. B	Alter. C	Alter. D
Vegetation and Wildlife					
Temporary Loss of Tidal Salt Marsh	LTS	NA	NA	NA	NA
Conversion of Diked Salt Marsh to Tidal Salt Marsh (and/or Tidal Mudflat under No Action)	LTS / B	LTS / B	LTS / B	LTS / B	LTS / B
Loss of Tidal Salt Marsh	NA	LTS / B	LTS / B	LTS / B	LTS / B
Loss of Seasonally Poned Wetlands	NA	LTS	LTS	LTS	LTS
Loss of Congdon's Tarplant	LTS	LTS	LTS	LTS	LTS
Impacts to the Salt Marsh Harvest Mouse	NA	LTS / B	LTS / B	LTS / B	LTS / B
Impacts to Breeding California Clapper Rails During Construction	NA	LTS / B	LTS / B	LTS / B	LTS / B
Disturbance to California Clapper Rails	LTS	LTS	LTS	LTS	LTS
Loss of Harbor Seal Haul-out Access	NA	LTS	LTS	LTS	LTS
Hydrology and Water Quality					
Modification of Surface Drainage Patterns	S*	LTS / B	LTS / B	LTS / B	LTS / B
Increases in Flow Velocities at Pete's Outer Harbor	S*	LTS	LTS	LTS	LTS
Protection of Infrastructure on Inner Bair	NA	LTS / B	LTS / B	LTS / B	LTS / B
Short-Term Flooding Impacts	NA	LTS	LTS	LTS	LTS
Long-Term Flooding Impacts	NA	LTS	LTS	LTS	LTS
Short-Term Drainage Impacts	NA	LTS	LTS	LTS	LTS
Incremental Changes to Hydrology at Bair Island	NA	LTS	LTS	LTS	LTS
Undermining Steinberger Slough Levees	NA	LTS	LTS	LTS	LTS
Short-Term Construction-Related Water Quality Impacts	NA	LTS	LTS	LTS	LTS
Water Quality Impacts Associated with Placement of Dredged Material	NA	LTS	LTS	NA	NA
Increased Salinity Levels	NA	LTS	LTS	LTS	LTS
Improved On-site Water Quality	NA	LTS / B	LTS / B	LTS / B	LTS / B
Land Use					
Consistent with Applicable Land use plans and adjacent land uses	S*	LTS	LTS	LTS	LTS
Air Quality					
Long-term Air Quality Impacts	NI	LTS	LTS	LTS	LTS

Significance determinations: NI= No Impact, LTS = Less Than Significant, S = Significant, B = Beneficial (NEPA), NA = Not Applicable * All significant impacts are reduced to a less than significant level with mitigation or are listed under the No Project Alternative (because this alternative would result in no project being implemented, no mitigation is proposed if this occurs).

Table S-1: Summary Comparison of Impacts and Mitigation Measures (cont.)

Resources, Impacts, and Mitigation Measures	Impact Level by Alternative				
	No Action	Alter. A	Alter. B	Alter. C	Alter. D
Socio-economic and Environmental Justice					
Impacts to Port of Redwood City	S*	LTS	LTS	LTS	LTS
Impacts to Pete's Outer Harbor Marina	S*	LTS	LTS	LTS	LTS
Geology					
Geologic features which pose a substantial hazard to property and/or humans life	NA	LTS	LTS	LTS	LTS
Erosion and Siltation	S*	LTS	LTS	LTS	LTS
Public Health and Safety					
Mosquito Abatement	LTS	LTS / B	LTS / B	LTS / B	LTS / B
Hazardous Materials Contamination or from the Storage, Use and/or Disposal of Hazardous Materials	NA	LTS	LTS	LTS	LTS
Airport Safety Hazards	NA	LTS	LTS	LTS	LTS
Electromagnetic Field (EMF) Hazards	LTS	LTS	LTS	LTS	LTS
Cultural Resources					
Impacts to Cultural Resources <u>Mitigation:</u> If cultural resources are encountered, construction would be halted and appropriate authorities would be contacted	S	S	S	S	S
Visual/Aesthetic Considerations					
existing visual character or quality of the site and its surroundings	NI	LTS	LTS	LTS	LTS
Construction					
Navigable Waterway Impacts	NA	LTS	LTS	LTS	LTS
Impacts to Business and Utilities During Construction	NA	LTS	LTS	LTS	LTS
Air Quality Impacts During Construction <u>Mitigation:</u> feasible construction dust control measures that would be implemented during construction of the project	NA	S	S	S	S

Significance determinations: NI= No Impact, LTS = Less Than Significant, S = Significant, B = Beneficial (NEPA), NA = Not Applicable

* All significant impacts are reduced to a less than significant level with mitigation or are listed under the No Project Alternative (because this alternative would result in no project being implemented, no mitigation is proposed if this occurs).

Table S-1: Summary Comparison of Impacts and Mitigation Measures (cont.)

Resources, Impacts, and Mitigation Measures	Impact Level by Alternative				
	No Action	Alter. A	Alter. B	Alter. C	Alter. D
Recreational					
Consistency with Existing or Proposed Public Access Plans	S*	LTS	LTS	LTS	LTS
Impacts to Recreational Facilities	S*	LTS	LTS	LTS	LTS
Cumulative					
Invasion of Atlantic Cordgrass (<i>Spartina</i>) Impacts Mitigation: compliance with <i>Spartina</i> Control Program	S*	S	S	S	S
<i>Hydrology and Water Quality</i> Impacts to Mudflat Habitat	LTS	LTS	LTS	LTS	LTS
Impacts to Flooding	S*	S	S	S	S

Significance determinations: NI= No Impact, LTS = Less Than Significant, S = Significant, B = Beneficial (NEPA), NA = Not Applicable

* All significant impacts are reduced to a less than significant level with mitigation or are listed under the No Project Alternative (because this alternative would result in no project being implemented, no mitigation is proposed if this occurs).

SECTION 1. INTRODUCTION

1.1 Overview

Bair Island is a former tidal salt marsh that is located adjacent to the San Francisco Bay in Redwood City, San Mateo County, California, as shown in Figures 1, and 2. Historically, Bair Island was part of a large complex of tidal marshes and mudflats within the drainage of the San Francisco Bay and Belmont Sloughs. Bair Island was diked in the late 1800s and early 1900s for agricultural uses, including cattle grazing. Bair Island was converted to salt evaporation ponds starting in 1946, and remained in active salt production until 1965. The lands were subsequently drained and eventually sold to a series of real estate development companies. A local referendum in the City of Redwood City finally halted development plans for Bair Island. The California Department of Fish and Game (CDFG) and the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) both acquired portions of Bair Island over time. The Peninsula Open Space Trust (POST) purchased most of Bair Island that remained in private ownership, and turned over their interests in the property to these two agencies.

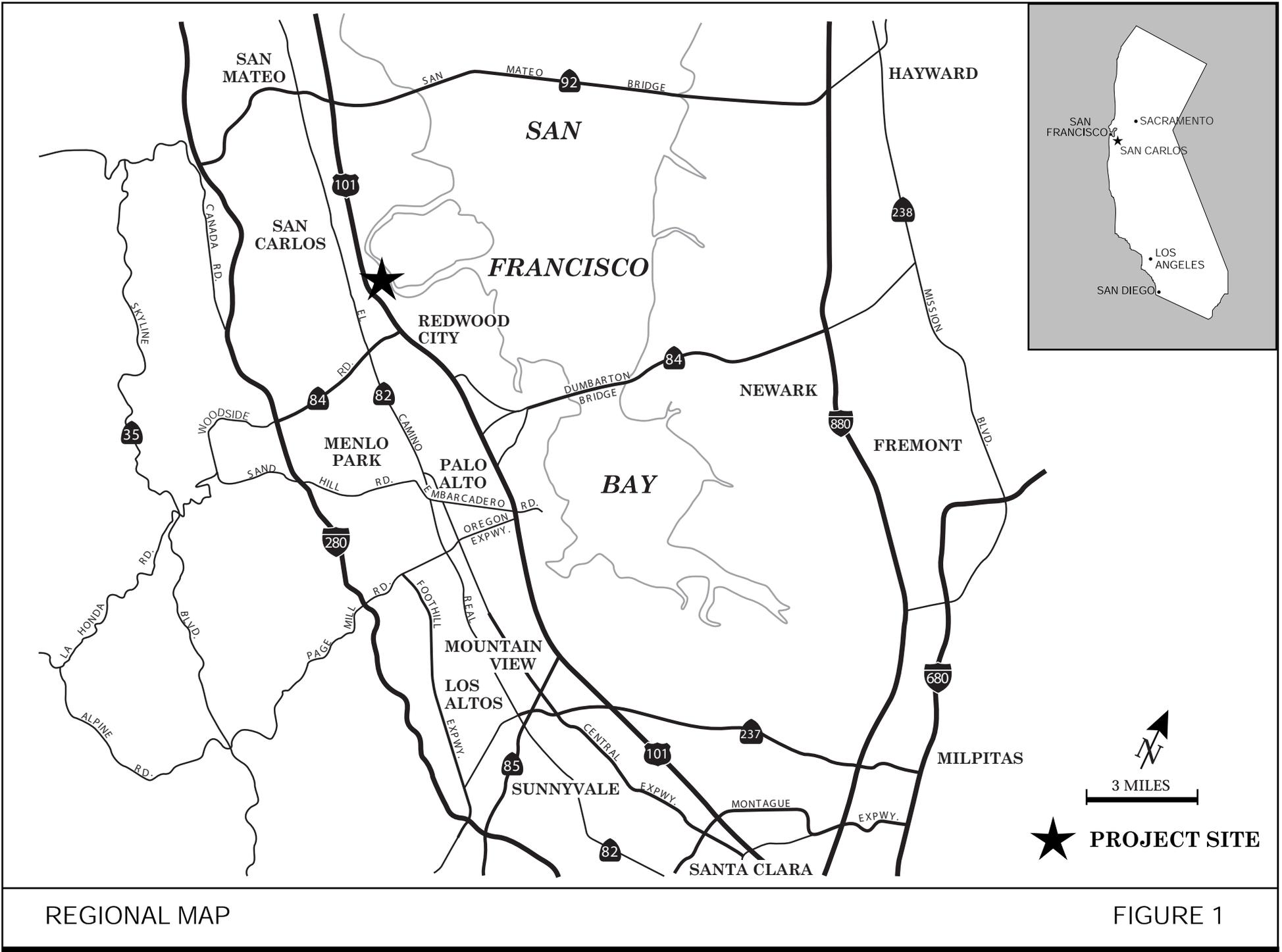
Small parcels of land on Middle Bair Island along Redwood Creek remain in private ownership, refer to Figure 3. A small area of the Bay outside of Outer Bair Island is privately owned. The San Carlos Airport also retains a portion of Inner Bair Island as a flight safety zone. In addition, two easements exist on Bair Island: (1) for the PG&E towers and transmission lines that run throughout the site, and (2) for the South Bayside System Authority (SBSA) sanitary sewer force main that runs underneath most of the southern part of the levee on Inner Bair Island. Pedestrians and bicyclists currently use the top of the Inner Bair Island levee as a 3.3-mile loop trail and in the dry season use a cross pond trail from the Whipple Avenue trailhead to the levee along Smith Slough.

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

Until June 2003, pedestrians and bicyclists would reach the trailhead to the Inner Bair Island levees from an unpaved area used for parking at the end of Whipple Avenue. As part of Caltrans' U.S. 101 Auxiliary Lanes Project from Ralston Avenue to Marsh Road, Caltrans closed off this area to parking. Visitors are now directed to park at the existing Refuge Bair Island parking lot along Bair Island Road and walk along the connector trail to the trailhead for Inner Bair Island at the end of Whipple Avenue.

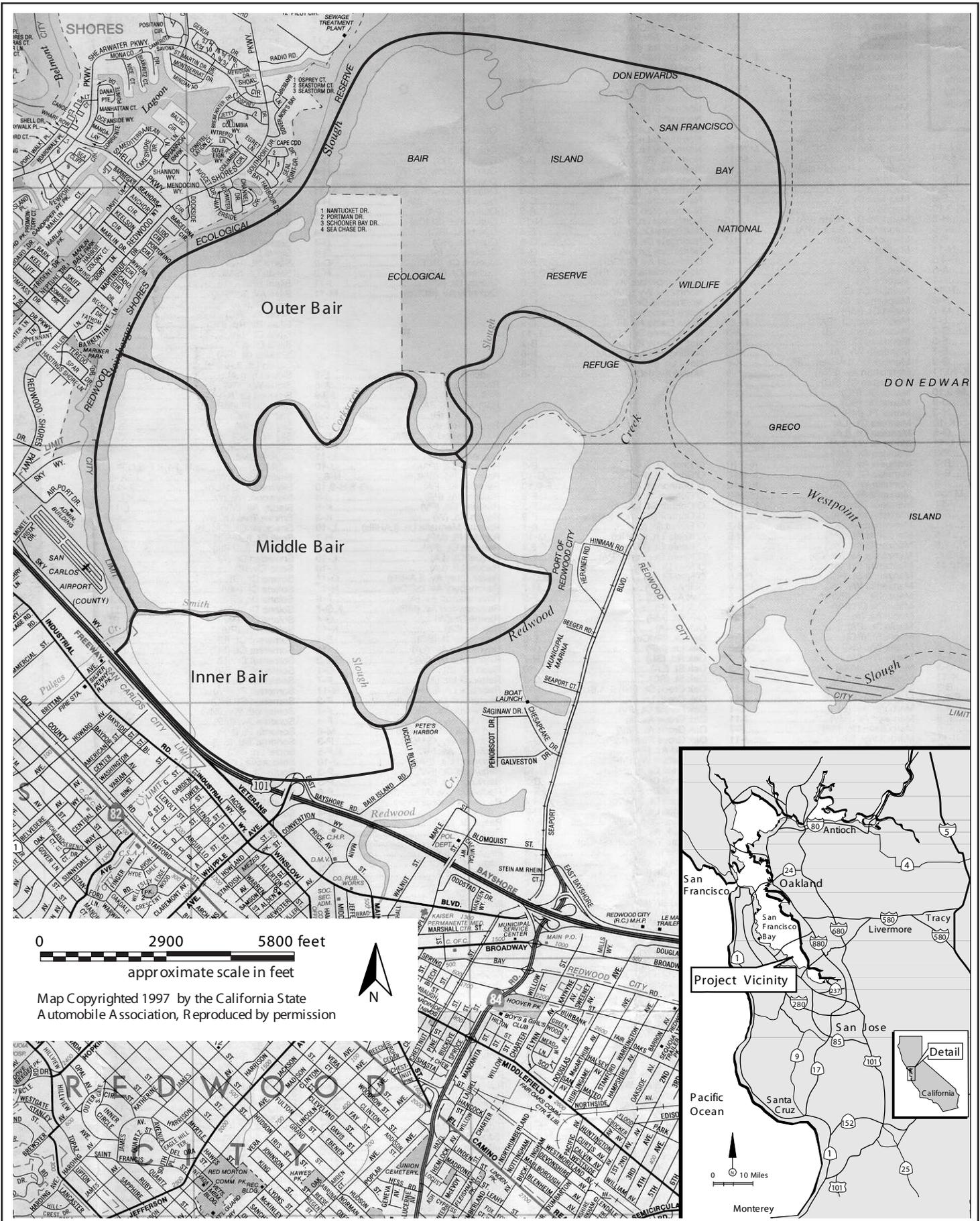
1.2 Purpose and Need

The U.S. Fish and Wildlife Service, Don Edwards San Francisco Bay National Wildlife Refuge (federal lead agency), and the California Department of Fish and Game (state lead agency) are proposing adoption of a restoration and management plan for the approximately 2,600-acre Bair Island complex in order to restore Bair Island to a tidal salt marsh. The lead agencies have prepared a Draft EIS/EIR, which describes and analyzes the potential environmental effects of the proposed restoration and management project.



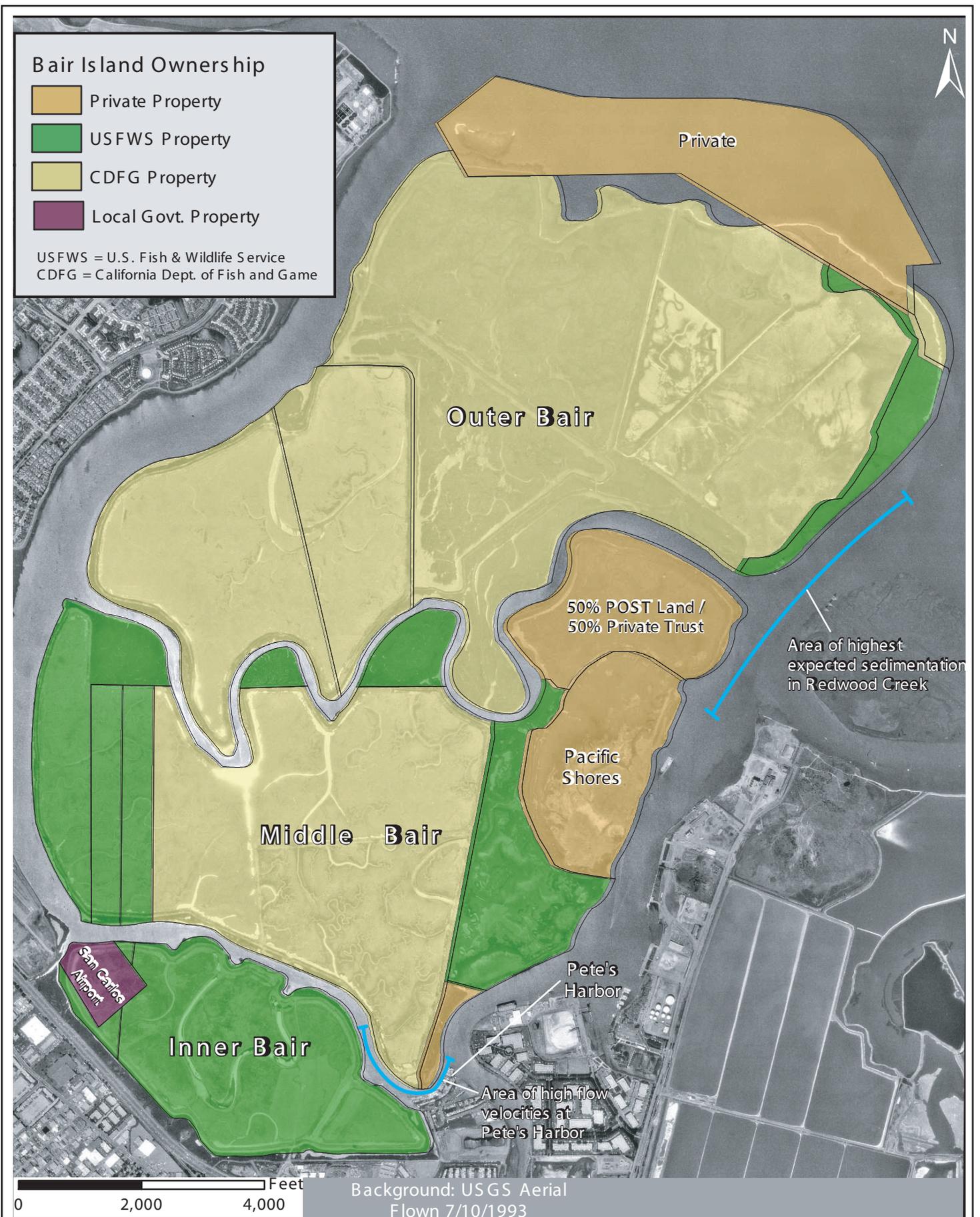
REGIONAL MAP

FIGURE 1



VICINITY MAP

FIGURE 2



OWNERSHIP MAP

FIGURE 3

National Environmental Policy Act (NEPA) implementing regulations require that each Environmental Impact Statement (EIS) briefly specify the purpose and need to which the agency is responding in proposing the various alternatives, including the preferred alternative. Similarly, the California Environmental Quality Act (CEQA) requires that each Environmental Impact Report (EIR) include a statement of the objectives for the proposed project. The objectives are intended to help the implementing agency develop a reasonable range of alternatives and to aid decision-makers in preparing findings or a statement of overriding considerations, if necessary.

The purpose and objective of the proposed Bair Island Restoration and Management Plan includes the following elements:

- Restore high quality tidal salt marsh habitat to Inner, Middle and Outer Bair Island in San Francisco Bay;
- Maximize the function and values of tidal salt marsh habitats in a timely manner;
- Provide habitat for endangered species and other native wildlife; and
- Enhance the public's appreciation and awareness of the unique resources of Bair Island.

The Bair Island site is a large complex of former salt evaporators, and has been a major priority for addition to the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) since the boundaries of the Refuge were expanded in 1990. The restoration of tidal habitats at Bair Island is ecologically important to South San Francisco Bay. Following restoration, Bair Island would become an integral part of the extensive wetland complex within the Refuge, as shown in Figure 4. This site, once restored, can assist with the preservation and perhaps recovery of both the California Clapper Rail and salt marsh harvest mouse. The California Clapper Rail and the salt marsh harvest mouse were listed by the US Fish and Wildlife Service as endangered species on October 13, 1970 (Federal Register 35:1604).

The project is needed because of:

- Historical losses of tidal salt marsh ecosystems and habitats;
- Deterioration of levees, which could lead to flooding, and velocity safety issues and increased sedimentation of the Redwood Creek Shipping Channel;
- The disturbance to sensitive species including the California Clapper Rail;
- Lack of control over undesirable species including invasive plants, undesirable predators and mosquitoes;
- Increasing restoration costs associated with site deterioration;
- Increasing operation and maintenance costs; and
- Limited opportunities in South San Francisco Bay for wildlife-oriented recreation.

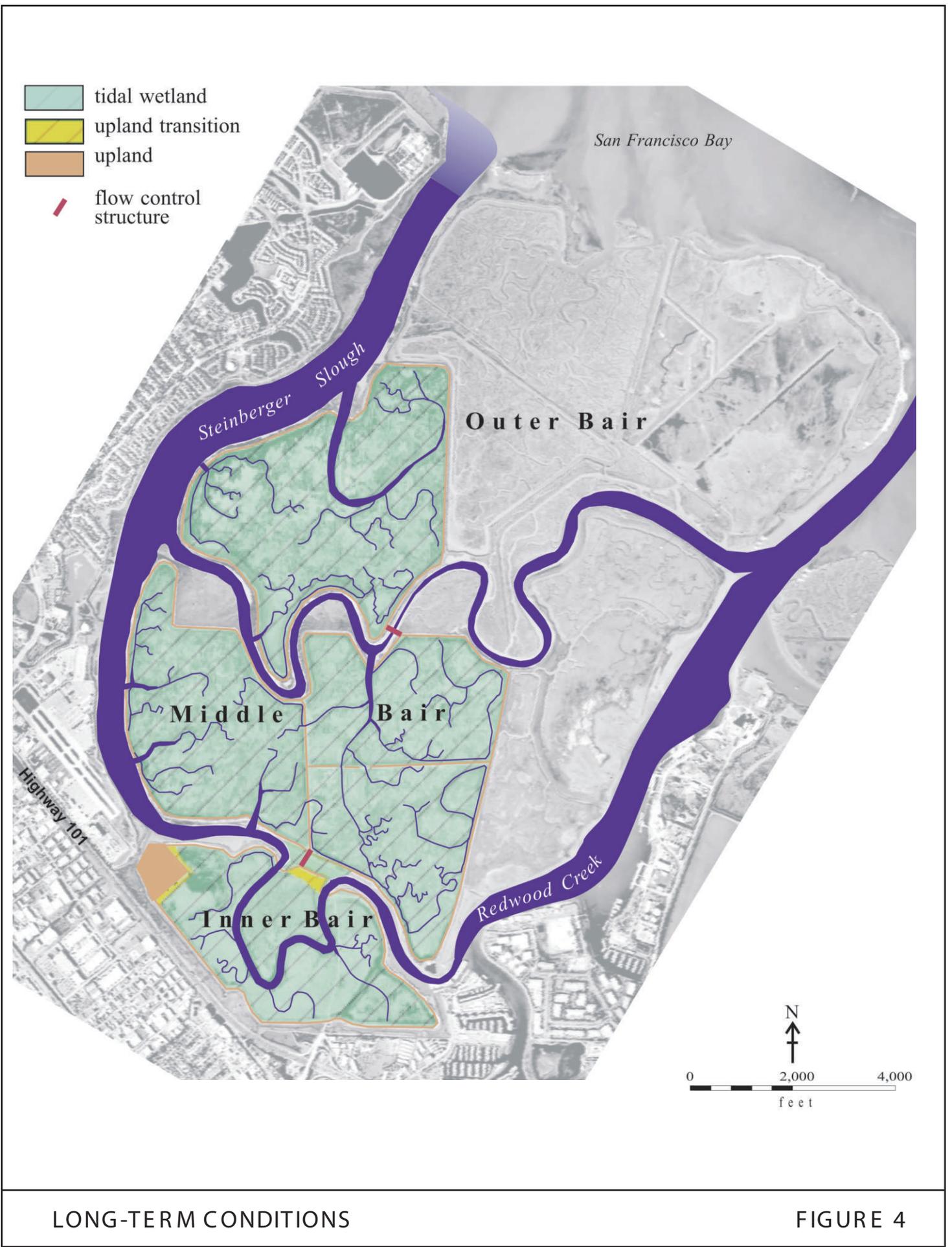
An earlier version of the restoration project's purpose and objectives included restoring habitat for California sea-blite (*Suaeda californica*) and the California Least Tern (*Sterna antillarum browni*). California sea-blite is an extremely rare succulent shrub of the upper intertidal zone, and favors both well-drained substrates and high-energy waves and tides. California sea-blite was probably never common in San Francisco Bay except in the few areas of sandy beach interface historically in Alameda and San Francisco counties (Baye et al 2000).

Bair Island is a significant distance from the Bay mouth and is subject only to low-energy wind and waves. The proximity of intertidal mudflats means the transport and deposition of sediments will be fine-grained and create mudflats. Sandy substrates suitable for supporting California sea-blite were

probably never present on Bair Island. It is therefore very unlikely that an attempt to create a sandy intertidal habitat would succeed, even on Outer Bair, without significant mechanical inputs to fill with dredged sand and prevent fine sediment deposition and mixing. Furthermore, these techniques are incompatible with the restoration design, which hinges on the natural accumulation of fine sediments on the subsided sites.

California Least Tern was the other species initially considered for the project goals. California Least Terns formerly nested on diked portions of Outer Bair that are not part of this restoration project. The likelihood of successfully creating breeding habitat in this location is slim, as years of management to preserve the former colony were not successful. In addition, the creation of nesting areas for the California Least Tern is not compatible with the natural sedimentation processes necessary for tidal salt marsh development.

Tidal salt marsh is the target habitat of this restoration as it serves as the primary habitat for the California Clapper Rail and salt marsh harvest mouse. Therefore, development of habitat for the California sea-blite and the California Least Tern were not considered further in the restoration plan.



LONG-TERM CONDITIONS

FIGURE 4

1.3 NEPA and CEQA Compliance

The National Environmental Policy Act (NEPA) (40 Code of Federal Regulations (CFR)1500-1508) and the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) are the federal and state laws that govern the disclosure and analysis of the environmental effects of agency actions. The purpose of this EIS/EIR is to present information to the public and governmental agencies regarding the environmental impacts of the proposed alternative and all other reasonable alternatives. Decision makers are required to take this information into account when deciding whether or not to approve the Bair Island Restoration and Management Plan Project. For this project, the United States Fish and Wildlife Service is the Lead Agency under the National Environmental Policy Act (NEPA), while the California Department of Fish and Game is the Lead Agency under the California Environmental Quality Act (CEQA). Both NEPA and CEQA encourage the preparation of combined environmental planning documents. Therefore, this joint EIS/EIR would serve to fulfill the statutory obligations of both NEPA and CEQA.

1.4 Public Involvement and Scoping

In late 1999, a meeting was held for elected officials, special interest groups, and governmental agencies to introduce the concept of restoring Bair Island and to develop a consensus on the goals and objectives for the restoration and management plan. The preparation of this EIS/EIR included the publication of a Notice of Intent (NOI) in the *Federal Register* (Federal Register Vol. 65, Number 59, Page 16217) on March 27, 2000. It also included the preparation and circulation of a Notice of Preparation (NOP) to Responsible Agencies adjacent cities, and the State Clearinghouse on February 10, 2003. A joint NEPA/CEQA scoping meeting was held on April 27, 2000 at the Redwood City Community Activities Building, 1400 Roosevelt Avenue, Redwood City, California.

During the meeting, members of the public were asked what issues they felt should be addressed. Responses to the NOI and NOP were received from nine agencies and several organizations: California State Department of Toxic Substances Control, California State Department of Boating and Waterways, City of Redwood City, County of San Mateo, San Mateo County Mosquito Abatement District, Federal Aviation Administration, Pacific Gas and Electric Company, California Regional Water Quality Control Board San Francisco Bay Region, San Carlos Airport Pilots' Association, San Francisco Bay Trail of the Association of Bay Area Governments, Sequoia Audubon Society, and South Bayside System Authority.

In January and November 2001 planning updates were sent to everyone who requested to be on the Bair Island mailing list. On August 12, 2002, a presentation was made to the Redwood City Council on the status of the plan and solicited their input. This presentation was also broadcast throughout Redwood City's local cable network. Throughout 2002 and 2003 a number of presentations were made to local boating organizations asking for ideas on how to mitigate potential short-term impacts to boating. Issues raised in these meetings have been addressed in this EIS/EIR.

1.5 Issues of Known Controversy

At this time, concern has been expressed to the Refuge from the public regarding dog use and public recreation at Bair Island.

SECTION 2. DESCRIPTION OF ALTERNATIVES

Based upon the existing site conditions, objectives, constraints and the public concerns identified during preparation of the Restoration Plan, a range of alternatives was identified. Descriptions of six restoration alternatives were prepared. Due to constraints ranging from existing infrastructure, to sensitive wildlife species¹, and through discussions between the U.S. Fish and Wildlife Service, the San Francisco Bay Wildlife Society, the California Department of Fish and Game and other state and federal agencies, a more limited and feasible set of restoration alternatives was prepared.

2.1 Alternatives That Were Studied But Are No Longer Under Consideration

Based on data gathered during the preparation of the Restoration and Management Plan, identification and evaluation of conflicts and inconsistencies with the purpose and need of the project (refer to page 1), and substantial input from the public, the following restoration and public use alternatives are no longer under consideration.

2.1.1 Minimal Construction Tidal Marsh Restoration

This alternative would maximize the use of natural processes in the ecological recovery of Bair Island. This alternative would have the lowest construction cost while providing for the restoration of the entire 1,400-acre area.

For this alternative the restoration approach for Middle and Outer Bair Islands is the same as described in Alternative A (refer to page S-3).

On Inner Bair Island, levees would be breached at historic slough channel locations, and borrow ditch cutoff berms would be created to prevent tidal capture by the existing borrow ditches². Fill material would be used to expand the southern levee of Inner Bair Island to adequately protect the SBSA sewer line and to create a cross-levee that protects the San Carlos Airport property on Inner Bair Island.

The cost of maintaining the Inner Bair Island levee for public access would increase over existing conditions due to increased wind-wave erosion and tidal scour. Levees would require maintenance on the inboard and outboard sides. The restored tidal prism would induce greater siltation within the Redwood Creek shipping channel and higher tidal velocities at Pete's Outer Harbor.

From an ecological perspective, this is the most direct restoration approach and it is also the most economical. It would, however, likely result in increased bird strike hazards for aircraft, Redwood Creek shipping channel siltation, and high tidal velocities at Pete's Outer Harbor. Due to the potential design-related impacts on operation of the San Carlos Airport, the Port of Redwood City and Pete's Harbor, this alternative will not receive further evaluation.

¹ A more detailed discussion of the site constraints can be found in the *Bair Island Restoration and Management Plan* located in Technical Appendix A of this EIS/EIR.

² Human-constructed channels adjacent to levees created by the process of "borrowing" material to build the levee. They tend to be straighter and offer less habitat complexity than natural channels.

2.1.2 No Restoration of Inner Bair Island

Under this alternative, no restoration to Inner Bair Island would occur but all current maintenance activities at Inner Bair Island would continue.

The restoration approach for Middle and Outer Bair Islands and channel modifications are the same as Alternatives C and D described in the Tidal and Managed Marsh Restoration Alternatives (refer to pages S-5 and S-6).

This alternative was not chosen for further evaluation because it is inconsistent with the overall purpose of restoring tidal marsh to as much of Bair Island as possible. Additionally, the restoration of Inner Bair Island would provide enhanced wildlife observation, public outreach and educational opportunities which would not be provided by this alternative.

2.1.3 Maximize Public Use

This alternative would include a full loop trail on the Inner Bair Island and Airport levees, similar to the existing use. Educational and interpretive signage would be located on the trail, along with orientation kiosks and a wildlife viewing platform on Inner Bair Island. Restrooms would be provided at the Refuge's Bair Island parking lot. Hunting of waterfowl on Middle and Outer Bair Islands would be allowed per state regulations. Fishing by boat in the sloughs and from docks on the Island would be permitted under this alternative. Pets would be allowed off-leash throughout the islands. Boats would have unlimited access into the sloughs, and Middle and Outer Bair Islands would be open to public use on remaining levees, with boat access and boat docks.

This alternative would cause a high level of disturbance to wildlife and wildlife habitat, including the endangered species present on Bair Island. The loop trail would not allow Smith Slough to be restored to its historic meander through Inner Bair Island because boats would not be able to pass under the trail bridge over the slough. Due to the inconsistency with the project's purpose of protecting endangered species and their habitat, this alternative was not selected for further evaluation.

2.2 Restoration and Management Alternatives

The following discussion of the No Action Alternative and four Action Alternatives (Alternatives A, B, C and D) which are evaluated in this EIS/EIR assumes a 50-year planning horizon, which is consistent with that used for other San Francisco Bay restoration projects currently in planning or recently implemented.

Proposed Action

The Bair Island Technical Review Team that developed and reviewed objectives and technical criteria, has recommended Alternative A for the proposed restoration of Bair Island. The Technical Review Team identified Alternative A as the proposed action based on the ability of this alternative to meet all four of the basic objectives of the project regarding wildlife protection, restoring high quality salt marsh in a timely manner and enhancing public appreciation and awareness. The Technical Review Team concluded that Alternative A balances objectives of wildlife protection and public access for educational and appreciation awareness objectives, without unacceptable disturbance to endangered species.

2.2.1 No Action Alternative

Tidal Marsh Restoration

The No Action Alternative would restore tidal action to and create tidal salt marsh habitat on Middle and Outer Bair Islands. However, restoring tidal marsh would occur in an unpredictable and potentially unsafe manner.

Middle and Outer Bair Islands

On-going levee maintenance at Middle and Outer Bair Islands would be discontinued. Levees on Middle and Outer Bair Islands would gradually deteriorate and eventually fail, allowing tidal action. Levees on Middle and Outer Bair Islands would likely overtop and begin to breach within the next ten years, since average levee crest elevation on these islands are below the ten-year high tide elevations. When levees on Middle and Outer Bair Islands breach this would allow tidal salt marsh to become established. The existing borrow ditches would capture much of the tidal prism and establishment of the remnant historic channels would be limited. Natural estuarine sedimentation would gradually rebuild the marshplain to elevations at which vegetation could reestablish. These marshes would evolve over a period of decades. Increased tidal flows would scour and deepen the surrounding major sloughs. Tidal inundation would increase tidal flows through the major sloughs and lower Redwood Creek. Higher tidal flows through the Redwood Creek Shipping Channel would increase siltation rates approximately threefold (PWA 2002). More frequent dredging in Redwood Creek would be required to maintain the same channel depth for deep-draft navigation. Also, high tidal flows through Smith Slough at Pete's Outer Harbor would increase current velocities above those recommended for small water craft navigation.

Inner Bair Island

Under the No Action Alternative, the Refuge would only undertake minor repairs to the existing levee to protect the South Bayside System Authority (SBSA) sewer line and the San Carlos Airport

safety zone on Inner Bair Island. The Refuge would work with the Airport and the SBSA to protect their infrastructure. There would be no tidal action occurring on Inner Bair Island; therefore, no tidal marsh habitat would be created.

