APPENDIX K

Environmental Assessment/Initial Study and FONSI

C-089099

Prospect Island Fish and Wildlife Habitat Restoration Study, Solano County, California

Final

Environmental Assessment/ Initial Study

July 1999

US Army Corps of Engineers
Sacramento District

Department of Water Resources
State of California

FINDING OF NO SIGNIFICANT IMPACT
Prospect Island Fish and Wildlife Restoration Study

I have reviewed and evaluated information presented in the Environmental Assessment/Initial Study (EA/IS) prepared for the Prospect Island Fish and Wildlife Restoration Study and considered the views of other interested agencies, organizations, and individuals concerning the restoration project.

The U.S. Army Corps of Engineers proposes to plan, design, and construct the restoration of wetlands and fisheries habitat on Prospect Island, located in the northwestern part of the Sacramento-San Joaquin Delta in Solano County. The island is bounded by the Sacramento River Deep Water Ship Channel to the west, the remnants of Little Holland Tract to the north, Miner Slough to the east, and the confluence of the ship channel and Miner Slough to the south. The restoration of wetlands and fisheries habitat on Prospect Island was designed to restore environmental resources that have been degraded by construction and operation of the ship channel and Sacramento River Flood Control Project.

The possible consequences of work described in the EA/IS have been studied with consideration given to environmental, economic, social, and engineering feasibility. In evaluating the effects of the proposed modifications, specific attention has been given to significant environmental conditions that could potentially be affected. The effects and mitigation requirements have been thoroughly coordinated with the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), the Natural Resources Conservation Service, the California Department of Fish and Game, and the State Historic Preservation Officer (SHPO).

Over half of the threatened and endangered plant and animal species in the State of California depend on wetlands. The restoration of wetlands on Prospect Island would benefit many of these species of concern. Fishes that would benefit include Delta smelt, chinook salmon, Central Valley steelhead, and Sacramento splittail. Waterfowl and shorebirds would also benefit from the restoration of agricultural land to an open shallow water habitat. The California Department of Water Resources will be conducting a monitoring program after construction to measure the success of the project. The Corps will obtain permission from FWS and NMFS for the incidental take of listed species during monitoring through the Endangered Species Act section 7 consultation process. These consultations will also address an approach for responding to the contingency that conditions develop within the project that could adversely affect listed species.

Flooded conditions at Prospect Island have prevented an intensive archeological survey from being conducted. Archival research has indicated a low probability for prehistoric use of Prospect Island. Coordination has been initiated with the SHPO to inform them of the condition of the island and of the Corps' intention to conduct a survey when conditions allow it. Section 106 consultation will be completed prior to the onset of construction.

The EA/IS and Finding of No Significant Impact were prepared in accordance with the National Environmental Policy Act. The proposed mitigation measures are sufficient to compensate for any potential effects. Based on my review, and contingent upon completion of the Section 106 consultation process, I have determined that the proposed restoration work would result in no significant effects on the human environment; therefore, an Environmental Impact Statement will not be prepared.

16 JULY 99
Date

Brandon C. Muncy
Major, Corps of Engineers
Acting District Engineer

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

PROPOSED
NEGATIVE DECLARATION
Prospect Island Wildlife Habitat Restoration Project

Project Description: California Department of Water Resources (Lead State Agency) and the Army Corps of Engineers (Lead Federal Agency) propose to plan, design, and construct the restoration of wetlands on Prospect Island located in the northwestern part of the Sacramento-San Joaquin Delta in Solano County. The island is bounded by the Sacramento River Deep Water Ship Channel to the west, the remnants of Little Holland Tract to the north, and Miner Slough to the east, and the confluence of the ship channel and Miner Slough to the south. The restoration of wetlands on Prospect Island is designed to restore environmental resources that have been degraded by construction and operation of the ship channel and Sacramento Flood Control Project.

The Finding: This project will not have a significant negative impact on the environment.

Basis for Finding: Based on the joint Environmental Assessment and Initial Study (EA/IS) (Appendix C of the Project Modification Report), no significant impact will occur as a result of this project. The possible consequences of work described in the EA/IS have been studied with consideration given to environmental, economic, social, and engineering feasibility.

Over half of the threatened and endangered plant and animal species in the State of California depend on wetlands. The restoration of wetlands on Prospect Island would benefit many of these species of concern. Fisheries that may benefit include delta smelt, chinook salmon, and Sacramento splittail. Waterfowl, shorebirds, songbirds, and furbearers would also benefit from the restoration of agricultural land to an open shallow water habitat.

Therefore, this proposed Negative Declaration is filed pursuant to Section 15070 et seq. of the Guidelines for Implementation of the California Environmental Quality Act.

The public review period for this proposed Negative Declaration and joint Environmental Assessment and Initial Study (Appendix C of the Project Modification Report) will end November 30, 1997. All comments or questions should be directed to DWR Collette Zemitis , 3251 'S' Street, Sacramento, CA 95816-7017 (916/227-7620 and fax 916/227-7554). Copies of the joint EA/IS and any referenced documents are available at the above address.

Randall L. Brown, Chief
Environmental Services Office

Date 10/30/97

C—089102

STATE OF CALIFORNIA PETE WILSON, *Governor*

Governor's Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

December 2, 1997

COLLETTE ZEMITIS
DEPT. OF WATER RESOURCES
3251 "S" STREET
SACRAMENTO, CA 95816

Subject: PROSPECT ISLAND WILDLIFE HABITAT RESTORATION PROJECT SCH #: 97102109

Dear COLLETTE ZEMITIS:

The State Clearinghouse submitted the above named environmental document to selected state agencies for review. The review period is closed and none of the state agencies have comments. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call Kristen Derscheid at (916) 445-0613 if you have any questions regarding the environmental review process. When contacting the Clearinghouse in this matter, please use the eight-digit State Clearinghouse number so that we may respond promptly.