Recreational Access

Currently, public access is allowed on a 3.3-mile loop trail on Inner Bair Island and during the dry season along a cross pond trail from Whipple Avenue trailhead to the levee on Smith Slough. Boating access is allowed throughout all of the adjacent sloughs and Redwood Creek. In the short term (approximately five years), this alternative would continue to allow limited public use consistent with protection of wildlife and habitat and compatibility with Refuge purposes and the National Wildlife Refuge System mission. The Refuge would not maintain the existing trails, signs, and gates as they deteriorate. Therefore, after approximately five years, no trails would be accessible to the public because it is predicted that the lack of maintenance would result in unsafe trail conditions. In the short term, pets (dogs only) would be allowed on Inner Bair Island on a six-foot leash and on designated trails for a test period to determine the compliance with Refuge regulations designed to protect wildlife³.

In the long term, no public access to Inner, Middle or Outer Bair Islands would be allowed. Although levees on Inner Bair Island would require some routine maintenance, the trails system would not be maintained. In the long term, pets would be prohibited on Bair Island as the infrastructure deteriorates and access is precluded.

Fishing and boating would not change in the short term. However, as the levees of Middle and Outer Bair Islands wear down and breach, the tidal prism would increase, leading to an increase in peak current velocities. This could result in exceeding safe navigation requirements for small water craft which would result in conditions that would be unsuitable for fishing and boating.

The Refuge's Bair Island parking lot near Pete's Harbor would be closed, once public access is no longer allowed. No trail improvements would be made. No additional public access infrastructure would be constructed.

2.2.2 Alternative A: Tidal Marsh Restoration and Moderate Public Access (*Proposed Action*)

Tidal Marsh Restoration

Alternative A restores full tidal inundation to Inner, Middle, and Outer Bair Island. For Middle and Outer Bair Islands, natural estuarine sedimentation would raise the marshplain surface to allow complete vegetation establishment over time. Restoration would include partially filling borrow ditches to direct flow into the historic tidal channels and to prevent the borrow ditches from becoming the primary drainage network after tidal action is restored to the marsh.

Channel modifications would be made at Smith and Corkscrew Sloughs to minimize project related effects on sedimentation rates in Redwood Creek shipping channel and flow velocities at Pete's Outer Harbor. These channel modifications include the realignment of Smith Slough to its historic meander through Inner Bair Island, and a flow restrictor in Corkscrew Slough to the east of the Middle Bair breaches.

³ The US Fish & Wildlife Service Dog Use Monitoring Program report is located in sub-Appendix C of the Restoration and Management Plan located in Appendix A of this EIS/EIR.

Middle and Outer Bair Islands

The restoration for Middle and Outer Bair Islands includes the following approach. Levees would be breached at seven historic channel locations on Middle and Outer Bair Islands, restoring natural tidal flows to both the islands (refer to Figure 5). Pickleweed-dominated marsh and vegetation would establish itself quickly in areas already at high intertidal elevations. Natural estuarine sedimentation on the lower mudflat areas would gradually build up these areas high enough for cordgrass and pickleweed to establish. By partially filling the borrow ditches, cutoff berms would be created to prevent tidal capture by the existing borrow ditches, allowing the natural channel system to reestablish. Interior berms and levees would be selectively lowered or removed to the extent possible, creating additional tidal habitat while still providing sufficient high tide refuge where needed for clapper rails and salt marsh harvest mice. Existing levees required to protect infrastructure from wind-wave erosion would be left in place.

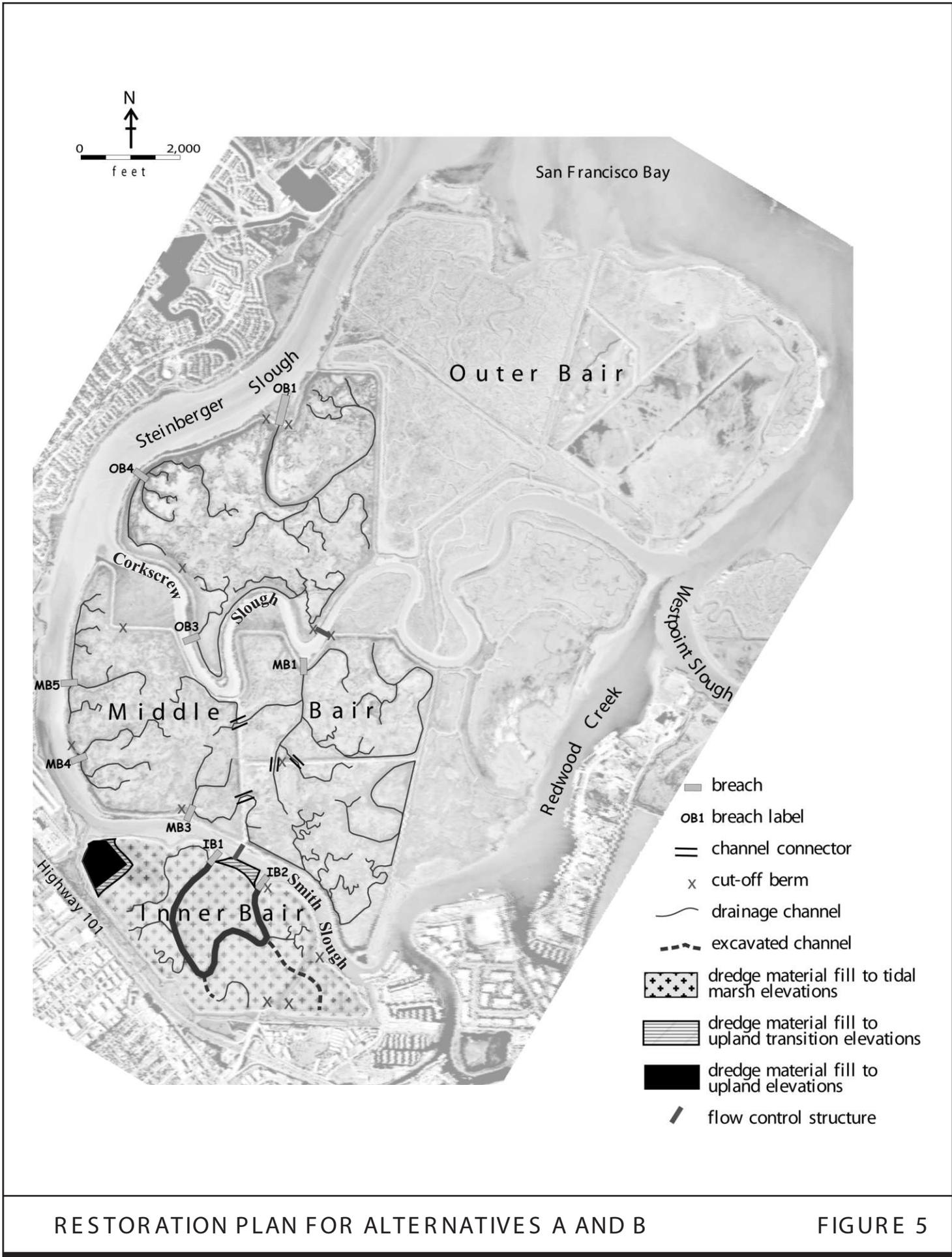
Based on initial ground elevations and predicted sediment supply, some vegetation colonization would begin immediately following restoration implementation. Most of this marsh formation would occur along the perimeter of the restoration areas, along historic slough channels or on higher elevation areas.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

In Corkscrew Slough a flow restrictor would be installed. The flow restrictor would partially block Corkscrew Slough in order to reduce unsafe flow velocities during tidal changes and reduce sedimentation in the Redwood Creek Shipping Channel. There would be warning and information signs near the flow restrictor and at all three boat ramps. A 30-foot wide notch for boat passage would be installed, along with a depth gauge at the notch. In addition, a small craft portage would be constructed along the banks of Corkscrew Slough in order for boaters to also have access around the flow restrictor during the short period of time when the velocities are high and water elevation differences occur on each side of the flow restrictor.

Inner Bair Island

At Inner Bair Island, dredged material (or other sources of fill⁴) would be used to raise the marshplain elevation to approximately 2.5 feet National Geodetic Vertical Datum (NGVD) for the planned tidal wetland areas and to approximately 6.6 feet NGVD for the Airport safety zone, prior to breaching. The purpose of this is to reduce bird strike hazards for the San Carlos Airport by reducing the duration of post-breaching open water at Inner Bair. Placement of dredged material would expedite the establishment of emergent marsh. Dredged material or other sources of fill would also be used to expand the southern levee of Inner Bair Island to protect the South Bayside System Authority (SBSA) sewer line and create a cross-levee that protects the San Carlos Airport property on Inner Bair Island. This portion of the site owned by the San Carlos Airport is a Federal Aviation Administration (FAA) established runway protection zone (RPZ). The FAA defines the runway protection zone as “an area off the runway end to enhance the protection of people and property on the ground.” Since the airport property is subject to federal aviation regulation, it must be kept clear of any structures or stationary objects. Under this alternative, the lack of unvegetated or open water habitat at Inner Bair Island, especially in the upland safety zone area, would minimize the bird strike

⁴ Possible sources of fill material include material excavated from levee breaches and levee crests on all three island areas, excavation of the cross-levee on Inner Bair, dredged material from Redwood Creek and imported fill from Yerba Buena Island. Sediment quality would need to be appropriate for wetland reuse.



RESTORATION PLAN FOR ALTERNATIVES A AND B

FIGURE 5

hazards within the runway protection zone. In addition, the current conditions of the airport safety zone include areas of ponded water that are used by waterbirds (Sequoia Audubon Society 2001). By placing fill in the airport safety zone and creating upland habitat, bird strike risks would be reduced over existing conditions. The levee surrounding the airport safety zone would be large enough to allow emergency vehicles access in the event of a plane crash. The levee surrounding the safety zone would be sloped gradually leading up to the airport property.

The cross-levee system protecting the San Carlos Airport safety zone, and the alignment of the SBSA sewer line would be filled with dredged material to an elevation that is above mean higher high water (MHHW)⁵ (refer to Figure 6). By creating upland and transitional habitats in these areas, some of the primary constraints including loss of upland habitat associated with reintroducing tidal action to Inner Bair Island are minimized. From the created upland areas, the fill material would gradually slope down to the lower elevations of the restored marshplain. Transition habitat would also be installed adjacent to the existing perimeter levee between the breach locations.

Fill elevation of the marshplain would vary by approximately one (1) foot, ideally providing ample areas with elevations high enough to allow for planting with native vegetation prior to breaching, and for the vegetation to immediately colonize once the levees are breached, but low enough to allow some channel development through natural tidal scour. Fill would be used to raise ground levels on Inner Bair Island from current elevations of approximately 0.0 feet NGVD to approximately 2.5 feet NGVD for the planned tidal wetland areas and to approximately 6.6 feet NGVD for the Airport safety zone, requiring between 400 and 500 thousand cubic yards of fill.⁶

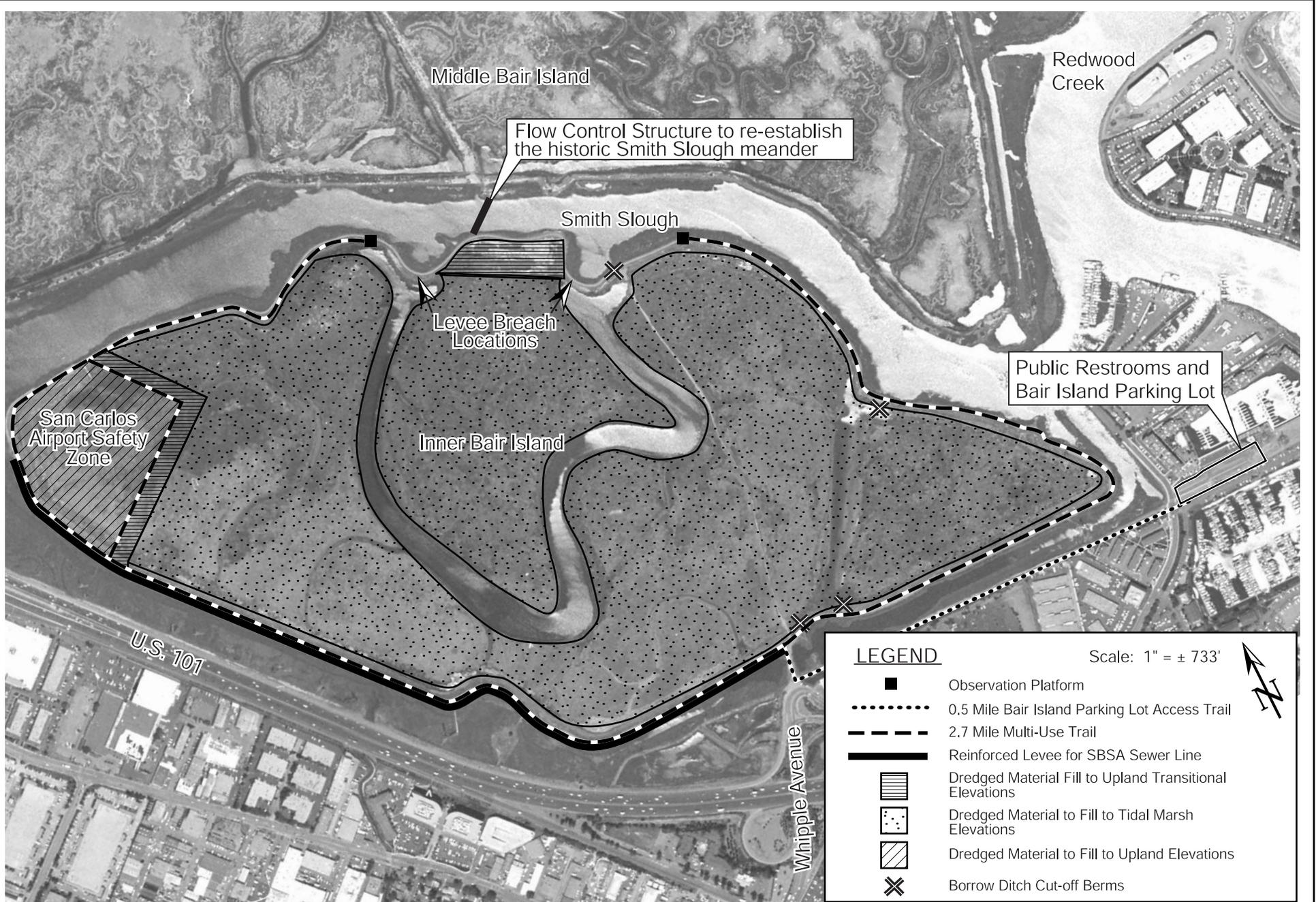
As shown in Figure 6, a flow-blockage control structure would be installed in Smith Slough in order to restore its historic meander through Inner Bair Island. The Smith Slough levee would be breached at the two historic Smith Slough channel locations on Inner Bair Island and borrow ditch cutoff berms would be created to prevent tidal capture by the existing borrow ditches. The historic Smith Slough channel within Inner Bair Island would not be filled with dredged material. Although other historic slough channels and borrow ditches would initially be filled with dredged material to the same elevation as the surrounding marshplain, differential settlement of the dredged material would result in a lower elevation, and therefore channel development, in these areas.

Recreational Approach

Currently, public access is allowed on a 3.3-mile loop trail on Inner Bair Island and during the dry season along a cross pond trail from Whipple Avenue trailhead to the levee on Smith Slough. Under Alternative A, public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 2.7-mile levee trail (refer to Figure 6). The trail will be shortened both to reduce future human disturbance to wildlife, and because the restoration of Smith Slough to its original alignment will cut the existing trail. Public access would be along an out and back trail that would extend from the Refuge trailhead at Whipple Avenue to the north around the San Carlos Airport levee and to an observation deck on Smith Slough near the northern levee break. Access would also be allowed on

⁵ MHHW is the average of the higher of two daily high tides.

⁶ This amount of fill is close to the 538 thousand cubic yards dredged from Redwood Creek during an average dredging event. Redwood Creek has been dredged eight times between 1977 and 1999, and the average annual accumulation rate is estimated to be 200 thousand cubic yards.



ALTERNATIVE A: RESTORATION AND RECREATION APPROACH FOR INNER BAIR ISLAND

FIGURE 6

the levee trail to the south towards Pete’s Harbor to an observation deck on Smith Slough near the southern levee break. The Refuge would work with partners⁷ to make trail improvements to the 0.5-mile connector trail from the Bair Island parking lot to the trailhead near Whipple Avenue. Sanitary facilities would be provided at the Bair Island parking lot located along Bair Island Road. An orientation kiosk would be provided at the trailhead and at the parking lot and viewing/environmental education platforms would be provided at the ends of the levee trail, adjacent to Smith Slough. Pets (dogs only) would be allowed on Inner Bair Island on a six-foot leash and on designated trails for a test period to determine compliance with refuge regulations designed to protect wildlife.⁸ Jogging and bicycling would be permitted on all designated trails. For the benefit of providing wildlife with an area of refuge from human disturbance and to allow boating through the realigned Smith Slough, no public access would be permitted between the two breaches on Inner Bair Island. Besides access by boat to a viewing platform with interpretative signage on Middle Bair (located at the channel restriction on Corkscrew Slough), public access for this alternative would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and other specific exceptions that are approved by a Refuge Special Use Permit. Interpretive signage would also be placed at the Redwood City boat ramp regarding the flow restrictors in Corkscrew and Smith Sloughs, as well as information on how to boat past the harbor seal haulout sites without disturbing them.

Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land or observation decks. In Smith and Corkscrew Sloughs, all motorized would be subject to “no wake zones” and speed limits of a maximum five miles per hour (mph). No motorized vehicles would be allowed within areas currently inside the existing levees. As discussed previously, a small craft portage would be constructed around the flow restrictor in Corkscrew Slough to facilitate boating during the short period of time when the velocities are high and water elevation differences occur on each side of the flow restrictor. Signs would be placed on both sides of the Corkscrew Slough flow restrictor to warn boaters of conditions around the flow restrictor. A depth gauge would also be placed on the notch in the Corkscrew Slough flow restrictor to help boaters judge the depth of water available for them to pass over the flow restrictor. Boating in Redwood Creek and Steinberger Slough would not be changed. Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.

This alternative is the lead agency’s proposed action.

2.2.3 Alternative B: Tidal Marsh Restoration and Restricted Public Access

Tidal Marsh Restoration

Inner, Middle and Outer Bair Islands

The restoration approach for Alternative B is the same as discussed under Alternative A. The following list briefly summarizes the tidal marsh restoration approach:

⁷ The partners are the San Francisco Bay Trails staff, Peninsula Open Space Trust, City of Redwood City, PG&E, Bay Conservation and Development Commission, Caltrans, and adjacent landowners.

⁸ The Refuge has a Dog Use Monitoring Program for Inner Bair Island that is located in Appendix D of *Bair Island Restoration and Management Plan*, located within the EIS/EIR Technical Appendix A.

- Restores full tidal inundation to Inner, Middle, and Outer Bair Island through systematic breaching.
- Channel modifications would be made at Smith and Corkscrew Sloughs including the installation of a flow-blockage control structure in Smith Slough in order to restore its historic meander through Inner Bair Island, and a flow restrictor in Corkscrew Slough that would partially block the slough in order to reduce unsafe flow velocities during tidal changes and prevent increased sedimentation along the Redwood Creek Shipping Channel.
- Dredged material would be used to raise the marshplain elevation on Inner Bair Island prior to breaching in order to reduce bird strike hazards for the San Carlos Airport and to protect the South Bayside System Authority (SBSA) sewer line.

Recreational Approach

Currently, public access is allowed on a 3.3-mile loop trail on Inner Bair Island. Alternative B is the same as Alternative A with the following differences discussed below.

Under Alternative B, public access on Inner Bair Island for pedestrians and bicyclists would be allowed along a 1.8-mile levee trail and a 0.5 connector trail from the parking lot to the Inner Bair Island trailhead. Public access would be along an out and back trail that would extend from the Refuge trailhead at Whipple Avenue to the north around the San Carlos Airport levee and to an observation deck on Smith Slough near the northern levee break (refer to Figure 7). No pets would be allowed on Bair Island. A seasonal closure to all boat access would be implemented to protect sensitive species (harbor seals).

2.2.4 Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access

Tidal Marsh Restoration

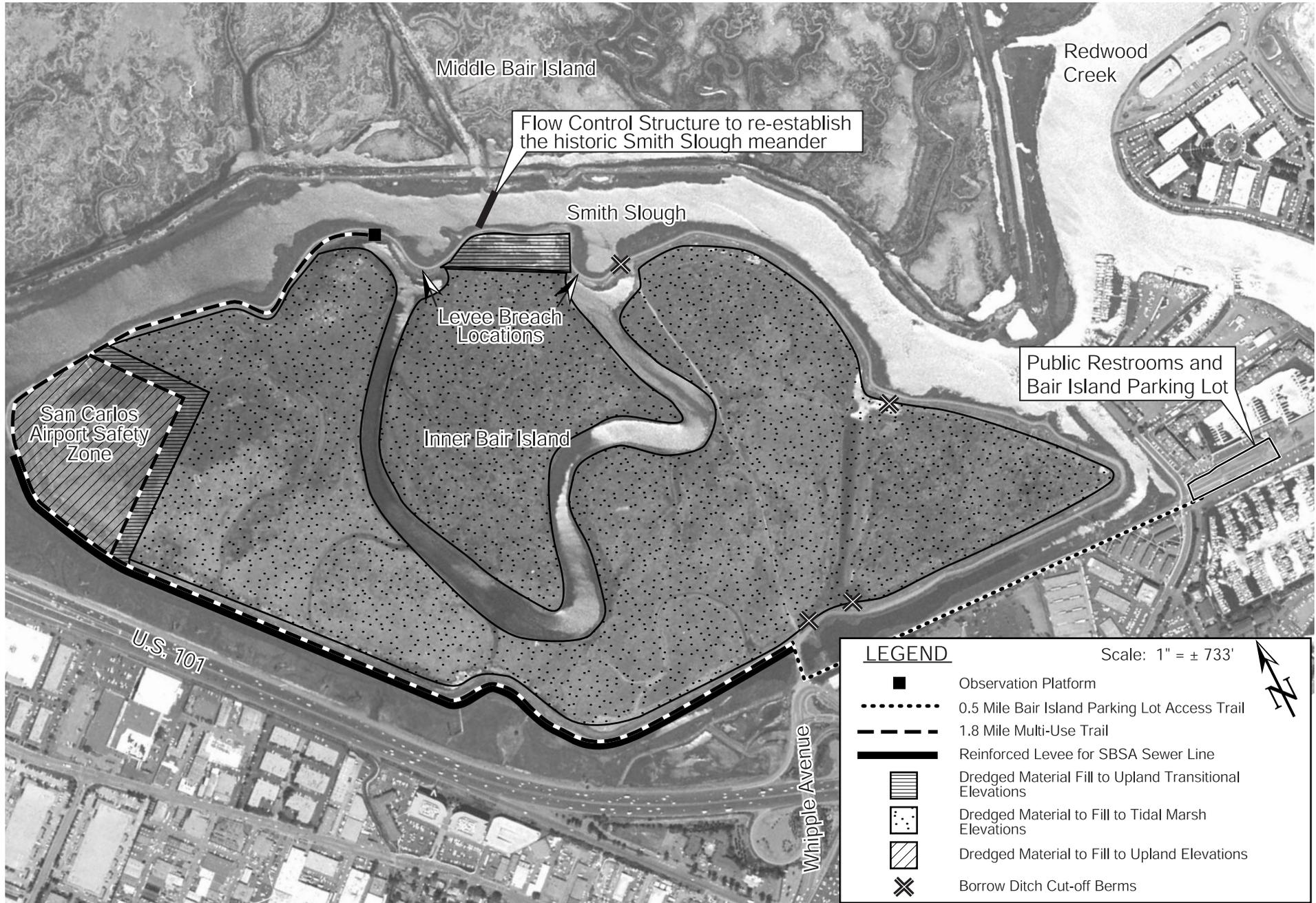
Middle and Outer Bair Islands

The restoration approach for Middle and Outer Bair Islands is the same as described under Alternatives A and B. The following list briefly summarizes the restoration approach for Middle and Outer Bair Islands:

- Restores full tidal inundation to Middle, and Outer Bair Island through systematic breaching.
- A channel modification would be made at Corkscrew Sloughs involving the installation of a flow restrictor that would partially block the slough in order to reduce unsafe flow velocities during tidal changes and prevent increased sedimentation along the Redwood Creek Shipping Channel.

Inner Bair Island

This restoration creates managed wetlands at Inner Bair Island. Smith Slough would not be restored to its historic meander through Inner Bair Island. This alternative allows the reestablishment of some salt marsh habitat on Inner Bair Island, while limiting the creation of open water habitat that would contribute to bird strike hazards for aircraft. A flow restrictor would be installed in Smith Slough that would partially block the slough in order to reduce unsafe flow velocities during tidal changes and prevent increased sedimentation along the Redwood Creek Shipping Channel.



ALTERNATIVE B: RESTORATION AND RECREATION APPROACH FOR INNER BAIR ISLAND

FIGURE 7

Hydraulic control structures (i.e., slide-flap gates, float-activated gates) would also be installed on Inner Bair Island to allow water management within Inner Bair (refer to Figure 8). These structures would allow tidal inundation between approximately mean lower low water (MLLW) and MTL⁹ (the existing marshplain elevation). A managed complex of diked salt marsh, uplands and shallow seasonal wetlands is planned. Rainfall would contribute to ponding on the site, and would be augmented by tidal inflows on a managed basis. Existing non-native grassland vegetation on the site would die back and be replaced by pickleweed, creating salt marsh. Existing seasonal wetlands would remain vegetated, while deeper channels (e.g., former slough and borrow ditches) would remain ponded.

Water management design remains to be developed, but flexibility would allow a range of management from muted tidal to occasionally flooded. Tidal inflow to Inner Bair Island could occur periodically except during the highest tides, to prevent high water levels and open water ponding. Water would be allowed to drain from the site as frequently as each tide cycle. The hydraulic control structure would be designed for flexibility, allowing the water level management regime to be adaptively managed in response to monitoring results. Several types of hydraulic structures could be left in the open position most of the time, and then manually closed during the high tide events to allow outflow only. Alternatively, float-activated gates could eliminate the need for manual gate closure. Floats would mechanically close the inflow culverts when water levels in Smith Slough were high. Flashboard weirs could be used in combination with gated culverts to adjust to the frequency of tidal flooding and depth of on-site ponding.

As discussed previously, there are a few different designs available for the hydraulic structures at Inner Bair Island. Additional hydraulic modeling would be used to refine the hydraulic structure design.

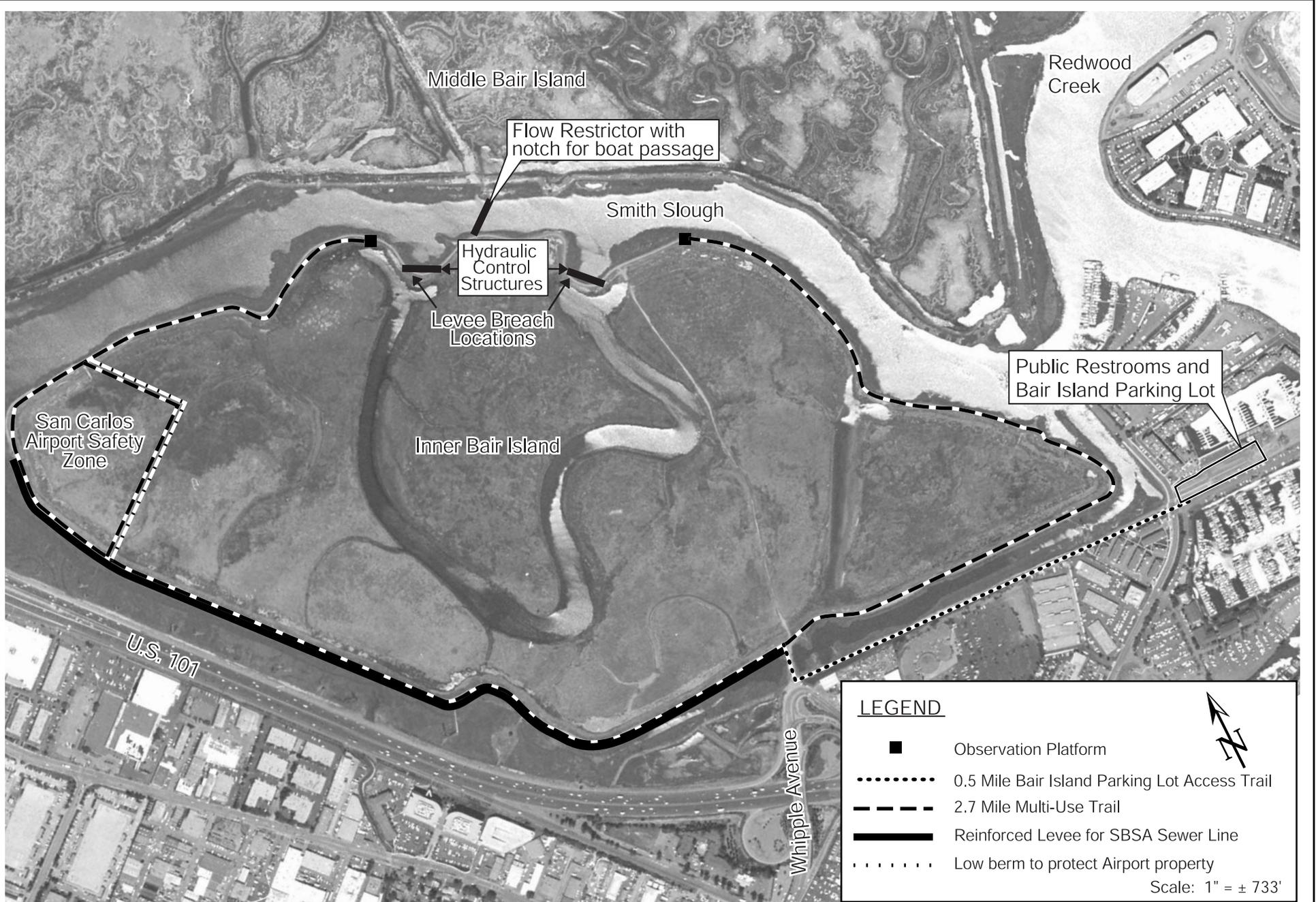
Regular maintenance would be required to maintain the hydraulic structures in working order. Water level control would require on-going active management. Maintaining public access after breaching would require periodic levee repair. A low berm would be built around the Airport property to prevent flooding and the levee containing the SBSA sewer line would be widened as necessary to prevent erosion.

Recreational Approach

The recreational access approach for Alternative C is the same as discussed under Alternative A. The following list briefly summarizes the recreational access approach:

- Public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 2.7-mile levee trail (refer to Figure 8).
- Pets (dogs only) would be allowed on Inner Bair Island on a six-foot leash and on designated trails for a test period to determine compliance with refuge regulations designed to protect wildlife.
- Public access would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and by boat to a viewing platform on Middle Bair.
- Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land.

⁹ Mean tide level.



ALTERNATIVE C: RESTORATION AND RECREATION APPROACH FOR INNER BAIR ISLAND

FIGURE 8

- In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph.
- Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.

2.2.5 Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access

Tidal and Managed Marsh Restoration

Inner, Middle and Outer Bair Islands

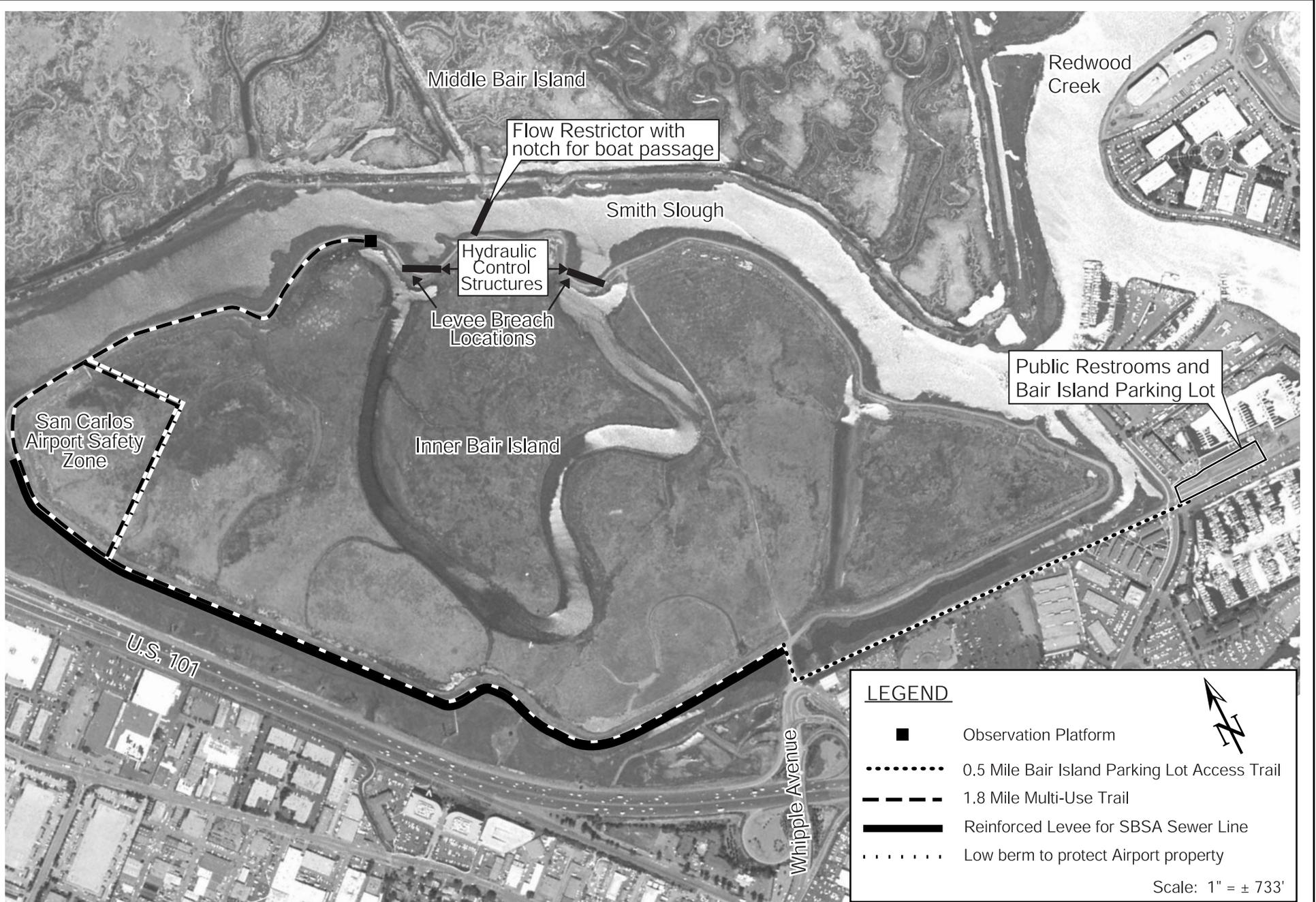
The restoration approach for Alternative D is the same as discussed under the Alternative C. The following list briefly summarizes the tidal and managed marsh restoration approach:

- Restores full tidal inundation to Middle, and Outer Bair Island through systematic breaching.
- Creates managed wetlands at Inner Bair Island.
- Channel modifications would be made at Corkscrew Slough and Smith Slough involving the installation of a flow restrictor that would partially block the sloughs in order to reduce unsafe flow velocities during tidal changes and prevent increased sedimentation along the Redwood Creek Shipping Channel.
- Smith Slough would not be restored to its historic meander through Inner Bair Island.
- Hydraulic control structures (*i.e.*, slide-flap gates, float-activated gates) would be installed on Inner Bair Island to allow water management within Inner Bair.
- A managed complex of diked salt marsh, uplands and shallow seasonal wetlands is planned.
- Regular maintenance would be required to maintain the hydraulic structures in working order. Maintaining public access after breaching would require periodic levee repair.
- A low berm would be built around the Airport property to prevent flooding and the levee containing the SBSA sewer line would be widened as necessary to prevent erosion.

Recreational Approach

The recreational access approach for Alternative D is the same as discussed under the Alternative B. The following list briefly summarizes the recreational access approach:

- Public access for pedestrians and bicyclists would be allowed on Inner Bair Island along a 1.8-mile levee trail (refer to Figure 9).
- No pets would be allowed on Bair Island.
- Public access would only be allowed on Middle and Outer Bair Islands by Refuge-guided trips and by boat to a viewing platform on Middle Bair.
- Fishing from boats in Smith, Corkscrew and Steinberger Sloughs and Redwood Creek would be allowed, however fishing would not be permitted from land.
- In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph. Seasonal closure to all boat access would be implemented to protect sensitive species (harbor seals).
- Hunting of waterfowl on portions of Middle and Outer Bair Islands would be allowed per state regulations.



ALTERNATIVE D: RESTORATION AND RECREATION APPROACH FOR INNER BAIR ISLAND

FIGURE 9

Alternatives	Meets Purpose & Objectives	Restoration Approach for Middle & Outer Bair Island	Restoration Approach for Inner Bair Island	Inner Bair Island Trail	Boating [Smith, Corkscrew, & Steinberger Slough and Redwood Creek]
No Action Alternative	some objectives	No maintenance	Only minor repairs to the existing levee.	Short term: same as existing public access (3.3 mile levee trail). Long term: as infrastructure deteriorates no public access Dogs allowed in short-term (five years) with 6-foot leash.	Short-term: same as existing Long term: as infrastructure deteriorates limited access by boat
Tidal Marsh Restoration/ Moderate Public Access (Alternative A)	Yes	Full tidal inundation with flow restrictor in Corkscrew Slough	Full Tidal inundation including adding dredged material to raise elevation and restoring historic meander of Smith Slough.	2.7 mile levee trail. Two viewing platforms on the east and west sides of Bair Island & loop around airport levee. Dogs allowed on leash	One viewing platform at Middle Bair accessible only by boat. In Smith and Corkscrew Sloughs, all motorized vehicles would be subject to “no wake zones” and speed limits of a maximum five mph
Tidal Marsh Restoration/ Restricted Public Access (Alternative B)	Yes	Full tidal inundation with flow restrictor in Corkscrew Slough	Full Tidal inundation including adding dredged material to raise elevation and restoring historic meander of Smith Slough.	1.8 mile levee trail. One viewing platform & loop around airport levee No access on east side of Inner Bair Island. No dogs allowed	Same as Alternative A description above with seasonal closure to all boat access to protect sensitive species (harbor seals).
Tidal and Managed Marsh Restoration/ Moderate Public Access (Alternative C)	some objectives	Full tidal inundation with flow restrictor in Corkscrew Slough	Managed wetlands with hydraulic control structures	2.7 mile levee trail. Two viewing platforms on the east and west sides of Bair Island & loop around airport levee. Dogs allowed on leash	Same as Alternative A description above.
Tidal and Managed Marsh Restoration/ Restricted Public Access (Alternative D)	some objectives	Full tidal inundation with flow restrictor in Corkscrew Slough	Managed wetlands with hydraulic control structures	1.8 mile levee trail. One viewing platform & loop around airport levee No access on east side of Inner Bair Island. No dogs allowed.	Same as Alternative B description above.

2.3 Scheduling

It is expected that the project would begin implementation in 2004 with 2-3 years of Altantic Cordgrass control preceding all levee breaching. The project is large scale and therefore would be implemented over a period of several years.

Under all alternatives except the No Action Alternative, Outer Bair Island would be restored first, followed by Inner and Middle Bair Island. Outer Bair Island can be breached at OB-1 (Figure 5) as soon as the internal pond features are constructed, which can occur relatively quickly. Breaching of Inner and Middle Bair Island must wait until after the channel flow control structures are in place. If Inner and Middle Bair Island were to be breached before the control structures were constructed, the result would be high velocities at Pete’s Outer Harbor and some additional silting of the shipping channel, though this second effect would be limited in extent and duration. Approximately one year prior to the restoration of tidal influence on Inner Bair Island, under Alternative A and Alternative B, dredged material would be placed on Inner Bair Island. To avoid flooding problems, the Smith Slough control structure would be installed after dredged material placement on Inner Bair Island is complete. It may be possible to refine the design later to provide for earlier phased breaching of parts of Middle Bair to Corkscrew Slough. Alternatives C and D would not involve the placement of dredged material. For all Action Alternatives channel flow control structures would be constructed during the dry season, to reduce the potential for flood risks before Inner and Middle Bair Island are breached.

2.4 Project Monitoring

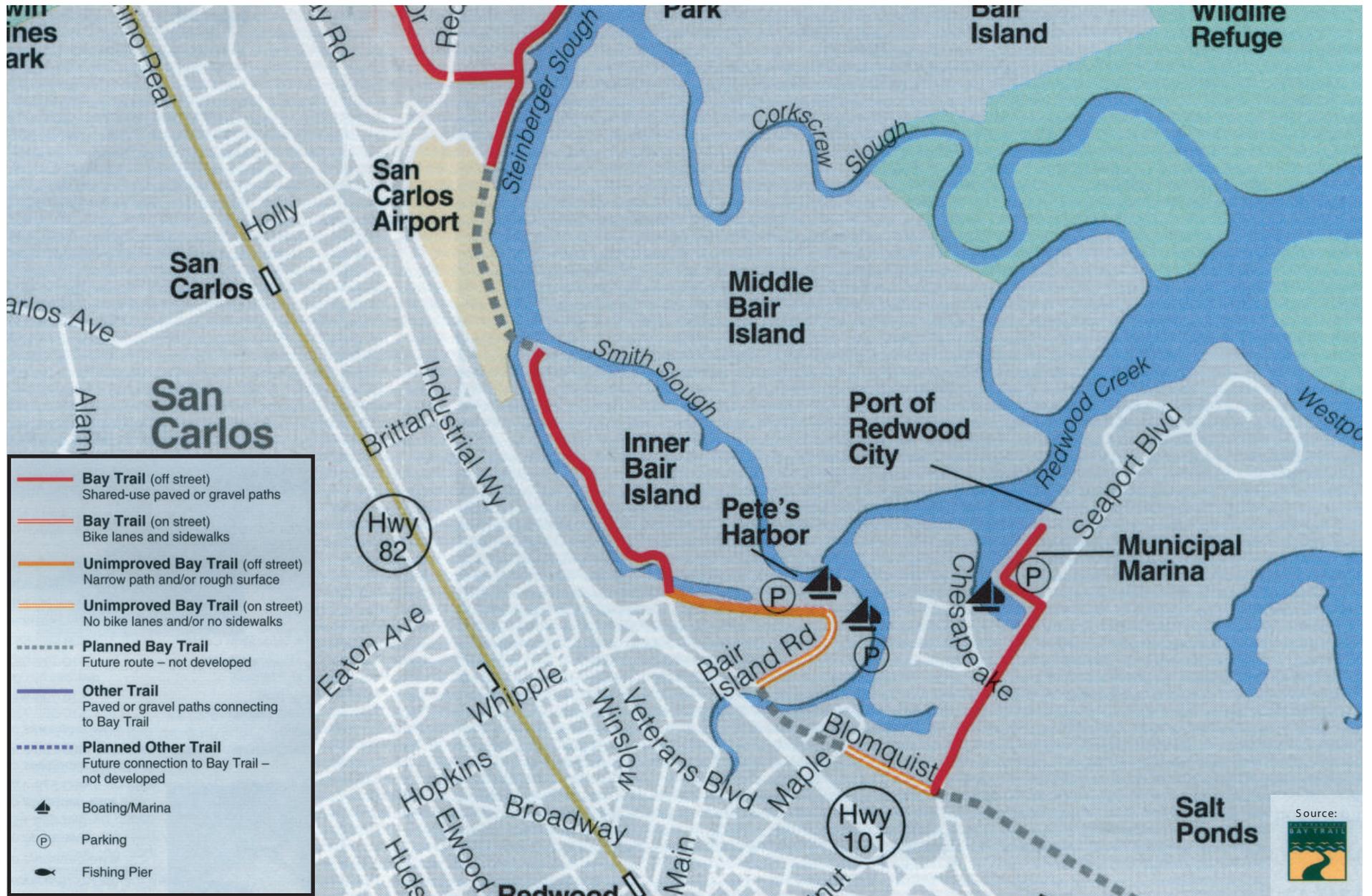
The Refuge and CDFG, along with qualified biologists, geomorphologists, contractors, and engineers, would monitor the restoration project. A draft monitoring plan has been developed to ensure that the restoration meets the project’s purpose and objectives, both initially and over time. A more detailed description of the monitoring plan can be found in the draft Monitoring Plan, located in Appendix B of this report.

The monitoring program, which includes both physical and biological elements, would continue for a minimum of 20 years following implementation of the selected restoration alternative. It may be necessary to extend the length of the monitoring program based upon the monitoring results.

2.5 Conformance with Relevant Plans, Goals, and Policies

Association of Bay Area Governments San Francisco Bay Trail Plan

The plan for the Bay Trail proposes development of a regional hiking and bicycling trail around the perimeter of San Francisco and San Pablo Bays. The Plan was prepared by the Association of Bay Area Governments (ABAG) pursuant to Senate Bill 100, which mandated that the Bay Trail provide connections to existing park and recreation facilities; create links to existing and proposed transportation facilities; and be planned in such a way as to avoid adverse effects on environmentally sensitive areas. The Bay Trail Plan proposes an alignment for what is planned to become a 400-mile recreational “ring around the Bay.” Currently, the Bay Trail Plan has designated a portion of this alignment along the existing levee trail on Inner Bair Island (refer to Figure 10). This segment of the



SAN FRANCISCO BAY TRAIL MAP

FIGURE 10

trail extends from the western point on the levee on Inner Bair Island to the trailhead at Whipple Avenue, and then continues on the narrow path that connects to Bair Island Road. The Bay Trail Plan also shows a future bay trail (planned but not developed) connecting Redwood Shores Bay Trail through San Carlos Airport property (along Steinberger Slough) and bridging the Airport property to Inner Bair Island. However, this connection through the Airport is not available for public access because of safety rules and regulations and safety concerns, and would not be presently permitted by the FAA. In addition, a proposal to build the Bay Trail on Inner Bair Island with connection to the mainland was determined by the US Fish and Wildlife Service to likely jeopardize the continual existence of endangered species. To provide access from the trailhead at Whipple Avenue north toward the San Carlos Airport without building a bridge to Inner Bair Island, Caltrans is building a trail along US 101 from north of Pulgas Creek south to Whipple Avenue.

The No Action Alternative could result in a conflict with the San Francisco Bay Trail Plan because recreation and public access would eventually be eliminated or substantially reduced on the designated Bay Trail Spur trail alignment on Inner Bair Island as levees fail. All of the Action Alternatives would improve the designated Bay Trail spur trail alignment on Inner Bair Island and the USFWS would work with partners¹⁰ to improve the connector trail to the parking lot on Bair Island Road. Therefore, all of the Action Alternatives are consistent with the Bay Trail Plan.

City of Redwood City General Plan

The *City of Redwood City Strategic General Plan* was adopted on January 22, 1990. Bair Island is within the boundaries of the City of Redwood City. Middle and Inner Bair Island have a General Plan designation of *Future Development Expanding Limits of Urbanization*, and are zoned *Tidal Plain*. Outer Bair Island has a General Plan designation of *Unimproved Areas (Land or Water) Devoted to Preservation of Natural Resources, the Managed Production of Resources, Outdoor Recreation, or Public Health and Safety*, and is zoned *Tidal Plain*. The project area where the existing parking lot is located has a General Plan designation of *Office Park* and is zoned *General Commercial*.

All of the Action Alternatives are in conformance with the stated goals of the City of Redwood City's open space element and conservation element that encourage open spaces areas within the urban complex to enhance the value of other lands and the quality of life and promote the environmental preservation, air and water quality, wildlife protection, and resource recovery. The following is a summary of relevant policies and objectives of the General Plan that would apply to the project.

Open Space objective 3 states to “provide a network of trails and pathways through Redwood City in order to enhance the City’s recreational opportunities.”

Open Space policy 3 states “open space areas which are primary wildlife habitats or which have major or unique ecological significance should be protected and conserved.”

Open Space policy 9 states “the City shall cooperate with County, Regional, State, Federal, and other public agencies on open space issues.”

¹⁰ The partners are the San Francisco Bay Trails staff, Peninsula Open Space Trust, City of Redwood City, PG&E, Bay Conservation and Development Commission, Caltrans, and adjacent landowners.

Conservation policy 3 states “environmentally unique open spaces such as San Francisco Bay, its tributaries, slough, and marshlands should be protected and enhanced for conservation and recreation purposes.”

The Action Alternatives would be consistent with the goals and policies of the *City of Redwood City Strategic General Plan*.

San Francisco Bay Conservation and Development Commission

The San Francisco Bay Conservation and Development Commission (BCDC) is a California state agency which controls all areas in the Bay subject to tides, including a shoreline band extending 100 feet inland. BCDC issues development permits for projects within its jurisdiction involving filling, dredging, or substantial changes in use. BCDC is responsible for enforcing the McAteer-Petris Act, which requires that “maximum feasible public access, consistent with a project be included as part of each project to be approved by the BCDC.” BCDC is also responsible for determining consistency with the federal Coastal Zone Management Act.

The Federal Coastal Zone Management Act and the California Coastal Act require the BCDC to review federal projects, projects that require federal approval or projects that are supported by federal funds. The BCDC Bay Plan (Bay Plan) promotes Bay conservation along with shoreline development and public access. BCDC has adopted policies that specifically address public access and wildlife compatibility, where in some “cases public access would be clearly inconsistent with the project because of public safety considerations or significant use conflicts, including unavoidable, significant adverse effects on Bay natural resources.”

BCDC jurisdiction in the project area extends over the Bay, including Steinberger Slough, Smith Slough, Corkscrew Slough, and Redwood Creek, to five feet above mean sea level in marshes and over a 100-foot shoreline band inland from the line of mean high tide. The project would require a BCDC consistency determination for dredging and filling and shoreline improvements.

Currently, public access is allowed on a 3.3-mile loop trail on Inner Bair Island. Boating access is allowed throughout all of the adjacent sloughs and Redwood Creek.

The BCDC has indicated that the waterways should remain accessible to the public. Located in Smith Slough east of Inner Bair Island, is Pete’s Outer Harbor, which is a part of Pete’s Harbor accessible off Bair Island Road (refer to Figure 3). In order to avoid unsafe and increased velocities at Pete’s Outer Harbor and the Redwood Creek shipping channel, the Action Alternatives include channel modifications in Corkscrew Slough and Smith Slough. Under Alternative A and B, a flow-blockage control structure would be installed in Smith Slough in order to restore its historic meander through Inner Bair Island. Under Alternative C and D, a flow restrictor would be installed to allow boat passage through Smith Slough. In all Action Alternatives, a flow restrictor would be installed in Corkscrew Slough, along with improvements to maintain access throughout the waterway. There would be warning and information signs near the flow restrictor and at the boat ramp. A 30 foot notch for boat passage would be installed, along with a depth gauge, at the notch. However, in the short term, it is possible that boat access may be compromised during low tides, or when water exchange through the structure is at its peak. A portage would, therefore, be installed along the banks of Corkscrew Slough in order for recreational users to have access around the flow restrictor. In the long term, slough channels would deepen by tidal scour thereby making them accessible for boating for longer periods of each tide cycle than current conditions. The flow control structures

would prevent any impacts to waterway accessibility; therefore the Action Alternatives are consistent with BCDC policies.

San Francisco Bay Regional Water Quality Control Board (RWQCB)

The Regional Water Quality Control Board has primary authority for implementing provisions of the federal Clean Water Act and California's Porter-Cologne Water Quality Control Act. These statutes establish the process for developing and implementing planning, permitting, and enforcement authority for waste discharges to land and water. The *Water Quality Control Plan, San Francisco Bay Region* (Basin Plan) establishes beneficial uses for surface and groundwater resources and sets regulatory water quality objectives that are designed to protect those beneficial uses (San Francisco Bay RWQCB 1995). Under the current Basin Plan, designated beneficial uses of the San Francisco Bay area's surface waters include municipal and domestic supply; agricultural supply; industrial service supply; groundwater recharge; contact and non-contact recreation; warm freshwater fish habitat; cold freshwater fish habitat; wildlife habitat; migration of aquatic organisms; and spawning, reproduction, and/or early development of fish.

The Plan provides a program of actions designed to preserve and enhance water quality and to protect beneficial uses. It meets the requirements of the U.S. Environmental Protection Agency and establishes conditions related to discharges that must be met at all times.

The implementation portion of the Basin Plan includes descriptions of specific actions to be taken by local public entities and industries to comply with the policies and objectives of the Plan. These include measures for urban runoff management and wetland protection.

The project would be designed to comply with RWQCB permitting requirements. The USFWS and CDFG would prepare and conform to a Storm Water Pollution Prevention Plan, as required under the State Water Resources Control Board implemented National Pollutant Discharge Elimination System (NPDES) Permit program for construction activities and conform to a Storm Water Pollution Prevention Plan (SWPPP), as required under the State Water Resources Control Board. The SWPPP would identify specific measures for reducing construction impacts such as erosion and sediment control measures.

The project would involve construction activities that could adversely affect water quality and therefore all of the Action Alternatives would require acquisition of a Clean Water Act Section 401 water quality certification from the RWQCB.

The San Francisco Bay RWQCB also has established sediment screening criteria and testing requirements for the beneficial reuse of dredged material (*e.g.*, wetlands creation and upland disposal). All sediment used for creation of upland habitat would be screened to meet wetland cover standards set by the Regional Water Quality Control Board (RWQCB).

The project would conform to the policies and objectives of the Basin Plan.

San Carlos Airport Master Plan¹¹

The San Carlos Airport currently owns a portion of Inner Bair Island, which is maintained as a runway protection zone (RPZ). This area must be kept clear of any structures or stationary objects and ponded water that attract waterfowl. The project proposes to construct a levee around the Airport's parcel that would be large enough to provide emergency vehicles access in airport emergencies. The levee leading up to the RPZ would be gradually sloped. This levee would be used as a public trail. Under Alternatives A and B, the Airport property behind the levee would be filled with dredged material in order to raise the area above the mean high water level and avoid ponding hazards. Under Alternatives C and D, hydrologic flow control structures would be installed on Inner Bair Island to control the changing water levels and avoid ponding hazards.

All of the Action Alternatives would conform to the policies and regulations of San Carlos Airport.

San Francisco Estuary Invasive *Spartina* Control Program

The *Spartina* Control Program (Control Program) proposes to implement a coordinated, region-wide eradication program, comprising a number of on-the-ground treatment techniques to stave off invasion of non-native cordgrass from the eastern United States. The Control Program would be focused within the nearly 40,000 acres of tidal marsh and 29,000 acres of tidal flats that comprise the shoreline areas of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, and Sacramento counties.

This proposed project assumes that the non-native plant species eradication and management included in the Action Alternatives would be consistent with the Control Program adopted in October 2003. An Invasive *Spartina* control program would be implemented with the selected action alternative for 2-3 years prior to breaching any levees.

2.6 Permits Required

The following permits/approvals would be required from the agencies indicated:

Section 404 Permit	U.S. Army Corps of Engineers
Section 401 Water Quality Certification	San Francisco Bay Regional Water Quality Control Board
BCDC Consistency Determination	San Francisco Bay Conservation & Development Commission

¹¹ San Carlos Airport Master Plan Update Draft EIR, June 2002

SECTION 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NEPA CEQ Regulations, CEQA Guidelines, and professional judgment were used during the evaluation of environmental consequences to assess whether or not the alternatives would result in significant impacts. Both context and intensity were considered when establishing the level of significance. The context means that the significance of an action must be analyzed in several contexts such as the locale in which the project site is located. The intensity refers to the severity of the impact.

3.1 Vegetation and Wildlife¹²

3.1.1 Existing Setting

This section is primarily based upon an Existing Biological Conditions Report prepared by *H.T. Harvey & Associates*. This report is located in Appendix C of this EIR.

There are seven different habitat types identified as presently existing on Bair Island. These include tidal salt marsh, muted salt marsh, diked salt marsh, seasonally ponded wetlands, aquatic/open water, shell mounds, non-native grassland, and developed. The physical extent and location of these habitats are shown on Figure 11 and the corresponding acreages of each habitat are listed in Table 2.

Bair Island consists of three sub areas: Inner, Middle and Outer Bair Islands. These areas are separated by slough channels, with only Inner Bair Island accessible without the use of a boat. The Bair Island area totals 2,635 acres: Inner Bair Island is 324 acres, Middle Bair Island is 896 acres, and Outer Bair Island is 1,415 acres.

Currently, pedestrians and bicyclists can access the levee loop trail on Inner Bair Island from a trail from the Bair Island parking lot on Bair Island Road.¹³ There is signage that dogs are allowed on Inner Bair Island levee trails if they remain on the trails at all times; however, on numerous occasions during public use surveys, dogs were not being controlled by their owner and were wandering off the designated trails and in marshes.

¹² In the following text, all plants and animal species are referred to using their common names. An expanded discussion which contains both the common and scientific/Latin names of the various species is in technical Appendix C.

¹³ Until June 2003, pedestrians and bicyclists took access at the trailhead to the Inner Bair Island levees from an unpaved area used for parking at the end of Whipple Avenue. The California Department of Transportation (Caltrans) owns this existing unpaved area along Whipple Avenue. As part of Caltrans' U.S. 101 Auxiliary Lanes Project from Ralston Avenue to Marsh Road, this area was closed off to parking by Caltrans in June 2003.



HABITAT MAP

FIGURE 11

Location	Habitat	Acres
Inner Bair Island	Aquatic	48.71
	Developed	8.47
	Diked Salt Marsh	9.06
	Non-native Grassland	187.89
	Seasonally Poned Wetland	32.82
	Tidal Salt Marsh	<u>36.90</u>
	Total	323.83
Middle Bair Island	Aquatic	112.01
	Diked Salt Marsh	553.64
	Non-native Grassland	38.02
	Tidal Salt Marsh	<u>192.54</u>
Total	896.21	
Outer Bair Island	Aquatic	100.21
	Diked Salt Marsh	468.90
	Muted Salt Marsh	51.77
	Non-native Grassland	141.45
	Shell Mounds	5.63
	Tidal Salt Marsh	<u>647.13</u>
	Total	1,415.09
Overall Acreage		2,635.13
Source: H.T. Harvey & Associates, 2000		

Biotic Habitats

Tidal Salt Marsh

Tidal salt marsh occurs along the outboard side of the existing levees, as well as in the former salt ponds in the northwest section of Outer Bair Island where the levees have been allowed to breach. The tidal salt marsh within these former salt ponds is at a slightly lower elevation than the outboard marshes. This results in a plant community comprising an equal mix of cordgrass and pickleweed.

Pickleweed is a native salt marsh plant species that supports a variety of wildlife species, but is especially important for the salt marsh harvest mouse. There is both a native species as well as an invasive non-native species of cordgrass present in San Francisco Bay. The native species provides prime habitat for the California Clapper Rail.

The slightly higher elevation found on the outboard marshes are predominantly composed of pickleweed. The outboard marsh serves as the ideal reference habitat for the restoration effort, with the marsh inside the former salt ponds on the west side of Outer Bair providing insight into the evolution of the sites once tidal action is returned.

Other common plant species found in the tidal salt marsh are alkali heath, salt marsh dodder and jaumea. Marsh gumplant occurs at higher elevations, as well as along the transitional area between tidal salt marsh and non-native grassland habitat.

Tidal salt marsh is a very important habitat in the San Francisco Bay estuarine system and performs integral functions, such as a filter for sediments and pollutants, for the bay ecosystem. The benthic organisms (those living in the mudflats or slough bottoms) and fish (which enter the channels of the marsh at high tide) found in this habitat support a rich assemblage of foraging shore and waterbirds, including the American Avocet, Black-necked Stilt, Sora, Semipalmated Plover, Long-billed Curlew, Great Blue Heron, Snowy Egret, and American White Pelican. The tidal salt marsh habitat also supports several species that are found only in these habitats, including the federally endangered California Clapper Rail and salt marsh harvest mouse, and the Alameda Song Sparrow and the salt-marsh wandering shrew, both California Species of Special Concern. Harbor seals use the waters around a marsh as a place to raise young and are known to haul out on the pickleweed and mudflats of Middle Bair and Outer Bair Island at low tide. Mammals such as raccoons, striped skunks and non-native red foxes may forage in this habitat. Although few reptiles or amphibians can reside here, species that live in nearby uplands may forage in this habitat including the southern alligator lizard and gopher snake.

Muted Tidal Salt Marsh

One pond on eastern Outer Bair Island contains deteriorated flapgate structures that are no longer functional and allow muted tidal action within the small leveed areas. This area (formerly a Least Tern nesting colony) was leveed off in a failed attempt to protect Least Tern nesting habitat. Currently, the area consists of a mix of cordgrass and pickleweed.

Muted tidal salt marshes support some of the same species as tidal salt marsh; however, the substantially reduced tidal influence reduces the value of this habitat relative to tidal wetlands for a number of species. For example, shorebirds typically feed on mudflats exposed by retreating tides and Alameda Song Sparrows are largely dependent on tidal marshes. California Clapper Rails reside in tidal marshes, and sometimes in muted tidal areas, but are typically not found in similar vegetation in non-tidal situations. Salt marsh harvest mice are found in muted tidal marshes such as those found on Bair Island if the marshes have robust pickleweed vegetation that is not inundated for long periods of time. The diked marshes of Middle and Outer Bair Island have pickleweed but during high rainfall years, the vegetation becomes covered with ponded rainwater resulting in a loss of most if not all harvest mice. Pickleweed vegetation in the tidal marshes is inundated for much shorter periods (extreme high tides) and for the most part has higher areas of refuge, so the mice are not lost as they are in some diked marshes.

Diked Salt Marsh

This habitat type is largely found on the interior of the former salt ponds on Inner, Middle and Outer Bair Islands. The diked salt marsh habitat generally consists of pickleweed interspersed with mudflats and small open water areas. The quality of the habitat within the four former salt ponds varies highly from pond to pond. The former salt pond on Outer Bair Island has the highest quality habitat with over 50 percent cover by pickleweed that has moderate vigor. The westernmost pond on Middle Bair Island has less than 50 percent cover by pickleweed of moderate to low vigor, while the two remaining diked salt marsh areas on Middle Bair Island have approximately 30 percent cover by pickleweed of low vigor. The latter two ponds also have a higher occurrence of brass buttons (a non-native species) and bare soil/salt pond.

Ponds within the diked salt marsh habitat have subsided between 2.2 and 3.4 feet below the elevation of the tidal salt marsh on the outboard side of the levee and the plants in these areas generally appear

to have a reduced vigor. This reduced vigor is likely related in part to the periodic flooding that occurs in high rainfall years (e.g., 1997-1998 El Niño years). The habitat, during such events, is completely inundated. Other common plant species found within the diked salt marsh are alkali heath, brass buttons and salt grass at the high elevations.

Seasonally Ponded Wetlands

These wetlands are located in slightly lower topographic depressions within the levees of Inner Bair Island. The slight changes in topography responsible for small patches of seasonal wetlands are very numerous, and made precise field mapping of all the patches virtually impossible. However, soil pits were dug within Inner Bair Island to determine the status of these seasonal wetland areas, and the result were extrapolated to all of Inner Bair Island using the habitat signatures present on aerial photographs. These wetland areas, supported largely by incidental rainfall, were dominated by rabbitsfoot grass and brass buttons with patches of pickleweed, spearscale and alkali heath also occurring throughout. These ponds support foraging shorebirds in winter, as well as waterfowl and gulls.

Aquatic/Open Water

Aquatic habitat occurs within the low flow channel of the creeks, slough channels and borrow ditches throughout Bair Island. This deep-water habitat does not support either emergent or terrestrial vegetation.

Fish species that occur in the vicinity include the bay ray, bay pipefish, bay goby, shiner surfperch, starry flounder, and English sole. Birds likely to occur here include the Western Grebe, American Coot, gulls, and various waterfowl species such as scaup. Harbor seals occur here as well.

Shell Mounds

A few small areas of exposed shell mounds exist along the perimeter of Outer Bair Island along San Francisco Bay. These areas are largely devoid of vegetation and are readily visible from the ground as well as from the aerial photography. Shell mounds may provide nesting substrate for American Avocets and Killdeer, and roosting habitat for Brown Pelicans, and other birds.

Non-Native Grassland

Non-native grassland habitat is found in three primary locations on Bair Island. The first area is associated with the levee tops throughout all of Bair Island. Secondly, most of Inner Bair Island is non-native grassland. This area was formerly a salt pond and less vegetation occurs in the interior of Inner Bair Island. Third, there are several other non-native grassland areas along the eastern side of Middle and Outer Bair Islands at locations containing spoil material disposal from past dredging of Redwood Creek. Other small, miscellaneous pockets of non-native grassland habitat exist throughout the project area, but are generally associated with either the levee system or with dredge spoil disposal.

The predominant non-native grassland species identified at Bair Island include non-native species such as Italian ryegrass, ripgut brome, black mustard, wild radish, Mediterranean barley, wild oats, yellow star-thistle, common sow thistle, bull thistle, bristly ox-tongue, rabbitsfoot grass, and brass buttons, as well as the native species alkali heath and coyote brush.

This habitat may support a variety of songbirds, such as Song Sparrows, House Finches, and Lesser Goldfinches. Various mammals, including brush rabbits and California voles are likely to occur here as well.

Developed Habitat

For the purpose of this analysis, developed habitat refers to the unvegetated trails that are present around the perimeter, and across the middle of Inner Bair Island. The parking lot area adjacent to Whipple Avenue does contain some hardscape (*e.g.*, asphalt) material, but the developed areas are mostly compacted soil. These areas do contain sporadic vegetation, generally consisting of non-native grassland vegetation around the perimeter trail and some brass buttons in the low spots along the trail down the middle of Inner Bair Island.

This habitat provides few resources to wildlife species. Although some species associated with adjacent habitats likely forage here to some extent, use of this habitat by wildlife is expected to be very limited.

Existing Special-Status Plant Species

“Special-status” plants include those species that are State and/or Federally-listed threatened or endangered species, or species proposed for such listing, species which are candidates for federal listing, or species which are otherwise considered sensitive. Sensitive species are those that do not meet any of the listed, candidate, or proposed criteria, but generally are warranted special management consideration. These include species assigned the CNPS 1B designation, which includes plants rare, threatened, or endangered in California according to the CNPS (but not listed *per se*). Sensitive (CNPS 1B) plants may receive the same level of protection as federal candidate species, depending on the nature of populations to be impacted.

When assessing the site’s potential suitability for special-status plant species, several factors are generally taken under consideration, including: 1) the proximity and date of known occurrences, 2) the presence and ecological condition of habitat found on-site, 3) past and current land use practices, 4) the existence of other species known to be found in conjunction with the special-status species (associate species), and 4) direct observation of plants as a result of optimally-timed, species-specific surveys. Reconnaissance-level surveys for special-status plant species were conducted during habitat mapping surveys between April 14th and 28th of 2000 within the project area.

The special-status plant species that occur regionally in habitats similar to those found in the project area are described below. The process of identifying special-status plant species for consideration involved the following two steps: first, a query of special-status plants in the California Natural Diversity Database (CNDDDB), Redwood Point quadrangle, and eight adjoining quads; second, the California Native Plant Society (CNPS) Inventory and the CDFG Rarefind Database were used to produce a similar list for San Mateo County. Plants were considered on the basis of their occurrence in the broad categories of marshes and swamps, and valley and foothill grasses that are most similar to the salt marsh, seasonal wetland, and non-native grassland habitats on site.

A total of 41 special-status taxa occur in the region within habitats similar to those found on site, according to the CNPS inventory and the CDFG Rarefind Database. Of these, 38 species were not considered present due to the absence of suitable microhabitats including appropriate substrates (*i.e.*, serpentine soils) and/or lack of associate species. Suitable habitat exists in the project area for only

three special-status plant species including: Congdon's tarplant, Point Reyes bird's beak, and Contra Costa goldfields. Although suitable habitat may be present on site, Point Reyes bird's-beak and Contra Costa goldfields are presumed absent from the Bair Island complex. The former is known only from historical occurrences in the Bay Area, the most recent dating back to 1917. Furthermore, CNPS reports that this species has been extirpated from San Mateo, Santa Clara and Alameda counties. Contra Costa goldfields are not known from San Mateo County and are believed to be extirpated from Santa Clara County. CNDDDB Rarefind Database reports only historical occurrences of this species in the search area. An expanded description for Congdon's tarplant is provided below.

Congdon's Tarplant

This annual herb occurs in valley and foothill grasslands, particularly those with alkaline substrates on Clear Lake or Pescadero clay soils, and in sumps or disturbed areas where water collects. The blooming period extends from June through November. The reported range of this species has been reduced to Monterey, San Luis Obispo, Santa Clara, and Alameda counties, and does not include San Mateo County (CNPS Inventory, 6th Edition). The closest known population is approximately 15 miles away in Alviso, Santa Clara County. Suitable habitat is present on site within the non-native grassland habitats. Protocol-level field surveys were not conducted for this species; it is possibly present.

Existing Special-Status Wildlife Species

Federal or State Endangered or Threatened Species

Steelhead

The steelhead is listed as Federally Threatened and has State listing status of a Species of Special Concern. The steelhead is an anadromous (return to river to breed) form of rainbow trout that migrates upstream from the ocean and bay to spawn. Steelhead usually migrate upstream to spawning areas in late fall or early winter, when flows are sufficient to allow them to reach suitable habitat in far upstream areas that may have little water at other times of the year. Spawning occurs between December and June. Steelhead eggs remain in gravel depressions that are known as redds for one and one-half to four months before hatching. After hatching, young steelhead using the deeper reaches of streams as rearing areas remain in freshwater streams for a year or two (range 1 to 4) before migrating to the ocean. After migration, these fish typically grow rapidly for two to three years before returning to freshwater streams to spawn. Unlike salmon, steelhead trout do not necessarily die after spawning. Many adults survive and return to the ocean after spawning, only to come back and spawn another season or two. Steelheads may occasionally be present in the slough channels at Bair Island, but do not currently spawn in any streams near the proposed project site. Although spawning may have occurred historically in local streams, there is currently no connectivity between Redwood Creek or Steinberger Slough and any spawning stream.

Chinook Salmon

The chinook salmon is an anadromous fish, spawning in freshwater rivers and streams, but spending most of its adult life at sea. Chinook salmon populations have suffered the effects of over-fishing by commercial fisheries, degradation of spawning habitat, added barriers to upstream migration, and reductions in winter flows due to dams. Almost all chinook salmon occurring in San Francisco Bay are from the Sacramento-San Joaquin watershed. There are four races of Sacramento-San Joaquin

chinook: winter, spring, fall, and late-fall, as defined by the timing of adult migration upstream to spawning areas. Spring-run chinook are state and federally listed as Threatened, and winter-run chinook are listed by both agencies as Endangered. Fall/late-fall chinook are listed as a California Species of Special Concern.

Chinook salmon have not historically spawned in streams flowing into South San Francisco Bay. Since the mid-1980s, however, small numbers of fall-run chinook salmon have been found in several such streams, including Coyote Creek, Los Gatos Creek, and the Guadalupe River. These fish are probably strays from Central Valley runs. These fall-run chinook salmon typically arrive in South San Francisco Bay streams in October or later, although on rare occasions, adult chinook salmon have been detected in these streams in summer, and spawning has been observed on Los Gatos Creek in early September. No spawning occurs in streams adjacent to Bair Island. Juvenile fish of all runs could forage in tidal wetlands throughout San Francisco Bay, including those around Bair Island.

California Clapper Rail

The California Clapper Rail is a permanent resident of salt and brackish marshes around San Francisco Bay. The only remaining populations occur in the San Francisco Bay. Since the mid-1800s, about 80 percent of San Francisco Bay's marshlands have been eliminated through filling, diking, or conversion to salt evaporation ponds. As a result, the California Clapper Rail lost most of its former habitat, the population declined severely, and the species was listed as Endangered.

Clapper Rails along the Pacific Coast prefer salt marshes and brackish marshes dominated by cordgrass and marsh gumplant; in brackish marshes they also frequent areas supporting bulrushes. These birds also require shallow areas or mudflats for foraging, particularly channels with overhanging banks and vegetation (Goals Project 2000). Clapper Rails forage on crabs, mussels, clams, snails, insects, spiders, worms, and occasionally mice and dead fish. As a refuge from extreme high tides and as a supplementary foraging area, rails move to the upper marsh vegetation where it intergrades with upland vegetation. These birds have no requirement for fresh water.

California Clapper Rails nest from early March through August in the tallest vegetation along tidal sloughs, particularly in California cordgrass and marsh gumplant. They are non-migratory, although juveniles disperse during late summer and autumn. In the San Francisco Bay area, Gill (1979) found densities during the breeding season to range from 0.3 to 1.6 rails per hectare (ha), with non-breeding season densities ranging from 0.1 to 1.1 rails. Harvey (1981) estimated a density of 1.2 rails per ha during the winter.