Sincerely,

Antero A. Rivasplata

ANTERO A. RIVASPLATA
Chief, State Clearinghouse

C—089103

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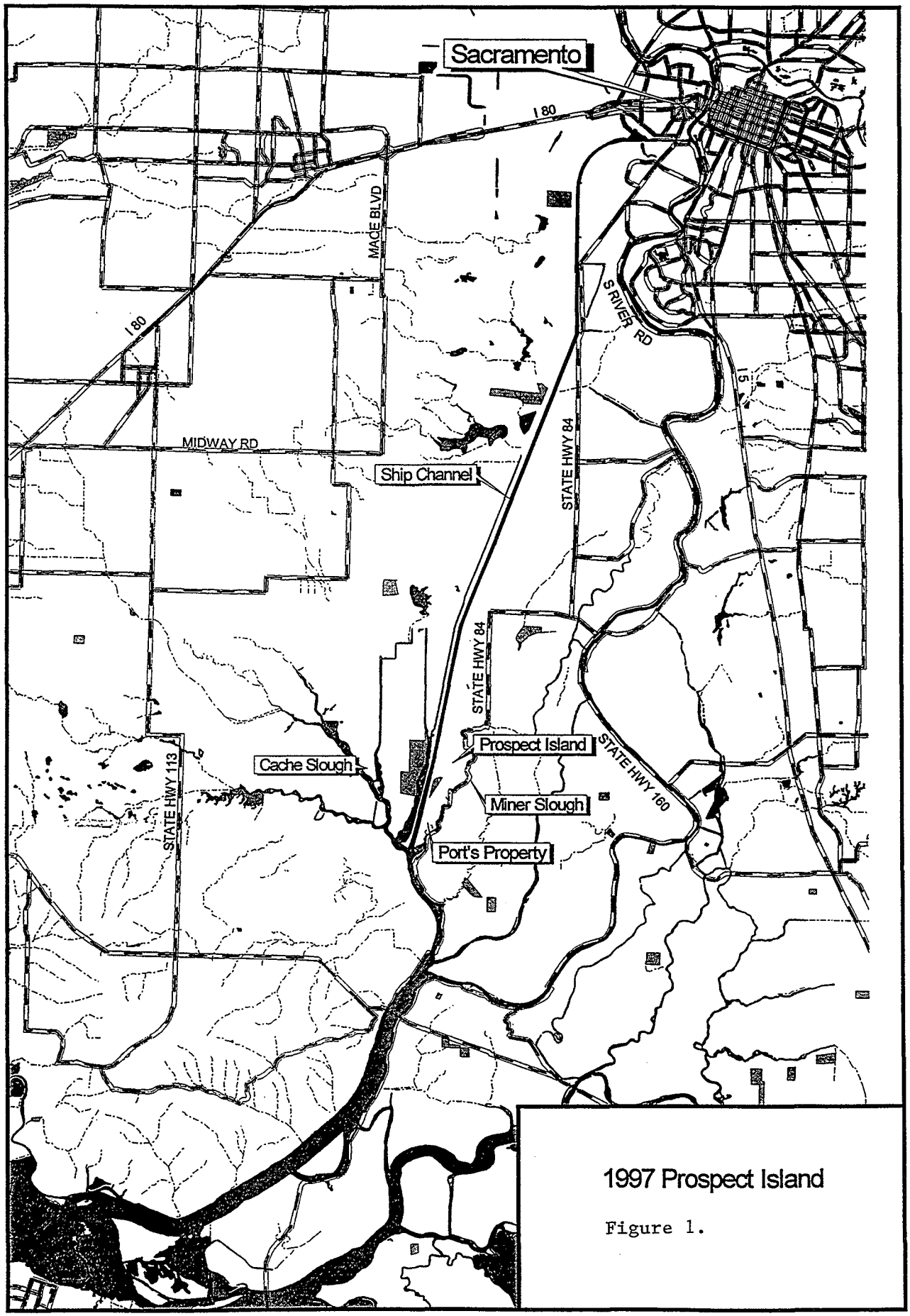
1.0 INTRODUCTION

1.1 Proposed Action. The U.S. Army Corps of Engineers (Corps) proposes to plan, design, and construct the restoration of wetlands and fisheries on Prospect Island located in the northwestern part of the Sacramento-San Joaquin Delta in Solano County. The island is bounded by the Sacramento River Deep Water Ship Channel (ship channel) to the west, the remnants of Little Holland Tract to the north, Miner Slough to the east, and the confluence of the ship channel and Miner Slough to the south (Figure 1). The restoration of wetlands and fisheries on Prospect Island was designed to restore environmental resources that have been degraded by construction and operation of the ship channel and Sacramento River Flood Control Project (flood control project).

1.2 Purpose and Need. The flood control project was implemented to reduce flood damages throughout the Sacramento River basin and to provide efficient conveyance of floodflows and sediment carried from upstream areas. Although the project reduces the potential for flood damage, its construction and operation have contributed to the degradation of environmental resources along the Sacramento River. The ship channel was constructed to provide navigation to the Port of Sacramento (Port). Both the construction and operation of the ship channel have contributed to the environmental degradation of some riverine and wetland species.

Over half of the threatened and endangered plant and animal species in the State of California depend on wetlands. Prospect Island wetlands restoration would provide habitat that may be beneficial for some of these species of concern. Fish species that may benefit include Delta smelt, chinook salmon, Central Valley steelhead, and Sacramento splittail. Waterfowl, shorebirds, songbirds, and furbearers would also benefit from the restoration of agricultural land to an open shallow water habitat.

The purpose of the Environmental Assessment/Initial Study (EA/IS) is to evaluate the effects on the environment that would result from implementation of wetlands and fish habitat restoration on Prospect Island. This EA/IS complies with the requirements of the National Environmental Policy Act and the California Environmental Quality Act.



1997 Prospect Island

Figure 1.

C—089108

C-089108

1.3 Location and Site Description. Prospect Island is located in Solano County in the northern portion of the Sacramento-San Joaquin Delta. The project area includes (a) a 1,316-acre parcel of Prospect Island, (b) surrounding levees owned by the Port, and overwater shade cover provided by trees growing on the outer side of the levees. The area is bounded to the east by Miner Slough, the west by the ship channel, the south by a levee at about ship channel mile 20, and the north by an east-west levee from Arrowhead Marina to the ship channel. With the exception of limited areas near the levees, the topography of the island is generally flat, varying from 2 feet mean sea level (msl) at the northern end to -5 feet msl at the southern end of the site. Mean water level (mwl) in nearby Shag Slough is about 2 feet above msl, which, if applied to Miner Slough, would place most of Prospect Island at -2 to -5 feet mwl (DWR, 1993).

This EA/IS assumes that Prospect Island would be constructed under dry conditions. Flooding on Prospect Island has occurred seven times in the last 17 years. Following each of these flood events, the levees were repaired, and the island was pumped dry and prepared for agriculture. The levees most recently breached along Miner Slough during January 1997. The cross levee separating the Port's property from the Bureau of Reclamation's (Reclamation) property also breached. The construction of the proposed action is based on Prospect Island being dry and the levees intact. Therefore, the Corps repaired the Miner Slough breach in November 1998, and repair of the cross levee was completed in January 1999.

1.4 Authorization. This EA/IS was authorized by Section 1135 of the Water Resources Development Act (WRDA) of 1986 (33 U.S.C. 2294) and Section 344(a)(3) of WRDA 1992. The acquisition of 1,228 acres of Prospect Island by Reclamation was authorized by House Resolution 2445, the 1994 Energy and Water Development Appropriations Act. The source of the funds, the Central Valley Project Restoration fund, was authorized in the Central Valley Project Improvement Act, Title 34 of Public Law 102-575. The fund was established to provide for habitat restoration, improvement and acquisition, and other fish and wildlife restoration activities in the Central Valley Project area of California. The Energy and Water Development Appropriations Act of 1995 appropriated funding for the acquisition of additional acreage for Prospect Island.

1.5 Scope of Analysis. This EA/IS provides (1) baseline data on existing and without-project environmental conditions within the designated study area, (2) an evaluation of potential effects on the environment that would result from implementation of proposed restoration alternatives, and (3) identification of mitigation measures to avoid, minimize, or offset adverse effects to the environment that would result from implementation of the alternatives. Additional details and discussion are provided in the Corps' 1995 Reconnaissance Report and 1999 Ecosystem Restoration Report (previously titled the Project Modification Report), which are incorporated by reference into this EA/IS.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Six alternative plans including the no-action plan were formulated. The five alternatives involve the creation of interior islands constructed under dry conditions. Although similar in concept, the alternatives differ in complexity, expense, and level of

development. Islands have been designed to provide wildlife habitat and reduce fetch lengths and associated wind-generated waves. In addition, the alternatives incorporate methods to stabilize interior levees through the use of biotechnical plantings. In each alternative, levees are breached to allow full tidal action to return to Prospect Island. The levee breaches have all been designed to allow a 1- or 2-day replacement of water at the site. The construction period would be followed by a 3-year establishment period during which the construction contractor would monitor the site and replace plant material, as necessary. After construction, the non-Federal sponsor would monitor, at their own expense as a separate but related effort, fisheries, wildlife, vegetation, water quality, zooplankton, phytoplankton, benthos, bathymetry, and disinfection precursors. Using a $1.25 million endowment fund issued to the Department of Water Resources (DWR) by Category III, the U.S. Fish and Wildlife Service (FWS) would accept responsibility for the operation and maintenance (O&M) of Prospect Island after the 3-year establishment period.

2.1 Alternatives Not Selected for Further Analysis

These alternative designs ranged from simple to complex in design and were not selected for further study because of structural and cost reasons. Additional details are provided in the ERR.

2.1.1 Alternative 1. Major features of this plan include:

Breaching

- Breach ship channel levee in two places, and stabilize the breaches with rock revetment.