Clapper Rails were reported at Bair Island by Gill (1979); other surveys found them in marshes immediately adjacent to Bair Island (e.g., Harvey, 1980). In December 1993, three (3) Clapper Rails were detected on Outer Bair Island during a survey conducted by CDFG (CDFG, unpubl. data). This was the first record of Clapper Rails in the restored area of Outer Bair Island. Total numbers of Clapper Rails detected during recent winter surveys at Bair Island include nine (9) (January 1993), seven to eight (7-8) (December 1993), ten (10) (December 1995), 13 (December 1998); and 21 (December 1999, CDFG unpubl. data). These winter surveys provide an index of breeding numbers, although no surveys have been conducted during the breeding season. All sightings are from Outer Bair Island or along Corkscrew Slough.

Salt Marsh Harvest Mouse

The salt marsh harvest mouse is listed as a Federal and State Endangered species. The salt marsh harvest mouse inhabits pickleweed marshes of the San Francisco Bay. This species is most abundant in deep, dense pickleweed in marshes providing areas with vegetation cover that do not become submerged during high winter tides (Shellhammer et al. 1982). Although this species makes some use of grasses and salt-tolerant forbs at the upper margins of salt and brackish marshes, it is closely tied to the cover of dense pickleweed, and it makes little use of pure alkali bulrush or Cordgrass stands (Wondolleck et al. 1976, Shellhammer 1977). These mice inhabit both marshes that are open to tidal action and diked marshes, provided that suitable pickleweed habitat is present.

Although no recent surveys have been conducted, many of the areas of Bair Island dominated by pickleweed provide high quality potential habitat for this species. This is especially true of the tidal marshes of the entire study area, and the muted tidal and diked marshes of Outer Bair Island. The diked units of Middle Bair Island contain less pickleweed and it is patchier, less dense, and shorter. The pickleweed habitats in Middle Bair Island provide salt marsh harvest mouse habitat that ranges from fair to non-habitat. The area that makes up Inner Bair Island is mostly non-habitat for the mouse, as pickleweed is found only as strips along waterways and standing water. The overall habitat value of Inner Bair Island to the mouse is generally poor. Most of the levees between areas in Middle Bair Island have moderate cover and it seems likely that salt marsh harvest mice may be able to move between levees, at least sporadically.

California Species of Special Concern

State endangered species legislation gives plant and animal species special status. The CDFG has produced three lists (amphibians and reptiles, birds, and mammals) of “species of special concern” that serve as “watch lists.” Species on these lists either are of limited distribution or the extent of their habitats have been reduced substantially, such that threat to their populations may be imminent.

Double-crested Cormorant

Double-crested Cormorants are yearlong residents along the entire coast of California and on inland lakes, in fresh, salt, and estuarine waters. Breeding occurs at undisturbed sites, typically in trees or on man-made structures, beside water on islands or mainland. This species is known to nest on some electrical transmission towers on Outer Bair Island (CNDDDB 2003).

Northern Harrier

The Northern Harrier is commonly found in open grasslands, agricultural areas, and marshes. Nests are built on the ground in areas where long grasses or marsh plants provide cover and protection. Harriers hunt for a variety of prey, including rodents, birds, frogs, reptiles, and insects by flying low and slow in a traversing manner utilizing both sight and sound to detect prey. Northern Harriers are known to occur on Bair Island (CNDDDB 2003) and likely breed as well as forage on Middle and Outer Bair Islands. Nesting is unlikely on Inner Bair Island, because of human recreational use.

Short-eared Owl

Short-eared Owls occur in open habitats such as grasslands, wet meadows, and marshes. They require tules or other tall grasses for nesting or daytime refuge. Although Short-eared Owls are now

uncommon, a pair was confirmed breeding at Greco Island in 1994 (Sequoia Audubon Society 2001). Short-eared Owls could currently nest on Outer Bair Island.

Burrowing Owl

The Burrowing Owl is a small, terrestrial owl of open country. Burrowing Owls favor flat, open grassland or gentle slopes and sparse shrubland ecosystems. These owls prefer annual and perennial grasslands, typically with sparse or nonexistent tree or shrub canopies. In California, Burrowing Owls are found in close association with California ground squirrels. Owls use the abandoned burrows of ground squirrels for shelter and nesting. Burrowing Owls have been recorded on the site and possible nesting habitat is present along the levees, primarily on Middle and Outer Bair Island. Burrowing Owls are more often found on Bair Island during the winter. They are rare on Inner Bair Island because of human disturbance (Morris, personal communication).

Loggerhead Shrike

Loggerhead Shrikes prefer open habitats interspersed with shrubs, trees, poles, fences, or other perches from which they can hunt. Loggerhead Shrikes are primarily monogamous and are very territorial throughout the year. They breed between early February and late June with the peak of breeding between mid-March and late June. Loggerhead Shrikes breed nearby (Sequoia Audubon Society 2001), and are known to occur on Bair Island at least in the winter (Morris, personal communication). They may breed as well as forage on the site.

Salt Marsh Common Yellowthroat

The Salt Marsh Common Yellowthroat inhabits emergent vegetation and breeds in fresh and brackish marshes and associated upland areas in the San Francisco Bay area. This subspecies (one of the approximately twelve subspecies of common yellowthroat recognized in North America) breeds from mid-March through early August and pairs frequently raise two clutches per year (Goals Project 2000). Because these subspecies cannot be reliably distinguished in the field, determination of the presence of Salt Marsh Common Yellowthroat can be achieved only by locating a nest in the breeding range known for this subspecies, or by observing them during the summer months when only the Salt Marsh Common Yellowthroat is present. Although little is known regarding the movements of this taxon, the wintering areas have been described as coastal salt marshes from the San Francisco Bay region to San Diego County. The Salt Marsh Common Yellowthroat is likely sparse on Bair Island owing to a lack of willow thickets and rushes (used for nesting). However, the species is known to occur on site and may breed as well as forage in the area (Morris, personal communication). Breeding would be limited to areas where rushes and other tall vegetation occur.

Alameda Song Sparrow

The Alameda Song Sparrow is one of three subspecies of song sparrow breeding only in salt marsh habitats in the San Francisco Bay area. Locally, it is most abundant in the taller vegetation found along tidal sloughs, including salt marsh cordgrass and marsh gumplant. Although it is occasionally found in bulrushes in brackish marshes, the Alameda Song Sparrow is very sedentary and is not known to disperse upstream into freshwater habitats (Goals Project 2000). Populations of the Alameda Song Sparrow have declined due to the loss of salt marshes around the bay, although within suitable habitat it is still fairly common. The Alameda Song Sparrow is expected to be fairly common in the salt marshes of Middle and Outer Bair Islands.

Salt-marsh Wandering Shrew

The salt-marsh wandering shrew inhabits medium-high marsh one to eight feet above sea level where abundant driftwood and pickleweed exist. It has been found to prefer the moister portions of pickleweed marshes, avoiding higher, drier areas. Salt-marsh wandering shrews have been found on Bair Island (CNDDDB 2003), and are expected to occur on site.

Other Special-Status Wildlife Species

White-tailed Kite

The White-tailed Kite is medium-sized raptor that is listed as Fully Protected by the state of California. White-tailed Kites forage for small rodents and other prey primarily in open grassy or scrubby areas. They nest in large shrubs or trees adjacent to this habitat. Kites have been documented nesting on Bair Island (CNDDDB 2003). They could potentially nest wherever large shrubs (*e.g.*, coyote brush) provide nesting habitat.

Pacific Harbor Seal

Pacific harbor seals are currently the only marine mammals that are permanent residents of San Francisco Bay. Harbor seals are protected under the federal Marine Mammal Protection Act, and are sensitive to human disturbance. Pacific harbor seals occur along the Pacific coast of North America from Alaska south to Baja California. In San Francisco Bay, they haul out at a number of sites to rest and pup (give birth). Most pupping occurs during spring, with a peak in April. Haul-out sites are typically mudflats far from areas used regularly by humans, and near deeper water, where seals forage. Primary haul-out sites in San Francisco Bay are Mowry Slough (243 seals in 1999), Castro Rocks, near the Richmond-San Rafael Bridge (107 seals in 1999), and Yerba Buena Island (72 seals in 1999; Lidicker and Ainley 2000). Use of haul-out sites varies over time, and other sites, including Newark Slough, Corte Madera, and Greco Island have been important haul-outs historically (Kopec and Harvey 1995). More than 10 sites around the Bay may be used by seals at any given time (Lidicker and Ainley 2000). At Bair Island, seals use haul-outs on the outer shore of Outer Bair Island, and several sites within Corkscrew Slough. The primary haul-out in Corkscrew Slough is along the west bank of the slough, near the bend closest to Redwood Creek. Secondary sites (used at high tide) are across from the first site (on the east bank), and west of the middle of the slough, along the north bank. The first site is used moderately (maximum of 20 seals in 1992), and pups have been recorded there (Kopec and Harvey 1995). During a site visit in February 2003, seven seals were hauled out at this site.

3.1.1.1 Existing Regulated Habitats

Waters of the United States Regulations Overview

Areas meeting the regulatory definition of “Waters of the U.S.” (jurisdictional waters) are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) under provisions of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as “Waters of the U.S.,” tributaries of waters otherwise defined as “Waters of the U. S.,” the territorial seas, and

wetlands (termed Special Aquatic Sites) adjacent to “Waters of the U.S.” (33 CFR, Part 328, Section 328.3). Wetlands on non-agricultural lands are identified using the *Corps of Engineers Wetlands Delineation Manual Environmental Laboratory 1987*.

A Wetland Technical Assessment was prepared in June 2000 as a general guidelines approach used by resource agencies in identification of jurisdictional wetlands.

Prior to the assessment, topographic maps and aerial photographs of the study area were obtained from several sources and were reviewed. These sources included the U. S. Geological Survey Map for the Redwood Point and Palo Alto Quadrangles, National Wetlands Inventory Maps for the Redwood Point and Palo Alto Quadrangles, and aerial photographs contained in the *Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California (Soil Conservation Service, 1991)*.

Approximately 1,993 acres of potential jurisdictional wetlands were mapped within the Bair Island. The extent and distribution of these wetlands, including tidal salt marsh, diked salt marsh, muted tidal salt marsh, and seasonally ponded wetland are shown in Figure 9. In addition, ‘other waters’ (as defined in the first paragraph of this section, *i.e.*, aquatic habitat), are shown in Figure 9.

California Department of Fish and Game Jurisdiction

Field surveys were also conducted within the project boundaries for habitats potentially under the regulatory jurisdiction of the CDFG as described under Division 2, Chapter 6, Section 1600-1607 of the Fish and Game Code of California. The CDFG potentially extends the definition of stream to include “intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams, and watercourses with subsurface flows. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife” (Environmental Services 1994). Such areas on site were determined using methodology described in *A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607* (Environmental Services 1994).

Under Section 1600-1607 of the Fish and Game Code of California, the CDFG does not claim jurisdiction over saltwater habitats including diked-, muted-, and tidal salt marsh similar to that found within the Bair Island complex.

3.1.2 Methodology and Significance Criteria for Vegetation & Wildlife Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of vegetation and wildlife impacts. Impacts on vegetation and wildlife were assessed by comparing the quantity and quality of the marsh habitat predicted to develop over time under the Action Alternatives with marsh habitat conditions under the No Action Alternative. A major assumption is that conditions predicted to result with implementation of each action alternative would occur within 50 years of project implementation.

Potential impacts of the project on vegetation and wildlife resources were characterized by evaluating direct, indirect, temporary, and permanent impacts. Direct impacts include the direct removal or loss of vegetation or individual animals within the footprints of ground disturbing actions such as levee breaches. Indirect impacts result from changes to habitat or wildlife that are incidental to project implementation. Wildlife species that occur or have potential to occur at the project site were

presumed to be indirectly affected if the quantity or quality of habitats within which they are typically associated would be affected. Temporary impacts have a short duration, and vegetation would be expected to recover or be restored with a few years after implementation. An example would be the removal of vegetation to install infrastructure, followed by vegetation recolonizing the site. A permanent impact would involve the long-term alteration of vegetation or wildlife habitat. An example would be the conversion of diked salt marsh area to tidal salt marsh.

Under NEPA CEQ Regulations, significant impacts may be beneficial or adverse and are considered equally. An example of a significant beneficial impact would be the conversion of non-native grassland or diked salt marsh habitat to habitat with greater function and values for salt marsh harvest mouse and California Clapper Rail (listed as endangered by the US Fish and Wildlife Service on October 13, 1970).

Thresholds of Significance

The following criteria were used to determine significant vegetation and wildlife effects under the State CEQA Guidelines. A vegetation and wildlife impact is considered significant if the project would:

- have a substantial adverse affect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status-species [including listed species] in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service; or
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service; or
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means; or
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site; or
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan; or
- have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of major periods of California history or prehistory.

Based on NEPA CEQ Regulations the project would have a beneficial impact if it would:

- result in a substantial increase in the quantity or quality of tidal marsh habitat or habitat for threatened or endangered species.

Impact Analysis Approach

Impacts were evaluated by assessing all of the proposed project implementation components, including the maturation of habitats that are anticipated to develop during the life of the project (50 years). Direct and indirect changes in wildlife habitat (increases and decreases) that would occur during the first decades following project implementation were compared to the ultimate areas of wildlife habitat that would exist by the end of the 50-year implementation period. This approach assumes that habitats would fully establish within 50 years of the project's initial implementation and that site evolution would allow some habitats to form immediately or within several years of construction.

Furthermore, all of the alternatives, including the No Action Alternative, would eventually restore tidal action and create tidal salt marsh habitat except at Inner Bair Island, where no tidal action would be restored under the No Action Alternative. However, the Tidal Marsh Restoration approach (Alternatives A and B) would restore the highest habitat functions and values in the shortest period of time. Predicted habitat changes under the all of the alternatives are shown in Table 3.

Potential Sources of Impacts From the Proposed Action

Several components of the proposed restoration plan could have substantial effects on the existing biotic resources of Bair Island. These include:

- the use of dredged material to raise the elevation of Inner Bair Island;
- the operation of equipment during construction, including dredges, boats, barges, excavators, dump trucks, and graders on and around Bair Island;
- the breaching of outboard levees;
- the placement of borrow ditch blocks on Middle and Outer Bair Islands;
- the creation of channel blocks in Corkscrew and Smith Sloughs; and
- the introduction of tidal flooding to all areas of Bair Island, thereby modifying existing habitats.

This impact analysis approach also assumes that the non-native plant species eradication and management would be consistent with the San Francisco Estuary Invasive *Spartina* Control Program and the impacts from that program have been addressed in a separate Program EIS/EIR prepared by the California State Coastal Conservancy and the US Fish and Wildlife Service in April 2003.

Predicted changes in habitat type and impact to habitat associated with natural levee failure at Bair Island under the No Action Alternative are described in the following section. The impacts of the four Action Alternatives are then described and compared.

Table 3: Predicted Habitat Evolution at Bair Island

	No Action			Alternatives A & B			Alternatives C & D		
Habitat Type	Existing Condition (acres)	Several Years After Implementation (acres)	50+ Years After Implementation (acres)	Existing Condition (acres)	Several Years After Implementation (acres)	50+ Years After Implementation (acres)	Existing Condition (acres)	Several Years After Implementation (acres)	50+ Years After Implementation (acres)
Inner Bair									
Diked salt marsh	9.1	9.1	9.1	9.1	0	0	9.1	0	0
Non-native grassland	187.9	187.9	187.9	187.9	12.9	12.9	187.9	12.9	12.9
Seasonally ponded wetlands	32.8	32.8	32.8	32.8	3.1	3.1	32.8	3.1	3.1
Managed marsh	0	0	0	0	0	0	0	260.6	274.4
Tidal salt marsh	36.9	36.9	36.9	36.9	260.6	274.4	36.9	0	0
Mudflat/Aquatic	48.7	48.7	48.7	48.7	38.8	25.0	48.7	38.8	25.0
Middle Bair									
Diked salt marsh	553.6	553.6	0	553.6	0	0	553.6	0	0
Non-native grassland	38.0	38.0	20.0	38.0	30.0	20.0	38.0	30.0	20.0
Tidal salt marsh	192.5	192.5	673.1	192.5	242.5	673.1	192.5	242.5	673.1
Mudflat/Aquatic	112	112	203	112	623.6	203	112	623.6	203
Outer Bair									
Muted salt marsh	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8
Diked salt marsh	468.9	468.9	128.5	468.9	128.5	128.5	468.9	128.5	128.5
Non-native grassland	141.5	141.5	119.5	141.5	133.5	119.5	141.5	133.5	119.5
Tidal salt marsh	647.1	647.1	953.5	647.1	695.1	953.5	647.1	695.1	953.5
Mudflat/Aquatic	100.2	100.2	156.2	100.2	400.6	156.2	100.2	400.6	156.2
Shell mounds	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6

Note: Developed areas are not included in the totals

3.1.3 Vegetation & Wildlife Impacts

3.1.3.1 No Action Alternative

Overview

The No Action Alternative would restore substantially less tidal salt marsh habitat within the 50 year planning horizon than the four Action Alternatives. The difference that would result in the reduced quantity of habitat include the uncontrolled breaching of the levees, the lack of channel blocks to isolate the Steinberger Slough side of the system from Redwood Creek, and the very low rates of sedimentation on part of Middle Bair Island. Areas of Middle Bair Island most distant from the natural breaches would likely remain unvegetated throughout the 50-year planning horizon. (These areas currently consist of sparsely vegetated diked salt marsh.)

Compared to the other four alternatives, there would be a substantial delay in habitat restoration due to both length of time until natural levee failure (10-50 years) and the likely inefficient, haphazard location of natural breaches. Natural levee breaches would not occur in areas that would maximize sediment distribution into the restoration sites. Furthermore, engineered cut-off berms would not be placed in borrow ditches that presently exist throughout the system. Borrow ditches, instead of historic slough channels, would capture the tidal channel flows. Sediment distribution would be reduced and this would further lengthen the time necessary to achieve target habitats on Middle and Outer Bair Islands.

The No Action Alternative would cause temporary and/or permanent loss of several habitats including tidal salt marsh, and diked salt marsh. No significant changes would occur to the habitats on Inner Bair Island, as minimal levee maintenance activities would continue to protect the existing airport safety zone and the SBSA sewer line.

Impacts to Biotic Habitats

Temporary Loss of Tidal Salt Marsh

There would be temporal losses of tidal salt marsh habitat under the No Action Alternative. Subsequent to the predicted erosion and uncontrolled breaching of levees on Middle and Outer Bair Islands, the increased flow velocity would cause erosion of the existing tidal salt marshes located on the outboard side of levees along slough channels. Also, some tidal salt marsh habitat would be lost due to erosion at each natural breach location. It is not possible to predict exactly how much tidal salt marsh would be lost to erosion. However, concurrent with the loss of tidal salt marshes on the outboard side of levees from erosion, new tidal salt marsh would be forming in Middle and Outer Bair Islands. As the surface elevation of Middle and Outer Bair Islands rises, the tidal prism in adjacent slough channels would begin to decrease, slowing flow velocities. With a slowing of flow velocities, natural sedimentation would allow tidal salt marsh to redevelop along some portions of the slough channels. Although there would be some initial loss of tidal salt marsh habitat on the outboard side of the levees due to increased erosion, there would be subsequent, long-term gain of hundreds of acres of salt marsh habitat throughout Bair Island.

Although it is not possible to precisely quantify the losses of tidal salt marsh habitat from levee breaching and erosion under the No Action Alternative, the loss of tidal salt marsh habitat from the

No Action Alternative would likely be greater than under the Action Alternatives. This loss would be from uncontrolled levee breaching.

- **The loss of existing tidal salt marsh habitat under the No Action Alternative would be less than significant because of the substantial net increase of tidal salt marsh habitat. (Less Than Significant Impact)**

Conversion of Diked Salt Marsh to Tidal Salt Marsh or Tidal Mudflat

Under the No Action Alternative, levee failures would result in the conversion of diked salt marsh on Middle and Outer Bair Islands to tidal salt marsh or tidal mudflat habitats. While it is very difficult to predict levee failures, it is likely that the restoration of Middle and Outer Bair Islands would be delayed at least 10 years (5-25 years are possible). With a 10 year delay, tidal salt marsh would probably be restored to the entire area within the 50 year planning horizon. If the delay approaches 25 years, then half or more of the approximate 900 acres could still be mudflat at the 50 year horizon. The diked salt marsh habitat generally consists of pickleweed interspersed with salt pannes, bare ground, and small open water areas. The vigor of the pickleweed within this habitat on Bair Island ranges from low to moderate, and cover is highly variable. The conversion of this habitat to intertidal habitats, most of which would be tidal salt marsh, would ultimately result in a healthier and more floristically diverse marsh, providing better habitat for wildlife than the existing conditions.

It is likely that there would be less conversion to tidal salt marsh and more conversion to intertidal mudflats with the No Action Alternative due to the low starting elevation of the existing diked salt marshes on Middle and Outer Bair. If levee breaches are not optimized to maximize sediment delivery to all marsh areas, then accretion is likely to be significantly slower. The No Action Alternative would ultimately restore intertidal habitats to Middle and Outer Bair Islands, although it would do so on a slower timeline. In addition, this alternative would not restore any intertidal habitats to Inner Bair Island.

- **The No Action Alternative would result in the conversion of diked salt marsh to tidal salt marsh and tidal mudflat habitats on Middle and Outer Bair Islands. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)¹⁴**

Impacts to Special-Status Plant Species

Loss of Congdon's Tarplant

Suitable habitat for Congdon's tarplant occurs in the non-native grassland habitat and along the margins of seasonally ponded wetlands within Inner Bair Island. It is possible that the species occurs on-site. Under the No Action Alternative, all of the levee slopes around this island would be kept in a condition similar to that now present on site.

- **Suitable habitat conditions for Congdon's Tarplant on Inner Bair Island would not be substantially altered under the No Action Alternative. (Less Than Significant Impact)**

¹⁴ Under CEQA “significant effects on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project...” Under NEPA, impacts may be beneficial or adverse.

Impacts to Special-Status Wildlife Species

Temporary Loss of Habitat for the Salt Marsh Harvest Mouse

Under the No Action Alternative, natural levee breaches would result in the loss and conversion of tidal and diked salt marsh habitats. This would constitute a temporary loss of salt marsh harvest mouse habitat until the marsh regenerates naturally over a period of 5 – 50 or more years (based upon the specific location within Bair Island). The conversion of diked salt marsh to tidal salt marsh would ultimately result in a healthier and floristically more diverse marsh, providing better habitat and increasing the carrying capacity at Bair Island for the species. In 10 to 50 years from now, when the outboard levees breach, tidal water would flood the diked marshes. As floodwaters enter the marsh, any salt marsh harvest mice living in the area would presumably seek higher ground, and/or enter adjoining marshes by crossing over a levee. As this tidal flooding occurs, water would enter the marsh at a rate such that, the animals would have ample time to move away from the rising water. However, these animals would encounter other salt marsh harvest mice, voles and house mice. The outboard marshes would not be able to support this influx of new animals. The net result would be a short-term loss of habitat and the associated carrying capacity in the marshes.

Before the levees break, the population of salt marsh harvest mice are impacted by flooding from winter rainfall. In periods of high rainfall, the entire diked pickleweed marsh is covered in water resulting in the loss of most or all of the existing mice. Natural levee breaks would allow tidal exchange and prevent the ponding of winter rains thereby eliminating long periods of flooding of pickleweed habitat (except for short periods during high tide events) that result in the loss of salt marsh harvest mice. Therefore, in the long-term, this would result in better habitat for the mice.

Additionally, some animals would be lost from the uncontrolled breach in the levees. The animals lost during this conversion process would not reduce the local population below a level sufficient to populate the nearby created habitat.

The net benefit of restoring the diked salt marsh back to tidal influence would far outweigh immediate impacts on individual animals. This conversion of diked salt marsh to tidal salt marsh would positively affect the greater salt marsh harvest mice population and would contribute to the recovery of the species as a whole. As it stands, this area of diked salt marsh provides poor to moderate quality habitat for salt marsh harvest mice. In the future, this area could represent a healthier and floristically more diverse marsh habitat for the species.

- **During and shortly after uncontrolled levee breaching, the No Action Alternative would result in the temporary loss of habitat for salt marsh harvest mice and loss of some individual animals. In the long-term the substantial increase in habitat and the associated population expansion associated with the new habitat, would offset both the temporary reduction in habitat and loss of individual animals. (Less Than Significant Impact)**

Disturbance to Breeding California Clapper Rails

Public access in the vicinity of nesting California Clapper Rails has the potential to disrupt breeding. There are situations where rails are known to nest in close proximity to public trails (*e.g.*, Palo Alto Baylands, Laumeister Tract, Greenbrae boardwalk, and numerous trails within the Don Edwards San Francisco Bay National Wildlife Reserve (NWR)). Rails nesting in areas with public use may

become somewhat accustomed to people, but they are very vulnerable to dogs. The reproductive success of these birds is unknown. A substantial increase in public use of the area, especially associated with unleashed dogs, may result in some disturbance. Disturbance of rails and other nesting waterbirds can lead to abandonment of nests and chicks, resulting in decreased reproductive success (Albertson 1995, Rodgers and Smith 1995, Carney and Sydeman 1999, USFWS 2001).

The No Action Alternative would support the current level of public use at Inner Bair Island, and the suitable habitat for the Clapper Rail would consist of the narrow strip of outboard marsh. However, after five or more years, the trail system would likely be closed as a result of no maintenance, eliminating terrestrial access for recreation. This would result in a decrease in human use, although most of the current use is not close to suitable rail habitat. Thus, no change, or a slight decrease would occur in the level of disturbance over existing conditions.

- **The No Action Alternative retains the same level or slightly lower level of potential disturbance to Clapper Rails. (Less Than Significant Impact)**

3.1.3.2 Alternative A: Tidal Marsh Restoration and Moderate Public Access (*Proposed Action*)

Impacts to Biotic Habitats

Conversion of Diked Salt Marsh to Tidal Salt Marsh

Approximately 894 acres of diked salt marsh would be converted to tidal salt marsh with the implementation of Alternative A. The diked salt marsh habitat generally consists of pickleweed interspersed with salt pannes, bare ground and small open water areas. The pickleweed observed within this habitat on Bair Island ranges from low to moderate vigor, and is highly variable in cover. As discussed earlier, these diked salt marshes periodically are inundated by heavy rainfall, which can cover virtually all of the pickleweed and other plant species present. The proposed loss and conversion of this habitat to tidal salt marsh, including restoring historical tidal drainages, would ultimately result in a healthier and more floristically diverse marsh, providing much better habitat for wildlife. Introducing tidal influence and restoring tidal salt marsh habitat has a net benefit to water quality, aquatic habitats and the aquatic species of San Francisco Bay (Goals Project 2000).

- **Implementation of Alternative A would result in the conversion of approximately 894 acres of diked salt marsh to tidal salt marsh during the life of the project. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**¹⁵

Loss of Tidal Salt Marsh

Construction of levee breaches, flow control structures, infrastructure protection and levee widening would cause the direct loss of approximately 3.2 acres of currently existing tidal salt marsh habitat. Most of this area would convert to tidal slough channels. Levee breaching and the subsequent restoration of historic tidal drainage channels within Inner, Middle and Outer Bair Islands would result in the colonization and establishment of tidal salt marsh vegetation, ultimately restoring at least 1,400 acres of tidal salt marsh habitat within Bair Island. Several hundred acres of tidal salt marsh would be restored within the first three years of project implementation, with the remaining salt marsh evolving over the next 50 years (refer to Table 3).

- **In the short-term, approximately 3.2 acres of existing tidal salt marsh habitat would be lost under Alternative A. Several hundred acres of tidal salt marsh would be restored within the first three years of implementation, and up to 1,400 acres would be restored within 50 years. The large net increase in tidal salt marsh habitat would reduce impacts associated with the loss of 3.2 acres of tidal salt marsh habitat to a less than significant level. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

Loss of Seasonally Ponded Wetlands

Under Alternative A, approximately 29.7 acres of seasonally ponded wetlands within Inner Bair Island would be converted to tidal salt marsh. These wetlands are largely supported by incidental rainfall, and currently contain low-to-moderate quality upper marsh plant species with low overall cover. These wetlands provide foraging habitat for a variety of shorebird species. However, the

¹⁵ Under CEQA “significant effects on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project...” Under NEPA, impacts may be beneficial or adverse.

conversion of 29.7 acres of ponded wetlands to tidal salt marsh (within Inner Bair Island) would result in a more floristically diverse habitat with greater plant cover, providing high quality habitat for wildlife (including shorebirds), especially for several rare, threatened and endangered species. In addition, levee breaching and changing the elevation of Inner Bair Island via the placement of dredged materials would restore the natural, historic tidal drainage flows, thereby allowing the tidal salt marsh to perform its integral functions (such as filter for sediments and pollutants) to the bay ecosystem. Additionally, those shorebird species that typically forage in such seasonal wetlands primarily forage in tidal mudflats. Implementation of the proposed restoration plan alternative would provide additional intertidal mudflat habitat for a number of years, while vegetation becomes established. The final tidal marshes would include intertidal drainages, and drainage-divide ponds. Thus, there would be both short-term and long-term benefits for these species.

San Carlos Airport Safety Zone

In order to minimize adverse impacts to the San Carlos Airport safety zone while converting approximately 175 acres of upland habitat to wetlands, it would be necessary to fill approximately 2.6 acres of seasonally ponded wetlands. These wetlands would be filled to become upland habitat as required for the safety zone for the San Carlos Airport (on San Carlos Airport property located on Inner Bair Island). An approximately 11-acre portion of Inner Bair Island adjacent to the airport would be filled with dredged material to create this upland habitat. Placement of dredged material would minimize the amount of ponded open water areas and provide an upland area near the end of the runway within the Airport's flight path. This 11-acre area is currently comprised of non-native grassland and seasonally ponded wetlands.

The FAA Advisory Circular number 150/5200-33 recommends a distance of 5,000 feet between the airport and new wildlife attractants such as wetlands. The circular also provides for exceptions to the recommended distance when the wetland in consideration provides "unique ecological functions, such as critical habitat for threatened or endangered species." The goal of the Bair Island restoration project is to provide habitat for the California Clapper Rail and the salt marsh harvest mouse, and therefore clearly falls within the outlined exceptions. In addition, the airport is surrounded by existing aquatic and wetland habitat that already serves as an attraction for wildlife.

Due to concerns about the potential for bird strikes at San Carlos Airport, a site specific approach for restoration and management near the San Carlos Airport was developed in coordination with airport personnel, FAA, and USDA Wildlife Services. The proposed filling of approximately 2.5 acres of seasonally ponded wetlands within the airport safety zone is proposed to limit the attractiveness of adjacent habitats to the wildlife that would pose the greatest threat to aircraft landing or taking off from the airport.

The existing seasonally ponded wetlands in the vicinity of the airport are largely supported by incidental rainfall, and are comprised of low to moderate quality upper marsh plant species (including several non-native plant species). Some small 2.5 acres of seasonal wetlands may redevelop in depressions following dredge material consolidation in the airport safety zone. These seasonal wetlands would be similar to those impacted.

As discussed previously, implementation of the restoration plan would result in habitat conversions on Outer, Middle and Inner Bair Island that would benefit shorebird species that typically forage in seasonally ponded wetlands. These benefits would occur in both the short-term and long-term. The project would also restore 1,400 acres of tidal salt marsh, including the conversion of over 175 acres

of upland habitat to tidal salt marsh habitat on Inner Bair Island. Overall, the project's restoration of these habitats would reduce the adverse effects from the permanent loss of seasonal wetlands on Inner Bair Island to a less than significant level.

- **Implementation of Alternative A would result in the conversion of approximately 32.3 acres of seasonally ponded wetlands to upland and tidal salt marsh habitat. Considering the overall increase in tidal salt marsh habitat and habitat for shorebirds, this alternative would not result in substantial adverse impacts to sensitive habitats. (Less Than Significant Impact)**

Impacts to Special-Status Plant Species

Loss of Congdon's Tarplant

Suitable habitat for Congdon's tarplant occurs in the non-native grassland habitat and along the margins of seasonally ponded wetlands within Inner Bair Island. It is possible that the species occurs on-site. Although the species is on the CNPS List 1B, (plants rare, threatened, or endangered in California and elsewhere), relatively large populations of Congdon's tarplant occur in Santa Clara and Alameda counties. A combined total of approximately 950,000 plants were observed in 1998 at 3 locations in the Livermore/Dublin area. Also in 1998, a population of approximately 7,000 plants was reported in the Warm Springs District in Fremont, and a population of approximately 2,500 plants was observed in Alviso, north of Highway 237. Numerous other large populations of Congdon's tarplant have been recently reported in Alameda County, particularly in the Livermore/Dublin area, and Contra Costa counties. Specific locations of each of these populations is maintained by the California Natural Diversity Database. Over the last several years, relatively large populations of this species have been found scattered throughout the nine Bay Area counties. As awareness of Congdon's tarplant increases with professional botanists, resource agencies, and the public, more and more populations continue to be discovered. Due to the highly invasive nature of this species, and tolerance for disturbance, any populations of Congdon's tarplant currently within the study area would be expected to recolonize disturbed upland habitats after work is completed. Based on the abundance of this species in the region, and given the relatively small predicted potential of impact to Congdon's tarplant on site due to habitat conversion, any impacts to populations of this plant species would be less than significant.

- **The conversion of seasonally ponded wetlands could result in the loss of Congdon's Tarplant on Inner Bair Island. Based on the abundance of this species in the region and the relatively small impact to possible populations of Congdon's tarplant, impact would be less than significant. (Less Than Significant Impact)**

Impacts to Special-Status Wildlife Species

Impacts to the Salt Marsh Harvest Mouse

The purpose of the project is to restore tidal salt marsh to provide substantial long-term benefit to endangered species, including the salt marsh harvest mouse. The increase in tidal salt marsh would provide a permanent net benefit to this species. Nonetheless, there would be some initial effects of the restoration on individual salt marsh harvest mice. These are described below, as are considerations for trying to minimize those initial effects.

The broad tidal salt marshes on site provide high-value habitat for the federally and state endangered salt marsh harvest mouse. Narrow strip marshes, which occur in some tidal locations, have value as corridors or refuges, but do not support the densities of mice found in the broader marshes. The diked salt marsh presently existing on site provides poor to moderate quality habitat for this species. As described previously, Alternative A would cause approximately 3.2 acres of tidal salt marsh to convert to aquatic habitat and approximately 894 acres of diked salt marsh to convert to tidal salt marsh habitat. The process of converting these habitats would cause a temporary loss of harvest mouse habitat at some locations until the marsh regenerates naturally over a period of years (5 – 50 years based upon the specific location within Bair Island). However, the conversion of diked salt marsh to tidal salt marsh would ultimately result in a healthier and floristically more diverse marsh, providing better habitat and increasing the carrying capacity at Bair Island for the species. The total area of tidal salt marsh habitat that would evolve over the life of the project (including over 200 acres of new pickleweed-dominated marsh on Inner Bair Island) would greatly exceed the current amount of tidal salt marsh and diked salt marsh on site, benefiting mouse populations. Population densities of salt marsh harvest mice in large tidal marsh far exceed those in sparse diked marshes such as those currently present on Middle Bair Island (H.T. Harvey & Associates, 1990).

Flooding Impacts

When the outboard levees are breached, tidal waters would flood the diked marshes. Each scheduled breach would be done systematically, with the Outer Bair Island selected levees to be breach first then Middle Bair Island levees and Inner Bair Island levees. As floodwaters enter the marsh, any salt marsh harvest mice living in the area would presumably seek higher ground, and/or enter adjoining marshes by crossing over a levee (Fisher 1965, Shellhammer 1982). As this tidal flooding occurs, water would enter the marsh at a rate where animals would have ample time to move away from the water. However, these animals would encounter other salt marsh harvest mice, voles and house mice. The outboard marshes would not be able to support all of this influx of new animals. The net result would be a short-term loss of habitat and associated carrying capacity in the marshes.

Without the levees breaches, the population of salt marsh harvest mice are impacted by flooding from winter rainfall. In periods of high rainfall, the entire diked pickleweed marsh is covered in water resulting in the loss of most or all of the existing mice. Levee breaches would allow tidal exchange and prevent the ponding of winter rains thereby eliminating long periods of flooding of pickleweed habitat (except for short periods during high tide events) that result in the loss of salt marsh harvest mice. Therefore, in the long-term, this would result in better habitat for the mice.