Levees

- Create a 5H:1V (or as appropriate) slope from elevation 0 to 5.5 feet msl on Miner Slough and both cross levees.
- Use biotechnical plantings on all levees.

Islands

- Site two islands to decrease longitudinal fetch. Islands should be 6 feet high to decrease fetch lengths.
- Develop two islands near the breaches to dissipate wave energy generated by ships passing through the ship channel. Protect the portion of these islands that faces the ship channel from wave-generated erosion.
- All fill material is available on Reclamation's property.

2.1.2 Alternative 2. This alternative is similar to alternative 1, but islands are designed to further decrease fetch and increase habitat. Alternative 2 also consists of a highly diversified channel-island complex.

Breaching

- Breach Miner Slough and ship channel levees. Stabilize breaches with rock revetment.

Levees

- Create a 10H:1V slope with 20-foot berm from elevation 0 to 5.5 feet msl on the Miner Slough and both cross levees.
- Use biotechnical techniques on all levees.

- Improve the Miner Slough levee road so that access is maintained for other landowners on the island.
- Construct a bridge across the breach on the Miner Slough levee to allow passage of private automobiles and trucks.
- Plant the waterside of Miner Slough and the ship channel with shaded riverine aquatic (SRA) cover.

Islands

- Vary the slope of islands to create more diverse habitat. The margins of the islands should have a 10H:1V or greater slope for 40 percent of the lineal length of islands, 5H:1V for 25 percent, 2H:1V for 20 percent, and 1H:1V for 15 percent.
- Plant all areas that are higher than 3.0 feet msl with riparian and upland vegetation.
- Develop an island near the ship channel breach to dissipate wave energy generated by ships passing through the ship channel.
- Make depressions within the islands to trap water at low tide, creating tule marsh habitat.
- Protect the portion of the islands near the breaches along the ship channel levee from wave-generated erosion.
- Plant Miner Slough and the ship channel levees with SRA.
- Construct shorebird loafing islands ranging from 6 to 120 feet wide by a few to several hundred feet long. The islands would vary from a maximum elevation of 3 feet msl to 5 feet msl. The islands would be covered by no more than 20 percent vegetation. Site these islands perpendicular to the prevailing winds. Plant the windward side with tules.
- Design this alternative to maintain its high habitat values and diversity. Design channels and islands to function at hydrologic equilibrium.
- Sources of fill material would be Reclamation's property, Port's property, and off-site materials.

2.1.3 Alternative 3. Alternative 3 was developed in response to the preliminary analysis of alternatives 1 and 2. Alternative 1 cost more to construct and provided less habitat than alternative 3, and alternative 2 was too costly. Furthermore, it is difficult to accurately determine how sedimentation and channel formation would affect highly developed restored wetlands. Therefore, alternative 3 was developed to be a simple tidal freshwater habitat that would facilitate natural sedimentation and natural channel formation. The habitat components of alternative 2 were too highly developed to be sustainable as designed. Furthermore, there was no non-Federal sponsor willing to support these expensive alternatives. The habitat components of alternative 1 were not as highly developed and not as costly; however, its simplicity lacked habitat value. Alternative 1 was reformulated to be less expensive but provide higher habitat value. The result was alternative 3, which has long narrow islands to further decrease fetch and maximize the water/land interface, and a central channel and two side channels.

Breaching

- Breach Miner Slough levee upstream and ship channel levee downstream. Size the breaches so that they do not require rock revetment.

Levees

- Construct levees with a 10H:1V slope and a 30-foot berm.

- Construct islands and levees with a highly sinuous interface with open water, and include embayments to provide more diverse habitat.
- Construct a bridge across the breach on the Miner Slough levee to allow passage of private automobiles and trucks.

Islands

- Use biotechnical plantings on all islands.

Channels

- Excavate a 5-foot-deep by 60- to 100-foot-wide central channel and a 5-foot-deep by 60-foot-wide dead end slough.
- All fill material is available on Reclamation's property and Port's property.

2.1.4 Alternative 4. A simpler alternative was desired by the non-Federal sponsor, resulting in alternatives 4 and 5. These alternatives would be very similar to alternative 3. Under alternative 4, the Miner Slough levee would be breached upstream, and the ship channel levee would be breached downstream. Both breaches would be 300 feet wide. Some levee sections along the ship channel are already at a gradual slope and would require no additional protection. All other existing levees would be stabilized with embankments of a 10H:1V slope with a 10- to 40-foot-wide berm. Most islands would be contoured with a 5H:1V slope and a 10-foot-wide bench. Islands in the deeper water area would have a 40-foot-wide bench. A peninsula (rather than an island) was designed so that differential wildlife use of islands and peninsulas could be monitored in the future. Cut and fill would be balanced on site between islands, levee embankments, and the excavated channel. Alternative 4 would also require a bridge. The primary differences between alternatives 3 and 4 are that less material would be moved and that not all surfaces exposed to water would be protected with biotechnical plantings. Project construction would take place over 2 years to allow soils to consolidate and to minimize any potential for landside slope slumps at or near the Prospect Island levees.

2.2 No Action. Under the no-action alternative, there would be no Federal participation in environmental restoration in the study area. Other activities such as O&M would continue. The assumptions for the without-project condition also apply to the no-action alternative. Reclamation and the Port would fix the levee breaches on Prospect Island. The 1,228-acre area would continue to be in Reclamation's ownership. Reclamation would likely lease the land to farmers for agricultural land use. Periodically, levees may breach. Uncontrolled breaches could result in erosion of levees on Reclamation's property and on other Prospect Island properties until the breaches are repaired. Agricultural activities would also be halted until the levees could be repaired and the island pumped dry. Depending on the breach location, access to private properties on Prospect Island would be temporarily interrupted until the breaches could be fixed.

Additional vegetation removal would continue in the no-action alternative as part of normal O&M activities. Riparian and upland habitat would likely be removed, and this limited vegetation clearing could prevent significant increases in riparian vegetation in the system. Normal O&M might remove mature riparian habitat. Mature trees may be replaced with rock revetment, rendering the growth of replacement habitat difficult for many years.

2.3 Alternative 5. Alternative 5 is very similar to alternative 4 except that the breach on Miner Slough is located on the southern portion of the study area, south of the 9-acre, privately owned property (Figure 2). In addition, this alternative does not require a bridge. A 3-year establishment period would follow construction of alternative 5. During the establishment period, the planting contractor would be required to monitor the survival of planted vegetation and replace dead plant material so that the plant survival rate at the end of the establishment period is 70 percent.

Breaching

- Breach the Miner Slough and ship channel levees. Stabilize breaches with rock revetment.

Levees

- Create a 10H:1V slope from elevation 0 to 5.5 feet msl with 10-foot berm at 4.0 feet msl or a 5H:1V slope from elevation 0 to 5.5 with a 40-foot berm at 4.0 feet msl on parts of the ship channel levee and the Miner Slough and both cross levees. The additional levee embankment would provide additional habitat area for SRA habitat.
- Use plantings to protect levees from erosion.
- Use plantings on the berm along Miner Slough to provide additional wind direction to Ryer Island.
- Improve the Miner Slough levee road so that access is maintained for other landowners on the island.

Islands

- Create a 5H:1V slope with either a 40-foot-wide or 20-foot-wide bench at 3 feet msl on all islands. The island crown would be at 7.0 feet msl. The interior islands would provide additional habitat area for SRA.
- Hydroseed all areas that are higher than 3.0 feet msl.
- Use biotechnical plantings on all islands.
- Develop one island near the ship channel breach to dissipate wave energy generated by ships passing through the ship channel.
- Protect the portion of the islands near the breaches along the ship channel levee from wave-generated erosion.
- All fill material is available on Reclamation's property.

Channels

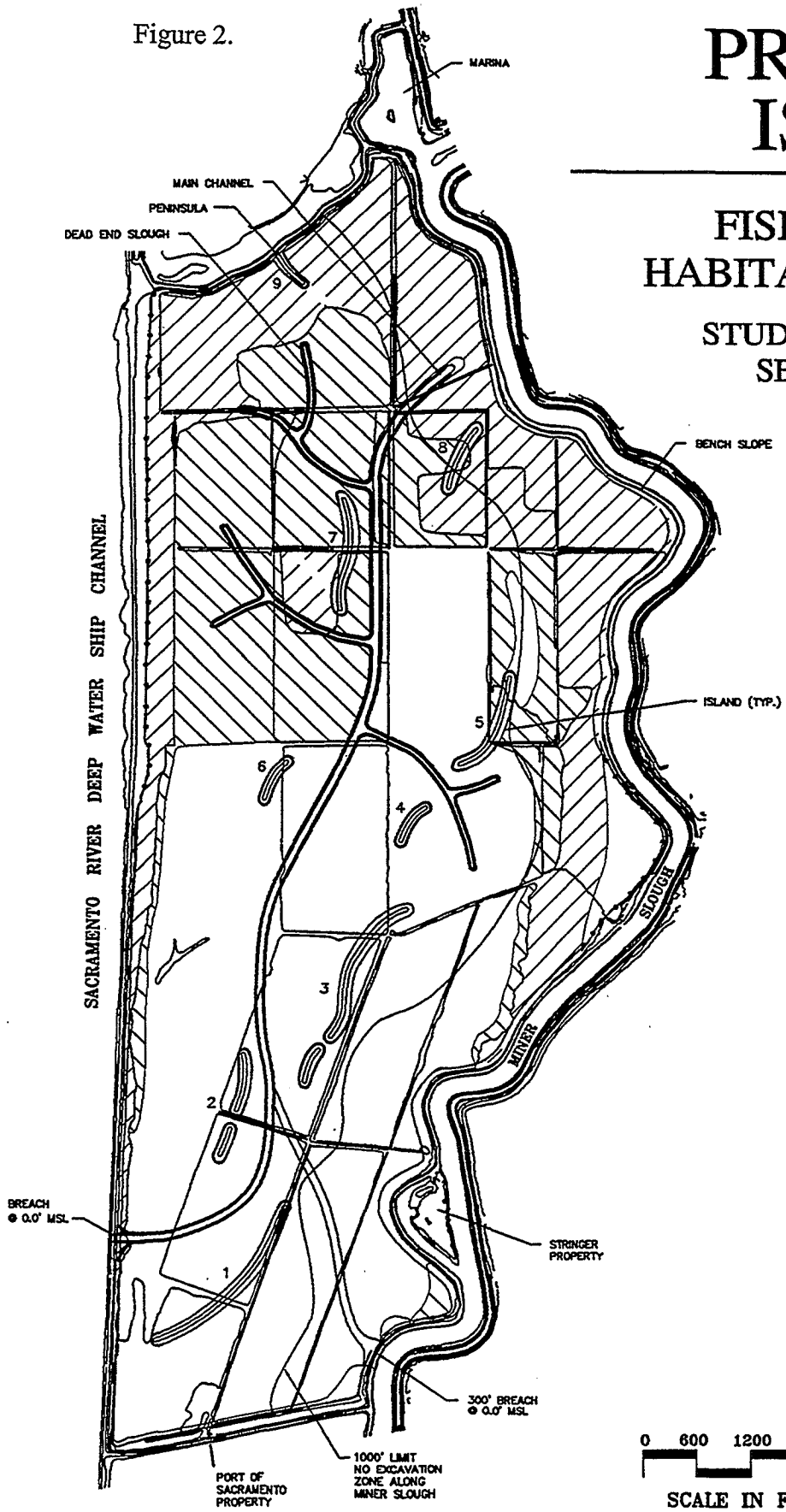
- Excavate a 5-foot-deep by 60- to 100-foot-wide central channel and a 5-foot-deep by 60-foot-wide dead end slough.
- Design this alternative to allow for dynamic processes of a freshwater tidal marsh system.

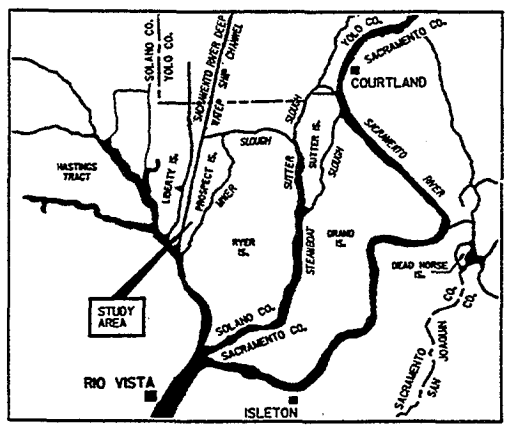
Figure 2.

PROSPECT ISLAND

FISH & WILDLIFE HABITAT RESTORATION

STUDY ALTERNATIVE 5 SELECTED PLAN





VICINITY MAP
SACRAMENTO–SAN JOAQUIN DELTA, PROSPECT ISLAND, CA

KEY: ISLAND CONFIGURATIONS		
ISLAND NO.	CONFIGURATION *	ISLAND LENGTH *
1	BARRIER ISLAND (40' BENCH/ 60' ISLAND/ 20' BENCH)	2,100
2	STANDARD ISLAND (40' BENCH/ 20' ISLAND/ 20' BENCH)	931
3	STANDARD ISLAND	1,801
4	BARRIER ISLAND	517
5	BARRIER ISLAND	928
6	STANDARD ISLAND	511
7	STANDARD ISLAND	1,024
8	BARRIER ISLAND	622
9	STANDARD ISLAND	456

* ESTIMATED CONFIGURATIONS AND LINEAR FEET

LEGEND		
HABITAT TYPES	SYMBOL	ACRES
OPEN WATER (>-1.0' MSL)		564.5
MUDFLAT (@ 0.0' MSL)	(NOT SHOWN)	4.0
TULE/EMERGENT (0.0' MSL TO 3.0' MSL)		333.8
POTENTIAL TULE/EMERGENT (-0.5' MSL TO 0.0' MSL)		230.0
SRA/RIPARIAN/UPLAND (>3.0' MSL)		153.7
TOTAL ACREAGE:		1316.0

0 600 1200 2400

SCALE IN FEET

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3.0 ENVIRONMENTAL SETTING

This section describes the resources in the project area that would not be adversely affected by the project. These resources are presented here to add to the overall understanding of the project area.

3.1 Climate. The project area is situated in the eastern portion of the Delta where there is a transitional climate zone between the coastal and inland extremes. The prevailing winds are from the south primarily because of marine breezes through the Carquinez Strait, although the sea breezes diminish, and winds from the north occur more frequently during the winter. During the summer, the predominant winds come from a south-southwest direction. Clear skies predominate throughout much of the year, but storms and tule (ground) fog frequently occur during the winter months.

Most of the precipitation in the area derives from air masses moving in from the Pacific Ocean during the winter months. These storms usually move through the area from the west or northwest. Variations in the climate can occur seasonally and from year to year, affecting freshwater flow patterns, fish and wildlife habitat, and Delta hydrology (Corps, 1993). Within the Delta, precipitation can vary greatly, with the wettest areas receiving about 60 inches of rain and the driest areas receiving 10 inches.

3.2 Geology/Geography. The Delta is located along the western edge of California's Central Valley. This valley was formed in the basin of a large sea between 175 and 25 million years ago. During this period, the area presently occupied by the Sierra Nevada was the continental margin. A second island mountain island chain lay to the west of this margin. As these mountains rapidly uplifted, huge volumes of sediment filled the basin. Mountain building and sedimentation continued to the Miocene (26 to 5 million years ago). Regional subsidence and deposition in a marine environment ended about 40,000 years ago during the late Eocene. From the late Eocene to the Pleistocene, continental alluvial deposits accumulated in the basin. During the Quaternary period, phases of glaciation caused sea levels to fluctuate, as well as alternating cycles of deposition and erosion.