Consideration was given to methods that could minimize take of the salt marsh harvest mouse. The possibility of relocating animals prior to flooding was examined. This would entail trapping the affected area before flooding and moving all captured animals away from the site. Attempts to re-introduce small mammals such as rodents have been difficult. Bright and Morris (1994) showed that it was hard to re-introduce dormice (*Muscardinus avellanarius*); in most cases successful re-introductions required the provision of supplemental food. Danielson and Gaines (1987) noted that it was very difficult to re-introduce prairie voles (*Microtus ochrogaster*) into habitats already occupied by conspecifics. The situation in voles is considered to be the general situation for most small rodents. Salt marsh harvest mouse translocations have proven unproductive in the past (H. T. Harvey & Associates 1984, 1999). A later study (H. T. Harvey & Associates 1999) documented the ability of the salt marsh harvest mouse to return to the area of disturbance, in spite of extensive efforts to prevent that return. Forty nine unique individuals were captured and relocated during the study. Twenty seven times, an individual that had been relocated returned to the area within the exclusion

fence. Some of these individuals were recaptured even after being moved a distance of over 900 feet. The majority of the recaptured animals were males apparently returning to their home territories. Relocated juveniles did not return to the site. Females were also recaptured but not as frequently as males. Depending upon the small mammal assemblage present at the relocation site, introducing new animals has the potential to cause serious disruptions to the existing makeup of the small mammal community. Overcrowding and exceeding carrying capacity are some possible detrimental effects. The most vulnerable animals under these circumstances would be the translocated mice. Being unfamiliar with their new surroundings, translocated mice would be more susceptible to predation and inter- and intra-species competition. All of these factors could work together to render an active translocation useless, or at least of highly questionable value. Allowing animals to passively seek new habitats may result in higher survival rates, although there is no experimental evidence to support that possibility. In situations where there is a large undisturbed marsh with suitable habitat for the salt marsh harvest mouse adjoining the area of disturbance, the value of exclusion trapping is questionable. This adjoining marsh can provide a source for recolonization of the disturbed area. Neither exclusion trapping (that was used in this case) nor vegetation removal is likely to increase the probability of persistence of the local population.

Additionally, some animals would be lost from the initial breach in the levees. However, the net benefit of restoring the diked salt marsh back to tidal influence would far outweigh any immediate impacts on individual animals. This restoration would positively affect the greater salt marsh harvest mice population and would contribute to the recovery of the species as a whole. As it stands, this area of diked salt marsh provides poor to moderate quality habitat for salt marsh harvest mice. In the future, this area could represent one of the most prolific areas for the species.

Potential Impacts From Construction Equipment

Heavy equipment would be used for placement of dredged material, levee breaches, and installation of channel controls. Some of this activity would occur in existing salt marsh harvest mouse habitat. The use of exclusion fences has been tested in the past to keep animals out of the footprint of construction. This method attempts to avoid take of listed species from heavy equipment use and other invasive construction activity. Salt marsh harvest mice are one of the smallest mammals in North America, making even the most negligible tear in the fence an easy entrance into the construction site. Salt marsh harvest mice also can and do move under fences through cracks in the mud channels. Therefore, exclusion fences are not very effective for keeping salt marsh harvest mice out of an area. Exclusion fences surrounding areas to be dredged would provide little if any protection to salt marsh harvest mice. No other method to exclude the animals has been identified. As described above, the net long-term benefits to the species and populations on Bair Island reduce the overall effects of the project on the species to a less than significant level.

Comparison to No Action Alternative

The same short-term loss of both individual salt marsh habitat mice and their habitat during flooding from levee breaches would also occur from the implementation of the No Action Alternative, albeit at a later undetermined date. It occurs now, on a periodic basis, due to high rainfall years where the marshplains are inundated. This situation creates what is known as a population “sink”. Specifically, areas are colonized by salt marsh harvest mice, but those individuals are periodically forced out due to high water, and may perish. As with the No Action Alternative, loss of individual salt marsh harvest mice during implementation of Alternative A would not cause the population to fall below a level that can not repopulate the newly created habitat in the future.

There would be no construction-related impacts from the No Action Alternative, since no construction activities would occur in or adjacent to salt marsh harvest mouse habitat.

- **During and shortly after the levee breaching, Alternative A would result in the temporary loss of habitat for salt marsh harvest mice, and loss of some individual animals. In the context of the substantial increase in habitat and the associated population expansion associated with the new habitat, both the temporary reduction in habitat and loss of individual animals would not result in a net loss of habitat. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

Impacts to Breeding California Clapper Rails During Construction

The primary purpose of the project is to restore tidal marsh to provide benefits to endangered species, including the California Clapper Rail. The project has been designed to maximize that restoration potential. The increase in tidal salt marsh would, under Alternative A, provide a net benefit to the species. Nonetheless, there could be some initial effects of the restoration on California Clapper Rails. These are described below, as are considerations for trying to minimize those initial effects.

Restoration of the marshes would involve constructing levee breaches through tidal marsh. These breaches would eliminate approximately 3.2 acres of tidal salt marsh. Additionally, while the method of construction of those breaches is not yet determined (*i.e.*, dredging from the channels or dredging from levee tops), there would likely be movement of construction equipment along the existing levees in some areas. While no rails have been known to use Smith Slough, installation of channel controls in Corkscrew Slough, in which Clapper Rails have been found, might impact rails because access by boat and probably along levees would be required. Levees would be lowered in selected locations to provide fill for borrow ditch blocks, and to enhance restoration. These construction activities could disrupt breeding and cause disturbance that impacts Clapper Rail. As stated previously, breeding Clapper Rail do tolerate disturbance in some locations, but it is assumed that some disruption would occur.

Consideration was given to limiting the activities described to the four months of the non-breeding season, in order to minimize impacts to California Clapper Rails, and associated indirect effects such as disturbance from construction activities near rail habitat. If the disturbance was extended over two or more years or seasons, there would be a much longer period of time during which individual rails (which are sensitive to disturbance) would be impacted. It would be better to confine the impacts to one season, and prevent extended disturbance over multiple seasons.

Comparison to the No Project Alternative

The No Action Alternative would not be likely to have construction-related impacts to nesting Clapper Rails similar to Alternative A. Although some work would occur (e.g., levee maintenance) in or adjacent to pickleweed habitat at Inner Bair Island, rails have not been recorded at Inner Bair Island, and are not expected to occur there under current conditions of high human use. Under the No Action Alternative, the public will continue to access the entire trail for approximately 5 years when the trail will be closed. Although public disturbance to the wildlife at Inner Bair Island will decrease at that time, the area will not be restored and therefore not contain habitat for Clapper Rails.

- **The increase in tidal salt marsh habitat under Alternative A would provide a net benefit to California Clapper Rail in terms of increased breeding and foraging habitat.**

Construction activities associated with the implementation of Alternative A may result in disturbance to nesting California Clapper Rail during a single nesting season. Limiting construction activities to a single season would not, however, substantially impact the long-term breeding success of California Clapper Rail on Bair Island. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)

Future Disturbance to California Clapper Rails

Public access in the vicinity of nesting California Clapper Rails has the potential to disrupt breeding. There are situations where rails are known to nest in close proximity to public trails (e.g., Palo Alto Baylands, Luameister Tract, Greenbrae boardwalk, and numerous trails within the Don Edwards San Francisco Bay National Wildlife Reserve (NWR)). Rails nesting in areas with public use may become somewhat accustomed to people, but they are very vulnerable to dogs. The reproductive success of these birds is unknown. A substantial increase in public use of the area, especially associated with unleashed dogs, may result in some disturbance. Disturbance of rails and other nesting waterbirds can lead to abandonment of nests and chicks, resulting in decreased reproductive success (Albertson 1995, Rodgers and Smith 1995, Carney and Sydeman 1999, USFWS 2001).

The trail around Inner Bair will no longer be a 3.3-mile loop trail to facilitate the restoration of Smith Slough to its historic meander. Because of the large variety of boat types that will be using Smith Slough, we are not able to install a trail bridge over the breaches without interfering with boating. In addition, having a complete loop trail around Inner Bair Island will lessen the quality of the restored Clapper Rail habitat.

The moderate public access under Alternative A would not increase public access in new areas, and leash restrictions if followed may reduce the potential for such disturbance. Additionally, the extensive tidal restoration proposed for Inner Bair Island would provide extensive, more isolated, nest locations than does the current strip marsh surrounding Inner Bair Island. However, the new habitat created under Alternative A will provide nesting habitat for rails in close proximity to areas used by humans. This potential for disturbance from humans and dogs on rails will be offset somewhat by a decrease in the total length of the recreation trail from 3.3 miles to 2.7 miles. The potential for long-term disturbance therefore is less than significant.

- **The proposed public access may result in some disturbance to California Clapper Rails, but the impact would not be a substantial increase compared to existing conditions. Future habitat would result in an improvement in available nesting sites compared to existing conditions. (Less Than Significant Impact)**

Loss of Harbor Seal Haul-out Access

Harbor seals haul-out on three sections of Corkscrew Slough year-round, using the mudflats of the slough as pupping sites during spring, their primary mating season. The primary areas used are in eastern Corkscrew Slough, with a secondary site in central Corkscrew Slough. The western haul-out site receives minimal use because at low tide, there is not suitably deep water for seals to escape (Kopec and Harvey 1995, Trulio et al. 2003). The proposed flow restrictor would be placed to the west (Steinberger Slough side) of the commonly used eastern haul-out sites close to the seldom used middle haul-out site. The restrictor could potentially impede access to the middle haul-out site, as seals are only known to enter the slough from Redwood Creek (Trulio et al. 2003). In addition, a viewing platform is proposed (accessible by boat) at the flow restrictor. Human presence at the

viewing platform would likely reduce the use of this site by harbor seals. The primary haul-out site, to the east of the block, would not be affected. Additional haul-out sites on Outer Bair Island would also not be affected by Alternative A. There are numerous other haul out sites in the South Bay, including areas such as Mowry Slough. Corkscrew Slough is a relatively small haul out, with a maximum count in the early 1990's of 25 seals, compared with 40 at nearby Greco Island, and more than 200 in Mowry Slough (Kopec and Harvey 1995). Seals currently also use the recently restored tidal marshes on Outer Bair Island as haul-out sites, which is analogous to the conditions that would be created by the restoration of the remainder of Bair Island. Therefore, as the restoration process progresses, additional mudflats and emergent marsh would be created and would likely serve as new haul-out areas for harbor seals. While access to and use of the existing middle haul-out site that receives minimal use would be impeded, there are a number of other sites available to harbor seals in the area, and substantial new sites would be created by the project.

Compared to Alternative A, the No Action Alternative would not block access to haul-out site for harbor seals because the flow restrictions would not be constructed.

- **Although Alternative A would block access to a harbor seal haul-out site that receives minimal use along Corkscrew Slough, there are a number of other haul-out sites available in the area and new suitable sites would be created as part of the restoration activities. (Less Than Significant Impact)**

3.1.3.3 Alternative B: Tidal Marsh Restoration and Restricted Public Access

The majority of the effects on vegetation and wildlife of implementing the restoration plan under Alternative B are identical to those of Alternative A. However, Alternative B will reduce impacts to wildlife compared with the impacts in Alternative A, including the endangered California Clapper Rail and salt marsh harvest mouse by reducing the length of the public access trail on Inner Bair Island from 2.7 miles to 1.8 miles, and eliminating impacts from dogs. See *Section 3.1.3.2* for descriptions of the effects of implementing the restoration plan including: Loss of tidal salt marsh during construction, conversion of diked salt marsh to tidal salt marsh, loss of seasonally ponded wetlands, loss of Congdon's tarplant, impacts to salt marsh harvest mice, impacts to breeding California Clapper Rails and loss of harbor seal haul-out access. These impacts are identical to those of Alternative B.

Under the Restricted Public Access of Alternative B, California Clapper Rails and other wildlife may have somewhat reduced impacts from disturbance by dogs, depending on how well the leash restrictions are observed under Alternative A. Dogs may be perceived by rails as predators, causing rails to abandon nests or chicks, and dogs off-leash have the potential to step on or depredate nests, chicks, or adult rails. Studies of Piping Plovers and Snowy Plovers have shown that birds react at closer distances to dogs than to pedestrians (USFWS 2001). However, with the leash restrictions under Alternative B (and the prohibition of dogs under Alternative A if the leash law is regularly violated), disturbance impacts under Alternative B are not expected to be substantially different from those under Alternative A.

Under Alternative B, there will be a seasonal closure of Corkscrew Slough to prevent disturbance to pupping harbor seals. From March 15 to June 15, the slough will be closed to all boat traffic. Boat traffic can disturb seals, causing them to flush from haul-out sites (Allen et al. 1984, Suryan and Harvey 1999). During the pupping season, disturbance could potentially lead to abandonment of pups. A closure to boating during this time period would prevent unnecessary disturbance.

However, research has shown that with some precautions, such as speed limits on boats and buffer areas around haul-outs, seals will tolerate human use of adjacent waters (Terhune and Brilliant 1996, Suryan and Harvey 1999). Under Alternative A, educational signs will be posted at nearby marinas directing boaters how to avoid impacts to harbor seals, and a no-wake speed limit will be imposed in Corkscrew Slough. Thus, we do not expect a significant difference in disturbance to harbor seals between Alternatives A and B. Both Alternatives A and B are expected to lead to a decrease in disturbance to harbor seals over current conditions. Under the no action alternative, disturbance to harbor seals will continue at current levels for several years, but eventually Corkscrew Slough will become unsafe for boating, and will be closed to boats. At that time, potential impacts to harbor seals from human disturbance would be eliminated.

3.1.3.4 Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access

Impacts to vegetation and wildlife from the implementation of Alternative C are nearly the same as described for the Tidal Marsh Restoration Alternatives (Alternatives A and B) except on Inner Bair Island. The effects of implementing the restoration plan are identical to those of Alternatives A and B at Middle and Outer Bair Islands, since there are no differences in the restoration plan at these sites. See *Section 3.1.3.2* for descriptions of effects of implementing the restoration plan including: Loss of tidal salt marsh, conversion of diked salt marsh to tidal salt marsh, impacts to salt marsh harvest mice and California Clapper Rails, and loss of harbor seal haul-out access.

Under Alternative C, the hydrologic structures would be used to direct limited tidal flows onto Inner Bair Island. The existing unmanaged seasonal wetlands and upland habitats on Inner Bair would largely be replaced by a complex of managed diked salt marsh and seasonal wetlands. This complex would create habitat for the salt marsh harvest mouse, but would not create habitat for the California Clapper Rail. Compared to Alternatives A and B, approximately 260 acres less tidal marsh habitat suitable for the California Clapper Rail would be created. Public use will be the same as in Alternative A so the impacts from public use will be the same; see *Section 3.1.3.2*. Compared to the No Action Alternative, this alternative would create at least 200 more acres of diked salt marsh suitable for the salt marsh harvest mouse.

3.1.3.5 Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access

Impacts to vegetation and wildlife from implementation of Alternative D are already stated under Alternative B and C. The public use plan will be the same as that in Alternative B and therefore, the impacts will be the same as listed for public use in *Section 3.1.3.3*. The impacts from implementation of the restoration of tidal marsh on Middle and Outer Bair Islands and managed marsh on Inner Bair Island will be the same as that in Alternative C and therefore, the impacts will be the same as listed in *Section 3.1.3.4*

Conclusion: All of the alternatives including the No Action Alternative would eventually restore tidal action and create tidal salt marsh habitat. The differences between the alternatives are how quickly tidal salt marsh habitat is created, how much is ultimately restored, the quality of the restored habitat and the amount of impact from public use. The No Action Alternative would restore the least amount of high quality salt marsh habitat in the longest amount of time. Alternatives A and B would create the greatest amount of high quality tidal marsh habitat in the shortest amount of time however, there would be less impact from public use in Alternative B. Alternatives C and D would

not restore tidal salt marsh to Inner Bair; therefore there would be less tidal salt marsh than Alternatives A and B. However, as since public use more restricted in Alternative D (as it is in Alternative B), there would be less impact from public use in Alternative D than Alternative C.

All of the alternatives including the No Action Alternative would result in less than significant adverse impacts to vegetation and wildlife. In addition, all of the alternatives including the No Action Alternative would result in significant beneficial impacts, in accordance with NEPA CEQ Regulations, to tidal salt marsh habitat.

3.2 Hydrology and Water Quality

3.2.1 Existing Setting

This section is primarily based upon an Existing Hydrologic Conditions Assessment prepared by *Philip Williams & Associates*, located in Appendix D of this EIS/EIR.

Historic Conditions

Bair Island was once part of a continuous band of tidal salt marsh wetland along the southwest shoreline of southern San Francisco Bay. From the time of initial submergence (approximately 10,000 years ago) until large-scale reclamation began (about 150 years ago), the aerial extent of the Bay's tidal marshes was determined by the interaction of sea level rise, estuarine sedimentation, and wind-wave erosion. Initially, salt marsh sedimentation and organic accumulation were not able to keep pace with the rapid rise in sea level, and the Bay supported only a thin, discontinuous fringe of salt marsh along its perimeter. The rate of sea level rise slowed to its current rate approximately 6,000 years ago, and allowed a continuous marsh fringe around the Bay as marsh accretion (slow addition to land by deposition of water-borne sediment) kept pace with sea level rise.

Near the turn of the century, portions of Bair Island were included in several attempts to reclaim marshplain land for agricultural use. The reclaimed areas eventually reverted back to marsh due to levee failure and tidal inundation. Between 1948 and 1952, most of Middle and Outer Bair Islands were leveed for use as salt evaporation ponds. Commercial salt production continued until 1965, when the ponds were drained and abandoned. Although not documented in the literature, it is believed that Inner Bair was leveed at the same time as Middle and Outer Bair Islands. Levee placement along Inner Bair included cutting off a large meander of Smith Slough and adding an area to Inner Bair Island that was formerly part of Middle Bair. Borrow ditches, or trenches in the soil, were created throughout Bair Island by excavation for construction of the levees. Tidal inundation was restored to a large portion of Outer Bair through a series of planned and unplanned levee breaches in the late 1970s and early 1980s, after the land was transferred to the California State Lands Commission as mitigation for the development of Redwood Shores.

Although the locations of the major slough channels have remained essentially unchanged between 1857 and the present, flow patterns have changed over time. The most significant change has been the increased conveyance through Redwood Creek due to dredging, which has captured a large portion of the tidal prism that once drained through Steinberger Slough. Since dredging in Redwood Creek began in 1955, Corkscrew and Smith Slough tidal flows have shifted toward Redwood Creek, making Steinberger Slough shallow due to lack of tidal scour. This pattern of shifting tidal flows has resulted in Smith Slough, the lower reach of Steinberger Slough, and the western portion of Corkscrew Slough all draining to Redwood Creek under existing conditions. (The sloughs and Redwood Creek are all shown in Figures 12).

Tidal Characteristics

San Francisco Bay experiences mixed semidiurnal tides, with two unequal high tides and two unequal low tides each day. Tides are modified with respect to their height and phase as they propagate through the Bay. Tidal data collected in Redwood Creek by the National Ocean Service

(NOS, 1987) are summarized in Table 4. The 10- and 100-year estimated high tides are from the U.S. Army Corps of Engineers (USACE, 1984) and represent extreme events.

	Elevation Relative to MLLW (feet)	Elevation Relative to NGVD (feet)
Estimated 100-Year High Tide	11.2	7.3*
Estimated 10-Year High Tide	10.5	6.6
Mean Higher High Water (MHHW)	7.96	4.05
Mean High Water (MHW)	7.35	3.44
Mean Tide Level (MTL)	4.27	0.36
National Geodetic Vertical Datum, 1929 (NGVD)	3.91	0.00
Mean Low Water (MLW)	1.19	-2.72
Mean Lower Low Water (MLLW)	0.00	-3.91
Sources: NOS (1987), USACE (1984), PWA analysis Note: Elevations are for the 1960 to 1978 tidal epoch * Adopted elevation: adopted by the USACE from the smoothed profile to calculate 100-year tides		

Tidal influences are observed throughout the slough network at Bair Island, with no appreciable damping or phase difference of high water levels. However, the shallow depths of Steinberger Slough retard ebb flow to some degree during lower low tides.

Regional Drainage Patterns

Three major creeks – Redwood, Cordilleras, and Pulgas Creeks – convey surface runoff from the hillsides southwest of Bair Island to San Francisco Bay. Redwood Creek continues all the way to the Bay, while Cordilleras and Pulgas Creeks flow into borrow ditches adjacent to the southwestern border of Inner Bair and from there to Smith and Steinberger Sloughs (refer to Figure 12). The storm drain systems of Redwood City and San Carlos discharge runoff into Redwood Creek and Pulgas Creek, respectively, through a combination of gravity drainage and pumping.

Redwood Creek

Redwood Creek drains 9.3 square miles of a largely developed watershed, almost entirely within the limits of Redwood City. The U.S. 101 bridge over Redwood Creek is well above the 100-year tide and allows for unrestricted passage of high flows as they drain to the Bay. Redwood City began a major storm drain improvement and channelization project on Redwood Creek in 1967, which extended and enlarged the storm drain system, added pump stations, and lined portions of the creek channel with concrete.

Most of the flows from low-lying areas of the Redwood Creek watershed are collected by nine pump stations, eight of which discharge directly to Redwood Creek. The remaining pump station drains into a leveed storage basin between U.S. 101 and Inner Bair, and then through a culvert to the eastern Inner Bair borrow ditch. A limited area drains to Redwood Creek via gravity drainage.



BAIR ISLAND WATERWAYS

FIGURE 12

Cordilleras Creek

Cordilleras Creek drains a 3.6-square mile watershed and forms much of the border between Redwood City and San Carlos. Most of the channel remains in its natural state, without significant human alterations. The creek passes through three 12-foot by 6-foot concrete box culverts under U.S. 101 before discharging into the western Inner Bair borrow ditch. Tidal influence extends approximately 1,000 feet up the creek from the Bay to Redwood High School. Cordilleras Creek is not connected to the main storm drain systems of either Redwood City or San Carlos.

Pulgas Creek

Pulgas Creek collects surface runoff from a 3.6-square mile area in central San Carlos and a small part of Belmont. The creek is confined to culverts in its lower watershed, including three 12-foot by 6-foot concrete box culverts under U.S. 101. Portions of Pulgas Creek have been channelized or lined with levees to protect adjacent areas against tidal flooding. A pump station at Industrial Road pumps floodwaters from nearby street conduits into the creek, while the remainder of the watershed appears to be gravity-drained.

Steinberger Slough and San Francisco Bay

Three main drainage areas northwest of Bair Island discharge to Steinberger Slough or directly to San Francisco Bay. Storm water runoff from San Carlos Airport is accommodated by several on-site pump stations that drain directly to Steinberger Slough. Runoff from northern San Carlos and Belmont drains to a holding pond in Phelps Slough, before being pumped into Steinberger Slough. Runoff from Redwood Shores is routed to a controlled interior lagoon, from which flows are collected by pump stations or stored until they can be released via gravity drainage at low tide to Steinberger Slough or to the Bay.

Regional Water Quality

Water quality varies throughout the San Francisco Bay Estuary due to variability in discharges of pollutants, tidal stage, and hydrodynamic circulation. Salinity and the concentrations of total suspended sediment (TSS) are two of the most fundamental water quality parameters that describe basic habitat and water chemistry. These parameters also influence chemical and physical processes, such as density stratification and vertical mixing of bay waters. Long-term monitoring has shown that South San Francisco Bay experiences large variability in surface salinity, with levels fluctuating between nearly zero to nearly marine values (about 32 parts per thousand, (ppt)). Variations in salinity occur on seasonal and inter-annual time scales, largely in response to freshwater inputs derived from local watersheds, as well as the Delta. Large river flows have a strong effect on TSS in Suisan and San Pablo Bays, but a weaker influence on concentrations in South Bay, where inputs from the local watersheds affect TSS values. In general, large gradients in salinity and TSS are observed during the wet season due to intense watershed inputs, but are damped during the dry season when discharge from the watersheds are reduced. Changes from dry to wet conditions may occur rapidly. For example, salinities in the South Bay dropped from 28-30 ppt to about 10 ppt between January 1 and February 8, 1998, in response to a series of El Nino-driven storms (SFEI 2000).

Existing Bair Island Drainage

Water levels in the inactive salt ponds on Inner, Middle and Outer Bair Islands are a function of ponding of direct rainfall, evaporation, and levee seepage. A slide-gated culvert on Inner Bair offers some level of drainage between the pond interior and Smith Slough, although its function is limited due to blockage by debris.

Beginning in the late 1970s or early 1980s, water in Middle and Outer Bair was siphoned periodically during the rainy season to minimize mosquito production. The San Mateo County Mosquito Abatement District discontinued siphon operations in 2000 due to lack of funds and staffing, although the PVC pipes are still visible at the site. Siphon operations were never carried out at Inner Bair since the area is easily accessible for other types of mosquito abatement.

Flooding Conditions

Flooding on and around Bair Island usually occurs in winter or early spring, and is most severe when a large frontal storm coincides with an extreme high tide. Current Federal Emergency Management Agency (FEMA) flood mapping shows Bair Island completely within the 100-year floodplain (FEMA 1982), although recent surveys in 1993 demonstrated that limited levee improvements around Inner Bair appear to provide protection against 100-year flooding. Off-site flooding has been observed due to levees being overtopped by high tides (tidal flooding), or due to a combination of high tides and high rainfall runoff at the downstream reaches of creeks (creek flooding).

Tidal flooding has been documented in portions of Redwood City and San Carlos, especially in areas east of U.S. 101 (FIA 1977). Prior to the 1967 storm drain project, flood events along Redwood Creek seem to have been caused by high creek flows and overtopping of channel banks. Later flood events along this creek appear to be caused by limited culvert capacity and debris blockage in the storm drain system. Flooding along Cordilleras Creek is exacerbated by erosion in the upper watershed, resulting in deposition and blockage in the flat, low-lying areas. Overflow from Pulgas Creek causes flooding in the industrial area between U.S. 101 and El Camino Real. Due to persistent minor flooding, Caltrans has recently improved the culverts under U.S. 101 along Pulgas Creek, and other improvements along surface streets further upstream are planned.

3.2.2 Methodology and Significance Criteria for Hydrology and Water Quality Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of hydrology and water quality impacts. Impacts on hydrology and water quality were assessed by comparing expected conditions in the future under each alternative scenario against the current hydrologic conditions. A major assumption is that conditions predicted to result with implementation of each action alternative would occur within 50 years of project implementation.

Potential impacts of the project on hydrology and water quality were characterized by evaluating direct, indirect, temporary, and permanent impacts. Temporary hydrologic and water quality impacts have a short duration, and would be expected to recover or be restored with a few years after implementation. A permanent impact would involve the long-term alteration of vegetation or wildlife habitat because the project would result in the removal or change in the vegetation type.

Under NEPA CEQ Regulations, significant impacts may be beneficial or adverse and are considered equally.

The following criteria were used to determine significant hydrologic and water quality effects under the State CEQA Guidelines. A hydrologic and water quality impact is considered significant if the project would:

- substantially alter existing drainage patterns in terms of direction or magnitude in a manner which would result in substantial erosion or siltation on-or off-site; or
- place structures within the 100-year flood hazard area that would impede or redirect flood flows; or
- increase the risk of substantial property loss, injury, or death as a result of flooding; or
- violate water quality standards; or
- substantially degrade water quality; or
- create a safety hazard for people boating in the project area.

Based on NEPA CEQ Regulations, the project would have a beneficial hydrology and water quality impact if it would:

- reduce the risk of flooding that could cause substantial property loss, injury, or death as a result of flooding; or
- result in modifications to surface drainage patterns that restore hydrologic conditions that support wetland structure and functions.

Impact Analysis Approach

Existing (2003) conditions were used as the baseline for the analysis of hydrologic and water quality impacts. Therefore, impacts related to the alternatives under consideration, including the No Action Alternative, were established by comparing expected conditions in the future under each alternative scenario against current hydrologic conditions. Note that hydrologic conditions change significantly under the No Action Alternative, as mentioned in the description of alternatives.

3.2.3 Hydrology and Water Quality Impacts

3.2.3.1 No Action Alternative

Modification of Surface Drainage Patterns

Tidal inundation at the inactive salt ponds at Middle and Outer Bair Islands could be expected to occur over the next decade or two, as levees fail due to discontinued maintenance. Compared to current 2003 conditions, this impact would result in drainage patterns closer to the historic configuration. Regular tidal inundation will facilitate nutrient and sediment transport into the inactive salt ponds, which is necessary for sustainable wetlands, including tidal salt marsh. The primary source of nutrients and sediment would be the waters of San Francisco Bay. However, the benefits of unplanned tidal inundation under the No Action Alternative would be substantially less than under the other alternatives since breaches would not be optimized for habitat restoration, and temporary poor drainage would result in slower sedimentation rates on the marshplains, more tidal muting inside the ponds, and lower rates of vegetation colonization.

Potential for Increased Siltation of the Redwood Creek Shipping Channel

Uncontrolled levee breaches and tidal inundation under the No Action Alternative would roughly triple the amount of sediment-laden water from the Bay that passes through the Redwood Creek Shipping Channel during a typical tidal cycle. Despite this increase in tidal prism, current velocities through the channel would remain relatively low due to maintenance dredging which keeps the channel artificially deep and its cross-sectional area large. The increase in volume of sediment-laden water drawn, coupled with the relatively low current velocities, would substantially increase the rate of sedimentation along the deep shipping channel. Numerical modeling indicates that the existing sedimentation rate along the shipping channel could approximately triple (PWA 2002). This rapid reduction in depth (shoaling) would have adverse effects to deep-draft access to the Port of Redwood City, which is served by the Redwood City Shipping Channel. This reduction in the depth of the shipping channel would reduce the size of the ships that would be able to access the Port facilities or would require more frequent dredging of the shipping channel. Both the reduction in the size of the ships using the Port and/or increased dredging of the Shipping Channel would have a negative financial impact on the Port. This impact is considered significant.

- **The No Action Alternative would result in substantially increased sedimentation that would decrease the depth of the Redwood Creek. (Significant Impact)**

Increases in Flow Velocities at Pete’s Outer Harbor

Unplanned tidal inundation at the inactive salt ponds due to levee failures would increase the tidal prism passing through Smith Slough since much of the flow would be preferentially routed toward Redwood Creek. This would lead to an increase in peak current velocities.

- **The No Action Alternative would increase velocities at Pete’s Outer Harbor, which would be greater than existing peak tidal velocities and could result in exceeding safe navigation requirements for small water craft. (Significant Impact)**

3.2.3.2 Alternative A: Tidal Marsh Restoration and Moderate Public Access (*Proposed Action*)

Modification of Surface Drainage Patterns

The proposed restoration activity would reestablish tidal exchange over the inactive salt ponds and increase tidal flows through Steinberger Slough, modifying the surface drainage patterns in the project area. Regular tidal inundation will facilitate nutrient and sediment transport into the inactive salt ponds, which is necessary for sustainable wetlands, including tidal salt marsh. The primary source of nutrients and sediment would be the waters of San Francisco Bay.

Human-induced changes, over the past century, such as the construction of salt pond levees, have significantly altered wetland functions on Bair Island. The Action Alternatives, including Alternative A, would reestablish a drainage pattern closer to the historic hydrologic configuration that supported wetland structure and functions along the margins of San Francisco Bay. Although existing surface drainage patterns and sedimentation rates would be altered, this would constitute a beneficial, rather than an adverse, environmental effect at this location.

- **Alternative A would modify surface drainage patterns in the sloughs by restoring historic drainage patterns. The restoration of regular tidal inundation to portions of Bair Island will facilitate nutrient and sediment transport that supports wetland structure and functions. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)¹⁶**

Protection of Infrastructure on Inner Bair

Alternative A includes levee improvements to protect against unplanned tidal inundation, specifically at the San Carlos Airport safety zone and along the South Bay System Authority (SBSA) sewer line. Under this alternative, the restoration design of Inner Bair includes construction of a levee around the perimeter of the San Carlos Airport safety zone to provide the same amount of flood protection as under existing conditions and would add additional fill within the safety zone which would raise the elevation above the high tide mark which would be an improvement over existing conditions. Additionally, a portion of the Inner Bair Island levee along the SBSA force main would be reinforced to provide increased protection against erosion as well as inspection and maintenance access.

- **The construction of a levee around and adding fill to the Airport Safety Zone and improvements to the SBSA levee on Inner Bair Island would result in protection of infrastructure against unplanned tidal inundation. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

Short-Term Flooding Impacts

Alternative A would re-direct Pulgas and Cordilleras Creeks' flows away from Redwood Creek and toward Steinberger Slough in order to address other project constraints. As previously discussed, persistent flooding has been documented along the lower reaches of Redwood, Pulgas, and Cordilleras Creeks. Until flood management actions are implemented to reduce these problems, any increases in water surface elevations along these creeks caused by downstream flow re-routing could increase the severity of existing flood hazards. PWA (2002) conducted numerical hydrodynamic modeling to assess possible changes in peak flood water levels at the Highway 101 crossings of Pulgas and Cordilleras Creeks. The modeling applied several combinations of Bay tides and upstream discharges, consistent with methods used by FEMA (1981) and Caltrans (Peterson 2000).

Based on the flood modeling, Alternative A is expected to increase peak water levels at Highway 101 by approximately 0.05 ft (less than an inch) during a 100-year flood event. This estimate is for initial conditions immediately after breaching and the increment of change would decrease as Steinberger Slough deepens over the first months and years. The magnitude of this change is also expected to decrease with distance upstream from Highway 101, although the flood assessment did not extend to these upstream areas. Increases in peak water levels were less for more frequent flood events (*i.e.*, the 10- and 50-year events) (PWA 2002).

One source of uncertainty in the above peak water level increase estimate is how closely the actual hydraulic characteristics of the flow control structures placed in Corkscrew and Smith Sloughs would match those simulated in the modeling. Flood performance would be affected if the flow control structures allow more or less flow than modeled. To address this uncertainty, Alternative A includes

¹⁶ Under CEQA a “significant effects on the environmental means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project...” Under NEPA, impacts may be both beneficial and adverse.

performance monitoring and adaptive management of the flow control structures as needed. The monitoring plan (HTH & PWA 2003) includes measurement of tide elevations and flow velocities at Year 0, immediately after project implementation. The measurements would be used to evaluate whether the structures are functioning per the design criteria given in the Restoration and Management Plan and incorporated into the model. The USFWS would be responsible for adjustments to the structures after construction that may be needed to meet the design criteria. The structures would be designed to allow adjustments (such as the addition or removal of rip-rap, or adjustment of weir elevations) for flexibility of post-construction management.

Increases in peak flood water levels of the magnitude predicted (less than an inch) are considered less than significant. This predicted change in estimated flood elevations is less than may result from errors, uncertainties, and effects that are typically disregarded in flood assessments, such as blockage by debris, in-channel sedimentation, errors in survey data and the assignment of roughness values, and the change in downstream boundary conditions due to sea level rise.

- **Alternative A would not result in significant short-term flooding impacts because the peak flood water level would increase less than one inch. (Less Than Significant Impact)**

Long-Term Flooding Impacts

As described above with respect to short-term impacts, small initial increases in potential peak flood elevations are expected to decrease over the first months and years as Steinberger Slough scours and deepens. In the long-term, the improvements in flood conveyance through Steinberger Slough would be partially offset by sedimentation in the restored ponds. Sedimentation in the ponds would decrease the flood conveyance of the marshplains, which function similarly to river floodplains in conveying flow. While slough scouring and deepening is expected to occur relatively quickly, marshplain sedimentation would occur more slowly, over decades.

PWA (2002) conducted numerical hydrodynamic modeling to assess potential long-term changes in peak flood water levels at the Highway 101 crossings of Pulgas and Cordilleras Creeks. The modeling is the same as that described above for short-term flood impacts, except that it uses long-term predictions of site evolution (marshplain sedimentation and slough deepening) and 50 years of predicted sea level rise.

Based on the modeling, flood impacts are expected to be less in the long-term than in the short-term. Alternative A is expected to increase peak flood water levels above what would otherwise occur by only a small amount, 0.02 ft, during a 100-year flood event. Flood impacts decrease over time because increases in Steinberger Slough conveyance more than offset decreases in marshplain (*i.e.*, floodplain) conveyance. The magnitude of the potential project-related change in peak water levels is expected to decrease with distance upstream from Highway 101. Increases in peak water levels were less for more frequent flood events (*i.e.*, the 10- and 50-year events) (PWA 2002).