The Delta began to take on its present form during the end of the last glacial period, about 11,000 years ago as the sea began to rise, filling the alluvial valley of the Sacramento River. Rivers and streams draining into the area formed a complex network of channels, islands and sloughs. Alluvial materials accumulated along the banks of channels forming natural levees around islands. Spring rains and high tides caused floods which easily overtopped these natural levees forming a network of large, shallow lakes. Highly productive soils formed behind these levees as detritus from marsh areas accumulated and as nutrient-rich detritus were deposited by floodwaters. During the period in which hydraulic mining debris was deposited in channels, increased flooding occurred, and the natural levees increased in height.

Today, soils in the Delta range from a variety of alluvial fan deposits to organic peats. Organic soils are associated with freshwater marshes and river channels. Mixed

mineral and organic soils and accumulated mineral sediments are found in elevated and drained areas.

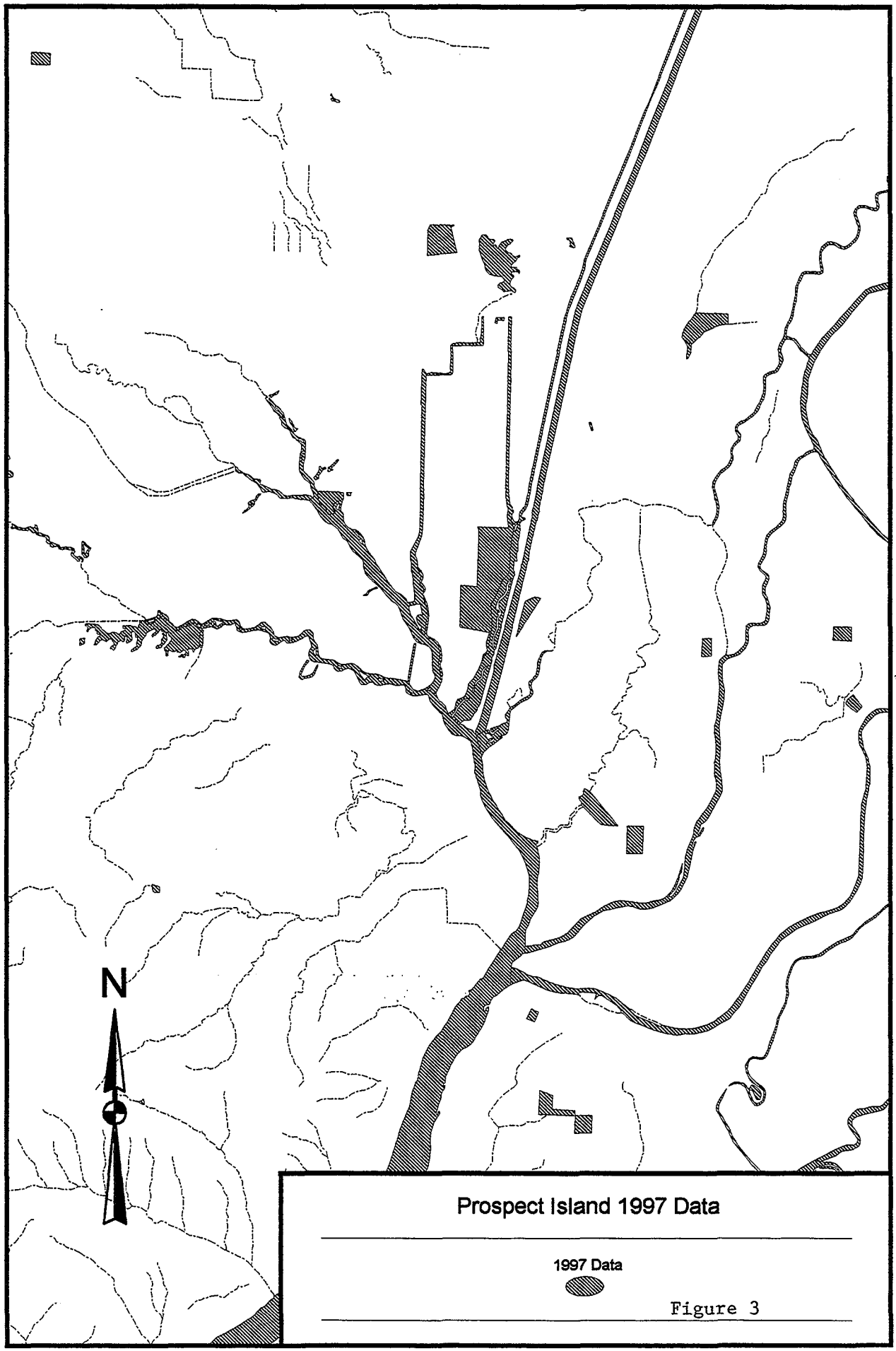
The geography of the study area has changed dramatically over 100 years. Many of the waterways changed over time because of natural channel meandering, channel-straightening activities, and land reclamation. Mapping conducted in 1997 illustrates the current alignment of waterways in the vicinity (Figure 3).

3.3 Water Supply. Availability of water supplies at the Delta varies with natural conditions and upstream development. Natural hydrologic variations cause extreme fluctuations in monthly and yearly inflows. Winter floods produce Delta flow rates of several hundred thousand cubic feet per second (cfs), while summer conditions can decrease rates to a few thousand cfs. The total annual volume of inflow can also vary substantially.

The North Bay Aqueduct delivers water to Solano County and Napa County. Water contractors who receive this water are concerned about the potential effect on the Barker Slough pumping plant (which serves the North Bay Aqueduct) from an increase in the Delta smelt population. Currently, DWR is required to discontinue or reduce pumping whenever concentrations of smelt larvae exceed a certain threshold. The DWR, Solano County Water Agency, FWS, Reclamation, and Corps met to discuss the water contractors' concerns. As a result, the FWS's field supervisor for Sacramento sent the following memo to Reclamation (attachment B). This memo reduced the water contractors' concerns. Pumping may not be affected by the project.

> Increased delta smelt larval may occur as a result of increases in shallow-water habitat associated with Prospect Island. These increases may cause additional restrictions on pumping at the Barker Slough diversion with the requirements in March 6, 1995, biological opinion. It is the Service's intent that increased larval production associated with Prospect Island not cause additional pumping restrictions when risk to the overall population of delta smelt is low. In the 1994 draft Recovery Plan, wide distribution and high numbers of rearing juveniles have been shown to lower risk to delta smelt. If these conditions exist, no additional Barker Slough pumping restrictions will occur due to increased larval production from Prospect Island.

Farmers on Ryer Island expressed a similar concern that additional restrictions may be placed on their diversions for irrigation. The Corps contacted the Endangered Species Office of the Service about the Delta smelt. The Service informed the Corps that no new additional restrictions would be placed on Ryer Island as a result of Prospect Island restoration (Thabault, 1998).



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3.4 Flood Control. Levees line the perimeter of Prospect Island to protect the property from flooding. However, Prospect Island levees are tidal levees that are maintained at a lower elevation than neighboring levees specifically to allow floodflows onto Prospect Island. The levee on the east side of Miner Slough along Ryer Island, across from Prospect Island, is part of the flood control project. Prospect Island flooded in 1980, 1982, 1983, 1986, and 1997. The ship channel levee is maintained by the Corps. The other levees have been maintained by Reclamation District 1667 and will now be maintained by Reclamation (Corps, 1995).

Maintenance of the ship channel levee on Prospect Island is an ongoing problem. These levees are subject to damage by floodflows, wind and tidal action, and vessel wave wash. Also, the subsidence of peat soils on most Delta islands is causing levees and their foundations to subside. This subsidence promotes uneven settling and further weakening of the levees. Moreover, the Delta soils have a high to very high shrink/swell potential and low strength for supporting the load of embankments, dikes, and levees. The soil volume is decreased substantially under the load of material.

3.5 Water Elevations and Tidal Action. Historically, natural Delta islands may have been influenced less by tidal action as the riparian perimeter thickened, restricting outlet channels. Such natural islands probably did not support large expanses of open water (deeper than -3 feet mwl) in the interior, and probably had limited tidal action in much of the tule regions.

Water elevations in the ship channel and Miner Slough are influenced by the daily tide and periodic flooding events. Tidal information was estimated considering 19 years of record at the Rio Vista tidal gage in the Delta and using those values (adjusted for location) for the Prospect Island site. These stage values represent the 1929 National Geodetic Vertical Datum. The tidal elevation data for the southern tip of Prospect Island are as follows:

	Tidal Elevations, msl (feet)
Mean high-high	4.1
Mean high	3.5
Mean	2.0
Mean low	0.2
Mean low-low	-0.3

3.6 Population/Socioeconomic Conditions. The project is in Solano County. The total population for Solano County as of January 1996 was 373,100. According to the State Department of Finance, Solano County's population will reach 520,900 by the year 2020, a growth rate of 28 percent. Solano County has one city within the project area, Rio Vista. In 1993, the population of Rio Vista was 3,690. Sacramento, Rio Vista, and Clarksburg are the closest populated areas to Prospect Island. The main sources of employment in the project area are provided by agriculture and by service jobs related to summer recreation. Also, the Port makes a significant economic contribution to the greater Sacramento area.

There are no permanent inhabitants on Prospect Island, but there is a marina located northeast of the island at Five Points. In addition, two landowners have legal access to their property along Prospect Island levees.

The restoration project and flooding of Prospect island would require relocating power to the 9-acre private property. The environmental effects of relocating the power lines over or underneath Miner Slough could include disturbance of riparian vegetation, and temporary increases in water turbidity and noise due to construction. The environmental effect of supplying the landowner with a generator could include minor noise and air quality effects. An alternative to relocating the power would be for the non-Federal sponsor to purchase the property (Chapter 7, ERR). There would be no adverse environmental effects associated with purchasing the 9-acre property. In addition, there would be no economic effects since the landowner does not farm the property and only uses the property as on an occasional residence.

3.7 Esthetics. An area's visual character is determined by the variety of the visual features present, the quality of those features, and the scope and scale of the scene. The visual components of a particular area consist of such features as landforms, vegetation, manmade structures, and land use patterns. The quality of these features depends on the relationship between them and their scale in the overall scene.

Visual analysis involves a degree of subjective evaluation based on the perception of the observer. Variety in a particular landscape and the relative value of the feature components will differ according to the perceptions of the individual observer. For example, areas with the greatest variety of features (steep slopes, large sharp exposed ridges, varied vegetation, and a large variety of water forms) are commonly considered to have the highest relative value among observers.

Existing esthetic conditions surrounding Prospect Island include agricultural land surrounded by levees and restored Delta wetlands at Cache Slough and Little Holland Tract. The visual effects of the alternative are considered to be beneficial to the surrounding area because the island would be restored from agriculture to its historic use of fish and wildlife habitat.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environmental resources that would be affected by the restoration project. This section analyzes the effects on these resources due to converting agricultural land to a wetland habitat. Although Prospect Island is currently flooded, the island will be pumped dry prior to construction. Therefore, the baseline condition for this EA/IS and FWS's Coordination Act Report (CAR) (1997) is dry conditions with agriculture (Attachment A).

4.1 Land Use

4.1.1 Baseline Conditions. Active farming operations took place until 1995. The project site flooded in March 1995 due to breaks in the south Miner Slough levee and

the cross levee separating the Port's property. The breaches in the cross levee and Reclamation's Miner Slough levee were repaired, and Reclamation's property was pumped dry in July 1996. In January 1997, the island flooded when the levees breached again. Repair of the Miner Slough levee breach was completed in November 1998, and repair of the cross levee was completed in January 1999.

Prior to Reclamation acquiring Prospect Island, land use was predominantly maintained for the production of agriculture crops. In 1994, about 450 acres each of corn and wheat and about 250 acres of safflower were planted. About the same proportions of these crops were rotated annually, but may have included about 100 acres of sugar beets in some years. A minor portion of the land was used for machinery paths and irrigation ditches. The irrigation ditches were generally free of vegetation although a few, very small, scattered patches of young willow scrub-shrub and emergent marsh survived. An unscreened diversion withdrew about several thousand acre-feet of water to support the crops (Corps, 1995).

4.1.2 Effects. The National Resources Conservation Service (NRCS) was consulted in accordance with the Farmland Protection Policy Act of 1981, as amended in 1994. A Farmland Conversion Impact Rating form was completed (see attachment D). For the California Environmental Quality Act and per the request of the State Department of Food and Agriculture, a State Land Evaluation and Site Assessment (LESA) was performed (see attachment D).

No Action. Reclamation would likely renew the leases for agriculture in the absence of a restoration project.

Alternative Plan. Prospect Island would be converted from agricultural use to other higher value wildlife habitats. The proposed action would develop the entire project site. A total of 1,316 acres of "prime" and "unique farmland" would be converted. No "land of statewide importance" would be affected. The relative value of the site as farmland provided by the NRCS is 64 on a scale of zero to 100. Using the site assessment criteria set forth in the Farmland Protection Policy Act of 1981, as amended in 1994, the site receives 115 out of 160 possible points (this is a reevaluation based on comments received on the draft EA). Although the combined total rating of 179 for Prospect Island is over 160, the threshold above which the U.S. Department of Agriculture recommends sites be given increasingly higher levels of consideration for protection, the Farmland Conversion Impact Rating is only meant to be advisory. The 1981 act, as amended in 1994, asks Federal agencies to consider and avoid, if possible, effects to farmland, but the act does not require mitigation for effects to farmland. Such effects were considered in the development of the project design. Alternative sites and designs were considered in the reconnaissance report; however, these alternative sites and designs did not meet project objectives and were not considered further. For Prospect Island, the purpose of the acquisition was to "restore wetlands and fisheries" as described in the House Reports accompanying the Energy and Water Development Appropriations Acts of 1994 and 1995. Because the island was specifically purchased for restoration, the types of alternatives considered were affected. As a result, it may not be appropriate to consider the types of alternatives listed in the regulations governing the Federal Farmland Protection Policy Act.

Furthermore, other considerations are not taken into account in the Farmland Impact Rating. For instance, Prospect Island has flooded at least seven times since 1979. Repair of levee breaches and pumping the island dry cost hundreds of thousands of dollars, in addition to the repair of ditches, culverts, and other farming structures. Periodic flooding and subsequent repairs limit the profitability of farming on Prospect Island and reduce the island's use as significant agriculture land. Based on these considerations, there would be no significant adverse effect to farmland resulting from implementation of the proposed action.

A LESA evaluation (optional under CEQA) was performed by DWR. The final LESA score indicated significant agricultural impact; however, DWR noted several reasons why the LESA does not apply to this land conversion decision. As described in the previous paragraph, Prospect Island has a historic and current propensity to flood, limiting the value of the land for agriculture. Also, the project would convert existing agricultural land to a less intensive use that will be compatible with agriculture. The LESA appears to be developed for primarily restricting the conversion of agricultural land to urban development. The managed wetland will prevent urban development of Prospect Island. In a letter to the State Department of Food and Agriculture, DWR stated its assessment that the project will not have a significant impact to agriculture (see attachment D).

4.1.3 Mitigation. According to the NRCS, no mitigation is requested. The land would change from agriculture to wildlife habitat, and it would not be taken out of Federal ownership.

4.2 Vegetation and Wildlife.

4.2.1 Baseline Conditions. For most of the year, the area is normally intensively cultivated, providing relatively low values to wildlife and no aquatic values. When farmed with row crops, a variable portion at the southern end of the site is seasonally flooded in the winter, providing habitat to migratory waterfowl and other birds.