Predictions of long-term flood impacts are less certain than predictions of short-term impacts because of uncertainties in future slough erosion and marshplain sedimentation. Based on the flood modeling, a “worst case” potential increase was estimated to cause a peak flood level impact of 0.06 ft for long-term conditions. This scenario assumes no scour of Steinberger Slough and full marshplain sedimentation in the restored ponds.

Increases in peak flood water levels of the magnitude predicted – 0.02 ft, with a possible range as high as 0.06 ft (both values are less than an inch) – are considered less than significant. Consistent with the short-term flood impacts discussion, these increases are less than other effects on upstream flood elevation estimates that are typically disregarded in flood assessments, such as blockage by debris, in-channel sedimentation, errors in survey data and the assignment of roughness values, and the change in downstream boundary conditions due to sea level rise. For context, sea level rise over the next 50 years is predicted to range between 0.16 and 0.92 ft, with a median value of 0.51 ft (IPPC 2001).

- **Implementation of Alternative A would not result long-term flood impacts. (Less Than Significant Impact)**

Short-Term Drainage Impacts

Steinberger Slough is currently undersized compared to the volume of the additional tidal prism associated with Alternative A, and damped tidal amplitudes¹⁷ that have elevated low water surface elevations are expected along the landward reach of the slough immediately following restoration. In other words, the tidal volumes would spread out, resulting in higher water levels. These damped tides would affect gravity drainage from areas adjacent to Bair Island that drain to Steinberger Slough.

Steinberger Slough receives pumped storm water runoff from the San Carlos Airport, northern San Carlos, and Belmont. Runoff from Redwood Shores is either routed to a controlled interior lagoon, collected at pump stations, or stored until it can be released to Steinberger Slough or to the Bay. Although the damped tides would raise the low water surface elevation in Steinberger Slough, there are no known gravity drainage to reaches of Steinberger Slough that are expected to be affected by the damped tides.

- **While there is a potential short-term impact for slower drainage in the low-lying areas of Bair Island immediately after restoration, there are no developed areas that utilize gravity drainage to this reach of Steinberger Slough. (Less Than Significant Impact)**

Incremental Changes to Hydrology at Bair Island

Increased Sediment in Redwood Creek

Tidal restoration at Bair Island would increase the amount of sediment-laden waters entering the slough system from the Bay, representing a potential increase in the amount of sedimentation along the Redwood Creek shipping channel. An increase in tidal prism through Redwood Creek would lead to higher rates of deposition and the need for more frequent dredging, since sediments would settle out due to the slow flow velocities through the oversized shipping channel. Alternative A includes design elements (*e.g.*, flow control structures in Smith and Corkscrew Sloughs) to divert restored tidal flows through Steinberger Slough and maintain the existing tidal prism that passes through Redwood Creek. Therefore, Alternative A would not increase sedimentation in Redwood Creek.

¹⁷ Damped tidal amplitudes refers to a reduction in the tide range.

Increased Flow Velocities at Pete’s Outer Harbor

The changes proposed in Middle and Inner Bair Islands would result in an increase in the amount of tidal prism conveyed through the slough network. Current tidal velocities at Pete’s Outer Harbor would increase accordingly if the restored tidal prism were routed through Redwood Creek and into Smith Slough. However, flow control structures and breach locations included in the proposed restoration alternative have been designed to direct the restored tidal flows toward Steinberger Slough, such that peak tidal currents at Pete’s Outer Harbor would be less than the existing levels.

Short-Term Increases in Turbidity

Under Alternative A, tidal exchange to the restored ponds would initially scour sediment from the channel beds (and possibly the newly placed dredged material) and lead to short-term increases in turbidity. However, the area of increased turbidity is expected to be confined to the immediate vicinity of the sloughs and near areas of incising inside the inactive salt ponds. Additionally, these geomorphic adjustments are expected to occur over several months or a few years. Alternative A would result in short-term increases in turbidity, however due the limited extent of tidal scour and time frame over which erosion occurs; this impact would not be significant.

Impacts from Wave Erosion

Increasing the area of open water over which wind blows over the restored ponds may raise heights of wind-waves, and potentially lead to erosion along Steinberger Slough. However, the extent of levee lowering along Steinberger Slough is limited under Alternative A, and thus would still provide wind breaks. Therefore, this impact would be less than significant.

- **Implementation of Alternative A would not substantially alter flows in Redwood Creek or at Pete’s Outer Harbor or result in increased turbidity or wave erosion. (Less Than Significant Impact)**

Undermining Steinberger Slough Levees

Steinberger Slough is expected to scour and deepen in response to the increase in tidal prism following implementation of Alternative A, potentially undermining levees that protect Redwood Shores and the San Carlos Airport. Steinberger Slough is currently overly wide and shallow compared to similar flow channels, as a result of several decades of weakening tidal currents and associated deposition. Even with the restoration, the channel remains wide for the tidal prism to be conveyed. Tidal scour would deepen Steinberger Slough until a new equilibrium channel shape is reached. Conditions are expected to approach close to equilibrium in one to two decades, with significant changes toward equilibrium in the shorter term (~five years) (PWA 2002). The risk of undermining levees due to channel erosion is so small it is considered less than significant.

- **Implementation of Alternative A would not result in substantial channel scour that would undermine levees along Steinberger Slough. (Less Than Significant Impact)**

Short-Term Construction-Related Water Quality Impacts

Construction activities associated with Alternative A could result in temporary water quality impacts, from an increase in turbidity near the levee breaches. Suspended sediment transport would be

relatively minor. Once erosion rates decrease (within approximately five years), suspended sediment transport would return to normal levels. Preparation of the levees by removing excess material prior to breaching and timing the breaching to coincide with the flood tide cycle would minimize turbidity.

- **Water quality impacts from suspended sediment during construction would not be substantial under Alternative A. (Less Than Significant Impact)**

Water Quality Impacts Associated with Placement of Dredged Material

Water quality and aquatic habitats may be adversely affected by contaminants in dredge material placed in Inner Bair. To minimize contaminants in the material, sediment would be screened to meet wetland cover standards set by the Regional Water Quality Control Board (RWQCB)¹⁸. Only dredged material that meets RWQCB standards would be used on Inner Bair Island. These standards include concentrations of various metals and other constituents, below which adverse biologic effects are less than significant.

- **Alternative A includes compliance with the RWQCB cover standards for dredge material and would not have an adverse effect on water quality through the placement of dredged material. (Less Than Significant Impact)**

Increased Salinity Levels

Given the former land use of the site as salt pond evaporator ponds, elevated salinity levels are expected to be found in the existing soil. These salts gradually leach from the soil once tidal action is restored, and will be exported to the surrounding sloughs and eventually the South Bay. Previous studies (Josselyn & Perez 1982, LSA 1999) have shown that leaching of soil salt following tidal restoration at former salt ponds occurs on a timescale of approximately one year (*e.g.*, they would not pose a chronic problem), with minimal effects on Bay water quality. At the Hayward Marsh, across the Bay from Bair Island, soil salinities dropped from 181 parts per thousand (ppt) to 10-22 ppt within 10 months of tidal restoration (Josselyn & Perez 1982). More recent tests carried out for Eden Landing (LSA 1999) indicate that leaching of salts from soils at the Baumberg Tract (also a former collection of salt ponds in the South Bay) associated with tidal restoration would produce at most a 2-3 ppt increase in water salinities. This maximum salinity increase does not account for the dilution as overlying water is discharged from the ponds into the sloughs and mixes with Bay water. Accounting for this dilution, increases in water salinities are expected to be negligible compared to natural variability in the Bay. Although the soil salinities at Bair Island are unknown, the effects of leaching is expected to be similar to those observed at the Baumberg Tract due to their similar historic functions as salt pond evaporator ponds. This impact will be less than significant.

- **Implementation of Alternative A would not result in a substantial adverse water quality impact from increased salinity levels in the Bair Island sloughs and San Francisco Bay. (Less Than Significant Impact)**

Improved On-Site Water Quality

Under existing conditions, water levels in the inactive salt ponds on Middle and Outer Bair Islands are controlled by ponding of direct rainfall, evaporation, and levee seepage. Limited drainage on

¹⁸ RWQCB, “*Recommended Sediment Chemistry Screening Guidelines*” for Wetland Surface Material. 1985

Inner Bair occurs through the existing culvert to Smith Slough. Although no testing was performed, it is likely that the extended periods of ponding and lack of regular tidal exchange has led to degraded quality of water and wetland soils. This degradation often includes high pH values and low levels of dissolved oxygen that inhibit normal plant growth and affects the availability of nutrients in the soil. Alternative A would improve on-site water quality by restoring regular tidal action throughout Inner, Middle, and Outer Bair Islands and create conditions favorable for plant and wildlife uses by establishing a more neutral pH and oxygen levels through the continual wetting process of tidal inundation.

- **Implementation of Alternative A would result in substantially improved on-site water quality through restoring tidal action at Bair Island. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)¹⁹**

3.2.3.3 Alternative B: Tidal Marsh Restoration and Restricted Public Access

Since the only difference between Alternative B and Alternative A is the amount of public recreational access, hydrologic impacts associated with the Alternative B are the same as those associated with Alternative A.

3.2.3.4 Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access

Under Alternative C, the restoration design at Middle and Outer Bair Islands and the flow control structures in Corkscrew Slough are the same as in the alternatives above. Therefore, impacts of Alternative C are nearly the same as those associated with Alternative A. The differences in impacts are described below.

Protection of Inner Bair Infrastructure

Under Alternative C, hydraulic structures would allow for limited tidal action on Inner Bair, and water surface elevations would vary between mean lower low water and the existing marshplain elevation at about the mean tide level. As in Alternative A, implementation of Alternative C would include construction of a levee around the perimeter of the San Carlos Airport safety zone and improvement of a portion of the Inner Bair Island levee along the SBSA force main. Since water levels on Inner Bair would be maintained well below the high tide elevation, the amount of earthwork required for infrastructure protection is less than under Alternative A.

- **The construction of a levee around the Airport Safety Zone and improvements to the SBSA levee on Inner Bair Island would result in protection of infrastructure against unplanned tidal inundation. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)²⁰**

¹⁹ Under CEQA a “significant effects on the environmental means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project...” Under NEPA, impacts may be both beneficial and adverse.

²⁰ Under CEQA a “significant effects on the environmental means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project...” Under NEPA, impacts may be both beneficial and adverse.

Modification of Surface Drainage Patterns

Alternative C would reestablish tidal exchange over the inactive salt ponds and increase tidal flows through Steinberger Slough, modifying the surface drainage patterns in the project area. Although existing surface drainage patterns would be affected, human-induced changes have significantly altered functions from their natural conditions. Since Alternative C does not include restoration of tidal flow through the historic meander in Inner Bair, beneficial impacts to the surface drainage patterns are somewhat less than for Alternative A but would be closer to the historic conditions than the No Action Alternative.

- **Implementation of Alternative C, would reestablish a drainage pattern closer to the historic configuration than the No Action Alternative. The restoration of limited tidal flows to Inner Bair Island will facilitate some nutrient and sediment transport that supports wetland structure and functions. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

Improved On-Site Water Quality

Under existing conditions, water levels in the inactive salt ponds on Middle and Outer Bair Islands are controlled by ponding of direct rainfall, evaporation, and levee seepage. Limited drainage in Inner Bair occurs through the existing culvert to Smith Slough. Although no testing was performed, it is likely that the extended periods of ponding and lack of regular tidal exchange has led to degraded quality of water and wetland soils. This degradation often includes high pH values and low levels of dissolved oxygen which inhibit normal plant growth and affects the availability of nutrients in the soil. Alternative C would improve on-site water quality by restoring regular tidal action throughout Inner, Middle, and Outer Bair Islands and create conditions favorable for plant and wildlife uses by establishing a more neutral pH and oxygen levels through the continual wetting process of tidal inundation. The water quality on Inner Bair Island would be less than the water quality improvement on Middle and Outer Bair Islands because there would be less tidal exchange under this restoration approach.

- **Implementation of Alternative C would result in substantially improved on-site water quality through restoring tidal action at Bair Island. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

3.2.3.5 Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access

Hydrologic impacts for Alternative D are the same as for Alternative C since there is no change to the marsh restoration components.

Conclusion: The No Action Alternative would result in significant adverse impacts to siltation of Redwood Creek and increase flow velocities at Pete's Outer Harbor. All of the Action Alternatives would have significant beneficial impacts to water quality. None of the Action Alternatives would result in significant hydrology or water quality impacts.

3.3 Land Use

3.3.1 Existing Setting

Existing Land Uses

The site currently consists of leveed, inactive salt ponds, restored tidal marsh, uplands resulting from past disposal of dredged material, and remnant historic marsh that are part of a large open space area adjacent to San Francisco Bay. The Inner Bair Island levees are currently used as trails by the public. Part of Inner Bair Island is owned by the San Carlos Airport and is maintained as a safety area for emergency landings.

Most of Bair Island is part of a federal wildlife refuge. Redwood Creek, Steinberger Slough, Corkscrew Slough, and Smith Slough, the major tidal channels adjacent to Inner, Middle, and Outer Bair Islands are used by recreational boaters. Infrastructure within the Bair Island area includes the South Bayside System Authority (SBSA) sewer line, PG&E transmission towers, and a slide-gated culvert at Inner Bair Island (refer to Figure 13). The SBSA line runs northwest underneath the Inner Bair Island levee from the Whipple Avenue interchange, across/under the western Inner Bair Island Pulgas Creek borrow ditch, and along the San Carlos Airport property. Infrastructure also includes many abandoned levees.

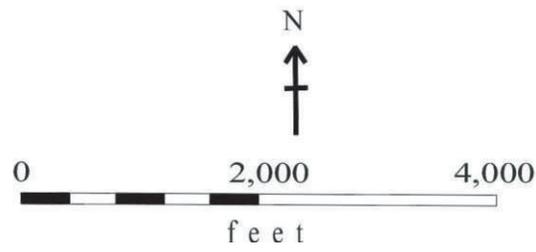
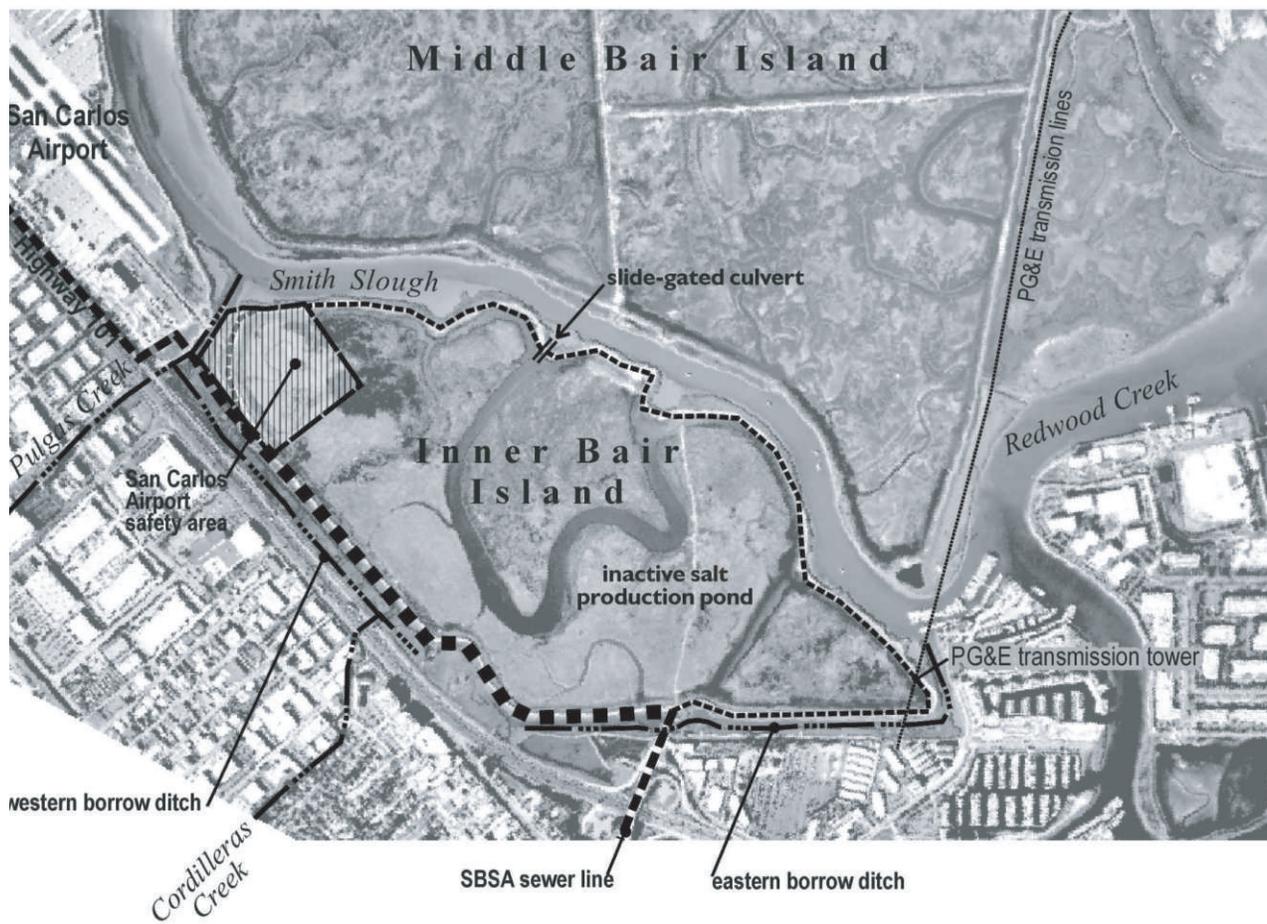
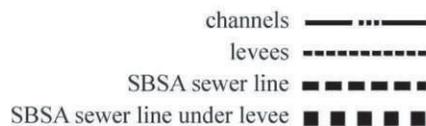
The San Carlos Airport approach path is located over a western portion of Inner Bair Island. This portion of the site owned by the San Carlos Airport falls under a Federal Aviation Administration (FAA) established runway protection zone (RPZ). FAA defines the runway protection zone as “an area off the runway end to enhance the protection of people and property on the ground.” Since the airport property is subject to federal aviation regulation, it must be kept clear of any structures or stationary objects. As part of its protection zone function, the levee for the airport property must be large enough to allow emergency vehicles to reach the area in the event of a plane crash.

Adjacent and to the south of Inner Bair Island, located off Bair Island Road, is approximately two acres of property that is also part of the proposed project site (refer to Figure 13). Pacific Gas and Electric (PG&E) has an easement that runs through this property owned by the USFWS. This narrow strip of land located on the east side of Bair Island Road is a paved parking lot that is presently available for Bair Island visitors. Across the Bair Island Road on the west side is a partially maintained trail connecting the parking lot to the Bair Island trailhead. As the connector trail passes the adjacent residential development, the trail rapidly deteriorates into a narrow dirt path.

There are two parallel electrical transmission lines, a 230-kilovolt (kV) line and a 115-kV line, both suspended from steel truss towers approximately 204 feet in height located adjacent to the Bair Island parking lot. The two towers in the parking lot connect to a PG&E substation adjacent to Seaport Boulevard to the east, and to towers on Bair Island to the west. One of the PG&E transmission towers is located on the Inner Bair Island levee, near the eastern tip of the island. The transmission lines then run northeast toward the bay.

General Plan and Zoning Designations

Bair Island is located within the City of Redwood City. Middle and Inner Bair Island have a General Plan designation of *Future Development Expanding Limits of Urbanization*, and are zoned *Tidal*



INNER BAIR ISLAND EXISTING CONDITIONS

FIGURE 13

Plain. Outer Bair Island has a General Plan designation of *Unimproved Areas (Land or Water) Devoted to Preservation of Natural Resources, the Managed Production of Resources, Outdoor Recreation, or Public Health and Safety*, and is zoned *Tidal Plain*. The project area where the existing parking lot is located has a General Plan designation of *Office Park* and is zoned *General Commercial*.

Adjacent Land Uses

Various land uses surround Bair Island (refer to Figure 14). To the northwest across Steinberger Slough is an area within Redwood City consisting of low and medium density residential uses, commercial and office uses, open space and the SBSA Facility Buildings. To the west is the City of San Carlos, including the San Carlos Airport, US 101, and existing industrial uses. South of Inner Bair Island is the interchange of U.S. 101 and Whipple Avenue, surrounded by office park and research and development uses. Located to the southeast are mixed commercial and residential uses, research and development, and the Port of Redwood City. To the north and east is the San Francisco Bay.

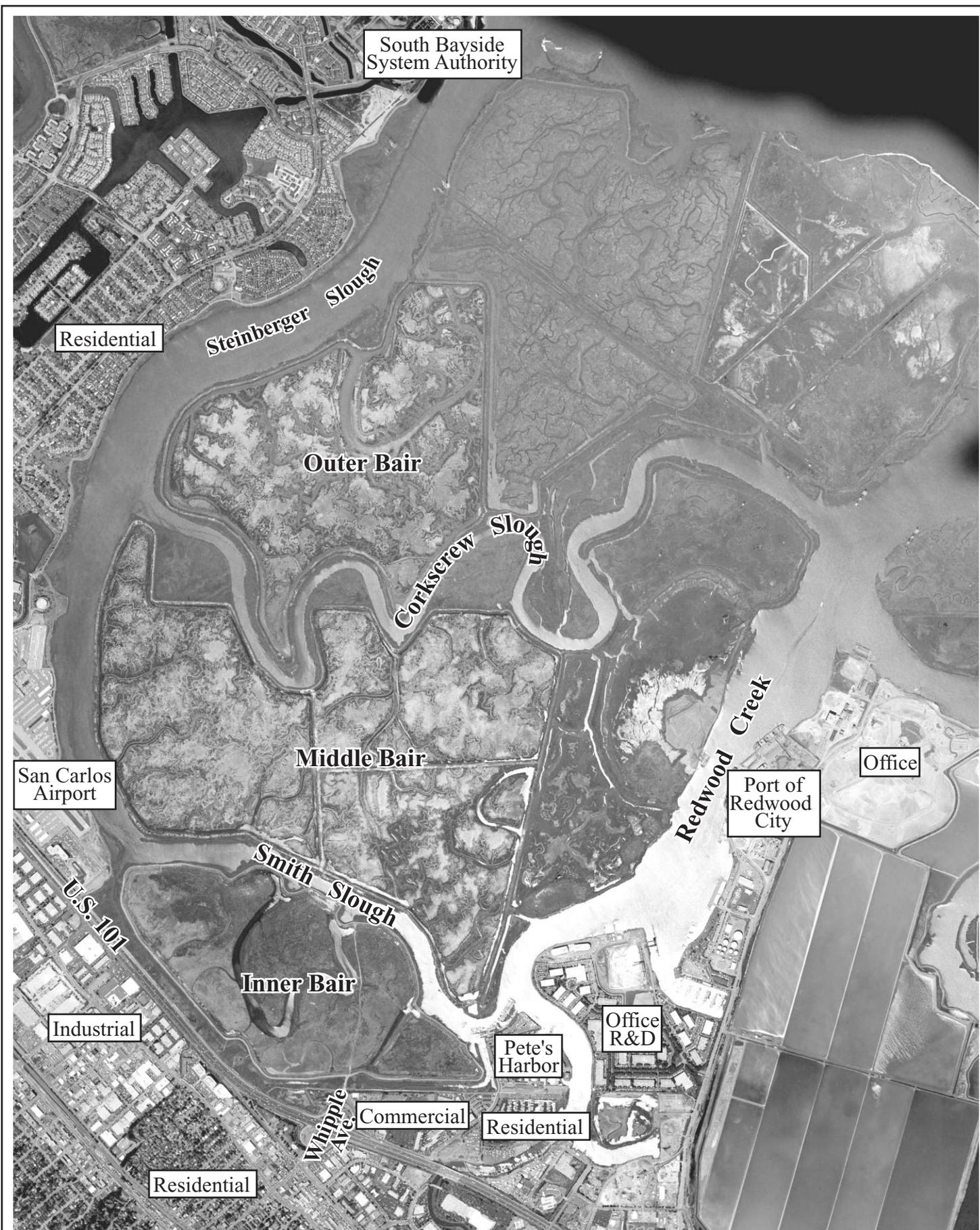
Also adjacent to Bair Island is Pete's Harbor. The Pete's Harbor property is approximately 13.21 acres, including approximately 2.90 acres of water area. Vehicular access to the property is provided by Bair Island Road. The Pete's Harbor marina is an active marina, which consists of 116 inner and 147 outer marina slips. Within the Inner and Outer Pete's Harbor marinas, a total of approximately 90 boats are currently in use as live-aboard units.²¹ Boat access to the Pete's Outer marina is provided by Redwood Creek and by Smith Slough; boat access to the inner marina is provided by Redwood Creek. The Pete's Harbor property is currently occupied by a variety of small-scale uses, including a restaurant, a harbor master's office (within the restaurant building), a recreational vehicle repair shop, storage containers, several occupied recreational vehicles and a mobile home, surface parking, and temporarily stored vehicles, including inventory from nearby, off-site auto dealerships.²² There is a current proposal to construct a large residential and office development along Bair Island Road which would include Pete's Harbor (City of Redwood City, Marina Shores Village Project EIR, February 2003).

Redwood Creek is dredged for use as a shipping channel to service the Port of Redwood City. The deepwater Shipping Channel through South San Francisco Bay is located approximately 6,000 feet offshore of Outer Bair Island.

There are existing industrially zoned and developed properties directly across Redwood Creek and Smith Slough from the project area. The closest industrial uses to the Inner Bair Island levee trails are approximately 580 feet across U.S. 101. An industrial business may include substantial outdoor activities, heavy truck use, hazardous materials use and storage, generation of noise, dust, odors, litter, and similar potential sources of annoyance to a sensitive land use.

²¹ City of Redwood City, *Marina Shores Village Project EIR*, February 2003.

²² City of Redwood City, *Marina Shores Village Project EIR*, February 2003.



AERIAL PHOTOGRAPH WITH SURROUNDING LAND USES

FIGURE 14

3.3.2 Methodology and Significance Criteria for Land Use Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of land use impacts. The potential impacts of the project were analyzed qualitatively, focusing on consistency between planned and permitted uses under applicable land use plans.

The following thresholds were used to determine significant land use effect under the State CEQA Guidelines. A land use impact is considered significant if the project would:

- result in or threaten a violation of Federal, State or local law or requirements imposed for the protection of persons or the environment; or
- result in a change in land use which is incompatible with the surrounding land uses; or
- disrupt or divide an established neighborhood/community; or
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

3.3.3 Land Use Impacts

3.3.3.1 No Action Alternative

Under the No Action Alternative, the Refuge would only undertake minor repairs to the existing levee to protect the SBSA sewer line and the San Carlos Airport safety zone on Inner Bair Island. No tidal action would occur on Inner Bair Island with implementation of the No Action Alternative. On-going levee maintenance at Middle and Outer Bair Islands would be discontinued. Levees on Middle and Outer Bair Islands would gradually deteriorate and eventually fail, allowing tidal action.

Deterioration of the levees would result in increased tidal velocities near Pete's Outer Harbor and would increase the siltation rate of Redwood Creek Shipping Channel. This would result in unsafe conditions and navigability for recreational boaters and live-aboard boats and could adversely impact the viability of that activity and may cause safety impacts to small water craft using the docks.

Public trails would not be accessible on Inner Bair Island in the long-term, eliminating most human activities on Bair Island.

- **The No Action Alternative would result in significant land use conflicts. The increased velocities would adversely affect the viability of Pete's Harbor and the additional siltation of Redwood Creek Shipping Channel would adversely affect the Port of Redwood City. (Significant Impact)**

3.3.3.2 All Action Alternatives

The Action Alternatives would allow low intensity uses on Inner Bair Island, consistent with FAA requirements for the San Carlos Airport. All four Action Alternatives are designed to ensure compliance with applicable Airport/FAA, local and state and federal restrictions and policies.

Any land uses that would compromise airport runway protection zones, such as placement of structures, concentrations of people, or features that could attract birds, are excluded from the Plan for this part of Bair Island. Proposed observations decks are located outside the runway protection

zone. The Action Alternatives would schedule levee breaches on Inner Bair Island to avoid ponding water, which attracts birds.

Under the Action Alternatives, the configuration of the trail on Inner Bair Island would change from an approximately 3.3 mile loop trail to a 1.8 to 2.3 mile out and back trail, depending on the selected alternative. This configuration would provide increased protection to wildlife resources from public disturbance while slightly decreasing the amount of linear trail. Therefore, the public interface with the nearby industrial uses would not change with the implementation of the Action Alternatives.

The Action Alternatives would create high quality habitat for sensitive plant and wildlife species. This high value habitat would be a sensitive land use. Special-status species can be susceptible to negative impacts from industrial land uses. The closest industrial uses to the newly created wetlands on Middle and Outer Bair Islands would be located approximately 500 feet to the east at office/research and development park across Redwood Creek and approximately 500 feet to the west at San Carlos Airport. The industrial users nearest Inner Bair Island are located approximately 580 feet across U.S. 101.

Based on the distance between the existing industrial uses and the Inner Bair Island trails, it is unlikely that the proposed improvements would be impacted directly by the adjacent industrial uses. The implementation of the Action Alternatives would not result in significant land use compatibility impacts.

Compared to the No Action Alternative, the four Action Alternatives would result in fewer land use impacts. The No Action Alternative would result in unscheduled levee breaches, unsafe velocities in Pete's Outer Harbor and increased sedimentation in Redwood Creek that would conflict with existing recreational boating use. Unscheduled levee breaches on Inner Bair Island could result in bird hazards for airplanes arriving and departing from San Carlos Airport, although, the Refuge would work with the Airport and SBSA to minimize impacts to their infrastructure.

- **The Action Alternatives would be consistent with applicable land use plans and adjacent land uses and would not result in any significant environmental impacts associated with the proposed land uses. (Less Than Significant Impact)**

Conclusion: No significant land use compatibility impacts would occur for any of the action alternatives. The No Action Alternative would result in significant land use impacts.

3.4 Air Quality

3.4.1 Existing Setting

The project is located within the San Francisco Bay Air Basin. During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Basin. Northwest winds are most common in Redwood City, reflecting the orientation of the Crystal Springs gap within the mountains of the San Francisco Peninsula. Winds are persistent and strong, providing excellent ventilation and carrying pollutants downwind. This area generally experiences dry, mild summers and cool, winters with an annual mean temperature of 58 degrees Fahrenheit.

The Federal and California Clean Air Acts mandate that concentrations of certain air pollutants which are commonly found in urban areas be reduced. Under the Acts, acceptable air quality is attained in an air basin if concentrations of the specified pollutants do not exceed certain levels more than once each year. Since these select pollutants set the criteria for attainment of good air quality they are referred to as “criteria” pollutants. Ozone, carbon monoxide (CO) and airborne particles are among the criteria pollutants. Concentrations of these three pollutants have exceeded standards in the San Francisco Bay area in the past, although air quality has been improving. Table 5 identifies the major criteria pollutants, characteristics, health effects and typical sources.

The U.S. Environmental Protection Agency (EPA) has classified the San Francisco Bay Area as a “nonattainment” area for ozone. In 1998, the Bay Area was reclassified from a nonattainment area to a “maintenance” area for CO. With regard to State standards, the Bay Area does not meet either the ozone or the particulate standards.

Concentrations of the criteria pollutants and some others are monitored by the Bay Area Air Quality Management District (BAAQMD). BAAQMD monitors air quality conditions at 31 locations throughout the Basin. The Redwood City monitoring station is located about 1,600 feet west of the Bair Island complex. The criteria pollutants monitored at the Redwood City monitoring station are ozone, carbon monoxide (CO), nitrogen dioxide (NO_x), and particulate matter (PM₁₀). Table 6 shows that the only consistent local air quality problem is violation of the state standard for particulate matter.

Pollutant	Characteristics	Health Effects	Major Sources
Ozone	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen. Often called photochemical smog.	<ul style="list-style-type: none"> • Eye Irritation • Respiratory function impairment. 	The major sources ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	<ul style="list-style-type: none"> • Impairment of oxygen transport in the bloodstream. • Aggravation of cardiovascular disease. • Fatigue, headache, confusion, dizziness. • Can be fatal in the case of very high concentrations. 	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	Reddish-brown gas that discolors the air, formed during combustion.	<ul style="list-style-type: none"> • Increased risk of acute and chronic respiratory disease. 	Automobile and diesel truck exhaust, industrial processes, and fossil-fueled power plants.
Sulfur Dioxide	Sulfur dioxide is a colorless gas with a pungent, irritating odor.	<ul style="list-style-type: none"> • Aggravation of chronic obstruction lung disease. • Increased risk of acute and chronic respiratory disease. 	Diesel vehicle exhaust, oil-powered power plants, industrial processes.
Particulate Matter	Solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time.	<ul style="list-style-type: none"> • Aggravation of chronic disease and heart/lung disease symptoms. 	Combustion, automobiles, field burning, factories and unpaved roads. Also a result of photochemical processes.

Pollutant	State Standard ²⁴	Number of Days Above State Standard		
		1999	2000	2001
Ozone	0.09 ppm (hourly)	0	0	1
Carbon Monoxide	9.0 ppm (8-hour)	0	0	0
Nitrogen Dioxide	0.25 ppm (hourly)	0	0	0
Particulate Matter	50µ/m ³ (24-hour average)	3	1	4

Sensitive Receptors

The Bay Area Air Quality Management District defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include residences, school playgrounds, child care center, retirement homes, convalescent homes, hospitals and medical clinics. Sensitive land uses adjacent to the Bair Island site include residential development located to the northwest and south.

3.4.2 Methodology and Significance Criteria for Air Quality Impacts

Criteria based on the State CEQA Guidelines and federal, state, and local air pollution standards and regulations, were used to determine the significance of air quality impacts. For the purposes of this project, an air quality impact is considered significant if the action would:

- expose sensitive receptors to substantial pollutant concentrations; or
- not conform to the Federal or California Clean Air Plan; or
- create objectionable odors affecting a substantial number of people.

3.4.3 Air Quality Impacts

3.4.3.1 No Action Alternative

Currently, there is limited traffic to the site mostly during non-peak hours, which does not substantially impact local and regional air quality. Under the No Action Alternative, traffic to and from the site would eventually end when trails and other public facilities deteriorate to unsafe conditions within 5 to 25 years. Thus there would be no long-term air quality impacts.

- **The No Action Alternative would not result in air quality impacts. (No Impact)**

3.4.3.2 Action Alternatives

Recreational trails on Inner Bair Island are used by pedestrians and bicyclists and boaters use the sloughs and creeks in the area. There are no large, active recreation areas or uses such as ball fields proposed under the action alternatives that could generate large numbers of vehicle trips and associated emissions.

²³ California Air Resource Board, California Air Quality Data, Annual Summaries, 1999 – 2001, BAAQMD, Air Currents, 2002

²⁴ PPM = Parts per Million; µ/m³ = Micrograms per Cubic Meter

Currently there is traffic to and from the site. This traffic would continue with implementation of any of the Action Alternatives. However, once construction begins throughout Bair Island, there would be increased air quality emissions associated with the operation of construction equipment. These short-term impacts associated with construction are discussed in *Section 3.13 Construction Impacts*.

The Action Alternatives may result in slight increases of traffic to and from the Bair Island parking lot once the public improvements (*i.e.*, restrooms, improved trails, and observation decks) have been completed. Since the land uses would remain the same and existing parking is adequate to serve the site, the Action Alternatives are not anticipated to generate trips that would result in substantial long-term air quality impacts.

The Action Alternatives would not result in substantial long-term air quality impacts compared to the No Action Alternative.

- **None of the Action Alternatives would result in substantial long-term air quality impacts. (Less Than Significant Impact)**

Conclusion: None of the alternatives would result in significant air quality impacts.

3.5 Socio-Economics and Environmental Justice

NEPA requires an EIS to include an assessment of a project's effect on the socio-economic environment. The Council of Environmental Quality (CEQ) regulations for implementation of NEPA (40 CFR 1500-1508) define (Section 1508.8) "effects" to include, among others things, economic and social effects, whether direct, indirect, or cumulative. Closely related to this requirement, Executive Order 12898 ("Environmental Justice" dated February 11, 1994) requires Federal agencies to address disproportionately high and adverse human health or environment effects of their activities of their activities on minority populations and low-income populations.