Fallow agricultural lands provide foraging areas for several raptors including white-tailed kite, red-tailed hawk, Swainson's hawk, northern harrier, American kestrel, and great horned owl. Songbirds including western bluebird, savannah sparrow, water pipit, western kingbird, western meadowlark, mourning dove, Brewer's blackbird, killdeer, ring-necked pheasant, and several species of swallow use the area and are found throughout the Delta.

The levees along the ship channel and Miner Slough are riprapped. The large rock riprap applied to the ship channel supports no vegetation. However, a bench of up to 40 feet wide is present outside the levee toe on the northern two-thirds of the ship channel. Stands of mature cottonwoods and willows are growing on the benches. Smaller trees, primarily willows up to 15 feet high and shrubs such as blackberry, grow through the riprap along the outer slope of the Miner Slough levee. About two-thirds of the perimeter of the site is covered with early successional and mature riparian or riparian shrub-scrub vegetation. The levees on site provide foraging for California quail, mourning dove, common crow, yellow-billed magpie, and ring-necked pheasant. Waterfowl such as

migratory Canada goose, mallard, wood duck, and common merganser use the ship channel and the slough.

The small area of riparian forest and shrub-scrub vegetation located along the ship channel and Miner Slough provides minimal habitat and cover for mammals such as raccoon, opossum, and various species of bats. Because river otter, muskrat, and beaver are common in the Sacramento River, it is likely that these species also use the ship channel and the slough. Predators such coyote and gray fox may forage on the island in search of small mammals such as deer mouse, California vole, and black-tailed hare. The seasonal levee maintenance activities probably discourage common reptiles and amphibians from inhabiting the levees. It is also unlikely that gopher snake, common garter snake, western fence lizard, and western toad are found in the area due to the past cultivation practices.

FWS representatives conducted qualitative site surveys of bird use and flood cover at the end of the migratory season in 1995 to evaluate wildlife use of the site. During that period, a levee bordering the Port's property to the south had breached, and water had seeped through the cross levee between the Port and Sakata Brothers (now Reclamation) properties. As a result, over 1,000 acres of the site exhibited shallow, non-tidal flooding. The shallowest, northern third of the project area displayed corn stubble from the previous growing season. Under these conditions, several thousand waterfowl and waterbirds of a variety of species were observed foraging at the site. The most abundant species of waders were dowitchers and sandpipers, with fewer numbers of sandhill cranes, egrets, and yellowlegs. Waterfowl included dabbling ducks such as shoveler, mallard, widgeon, coot, and pintail in the shallower waters, and occasional coots, grebes, and scaups in the deeper areas. Cliff swallows, blackbirds, flicker, and goldfinch were also fairly abundant, with fewer numbers of other passerine species. According to a lessee of the property, the flooded area and winter bird use were typically restricted to the small area near the drain pump in the southern portion of the site (FWS, 1997).

The descriptions and locations of the nine cover types on Prospect Island according to the FWS's CAR (1997) are listed and briefly described in Table 1 and illustrated in Figure 4. In the ERR and appendixes, these nine cover types have been grouped into four cover types: open water, mudflat, emergent marsh, and SRA/riparian.

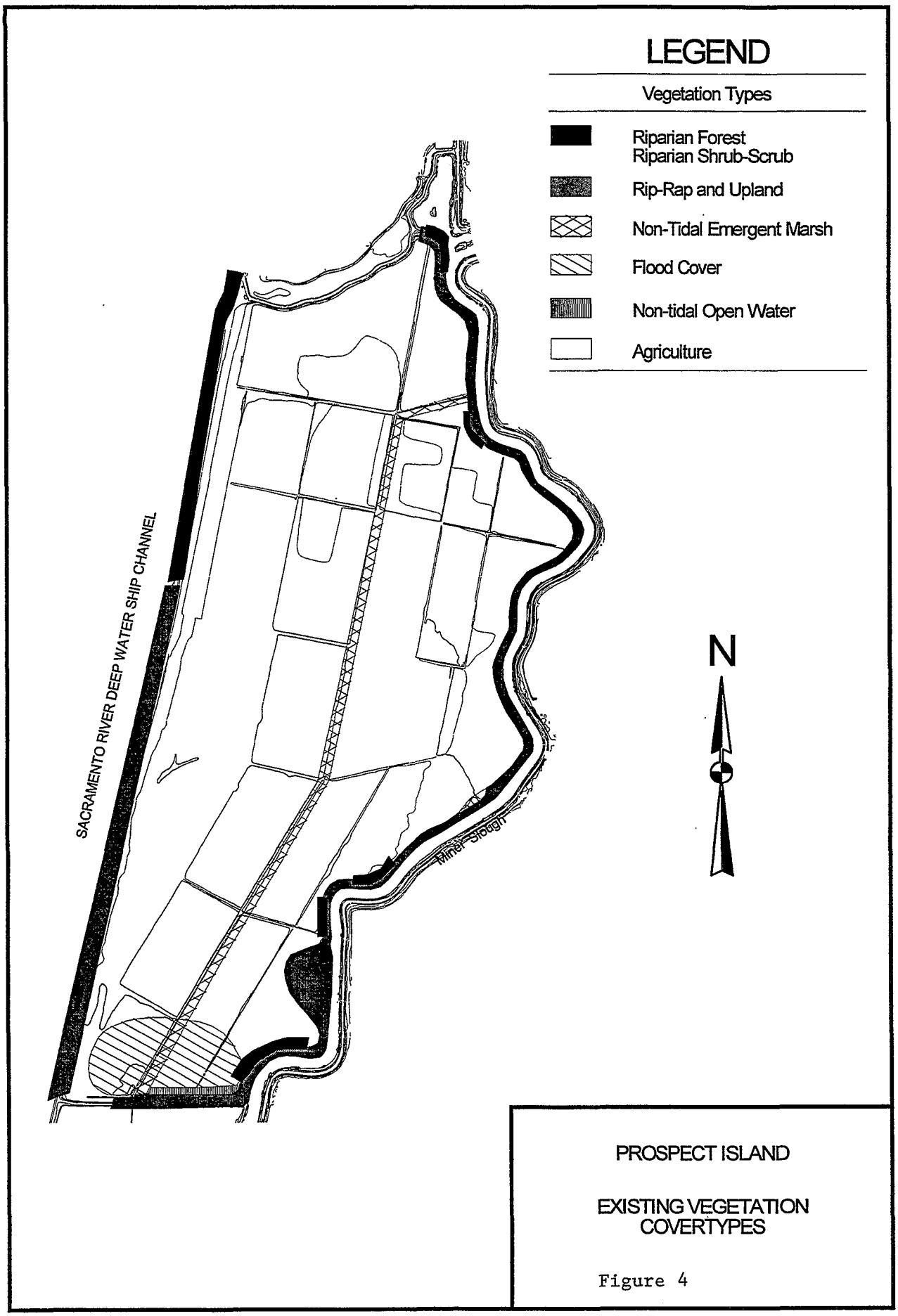
4.2.2 Effects. The effects of the restoration project on vegetation and wildlife were coordinated and analyzed with the FWS.

No Action. Significant changes in vegetation and wildlife are not expected with the no-action alternative. The land would remain in agriculture. Agricultural land provides habitats of low to moderate value to wildlife. Agricultural land in fallow can provide higher values depending on several factors such as the types of vegetation at the site and length of time in fallow.

Alternative Plan. Creation of interior islands and additional berms/benches on sections of the ship channel and Miner Slough levees would enhance specific wildlife

Table 1. Vegetation Cover Types on Prospect Island.