3.5.1 Existing Setting

Population and Labor Characteristics

The project is located within Redwood City, California. Redwood City is located in the southeastern portion of San Mateo County. Redwood City had a population of 99,210 in the year 2000 and has the second largest population San Mateo County. San Mateo County had a population of 395,890 in 2000. Redwood City had 62,000 jobs in 2000 and San Mateo County had 395,890 jobs in 2000.

3.5.2 Methodology and Significance Criteria for Socio-Economics and Environmental Justice Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of socio-economic/environmental justice impacts. The following thresholds were used to determine a significant effect under the State CEQA Guidelines. For the purposes of this project, a socio-economic/environmental justice impact is considered significant if the action would:

- disrupt or divide an existing neighborhood or cohesive community (including the isolation of a portion of a neighborhood or an ethnic group); or
- adversely affect cultural or religious facilities in the community; or
- impact a minority or low-income population to a disproportionate degree when compared to impacts to non-minority and non-low-income populations.

3.5.3 Socio-Economics and Environmental Justice Impacts

3.5.3.1 No Action Alternative

Impacts to Port of Redwood City

As discussed in *Section 3.2 Hydrology and Water Quality*, increased siltation would occur in Redwood Creek Shipping Channel due to uncontrolled levee breaches and tidal inundation. The No Action Alternative would roughly triple the amount of sediment-laden water from the Bay that passed through the Redwood Creek Shipping Channel during a typical tidal cycle. The increase in volume of sediment-laden water drawn, coupled with the relatively low current velocities, would substantially increase the rate of sedimentation along the deep shipping channel. Numerical modeling indicates that the existing sedimentation rate along the shipping channel could approximately triple (PWA 2002). This rapid reduction in depth would have adverse effects to deep-draft access to the Port of Redwood City, which is served by the Redwood City Shipping Channel.

- **Under the No Action Alternative, the increased sedimentation that would decrease the depth of Redwood Creek would result in an adverse impact to the Port of Redwood City business. (Significant Impact)**

Impacts to Pete’s Outer Harbor Marina

As discussed in *Section 3.2 Hydrology and Water Quality* and *Section 3.3 Land Use*, unplanned tidal inundation at the inactive salt ponds due to levee failures would increase the tidal prism passing through Smith Slough. This would lead to an increase in peak current velocities at Pete’s Outer Harbor marina. This would result in unsafe conditions and navigability for recreational boaters and live-aboard boats and could effect the economic viability of Pete’s Harbor marina.

- **The No Action Alternative would increase velocities at Pete’s Outer Harbor that could result in an adverse impact to Pete’s Outer Harbor. (Significant Impact)**

3.5.3.2 All Action Alternatives

Implementation of any of the Action Alternatives would not require removal of any residences or businesses. These alternatives would not adversely affect the affordability of housing or the availability of employment in the project area. In the short-term, the Action Alternatives would create construction jobs; however, these jobs would not be permanent and would have no new impact on population movement. The action alternatives would not disrupt or divide any neighborhoods. No cultural or religious facilities would be impacted by these alternatives.

- **None of the Action Alternatives would result in any significant socio-economic or environmental justice impacts. (Less Than Significant Impact)**

Conclusion: None of the Action Alternatives would result in any socio-economic or environmental justice impacts. The No Action Alternative would result in significant socio-economic impacts.

3.6 Geology

3.6.1 Existing Setting

Bair Island is located on the southwestern shore of San Francisco Bay in Redwood City. The region is characterized by northwest-trending ridges and valleys that parallel northwest-trending folds and strike-slip faults. In the site vicinity, bedrock of the Franciscan Assemblage underlies alluvial and estuarine deposits at a depth of approximately 400 feet.²⁵

Inner, Middle and Outer Bair Islands are flat, tidal lands composed primarily of estuarine sediments. Tidal flows have been modified by the construction of levees for former ranching and salt production activities. Elevations on the site range from approximately -0.8 National Geodetic Vertical Datum (NGVD) in the subsided, diked marsh, to nine feet NGVD at the levee crests, to over 11 feet NGVD where dredge spoils have been deposited. Soils mapped on the site consist of Reyes clay, with some areas of Novato clay.²⁶ The Reyes series consists of very deep somewhat poorly drained soils that formed in alluvium derived from various kinds of rock. The Novato series consists of very deep, very poorly drained soils in tidal marshes. Fill has been used to construct levees bordering Steinberger Slough, Smith Slough and Corkscrew Slough.

Near-surface deposits on the site include Bay Mud, alluvium from local creeks, and unengineered fill materials. Bay Mud consists of unconsolidated, dark organic-rich plastic clay and silty clay. Bay Mud can be relatively weak and compressible. Alluvial deposits consist of interbedded layers of material, ranging from clays to sands. Alluvium is found associated with channels and under the Bay Mud. Fill placed in the Bair Island area dates back to the middle of the nineteenth century. Unengineered fill has been placed to drain marsh areas and for salt pond construction.

Bair Island is largely surrounded by water, with the exception of Inner Bair Island. Waterways bordering the site include Redwood Creek, Smith Slough, Steinberger Slough and Corkscrew Slough.

Seismicity

No active faults cross the Bair Island complex. Many faults capable of producing earthquakes exist in the San Francisco Bay Area, which can cause strong ground shaking in the project area. Regional faults include the San Andreas, Hayward, and San Gregorio faults, as well as many smaller ones. The San Andreas Fault is located approximately eight miles southwest of the Bair Island complex. The Hayward and San Gregorio faults are located approximately 22 miles northeast and 22 miles west of the Bair Island complex, respectively. Because there are no faults on Bair Island or on adjacent properties, there is no known risk of surface rupture during an earthquake.

Soil liquefaction is a phenomenon in which saturated (submerged) granular soils, most notably loose, clean, saturated, uniformly graded, fine grained sand, experience a temporary loss of strength (liquefy) when subjected to earthquake ground shaking. Lateral spreading is failure within a nearly horizontal soil zone, commonly associated with liquefaction, which causes the overlaying soil mass to move towards a free face or down a gentle slope. The project area contains some saturated sand layers below the Bay Mud that may liquefy and result in seismically induced ground settlement.

²⁵ City of Redwood City. Marina Shores Village EIR, February 2003.

²⁶ Soil Conservation Service; (SCS) 1991. *Soil Survey of San Mateo County, Eastern Part, and San Francisco Bay*

3.6.2 Methodology and Significance Criteria for Geologic Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of geology impacts. Impacts on geology were analyzed qualitatively based on a review of soils and existing geologic data of the project site.

The following criteria were used to determine significant geology effects under the State CEQA Guidelines. A geology impact is considered significant if the project would:

- be located on a site with geologic features which pose a substantial hazard to property and/or human life (*e.g.*, active fault, an active landslide); or
- expose people or property to major geologic hazards that cannot be mitigated throughout the use of standard engineering design and seismic safety techniques; or
- cause substantial erosion or siltation.

3.6.3 Geologic Impacts

3.6.3.1 No Action Alternative

Under the No Action Alternative, levees would continue to deteriorate, primarily through erosion caused by wind-wave action within the salt ponds.

Since no ongoing maintenance would occur under the No Action Alternative except minor repairs to the existing levee on Inner Bair, strong seismic activity could cause already deteriorating levees to fail.

- **The No Action Alternative could result in substantial erosion associated with levee failure. (Significant Impact)**

3.6.3.2 All Action Alternatives

Seismicity

The Bair Island complex is underlain by Bay Mud that can be compressible or weak. Underlying mostly discontinuous layers of sand, which may liquefy and result in seismically induced ground settlement during a seismic event are also reported to occur in the area. For the Action Alternatives, repairs and upgrades to existing levees and construction of new, engineered levees would be completed. All new improvements would be engineered to withstand seismic events in accordance with acceptable levels of risk for the proposed uses.

- **Implementation of the Action Alternatives would not result in geologic or seismic hazards that pose a substantial hazard to property or human life. (Less Than Significant Impact)**

Erosion and Siltation

As discussed in *Section 3.2 Hydrology and Water Quality*, the Action Alternatives would increase the amount of sediment-laden waters entering the slough system from the Bay, representing a potential increase in the amount of sedimentation along the Redwood Creek shipping channel.

However, the Action Alternatives include design elements (*e.g.*, flow control structures in Smith and Corkscrew Sloughs) to divert restored tidal flows through Steinberger Slough and maintain the existing tidal prism that passes through Redwood Creek and thus reduce sedimentation.

The Action Alternatives would increase the area of open water over which wind blows over the restored ponds and may raise heights of wind-waves, and potentially lead to erosion along Steinberger Slough. However, the extent of levee lowering along Steinberger Slough is limited under the Action Alternatives, and thus the levees would still provide a wind break and avoid or limit accelerated erosion.

- **Implementation of the Action Alternatives would result in less than significant erosion and sedimentation impacts. (Less Than Significant Impact)**

Conclusion: None of the alternatives would result in significant geologic impacts except the No Action Alternative.

3.7 Farmlands

There are no farm or agricultural lands within or adjacent to the Bair Island complex. Therefore, no farmland impacts would occur if any of the alternatives including if the No Action Alternative is implemented.

3.8 Wild and Scenic Rivers

There are no waterways designated as Wild and Scenic Rivers in the project area. The closest rivers with the designation are over 110 km (70 miles) from the project area. Therefore, no impacts to Wild and Scenic Rivers would occur if any of the alternatives including the No Action Alternative were implemented.

3.9 Coastal Zones and Coastal Barriers

Bair Island is not within or near areas covered by the Coastal Barriers Resource Act (1982). The Bair Island complex is within areas covered by the Coastal Zone Management Act (1972). The San Francisco Bay Conservation and Development Commission (BCDC), is responsible for administering the federal Coastal Zone Management Act within the San Francisco Bay segment of the California coastal zone to ensure that federal activities reflect Commission policies. Since the Commission is charged with regulating all filling and dredging in San Francisco Bay (which includes sloughs and certain creeks and tributaries that are part of the Bay system, salt ponds and certain other areas that have been diked-off from the Bay), a Consistency Determination would be required for dredging, filling and shoreline improvements, in order to implement the any of the Action Alternatives. The No Action Alternative would continue maintenance on Inner Bair Island on an as needed basis. Work on any routine maintenance project cannot be started until the Commission has been notified that the project has been preauthorized by one of the Commission's regionwide permits.

Impacts to coastal zone resources are described through the document. See sections 3.1. and 3.2 for complete descriptions.

3.10 Public Health and Safety

This section is primarily based upon a Phase I Environmental Site Assessment prepared by Levine Fricke Recon in March 1997, an Environmental Site Assessment Level I Survey Checklist prepared by the Environmental Contaminants Division of the Fish and Wildlife Service in November 2001, and information from Redwood City’s Marina Shores Village Project DEIR dated February 2003.

3.10.1 Existing Setting

Site History

Bair Island was diked in the late 1800s and early 1900s for agricultural uses, including cattle grazing. Bair Island was converted to salt evaporation ponds starting in 1946, and the ponds remained in production until 1965. The lands were drained and eventually sold to a series of real estate development companies. Several small wooden hunters’ cabins and boat docks have been built along the navigable channels over the years, but no structures currently remain on the island. Historical aerial photographs from 1955, 1972, and 1995 show virtually no change in site use through the period, and fluctuation in pond water levels are the only visible variation.

There is no historical or reconnaissance evidence that hazardous substances have been stored on the site. The only recorded commercial use of the site has been for salt production, which does not involve industrial processes or chemicals.

Existing Setting

Currently, Bair Island is a known breeding location for the California salt marsh mosquito, which would develop extremely dense, pestiferous populations if left untreated (San Mateo County Mosquito Abatement District (SMCMAD), 1997). Mosquito control included surveillance, siphoning of diked salt ponds, and larvicide and insecticide application from the ground and the air. Beginning in the late 1970s or early 1980s, water in Middle and Outer Bair was siphoned periodically during the rainy season to minimize mosquito production. The San Mateo County Mosquito Abatement District discontinued siphon operations in 2000 due to lack of funds and staffing, although the PVC pipes are still visible at the site. Siphon operations were never carried out at Inner Bair since the area is easily accessible for other types of mosquito abatement. The SMCMAD confirmed that three types of mosquito chemicals have been used on the site, with the trade names of Altocid, Golden Bear, and Bti (*Bacillus thuringiensis* var. *israelensis*). According to an SMCMAD representative, none of the pesticides persist in the environment for more than three days and the chemicals are used specifically for their general environmental safety.²⁷ Currently, large numbers of mosquito larvae develop in rainwater collecting behind the dikes in the former salt pond on Bair Island.

Storm surge and high-tide debris were observed at various locations along the channel shorelines, but these materials were limited to non-hazardous plastic, paper, and wood debris during the site reconnaissance. It is possible that containers of paint, lubricants, solvents and other “household hazardous waste” occasionally are a component of the tidal debris.²⁸

²⁷ Levine Fricke Recon, *Phase I Environmental Site Assessment*, March 1997.

²⁸ Levine Fricke Recon, *Phase I Environmental Site Assessment*, March 1997.

Electrical power is delivered to the area through overhead and underground transmission lines. The transformers are owned and maintained by Pacific Gas and Electric (PG&E). There are two parallel electrical transmission lines, a 230-kilovolt (kV) line and a 115-kV line, suspended from steel truss towers approximately 204 feet in height located adjacent to the Bair Island parking lot. These two towers in the parking lot connect to a PG&E substation adjacent to Seaport Boulevard to the east and extend to towers on Bair Island to the west. One of the PG&E transmission towers is located on the Inner Bair Island levee, near the southeastern tip of the island. The transmission lines then run northeast toward the bay (refer to Figure 13, page 75). According to PG&E, none of the PG&E maintained transformers in the vicinity contain PCBs.

A sanitary sewer pipeline is situated beneath the south levee on Inner Bair Island, delivering effluent from the developed areas of Belmont and Redwood City to the wastewater treatment plant located approximately 1,500 feet southeast of the site. The pipeline is maintained by the South Bayside System Authority (SBSA), and according to the plant manager, leaks occur in this pipeline with relative frequency. Leakage is normally discovered as muddy areas on the levee during the dry season. Municipal wastewater may contain pathogens, inorganic chemicals and metals, synthetic organic compounds, and chemical additives such as chlorine and fluorine. No evidence of sewage contamination, such as odors or saturated areas at the surface of the south levee on Inner Bair Island, was observed during the site reconnaissance.

The San Carlos Airport approach path is located over a western portion of Inner Bair Island. This portion of the site owned by the San Carlos Airport falls under a Federal Aviation Administration (FAA) established runway protection zone (RPZ). FAA defines the runway protection zone as “an area off the runway end to enhance the protection of people and property on the ground.” Since the airport property is subject to federal aviation regulation, it must be kept clear of any structures or stationary objects.

Adjacent Uses

A review of published agency documents, agency files, and other pertinent documents was performed for properties within a one mile radius of the site. There are numerous recorded contaminated and hazardous material storage sites adjacent to and near Bair Island. Major local sources of these contaminants include industrial facilities in the vicinity of Seaport Boulevard within 2,320 feet of Inner Bair Island, the Port of Redwood City (within 5,800 feet) and San Carlos Airport within 300 feet. Railways and US 101 traversing the area also are potential sources of accidental releases of toxics. Accidental release of airborne toxics from these sources could possibly reach the proposed project site, as could an accidental spill that may flow into Redwood Creek, Smith Slough or Steinberger Slough. Off-site soil and groundwater contamination, however, would not likely affect the site.²⁹

²⁹ Levine Fricke Recon, *Phase I Environmental Site Assessment*, March 1997.

There is one Leaking Underground Storage Tank (LUST) case referenced as a spill of diesel fuel at the Lockheed facility located at 888 Seaport Road, approximately 1,500 feet southeast of Inner Bair Island. The case was closed after investigation and/or appropriate mitigation. That site is separated hydrologically from Bair Island by Redwood Creek.

The San Carlos Airport currently has two underground fuel storage tanks and is planning to add 10,000 gallons in additional storage.

3.10.2 Methodology and Significance Criteria for Public Health and Safety Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of public health and safety impacts. Potential impacts attributed to the presence of hazards to the project site were assessed by identifying potential receptors, exposure scenarios and exposure pathways for each alternative.

The following criteria were used to determine significant public health and safety effects under the State CEQA Guidelines. A public health and safety impact is considered significant if the project would:

- create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination in excess of soil and groundwater cleanup goals developed for the site; or
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; or
- be located on or adjacent to a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment; or
- for a project located with an airport land use plan or within two miles of a airport, would the project result in a safety hazard for people residing or working in the project area; or
- impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

Based on NEPA CEQ Regulations, the project would have a beneficial public health and safety impact if it would:

- reduce hazards to the public, including reducing habitat for disease vectors.

3.10.3 Public Health and Safety Impacts

3.10.3.1 No Action Alternative

Mosquito Abatement

As stated above, there are large numbers of mosquito larvae that develop in ponding rainwater on Bair Island. Under the No Action Alternative ponding water would continue to occur on Middle and Outer Bair Islands until the levee breach and tidal action occurs. Therefore, the need for mosquito abatement on Bair Island would be similar to existing conditions.

- **The No Action Alternative would not result in significant public health and safety impacts. (Less Than Significant Impact)**

Electromagnetic Field (EMF) Hazards

In recent years there has been considerable controversy regarding the potential health effects resulting from long-term exposures to electric and magnetic fields (EMFs). EMF is a term used to describe electric and magnetic fields that are created by electric voltage³⁰ (electric field) and electric current (magnetic field). While EMF occurs naturally and is present in everything from visible light to radio waves to X-rays, attention has focused on whether exposure to EMF associated with alternating current electricity is hazardous. Hundreds of laboratory and epidemiological studies have been conducted on the relationship between EMF exposure and health effects. Scientists to date have found no threshold value, dose response or causative relationship that demonstrates evidence of any adverse physical effect of EMF.³¹

Two electric transmission lines, a 230 kV and a 115 kV transmission line, extend through portions of the Bair Island complex. Two transmission towers are located adjacent to the existing parking lot on Bair Island Road and the transmission lines cross the existing levee trail in the southeast portion of Inner Bair Island and also run adjacent to the connector trail from the parking lot to the trailhead. Pedestrians and bicyclists using the parking lot and existing trails are currently exposed to higher than background levels of EMF as they approach and cross under the existing transmission lines. Exposure of recreational users to EMFs from the existing transmission lines is not prolonged, however, as trail users enter and exit the parking lot or travel on the trails.

- **The No Action Alternative would not result in additional EMF exposure to visitors at Bair Island. (Less Than Significant Impact)**

3.10.3.2 Alternative A (*Proposed Action*) and Alternative B

Mosquito Abatement

As stated above, there are large numbers of mosquito larvae that develop in ponding rainwater on Bair Island. Currently pesticides are used for mosquito abatement on Bair Island. Alternative A and Alternative B would improve conditions by opening five diked salt ponds to tidal action, thus

³⁰ Electric voltage is a measure of electric potential or potential difference between two points in a conducting wire.

³¹ City of Santa Clara. 2003. NRS 230 kV Transmission Line Project, Final EIR.

reducing the amount of breeding habitat. The Technical Committee for the Development of Vector Prevention Standards (1986) proposed a series of guidelines for marsh restorations project. These include providing for free tidal flow through deep channels, adequate levee breaches to ensure proper tidal circulation, and avoiding the creation of areas that would pond water. All of these design elements were taken into consideration during the restoration design of Bair Island.

Alternative A and Alternative B would greatly limit mosquito breeding on Bair Island and thus reduce the need for the application of pesticides. Full tidal inundation is expected to occur on Bair Island as the levees are systematically breached.

- **Alternative A and Alternative B would reduce habitat for disease vectors on Bair Island and would not increase mosquito breeding or result in the need for expanding the mosquito abatement on Bair Island. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

Hazardous Materials

As previously discussed, hazardous materials are used at industrial facilities in the vicinity of Seaport Boulevard, at the Port of Redwood City and at San Carlos Airport. Hazardous materials are also transported in trucks along US 101 and in railcars on Southern Pacific Rail Road (SPRR) and spur lines serving the Port of Redwood City. Some of the industrial facilities, and the railways and highways traversing the area, are potential sources of accidental releases of airborne toxic gases.

Alternative A and Alternative B allow visitor use by pedestrians and bicyclists along levee trails. The trails would be used by mobile adults and children at a low intensity. The location of industrial uses and the trails on Inner Bair Island does not appear to pose a substantial risk to current or future recreational users based on the distance between the industrial uses and the site, the type of proposed users, the relatively low number of people using the trails at any one time, the ventilation and dilution provided by winds near San Francisco Bay, and the likelihood of a worst-case accidental release of toxic substances from an industrial facility or truck on the highway.

The SBSA is responsible for ongoing monitoring and maintenance of their pipeline. If a significant leak occurs along the effluent pipeline that crosses the south margin of Inner Bair Island, SBSA would be notified. Depending on the extent of the leak, subsurface sampling and analysis for typical municipal wastewater constituents may be warranted to determine the extent of contamination and to identify appropriate mitigation measures.

- **Alternative A and Alternative B would not expose people to significant risks from hazardous materials contamination or from the storage, use and/or disposal of hazardous materials. (Less Than Significant Impact)**

Airport Safety Hazards

The San Carlos Airport approach path is located on a western portion of Inner Bair Island. This portion of the site owned by the San Carlos Airport falls under a Federal Aviation Administration (FAA) established runway protection zone (RPZ). FAA defines the runway protection zone as “an area off the runway end to enhance the protection of people and property on the ground.” Since the airport property is subject to federal aviation regulation, it must be keep clear of any structures or

stationary objects. The levee for the airport property must be large enough to allow emergency vehicles to reach the area in the event of a plane crash.

Alternative A and Alternative B would allow low intensity uses on Inner Bair Island, which is consistent with the FAA requirements. The alternatives have been designed to ensure compliance with applicable Airport/FAA, local and state and federal restrictions and policies. The only changes that would occur within the RPZ would be improvements to the cross-levee system protecting the safety zone. The levee surrounding the airport safety zone would be large enough to allow emergency vehicles access in the event of a plane crash. The outside of the levee would be sloped gradually leading up to the airport property. The area would be filled with dredged material to an elevation that is above mean higher high water (MHHW).

Any land uses that would compromise airport runway protection zones, such as placement of structures, concentrations of people, or features that could attract birds, are excluded from the Plan. Alternative A and Alternative B would schedule placement of dredged material and levee breaches on Inner Bair Island to avoid ponding water, which attract birds.

- **Implementation of Alternative A or Alternative B would not result in an airport safety hazard. (Less Than Significant Impact)**

Electromagnetic Field (EMF) Hazards

None of the Action Alternatives would change the existing access to and from the Bair Island trailhead and therefore would not result in new or increased exposure of the public to sources of EMF.

- **Alternatives A, B, C, and D would not result in increased exposure to EMF. (Less Than Significant Impact)**

3.10.3.4 Alternative C and Alternative D

Mosquito Abatement

Alternative C and D would create tidal action on all but Inner Bair Island which would become managed marsh. Mosquito abatement is less of a problem in open water or tidal marshes with good tidal flow such as would be created on Outer and Middle Bair. However, shallowly flooded, vegetated areas with little tidal flow can be large mosquito sources. If Alternatives C or D is selected for implementation, mosquito problems would be prevented by following the Technical Committee for the Development of Vector Prevention Standards (1986) guidelines for marsh restoration projects. Therefore, Alternatives C and D would greatly limit mosquito breeding on Bair Island and thus reduce the need for the application of pesticides to Bair Island.

- **The Alternatives C and D would limit mosquito breeding and reduce the need for expanding the mosquito abatement on Bair Island. (CEQA: Less Than Significant Impact) (NEPA: Significant Beneficial Impact)**

Hazardous Materials

Alternative C and Alternative D hazardous materials impacts would be the same as Alternative A and Alternative B.

- **The Alternative C and Alternative D would not expose people to significant risks from hazardous materials contamination or from the storage, use and/or disposal of hazardous materials. (Less Than Significant Impact)**

Airport Safety Hazards

The restoration approach for Alternatives C and D create managed wetlands at Inner Bair Island. This alternative allows the reestablishment of some salt marsh habitat on Inner Bair Island, while limiting the creation of open water habitat that would contribute to bird strike hazards. Hydraulic control structures (*i.e.*, slide-flap gated culverts, float-activated gates) would also be installed on Inner Bair Island to allow water management within Inner Bair. As stated above, any land uses that would compromise airport runway protection zones, such as placement of structures, concentrations of people, or features that could attract birds, are excluded from the Plan. Since rainfall and former sloughs and borrow ditches would contribute to ponding on Inner Bair Island under Alternatives C and D, these alternatives include water management to allow tidal inflow periodically on a managed basis that would prevent open water ponding. Pumps may also be installed to facilitate drainage, should unusual ponding occur.

- **Implementation of Alternative C or Alternative D would include design features to reduce airport safety hazards. (Less Than Significant Impact)**

Electromagnetic Field (EMF) Hazards

As stated above, Alternative C and Alternative D would not change the existing access to and from the Bair Island trailhead and therefore would not result in new or increased exposure of the public to sources of EMF.

- **The Alternative C and Alternative D would not result in increased exposure to EMF. (Less Than Significant Impact)**

Conclusion: None of the alternatives, including the No Action Alternative, would result in significant public health and safety impacts.

3.11 Cultural Resources

The following discussion is based upon a record search and field survey prepared for the project by the U.S. Fish and Wildlife Service, Cultural Resources Team in December 2000 and June 2003.

3.11.1 Existing Setting

Before modern era alterations Bair Island was a tidal marsh and tidal mudflat area.

Recent geological and human actions have significantly altered the landscape of the Bay. Nearly constant complex geophysical actions have raised, lowered, or tilted the Bay. From about 15,000 years ago melting continental glaciers started to raise sea levels. By 8,000 years ago the water had reached into what is now called the San Francisco Bay. Around 3,000 years ago vibrant estuaries and marshland habitats were well established. With the ocean, marshes, mudflats, low hills and diverse forests San Francisco Bay had a broad and dense diversity of wildlife.

With the advent of hydraulic gold mining in the mid-19th century, the Bay, particularly the northern end, lost depth, becoming choked with the silt from washing gold. Market hunting, habitat destruction and the presence of a dense human population greatly reduced the variety and numbers of wildlife. Mudflats and tidal marshes were diked, used for salt production or filled in to provide space for construction.

Cultural Setting

Ethnographic accounts from the last 230 years show the southern San Francisco Bay Area was inhabited by a plethora of groups. Around the project area were several bands of Native Americans, referred to as Costanoan in this area, meaning coastal people. Recently the name Ohlone, derived from the name of a tribelet, has supplanted the broader term. Archaeological and linguistic evidence indicates that the ancestors of the Ohlone moved to the Bay Area about 1,500 years ago.

Spanish Missions were established in the last quarter of the 18th century. Disease and social change precipitated a drastic drop in the Ohlone population.

Shell Mounds

Shell mounds or middens are piles of discarded shells, often including fish bone, mammal bone, and fire cracked rock that provide evidence of human occupation. Work early in the 20th century recorded hundreds of shell mounds, demonstrating use of the rich salt marsh areas, which contained an abundance of shell fish, mollusks, fish and waterfowl. Occasionally human remains have been encountered within a Bay area shell mound. The abundant calcium carbonate contributes to the excellent morphological preservation of bone. The northeast edge of Outer Bair Island has an abundance of shells in a privately owned area. A small concentration of shell occurs in the southeastern edge of Middle Bair Island. During the survey no evidence was found of anything but shells at this location.

Fish Camp

Around 1869 Thomas A. McCollam diked off about 10 acres of marshland near the junction of Redwood Creek and Corkscrew Slough to create a fishing village. This station was operated as the Chinese-McCollam Fish Camp, where primarily shrimp and shellfish were harvested. Years later several hunters' shacks were at the fishing village location.

Morgan Oyster Company

In 1877, The Morgan Oyster Company built an oyster house on an island at the entrance of Steinberger Slough, which was used for their headquarters. Reportedly this house was moved to Redwood City, possibly at Spring Street and Chestnut Street. In the first part of the 20th Century less than ideal conditions for the growing of oysters caused a collapse in the industry. Many of the oyster beds were bought by the Pacific Portland Cement Company.

Pacific Portland Cement Company

In 1924, the Pacific Portland Cement Company established a processing plant on Redwood Creek, east of Bair Island. They used oyster dredged from the bay in creating cement. The San Mateo Bridge is built with cement derived from oyster shell recovered when digging the bridge footings.

Salt Production

The gathering of salt from the sea came late to Bair Island, but has a long history in the South Bay. There is more sun and less rain than in San Francisco or the North Bay. Natural occurring pools of sea water evaporated creating crusts of salt. Records from Spanish missionaries indicate the Native Americans gathered this salt. The Spanish took control of the salt trade.

Commercial production began in 1846 using a common technique of capturing sea water in shallow basins and allowing the water to evaporate. Used world wide for seasoning and in the preservation of food, salt also served the Silver mining boom the late 19th century. Sodium chloride is used in the refining process to separate silver from other minerals. In the late 19th century, dozens of salt companies appeared in the Bay Area. Eventually various companies were bought up and consolidated into the Leslie Salt Company.

After World War II, Leslie expanded production, and converted portions of Inner and Middle Bair Island into salt ponds. Within a few years it was deemed unprofitable and by 1968 production was halted.

Development

Triangulation Station Marsh on the northeast corner of Outer Bair Island was filled by the U.S. Army Corps of Engineers in the early 1900s as part of a dredging project in Redwood Creek. In 1945, the Bair Island Corporation planned to develop the tip of the island as a railroad terminal. They constructed a road and a railway grade extending to Redwood Point but the project was then abandoned.

With the decline in salt and the rising value of land in the late 1960s the salt ponds around Redwood City were drained for development. Housing and commercial properties were developed on former

salt ponds east and west of Bair Island, but a succession of development plans for Bair Island were never implemented.

Previously Recorded Sites and Previous Fieldwork Reports

A search of the files of the Northwest Information Center, Sonoma State University, revealed that no previously recorded archaeological sites occur in or near the project area (NW Info Center # 00-54). Four archaeological surveys have been conducted near, and in conditions similar to the project area.

The project's Area of Potential Effects (APE) for archaeology encompasses the proposed project site. No archaeological site or reported cultural resources are situated in or adjacent to the APE.

3.11.2 Methodology and Significance Criteria for Cultural Resources Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of cultural resource impacts.

Under the National Historic Preservation Act (NHPA), cultural resources include archaeological resources, historic properties, objects of antiquity, cultural items, and traditional/religious values. Historic properties are "any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register of Historic Places" [16 U.S.C. 470w (5)]. The criteria used to evaluate National Register eligibility are as follows:

- The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
 - that are associated with events that have made a significant contribution to the broad patterns of our history; or
 - that are associated with the lives of persons significant in our past; or
 - that embody the distinctive characteristics of a type, period or method of construction; or
 - that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguished entity whose components may lack individual distinction; or
 - that have yielded or may be likely to yield information important in prehistory or history.

The 1992 NHPA amendments specify that properties of traditional religious and cultural importance to an Indian Tribe or Native Hawaiian organization (traditional cultural properties) may meet the criteria for listing on the National Register.

3.11.3 Cultural Resources Impacts

A project of this scope has the potential to disturb both exposed and buried cultural resources. The Service has the responsibility to protect these resources and comply with Section 106 of the National Historic Preservation Act (NHPA). The Service, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer (SHPO), pursuant to section 800.13 of the regulations (36 CFR 800.13) implementing Section 106 of the NHPA, have entered into a Programmatic Agreement (Agreement) to streamline the cultural resource compliance process for low impact projects. Initial survey and reporting for the Bair Island project has been reported and submitted to the SHPO under this agreement October of 2002. Additional survey and research was subsequently undertaken.

3.11.3.1 All Alternatives including No Action Alternative

Evident shell concentrations lay outside the project area of potential effects. Further, without detailed study it is not possible determine if the shells seen near the project area are remnants of Native American processing, planted oysters, or stockpiles for the cement company. It is likely that all three are commingled.

The Chinese-McCollam Fish Camp also lies outside of the project area of potential effects and is not managed by USFWS. There are evident pilings, building remnants, but no standing structures, in the location.

The bulk of the project area consists of former salt ponds. Although constructed more than 50 years ago, the former salt ponds and associated levees do not meet any criteria as historic properties. The integrity and association have been lost through years of abandonment. They do not convey a strong association with the importance of salt production. There is no physical evidence remaining of occupation by an important person. No buildings remain, and linear structures (levees) have been modified and do not constitute a significant feat of engineering. The few structures that remain (possible brine control structures in small internal levees) are greatly deteriorated.

As no historic properties were identified, no effect on cultural resources is anticipated under any alternative including the No Action Alternative. Although it is unlikely that buried cultural materials would be encountered during excavation for levee breaches or routine maintenance, the appearance of cultural properties can never be predicted with certainty. Therefore, there is the potential for subsurface deposits in this project location.

- **Implementation of any of the Alternatives could result in a significant impact to buried cultural resources that could be present on the site. (Significant Impact)**

3.11.4 Mitigation Measures

Although it is unlikely that buried cultural materials would be encountered, the appearance of cultural properties can never be predicted with certainty. Since there is the potential for subsurface deposits in this project location the following measure is included for all construction and maintenance activities that involve excavation or disturbance to existing ground surface.

- Should any cultural deposits be encountered during any phase of the project, work shall halt and the Refuge Manager notified. If human bones are found, the

appropriate County authority (Coroner, Sheriff, or Medical Examiner), the Native American Heritage Commission, and the Service's Regional Archaeologist would be contacted immediately. An assessment of the deposits would be made by the Regional Archaeologist, or other similarly qualified individual, before work may resume in the area of discovery.

- **Incorporation of the above mitigation measure would reduce any cultural resources impacts to a less than significant level. (Less Than Significant Impact with Mitigation)**

Conclusion: None of the alternatives including the No Action Alternative would result in significant cultural resources impacts that could not be mitigated to a less than significant level.

3.12 Visual/Aesthetics Resources

3.12.1 Existing Setting

The visual quality of the overall bayfront area is created by the openness associated with marshes, waterways, and the Bay beyond. Clear and unobstructed views, a broad visual horizon, and an uninterrupted expanse of sky are key elements.

Bair Island is visible from a number of vantage points including U.S. 101, the residential community on Redwood Shores, Bair Island Road, and from Redwood City hillsides and Edgewood Park.

3.12.2 Methodology and Significance Criteria for Visual/Aesthetic Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of visual/aesthetic impacts. The impacts on visual resources were analyzed qualitatively. There would be a significant impact on visual/aesthetic resources if the action would have a substantial adverse effect on a scenic vista.

The following criteria were used to determine significant visual/aesthetic effects under the State CEQA Guidelines. A visual/aesthetic impact is considered significant if the project would:

- substantially alter existing views of scenic vistas or resources; or
- remove important aesthetic features; or
- produce substantial light or glare, such that it poses a hazard or nuisance, or interferes with nearby land uses.

3.12.3 Visual/Aesthetic Impacts

3.12.3.1 No Action Alternative

Under the No Action Alternative there would be no restoration of Bair Island and no improvements to public access. There would therefore be no visual changes occurring at Bair Island.

- **The No Action Alternative would not result in any visual impacts (No Impact)**

3.12.3.2 Alternative A: Tidal Marsh Restoration and Moderate Public Access (*Proposed Action*)

Alternative A would not substantially alter existing views of the project area. The visual change resulting from the tidal marsh restoration alternative would be minimal. The only clearly visible change would be the public access improvements. The parking lot on Bair Island Road would include public restroom facilities and the connector trail from the parking lot to Inner Bair Island trailhead would be widened and improved for safety. On Inner Bair Island there would be two observation decks located along Smith Slough. These observation decks would be approximately 12 feet by 12 feet and located approximately three feet above the levee. On Middle Bair there would be a viewing platform located at the channel restriction on Corkscrew Slough. Access to this observation platform would only be by boat, and access beyond the observation platform would not be permitted.

None of these improvements to Bair Island would substantially alter the existing visual character of the surrounding area, which is currently characterized by open and expansive natural views. From most of the viewpoints listed above there would be no visible change to Bair Island itself. A small restroom building would be visible from Bair Island Road and adjacent residential development. However this new structure is not considered a substantial change in the visual character of the site. As a result, Alternative A would not have a substantial adverse effect on surrounding scenic vistas and would not significantly alter public views and view corridors.

Under the No Action Alternative, none of the public access improvements would be constructed. However with or without the public access improvements, Bair Island's visual quality would remain similar to existing conditions.

- **Implementation of Alternative A would not degrade the existing visual character or quality of the site and its surroundings. (Less Than Significant Impact)**

3.12.3.3 Alternative B: Tidal Marsh Restoration and Restricted Public Access

The visual and aesthetic impacts for Alternative B would be similar to Alternative A, except that Alternative B would not have a levee trail or observation deck on the southeastern side of Inner Bair Island. Alternative B would therefore have slightly less visual impact than Alternative A, but a larger visual impact than the No Action Alternative.

3.12.3.4 Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access

The visual and aesthetic impacts for Alternative C would be identical to Alternative A.

3.12.3.5 Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access

As in Alternative B, this alternative would not have a levee trail or observation deck on the southeaster side of Inner Bair Island. Therefore, the visual and aesthetic impacts from Alternative D would be the same as those for Alternative B.

Conclusion: None of the alternatives would result in significant impacts to the visual or aesthetic environment.

3.13 Construction Impacts

3.13.1 Methodology and Significance Criteria for Construction Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of construction impacts.

The following criteria were used to determine significant construction effects under the State CEQA Guidelines. A construction impact is considered significant if the project would:

- result in the closure of a major traffic-carrying street or a navigable waterway for an extended period of time (one month or more); or
- disrupt a business for a period of three months or more; or
- construction of the project would cause a disruption in any utility service for a period of 24 hours or more; or
- generate substantial amounts of dust; or
- generate noise or vibration which substantially affects nearby sensitive receptors (*e.g.*, residences, schools, parks, etc.).

3.13.1.1 No Action Alternative

Under the No Action Alternative no construction or maintenance would occur on Bair Island except minor repairs to the existing levee on Inner Bair Island in the vicinity of the San Carlos Airport safety zone and the South Bayside System Authority sewer line.

In order to avoid or reduce safety impacts, the San Carlos Airport may be required by the FAA to undertake improvements to the levee around the perimeter of their safety zone on Inner Bair Island. In addition, the SBSA may need to undertake measures to maintain the portion of the levee on Inner Bair Island that protects their existing force main pipeline. The Refuge would work with the Airport and SBSA to avoid or reduce these impacts. These maintenance and/or construction activities may result in short term air quality impacts, but the construction is outside of the scope of this project and may require sequential environmental review at a future time.

- **The No Action Alternative would not result in any significant construction impacts. (No Impact)**

3.13.1.2 Alternative A: Tidal Marsh Restoration and Moderate Public Access (*Proposed Action*)

Navigable Waterway Impacts

Alternative A would install channel modifications at Smith and Corkscrew Sloughs to avoid impacts to the Redwood Creek shipping channel and Pete's Outer Harbor. A flow-blockage control structure would be installed in Smith Slough in order to restore its historic meander through Inner Bair Island. In Corkscrew Slough a flow restrictor would be installed. There would be warning information signs near the flow restrictor and at all three boat ramps. A 30-foot notch for boat passage would be installed, along with a depth gauge, at the notch. In addition, a portage would be installed along the banks of Corkscrew Slough to allow boaters to carry their boat out of the water and to the other side

of the structure. This portage would only be able to accommodate small boats that can be manually carried out of the water. Currently only small boats are able to pass through Corkscrew Slough easily, and no boats are able to use the western end of the Slough at low tide, so the accessibility would not substantially change. However in the long-term it is expected that passage through Corkscrew and Smith Sloughs would improve.

In the short-term while the potential tidal prisms of the ponds are highest and low water drainage in the slough system is poor, the water levels across these structures will induce high current velocities in their immediate vicinity. High current velocities would occur during low tides. Current velocities through the flow control structures will diminish in time, as Steinberger Slough and Corkscrew Slough deepen and the ponds fill with sediments. During periods of high tides, water levels across the flow control structures are expected to be the same on both sides and thus will not impact boat passage. Current velocities during high tides will be consistent with the rest of the sloughs.

During construction of these channel structures, barges may be present in the sloughs while placing the structures. Implementation of Alternative A would not require closure of navigable waterways during construction. However, it is possible that it may be difficult or unsafe to pass through the flow restrictor at low tide and when the tide is rapidly falling over the flow restrictor.

- **Alternative A would not result in significant impacts to navigable waterways during construction. (Less Than Significant Impact)**

Impacts to Business and Utilities During Construction

There are no anticipated impacts to any business during the construction of Alternative A. No utility relocation would be required to implement Alternative A.

- **Alternative A would not disrupt a business for a period of three months or more or require a disruption in any utility service for a period of 24 hours or more. (Less Than Significant Impact)**

Air Quality Impacts During Construction

Construction equipment would include dredges, boats, barges, excavators, dump trucks and graders on and around Bair Island. These construction activities, including construction vehicle traffic and wind blowing over exposed earth, would generate exhaust emissions and fugitive particulate matter (*i.e.*, dust) emissions that would affect local and regional air quality. Construction activities are also a source of organic gas emissions. Solvents in adhesives, thinners, and some construction materials would evaporate into the atmosphere and would participate in the photochemical reaction that creates urban ozone.

Construction dust could affect local air quality at various times during construction of the project. The dry, windy climate of the area during the summer months creates a high potential for dust generation, when the dredged material is exposed to the atmosphere.

The effects of construction activities would be increased dust and higher levels of particulates downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties, and may constitute a health impact for children or persons with chronic health

problems. Given the proximity of the residences and recreational users in the Bay this potential impact could be significant.

Alternative A would involve the use of dredged material to raise the elevation on Inner Bair which would take approximately five to six months. The placement of dredged material has the potential to create unpleasant odors due to the presence of decaying organic material in the mud.

Due to the increase in wetland vegetation on the project site over time, net air quality should improve as a result of this project. There may be short term negative impacts during placement of dredge material and construction, especially in terms of dust and odor production, but this should be only during construction. The odor should not differ significantly from a low tide event in the area which also exposes sediments containing decaying organic material.

- **Construction from the implementation of Alternative A could result in significant air quality impacts associated with dust generation. (Significant Impact)**

3.13.1.3 Alternative B: Tidal Marsh Restoration and Restricted Public Access

Alternative B would have similar construction impacts as Alternative A with the exception that it would have fewer public access improvements (shorter trail on Inner Bair Island) and therefore would result in slightly fewer impacts to air quality.

3.13.1.4 Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access

Alternative C would have similar construction impacts as Alternative A with the exception that this alternative would not involve the placement of dredged material and thus would reduce odor impacts.

3.13.1.5 Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access

Alternative D would have the same construction impacts as the Alternative C with the exception that it would have fewer public access improvements (shorter trail on Inner Bair Island) and therefore would result in slightly fewer impacts to air quality.

3.13.2 Mitigation Measures

The Bay Area Air Quality Management District (BAAQMD) has prepared a list of feasible construction dust control measures that can reduce construction impacts to a level that is less than significant. Except when it is raining, the following construction practices would be implemented during construction of any of the alternatives:

- Sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent public streets;
- Limit traffic speeds on unpaved areas to 15 mph;
- Replant vegetation in disturbed areas;

- Water or cover all stockpiles of soil that can be blown by the wind;
- Sweep daily (with water sweepers) the paved access roads, parking areas, and staging areas at construction site.

Conclusion: With implementation of the mitigation measures listed above, the Action Alternatives would not result in significant construction impacts. The No Action Alternative would not result in any significant construction impacts.

3.14 Recreational Impacts

The following existing setting discussion is based upon the Bair Island Visitor Use Survey, prepared by the Sequoia Audubon Society in December 2000.

3.14.1 Existing Setting

Recreational activities that currently take place at Bair Island include jogging, hiking/walking, bicycling, boating and hunting, (hunting is only allowed by boat at portions of Middle and Outer Bair Islands). Pedestrians and bicyclists use the 3.3-mile levee loop trail on Inner Bair Island starting from a narrow and deteriorated connector trail from the Bair Island parking lot on Bair Island Road.³² This existing paved parking lot is owned and maintained by the Refuge (refer to Figure 13).

Pedestrians and Bicyclers

A survey was prepared of visitors using the 3.3-mile loop trail on Inner Bair Island who walk/hike, jog, or bicycle. Based on this survey it is estimated that approximately 250,000 individuals visit Inner Bair Island annually. Sunday has the highest volume of visitors to Bair Island, followed by Saturday. Wednesday and Friday are the least busy days of the week. In addition, mornings are busier than afternoons. Most of the visitors walk or hike and of the percentage of visitors that hike, jog, or bicycle, 38 percent of them bring dogs. Based on the survey, only 44 percent were on a leash. Currently dogs are allowed on Inner Bair Island levee trails and are required to remain on the designated trails and under control at all times, however, on numerous occasions during public use surveys dogs were located off the designated trails.³³ Redwood City requires all dogs to be on a leash but this has not been enforced on Bair Island.

Boating

Approximately five high schools with about 200 to 250 members, two universities (Stanford and Santa Clara) with about 75 to 100 members, and four adult clubs (Bair Island Aquatic Center, Los Gatos, Stan Rowing Club, and Redwood Creek Rowing Club) with about 200 to 300 members, use the Bair Island waterways for non-motorized boating. The Cortez Racing Association also hosts a number of regattas each year on Redwood Creek. Additionally there are three to four non-motorized races held each year that go clockwise from Redwood Creek to Smith Slough to Steinberger Slough to Corkscrew Slough and back to Redwood Creek. Most boating classes and events are held from July through November.

Waterfowl hunting is allowed per state regulations by boat on portions of Middle and Outer Bair Islands and Corkscrew Slough except at the confluence of Redwood Creek and Steinberger Slough. Fishing is permitted from boats in Smith Slough, Corkscrew Slough, Steinberger Slough and Redwood Creek.

³² Before June 2003, pedestrians and bicyclists would take access at the trailhead to the Inner Bair levees from an unpaved area used for parking at the end of Whipple Avenue. The California Department of Transportation (Caltrans) owns this existing unpaved area along Whipple Avenue. As part of Caltrans' U.S. 101 Auxiliary Lanes Project from Ralston Avenue to Marsh Road, this area was closed off to parking by Caltrans in June 2003.

³³ The Refuge will start requiring dogs to be on a maximum six-foot leash at the end of the public review period for this EIS/EIR. The new rule will be added to the signage at Bair Island.

Motorized boaters and larger sailboats are mostly limited to Redwood Creek because Smith Slough, Steinberger Slough, and Corkscrew Slough are too shallow. The only motorized boats that do use these sloughs are smaller and can only use them at high tides. Each year one of the local yacht clubs hosts an event at high tide for the larger boats through the Corkscrew Slough, Steinberger Slough, and Smith Slough loop.

3.14.2 Methodology and Significance Criteria for Recreational Impacts

State CEQA Guidelines and NEPA CEQ Regulations were used to determine the significance of recreational impacts. The impacts on recreation were analyzed qualitatively, focusing on the existing and proposed policies related to the project area, the types of changes expected to result, and the potential of the restoration changes to adversely affect current and proposed recreational uses at Bair Island.

The following criteria were used to determine significant recreational effects under the State CEQA Guidelines. A recreational impact is considered significant if the project would:

- increase the use of recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment; or
- conflict with existing or planned recreational use and recreation policies; or
- conflict with existing or planned public access plans.

3.14.3 Recreational Impacts

3.14.3.1 No Action Alternative

In the short term (approximately five years), the No Action Alternative would allow continued limited public use consistent with protection of wildlife and habitat and compatibility with Refuge purposes and the National Wildlife Refuge System mission and with the Bay Trail Plan. In the long term, the Refuge would not maintain the existing levee for public use of Inner Bair Island. After approximately five years, trails are expected to become unsafe and would not be accessible to the public. Fishing and boating would not change in the short term. However, as the levees of Middle and Outer Bair Islands wear down and breach, some areas may become unsuitable for fishing and boating. The Refuge's Bair Island parking lot near Pete's Harbor would be closed, once public access is no longer allowed. No trail improvements would be made. No additional infrastructure would be constructed.

The City of Redwood City and BCDC both have public access policies that recommend enhancement of public recreational opportunities along the San Francisco Bay. The No Action Alternative would not be consistent with existing public access plans and policies for Bair Island because public access would eventually be eliminated from Bair Island. The existing recreational facilities would deteriorate and become unsuitable for public use.

- **The No Action Alternative would result in significant adverse recreational impacts. (Significant Impact)**

3.14.3.2 Alternative A: Tidal Marsh Restoration and Moderate Public Access (Proposed Action)

Consistency with Existing or Proposed Public Access Plans

Currently the Bay Trail Plan has a designated spur trail along Inner Bair Island. This segment of the spur trail extends from the westernmost point on the levee on Inner Bair Island to the trailhead at Whipple Avenue, then continues on the narrow path that connects to Bair Island Road. The Bay Trail Plan also shows a future bay trail (planned but not developed) connecting Redwood Shores Bay Trail through San Carlos Airport property (along Steinberger Slough) and bridging the Airport property to Inner Bair Island. However, this connection through the Airport is not presently viable for public access because of safety rules and regulations and safety concerns, and would not be permitted by the Federal Aviation Administration (FAA). Alternative A does not propose this connection to the San Carlos Airport and it is beyond the scope of this project because it is located on the Airport property. Alternative A would improve the designated Bay Trail on Inner Bair Island and the connector trail to the parking lot on Bair Island Road. Alternative A is consistent with the proposed Bay Trail Plan within the Refuge.

The No Action Alternative would result in greater conflicts with policies and plans for the site than Alternative A because recreation and public access would eventually be eliminated or substantially reduced in the long-term.

- **Implementation of Alternative A is consistent with the existing Bay Trail Plan along Inner Bair Island. (Less Than Significant Impact)**

Impacts to Recreational Facilities

After raising the elevation on Inner Bair Island (estimated to be approximately six months), the public access improvements would be made on Inner Bair Island. Public access for pedestrians and bicyclists on Inner Bair Island would change from a 3.3-mile loop trail to a non-loop 2.7-mile levee trail. The Refuge would work with partners³⁴ to make trail improvements to the 0.5-mile connector trail from the Bair Island parking lot to the trailhead near Whipple Avenue. Sanitary facilities would be provided at the Bair Island parking lot. Orientation kiosks would be provided at the trailhead and park lot and viewing/environmental education platforms would be provided at the ends of the levee trails, adjacent to Smith Slough. By restoring wildlife habitat and providing the orientation kiosks and wildlife viewing platforms at the ends of the trails would help meet the project purpose of enhancing the public appreciation and awareness of the unique resources of Bair Island.

Alternative A would include channel modifications at Smith and Corkscrew Sloughs to avoid impacts to the Redwood Creek shipping channel and Pete’s Outer Harbor. A flow-blockage control structure would be installed in Smith Slough in order to restore its historic meander through Inner Bair Island. This would prevent unsafe flow velocities for boaters using the sloughs and creek. Boats would be able to use the realigned Smith Slough as they have used the existing Smith Slough.

In Corkscrew Slough a flow restrictor would be installed. There would be warning and information signs near the flow restrictor and at the boat ramp. A 30-foot notch for boat passage would be

³⁴ The partners are the San Francisco Bay Trails staff, Peninsula Open Space Trust, City of Redwood City, PG&E, Bay Conservation and Development Commission, Caltrans, and adjacent landowners.

installed, along with a depth gauge, at the notch. In addition, a portage and observation deck would be installed along the banks of Corkscrew Slough in order to allow recreational users to have access around the flow restrictor when it is not possible during the construction phase at low tides. In the long-term, the shallow slough channels (Smith, Corkscrew, and Steinberger Sloughs) which are currently too shallow to be used by boats at low tide, would be scoured by increased tidal action. This will result in these waterways being usable by boats for much longer periods of the tidal cycle.

As described in *Section 3.1 Vegetation and Wildlife*, under Alternative A the overall habitat quality would improve for many species. As habitat improves, recreational uses are expected to increase. As discussed above, upgrades to the existing recreational facilities would include widening and improving the trail and the trailhead, creation of viewing platforms, and installing public restrooms. The specific impacts from constructing these facilities are discussed in the appropriate sections of this document. The improved access may increase use of the facilities, including by domestic dogs. Dogs may cause disturbances to wildlife, including endangered species, and Refuge visitors, however, the Refuge will be conducting a monitoring program on dog use to identify if owners are violating the Refuge dog walking regulations. If the monitoring plan demonstrates that dog owners are violating the dog walking regulations above the established wildlife protective standard, dogs will no longer be allowed on Bair Island (see Dog Use Monitoring Plan in Appendix A of this EIS/EIR).

- **Implementation of Alternative A would not result in physical deterioration or an adverse effect to recreational facilities. (Less Than Significant Impact)**

3.14.3.3 Alternative B: Tidal Marsh Restoration and Restricted Public Access

The impact of Alternative B would be similar to the impacts from Alternative A except that the public access plan would have a shorter trail on Inner Bair Island (1.8 miles) and would not allow dogs and would establish a seasonal closure of Corkscrew Slough to protect harbor seals. This would reduce potential disturbance to endangered species, other wildlife and Refuge visitors.

- **Implementation of Alternative B would reduce the length of trails available to the public on Inner Bair Island; however, it would not result in an adverse effect to recreational facilities. (Less Than Significant Impact)**

3.14.3.4 Alternative C: Tidal and Managed Marsh Restoration and Moderate Public Access

The impacts of Alternative C would be the same as impacts from Alternative A.

3.14.3.5 Alternative D: Tidal and Managed Marsh Restoration and Restricted Public Access

The impacts of Alternative D would be the same as impacts from Alternative B.

Conclusion: None of the Action Alternatives would result in significant recreational impacts except the No Action Alternative would have significant impacts.

3.15 Cumulative Impacts

A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

This discussion summarizes the potential cumulative impacts associated with the alternatives. This discussion would analyze the potential cumulative effects of this tidal marsh restoration project combined with other past, present, and reasonably foreseeable tidal restoration projects within the project vicinity and flood management projects within Redwood City.

The following projects were considered during the cumulative impact analysis:

Project	Location	Use	Size
Moseley Tract Project	Menlo Park	Tidal Restoration	54 ac.
Foster City Marsh Project	Foster City	Tidal Restoration	31.35 ac.
San Mateo Shoreline Parks Project	San Mateo	Tidal, Non-Tidal restoration	7.7 ac.
Knapp Tract	San Jose	Tidal Restoration	382 ac.
South Bay Salt Pond Restoration Project	San Mateo Co. Santa Clara Co.	Tidal Marsh Restoration	8,946 ac.
South Bay Salt Pond Restoration Project	Hayward, Alameda Co.	Enhancement Restoration	4,748 ac.
Marina Shores Village Project	Redwood City	Mixed Use: 1,900 residential units; 300,000 sf office	46 ac.
Hayward Shoreline Enhancement Project	Hayward	Restored Managed Marsh	134 ac.
Pond A4	San Jose	Tidal Restoration	310 ac.
San Francisco Estuary Invasive <i>Spartina</i> Project	All 9 Bay Area Counties	<i>Spartina</i> Control and Management	69,000 ac.

3.15.1 Cumulative Thresholds of Significance

For the purposes of this project, a cumulative impact is considered significant if the project would:

- in conjunction with other projects proposed or reasonably foreseeable, would result in an impact that exceeds the significance criteria identified elsewhere in this document for a particular resource.

The following resources were found not to have the potential to contribute to cumulative impacts because the effects were extremely minor, were temporary, or had no potential to be additive and therefore contribute to cumulative impacts: land use, short-term water quality, long-term air quality, socio-economics, environmental justice, geology, farmlands, wild and scenic rivers, coastal zones, public health and safety, cultural resources, visual resources, and recreation.

3.15.2 Cumulative Impacts

Vegetation and Wildlife

Invasion of Atlantic Cordgrass (*Spartina*) Associated with Disturbance from Tidal Marsh Restoration Projects

Sheltered mudflats and immature tidally restored baylands are highly susceptible to invasion by Atlantic cordgrass. Atlantic cordgrass is capable of colonizing mudflats at a lower elevation (and therefore earlier) than the native marsh species. Breached salt ponds that will rely on natural sedimentation processes to bring the elevations up to heights suitable for marsh establishment will be susceptible to invasion by Atlantic cordgrass. The implementation of other large-scale restoration projects could also result in the expansion of invasive non-native cordgrass populations. The project proponents are working closely with the San Francisco Bay Invasive *Spartina* Program to ensure that any activities at Bair Island are consistent with the goals and procedures of the bay-wide eradication program. It is expected that an Invasive Cordgrass control program will be conducted on Bair Island 2-3 years before breaching any levees. It is likely that control on invasive cordgrass as part of the San Francisco Bay Invasive *Spartina* Program will occur at Bair Island even under the No Action Alternative.

- **All of the alternatives (including No Action Alternative), along with other tidal restoration projects, could contribute to the creation of additional habitat in the Bay Area that would be susceptible to invasion by Atlantic cordgrass. (Significant Cumulative Impact)**

Hydrology and Water Quality

Impacts to Mudflat Habitat

The existing aerial extent of mudflat habitat in South San Francisco Bay may decrease in response to future decreases in delivery of sediment from contributing watersheds, accelerated sea level rise, subsidence, and sediment demands associated with large-scale tidal wetland restoration projects such as those planned for the South Bay Salt Ponds. Although tidal restoration at Bair Island would add to the overall sediment demand within the South Bay, all of the alternatives including the No Action Alternative would create intertidal mudflat habitat at Middle and Outer Bair Islands. This creation would increase the extent of intertidal mudflat relative to existing conditions, and is expected to persist to at least some extent over the planning horizon, as intertidal mudflat is slowly converted to vegetated marshplain through natural sedimentation and vegetative colonization.

- **All of the alternatives including the No Action Alternative are not expected to contribute to the reduction of intertidal mudflat habitat that may occur in the future due to changes in the sedimentation processes in South Bay. (Less Than Significant Cumulative Impact)**

Impacts to Flooding

None of the other tidal restoration projects planned in the area would contribute to a cumulative impact to flooding. Further urbanization in the watersheds of Pulgas and Cordilleras Creeks could increase the amount of runoff, and worsen flood impacts. However, no substantial further development is expected in the cities of Belmont, San Carlos, and Redwood City within the watershed.

The predicted sea level rise over the next 50 years could range from 0.16 to 0.92 feet. Sea level rise would be independent of future foreseeable projects. A cumulative impact is defined as an impact which is created as a result of the combination of the proposed project together with other projects causing related impacts (CEQA Guidelines Sec. 15355 & 15130(a)(1)). While changes in sea level are not, technically, a “project”, sea level rise could effect flood levels, to an unknown extent.

- **The Action Alternatives along with planned development in the watershed is not expected to result in significant flooding impacts. (Less Than Significant Cumulative Impact)**

3.15.3 Mitigation Measures

The discussion below identifies potential mitigation, where it can be identified, for the cumulative impacts identified above.

Mitigation for Cumulative Vegetation and Wildlife Impacts

Invasion of Atlantic Cordgrass (Spartina) Impacts

All of the Alternatives including the No Action include controls for non-native *Spartina* species within the Bair Island restoration site and follows many of the suggestions and methods contained within the *Spartina* Control Program. The Bair Island Restoration and Management Plan would be reviewed by California State Coastal Conservancy and the US Fish and Wildlife Service for its consistency with the *Spartina* Control Program. If necessary the control methods in the Bair Island Restoration and Management Plan would be modified to remain consistent with the final approved version of the San Francisco Estuary Invasive *Spartina* Control Program EIS/EIR.

Therefore, implementation of proper non-native *Spartina* treatment at the Bair Island site in accordance with the *Spartina* Control Program would not cumulatively contribute to the spread of invasive *Spartina* to the San Francisco Estuary.

Conclusion: The proposed restoration alternatives, along with other local restoration project may cumulatively result in short-term impacts to vegetation and wildlife. However, the proposed restoration alternatives would result in substantial long-term benefits to endangered species and aquatic resources by creating a substantial amount of new tidal salt marsh habitat.

Implementation of appropriate non-native Spartina treatment at the Bair Island site would avoid contributing to the spread of invasive Spartina in the San Francisco Bay.

3.16 Irreversible or Irrecoverable Commitments of Resources

The project would result in the irretrievable commitment of fossil fuels and other energy sources to build, operate, and maintain the wetlands.

3.17 Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Short-term uses of the environment that would occur with restoration include the impacts on existing wetlands and habitat and those from construction-related activities. However, in the long-term, the site is expected to be substantially more productive for habitat and wildlife values.

3.18 Growth-Inducing Impacts

Section 15162.2(d) of the State CEQA Guidelines requires that an EIR address the potential growth-inducing impacts of a proposed project. Specifically, the EIR shall “discuss the ways in which a project could foster economic or population growth, or the construction of additional housing either directly or indirectly, in a surrounding environment”. Projects which could remove obstacles to population growth (such as a major public service expansion) must also be considered in this discussion.

While the Action Alternatives would incrementally increase recreational opportunities, such facilities are not a known constraint to population growth in the Bay area. The proposed improvements to Bair Island are unlikely to induce or encourage additional population growth or development elsewhere.

The growth inducement associated with the alternatives is anticipated to have a less than significant impact on the environment.

3.19 Environmentally Preferred/Superior Alternative

NEPA states that an EIS shall identify the environmentally preferable alternative from the range considered. The environmentally preferable alternative is the alternative that best promotes the national environmental policy expressed in NEPA. This means the alternative that causes the least damage to the environment and best protects biological and physical resources. CEQA Guidelines state that an EIR shall identify an environmentally superior alternative. In addition, if the No Project alternative is identified as environmentally superior, then the EIR also must identify the environmentally superior alternative among the other alternatives.

As this is a restoration project, all alternatives by definition would benefit the biological and physical environment and are designed to enhance the natural resources in the project area. However, the Alternative B (Tidal Marsh Restoration and Restricted Public Use) is considered the environmentally preferred alternative because it would result in the highest quality tidal marsh habitat in the quickest amount of time *and* would result in the least amount of public disturbance to special-status species. Alternative A would have the same results in habitat restoration but would have a slightly higher potential for disturbance to special-status species because this alternative would allow dogs and includes longer segments of trails adjacent to restored marsh habitats and does not include seasonal

closure of sloughs to protect harbor seals. Implementation of this alternative would not result in an unacceptable level of disturbance to special status species populations (See Section 2.2 and Section 3.1.3.3.).

Alternatives C and D would also restore high quality tidal marsh habitat but would not restore as much as Alternatives A and B including reduced available California Clapper Rail habitat. Construction-related impacts for Alternative B would be equivalent to Alternatives A, C and D.

The No Action Alternative is not considered the environmentally preferable alternative because of the continued deterioration of the site and hydrology, recreation, and public health and safety impacts.

SECTION 4. ACRONYMS, ABBREVIATIONS AND DEFINITIONS OF TERMS

ABAG	Association of Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
Breach	An excavation through an earth levee through which tidal exchange is provided to and from the restored island
Borrow ditch	Human-constructed channels adjacent to levees created by the process of “borrowing” material to build the levee. They tend to be straighter and offer less habitat complexity than natural channels.
CDFG	California Department of Fish and Game (Lead Agency for CEQA)
CEQA	California Environmental Quality Act
Cut-off berm	Earth fill that crosses an existing borrow ditch to inhibit flow.
Damping	(tidal damping) a reduction in the tide range at a location due to frictional losses between the location and the boundary tide.
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
Environmentally preferable alternative	The environmentally preferable alternative is the alternative that best promotes the national environmental policy expressed in NEPA. This means the alternative that causes the least damage to the environment and best protects biological and physical resources.
Fetch	(wind fetch) An area of open water over which wind blows to generate waves.
Headcut	An erosion point in a channel that occurs where there is an abrupt drop in the channel bottom elevation in the downstream direction.
MHHW	Mean higher high water, average of the higher of two daily high tides.
MLLW	Mean lower low water, average of the lower of two daily low tides.
MTL	Mean tide level; the existing marshplain elevation.
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act

NGVD	National Geodetic Vertical Datum A fixed vertical datum at the mean sea level of 1929. Used in this study for consistency with previous ground surveys. NGVD has been superceded by NAVD88, which came into common use in the San Francisco Bay Area during the course of this study.
Proposed Action	The proposed action is a term used in this restoration project to identify the recommend alternative of the draft restoration and management plan.
SBSA	South Bayside System Authority (owners of sewer line on Inner Bair Island).
Shoaling	To gradually become shallow.
SHPO	State Historic Preservation Officer
Slough	In general use, a tidal channel. In this project the term may also refer specifically to the major (named) tidal channels between the ponds (<i>e.g.</i> , Steinberger Slough, Smith Slough, Corkscrew Slough, etc.).
Subsidence	The sinking of earth. In this context, the settling of constructed earth fill.
Thalweg	The deepest point or a line joining the deepest points of a stream channel.
Tidal capture	An increase in the amount of tidal prism through a slough or channel due tidal waters preferentially flowing through routes with greater hydraulic efficiency.
Tidal damping	A decrease in tidal range at a location due to frictional losses between the location and the boundary tide.
Tidal muting	Reduction of the tide range caused by undersized inlets or engineered structures that limit the volume of water as the tide waves passes from more open water. The degree of muting is a function of the relative sizes of the inlet and estuary.
Tidal prism	Volume of water that flows into or out of an area during the diurnal tide. In the San Francisco Estuary, the diurnal tide is between MHHW and MLW.
USFWS	United States Fish and Wildlife Service (Lead Agency for NEPA)

SECTION 5. DRAFT EIS/EIR DISTRIBUTION LIST

The Draft EIS/EIR was made available for public review at the following locations:

Don Edwards San Francisco Bay National Wildlife Refuge Headquarters Visitors Center,
Newark, California.

Redwood City Downtown Main Public Library, 1044 Middlefield Road, Redwood City.

San Carlos Public Library, 610 Elm Street, San Carlos, California.

Online at <http://www.southbayrestoration.org/Documents.html>

The Draft EIS/EIR was distributed to the following agencies, organizations, and individuals:

Agencies

Association of Bay Area Governments, San Francisco Bay Trail
California Department of Boating and Waterways
California Department of Conservation
California Department of Fish and Game
California Department of Parks and Recreation
California Department of Toxic Substances Control
California Department of Transportation District 4
California Department of Water Resources
California Resources Agency
California State Coastal Conservancy
California State Clearinghouse
California State Lands Commission
City of San Carlos
City of Redwood City
City of Redwood City Police
County of San Mateo
Native American Heritage Commission
Regional Water Quality Control Board, Region 2
San Carlos Airport
San Francisco Bay Conservation and Development Commission
San Mateo County Mosquito Abatement District
San Mateo Transportation Authority
South Bayside System Authority
State Water Resources Control Board, Division of Water Quality
US Army Corps of Engineers
US Department of Commerce, National Oceanic and Atmospheric Administration
US Department of Transportation Federal Aviation Administration
US Environmental Protection Agency
US Fish and Wildlife Service
US Geological Survey
US National Marine Fisheries Service

Other Organizations

California Native Plant Society
California Waterfowl Association
Citizens to Complete the Refuge
Ducks Unlimited
Friends of Redwood City
Marine Science Institute
National Audubon Society, Sequoia Chapter
Pacific Gas and Electric Company
Peninsula Access for Dogs
Peninsula Conservation Center
Peninsula Open Space Trust
Peninsula Yacht Club
Pete's Harbor
Point Reyes Bird Observatory
Port of Redwood City
San Carlos Airport Pilots' Association
San Francisco Bay Bird Observatory
Save the Bay
Sequoia Yacht Club
San Francisco Bay Wildlife Society
Wildlife Stewards

Other Interested Persons

All individuals on the Bair Island Restoration and Management Project mailing list were notified of the availability of this report.

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Persons Contacted

- Audrey Darnel, City of San Carlos, Planning Department, November 5, 2003.
Clyde Morris, USFWS, Don Edwards San Francisco Bay NWR, January 2004
Tom Passansis, City of Redwood City, Planning Department, October 6, 2003.

SECTION 7. LIST OF PREPARERS AND CONTRIBUTORS

The following individuals were principally responsible for preparing this EIS/EIR and/or technical studies upon which the EIS/EIR is based:

United States Fish and Wildlife Service San Francisco Bay National Wildlife Refuge

Clyde Morris, Manager of Don Edwards San Francisco Bay NWR
MPA, Brigham Young University, Utah
BS, Resource Planning and Interpretation, Humboldt State University, CA
Years Experience: 30+

Marge Kolar, Refuge Complex Manager
San Francisco Bay National Wildlife Refuges
MS, Fisheries and Wildlife, Michigan State University
BS, Physics and Math, University of Detroit
Years of Experience: 30+

Joelle Buffa, Supervisory Wildlife Biologist, San Francisco Bay NWR Complex
BS, Fisheries and Wildlife Biology, Iowa State University, Ames, Iowa
Years of Experience: 26

Joy Albertson, Wildlife Biologist
MA, Conservation Biology, San Francisco State University
BS, Zoology, North Dakota State University
Years of Experience: 14

California Department of Fish and Game, Central Coast Region

Carl Wilcox, Habitat Conservation Manager
MS, Biology, New Mexico Highlands University
BS, Biological Conservation, California State University, Sacramento
Years of Experience: 22

David J Powers & Associates

Michelle Yesney, Vice President, Principal
BA History, Fresno State University
Years Experience: 30+

Nora Monette, Project Manager
MS, Soil Science, University of California, Berkeley
BS, Soil and Water Science, University of California, Davis
Years Experience: 17

Julie Mier, Project Manager
BA, Environmental Studies, University of California, Santa Barbara
Years Experience: 3

Stephanie Grotton, Graphic Artist

Years Experience: 3

H.T. Harvey & Associates

Ronald R. Duke, Principal-in-Charge

MA, Animal Ecology, University of Colorado

BA, Biological Sciences-Ecology, University of California, Berkeley

Years of Experience: 25

John Bourgeois, Project Manager

MS, Biology, University of Louisiana-Lafayette

BS, Ecological, Evolutionary and Organismal Biology, Tulane University

Years of Experience: 9

Eric Webb, Wetland Ecologist

PhD, Oceanography & Coastal Sciences, Louisiana State University

MS, Biology, Morehead State University

BS, Biology, Ohio Dominican University

Years of Experience: 11

Dan Stephens, Senior Restoration Ecologist

BS, Biology, Humboldt State University

Years of Experience: 23

Howard Shellhammer, Senior Mammologist

PhD, Zoology, U.C. Davis

AB, Zoology, U.C. Davis

Years of Experience: 43

Scott Terrill, Senior Ornithologist

PhD, Biology/Ecology, State University of New York, Albany

MS, Zoology, Arizona State University

BS, Zoology, Arizona State University

Years of Experience: 23

Kurt Flaig, Plant Ecologist

MS, Range Ecology, Colorado State University

BS, Natural Resource Management, Colorado State University

Years of Experience: 5

Ginger Bolen, Wildlife Biologist

PhD, Integrative Biology, University of California, Berkeley

BS, Wildlife Science, Purdue University

Years of Experience: 4

Laird Henkel, Wildlife Biologist
MS, Marine Science, Moss Landing Marine Laboratories
BA, University of California, Santa Cruz
Years of Experience: 9

David Thomson, Wetland Ecologist
MS, Biology, Southeastern Louisiana University
BS, Biology, Seattle University
Years of Experience: 3

Philip Williams & Associates

Philip B. Williams, Ph.D., P.E., President, Philip Williams & Associates, Ltd.
Ph.D., Hydraulics (specializing in fluvial sediment hydraulics), University of London, UK
B.Eng., Civil and Structural Engineering, Sheffield University, UK
Years Experience: 27

Michelle K. Orr, P.E., Associate Principal, Philip Williams & Associates, Ltd.
M.S., Water Resources Engineering (Civil), University of California, Berkeley
B.A., History of Science, *magna cum laude*, Harvard University, Cambridge, MA
Years Experience: 10

Donald G. Danmeier, Ph.D., Senior Associate, Philip Williams & Associates, Ltd.
Ph.D., Ocean Engineering, Massachusetts Institute of Technology
M.S., Naval Architecture and Offshore Engineering, University of California at Berkeley
B.S., Mechanical and Environmental Engineering, University of California at Santa Barbara
Years Experience: 4

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**Don Edwards San Francisco Bay
National Wildlife Refuge**
P.O. Box 524
Newark, CA 94560
510/792 0222

Bair Island Ecological Reserve
P.O. Box 47
Yountville, CA 94599
707/944 5500

U.S. Fish & Wildlife Service
1800/344 WILD
<http://refuges.fws.gov/>

California Department of Fish & Game
1416 Ninth Street
Sacramento, CA 95814
916/445 0411
<http://www.dfg.ca.gov/>

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