Cover	Acre	Location on Prospect Island
Agriculture	1,117	Agricultural land is the predominant cover type found on site.
Upland	39.8	Upland/herbaceous vegetation consisting of grasses and forbs covers the levee slopes, road shoulders, and uncultivated margins of the irrigation ditches and field borders.
Nontidal open water	0.7	Nontidal open water is limited to the east-west ditch located at the southernmost portion of the island between the central ditch and the pump station.
Riparian forest	7.4	Riparian forest vegetation consisting of open to dense stands of woody vegetation dominated by willows and tree saplings exists in limited patches along parts of the Miner Slough levee and along the northern end of the ship channel levee.
Riparian shrub-scrub	7.8	Riparian scrub-shrub consisting of bramble thickets such as blackberry bushes, poison oak, young willow, buttonbush, and elderberry bushes exists in limited patches along parts of the ship channel and Miner Slough levees and in very limited sections of the irrigation ditches which have not been maintained. The elderberry bushes are limited to the northern end of the ship channel levee.
Nontidal emergent marsh	2.7	Nontidal emergent marsh consisting of tules, cattails, and rushes is confined to limited areas near the pump station and in four irrigation ditch segments which receive a constant supply of water.
Shallow flood cover	120	Shallow flood cover is located in the southeast corner of the site where water drains towards the middle of the island where there is a large, open-water canal and a 60-horsepower drain pump that empties into Miner Slough. This portion of the agricultural land exhibits shallow flooding in the winter and spring.
SRA	7.4	SRA cover consisting of overhanging riparian vegetation occurs in limited patches along the waterside of the ship channel and Miner Slough. Both the ship channel and Miner Slough levees are riprapped so limited patches of riparian vegetation such as willows, blackberry bushes, and button brush are able to succeed.
Bare ground	20.8	Bare ground represented by the perimeter levee road and several machinery access roads within the site.



PROSPECT ISLAND

EXISTING VEGETATION COVERTYPES

Figure 4

habitat vegetation types for waterfowl, shorebirds, and other species typical of the historic Delta wetlands.

Restoration of tidal action would increase the total acreage of several cover types of high value to a diversity of fish and wildlife, including several threatened and endangered species. The FWS conducted a Habitat Evaluation Procedures analysis to determine the net gains in cover types and habitat units annualized over the project life average of restored habitat. The FWS estimated that with-project habitat values of high importance cover types would show a four-fold increase over baseline conditions, while habitat values of low importance cover types would increase by a 38 to 59 percent increase over baseline conditions. Table 2 shows the changes in vegetation cover types and the gains or losses in average annual habitat units (AAHU).

Waterfowl habitat would include tule marsh, which would provide nesting habitat for dabbling and diving ducks. Tule marsh is used extensively by diving ducks and other crustacean- and fish-eating birds such as grebes, coots, and great blue herons. All waterfowl except for some diving ducks prefer marsh habitats. This habitat would include a covering of water 3 feet deep or less and/or emergent vegetation over 40 to 85 percent of the site. The optimal percent cover is 60 to 85 percent. Creation of mudflat and SRA vegetation would provide loafing areas safe from predators. Designated upland habitat on the interior islands would provide escape and nesting cover, and food for breeding waterfowl.

Shorebird habitat would include mudflats flooded to depths of 0 to 2 inches. The mudflats would provide an invertebrate food source required by shorebirds. Loafing areas for shorebirds would be located near the mudflats with the optimal shorebird habitat located more that 150 feet from any manmade disturbance such as footpaths.

The restored wetlands area may provide habitat for potential intrusion of water hyacinth. Water hyacinth is considered an invasive exotic plant that predominantly develops in slow-moving backwater areas and invades an area quickly. Water hyacinth is a problem in the San Joaquin River system where tidal influence is minimal. Although the plant is not seen in the Cache Slough area, it has been sighted south along Decker Island. Since water hyacinth has been an ongoing issue in the Delta, precautionary measures such as monitoring would be taken at the restored Prospect Island wetlands to ensure that the plant does not develop into a problem for management.

4.2.3 Mitigation. Both mitigation policy and regional mitigation goals for riparian forest, riparian scrub-shrub, shaded palustrine aquatic cover, non-tidal open water, uplands, and agriculture would be met under with-project conditions. Accordingly, no mitigation measures are recommended for these cover types.

Virtually all of the agricultural cover type on Prospect Island infrequently becomes temporarily flooded wetland as a result of breaching or overtopping of the levees during the wettest water years. Most of these temporarily flooded wetlands are deeper waters that are partially tidal in nature and inaccessible as forage for wildlife. Therefore, the FWS has determined that the acreage and habitat value losses of temporarily flooded areas of

the agricultural cover type would be fully compensated by the with-project design, which involves a permanent breaching of the levees, and would not require mitigation.

Table 2. Changes in Vegetation Cover Types.

Cover Type	FWS		Acres		AAHU's
	Resource Category/Mitigation Goal		Baseline	With Project	Gained/Lost
Agriculture	3	*No net losses of habitat value while minimizing loss* of in-kind habitat.	1,116.8	0.0	-44.7
Upland	4	Minimum loss of habitat value.	39.8	12.7	-8.3
Nontidal open water	3	No net losses of habitat value while minimizing loss of in-kind habitat.	0.7	0.0	0.0
Riparian forest	2	No net loss of in-kind habitat value.	15.2	69.8	30.0
Riparian scrub-shrub	2	No net loss of in-kind habitat value.	2.7	0.0	
Nontidal emergent marsh	2	No net loss of in-kind habitat value.	120.0	0.0	-0.2
Shallow flood cover	2	No net loss of in-kind habitat value.	7.4	0.0	-30.1
SRA cover	1	No loss of existing habitat value, acreage, or riverside length.	20.8	3.0	0.0
Bare ground	na		na	na	na
Riprap	na		na	na	na
Additional Cover types with Project Construction					
SPA* cover	2	No net loss of in-kind habitat value.	0.0	16.4	10.5
Tidal marsh	2	No net loss of in-kind habitat value.	0.0	300.6	173.6
Tidal open water	2	No net loss of in-kind habitat value.	0.0	665.0	368.0
Mudflat	2	No net loss of in-kind habitat value.	0.0	54.0	194.5

*SPA = shaded palustrine aquatic. This cover type was included in the FWS's CAR.

4.3 Special Status Species.

4.3.1 Baseline Conditions. A list of Federally listed threatened, endangered, and proposed species was received from the FWS for the Liberty Island and Rio Vista USGS quadrangle maps in July 1997 and updated in April 1998. According to the species list in the April letter, the Federally listed species that may occur within, or be affected by projects within, the two quads include the American peregrine falcon, Aleutian Canada goose, bald eagle, giant garter snake, California red-legged frog, winter-run chinook salmon and its critical habitat, delta smelt and its critical habitat, Central Valley steelhead, Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, valley elderberry longhorn beetle, and delta green ground beetle. Federally listed plants that are

on the Solano County list and may occur within the project area include Suisun thistle, salt marsh bird's beak, soft bird's beak, Contra Costa goldfields, Solano grass, and Colusa grass. The Federally proposed species include the riparian woodrat, riparian brush rabbit, Central Valley spring-run chinook salmon and its critical habitat, Central Valley fall-run chinook salmon and its critical habitat, and Sacramento splittail. In addition, two candidate species and 41 species of concern were included on the list (Attachment B).

A search of the Natural Diversity Database (NDDB) revealed no occurrences in the project area of the American peregrine falcon, Aleutian Canada goose, riparian woodrat, riparian brush rabbit, giant garter snake, California red-legged frog, Conservancy fairy shrimp, vernal pool tadpole shrimp, vernal pool fairy shrimp, delta green ground beetle, and any of the listed plants. In addition, there is no suitable habitat in the project area for these species. Potential roosting habitat for bald eagles, and elderberry shrubs, the host for the valley elderberry longhorn beetle, were found in the area. The NDDB search did reveal three State species in the vicinity of the project area: Mason' lilaeopsis, Delta tule-pea, and Swainson's hawk. Figure 5 shows the locations of the NDDB search. Foraging habitat for the Swainson's hawk occurs in the project area (FWS, 1997).

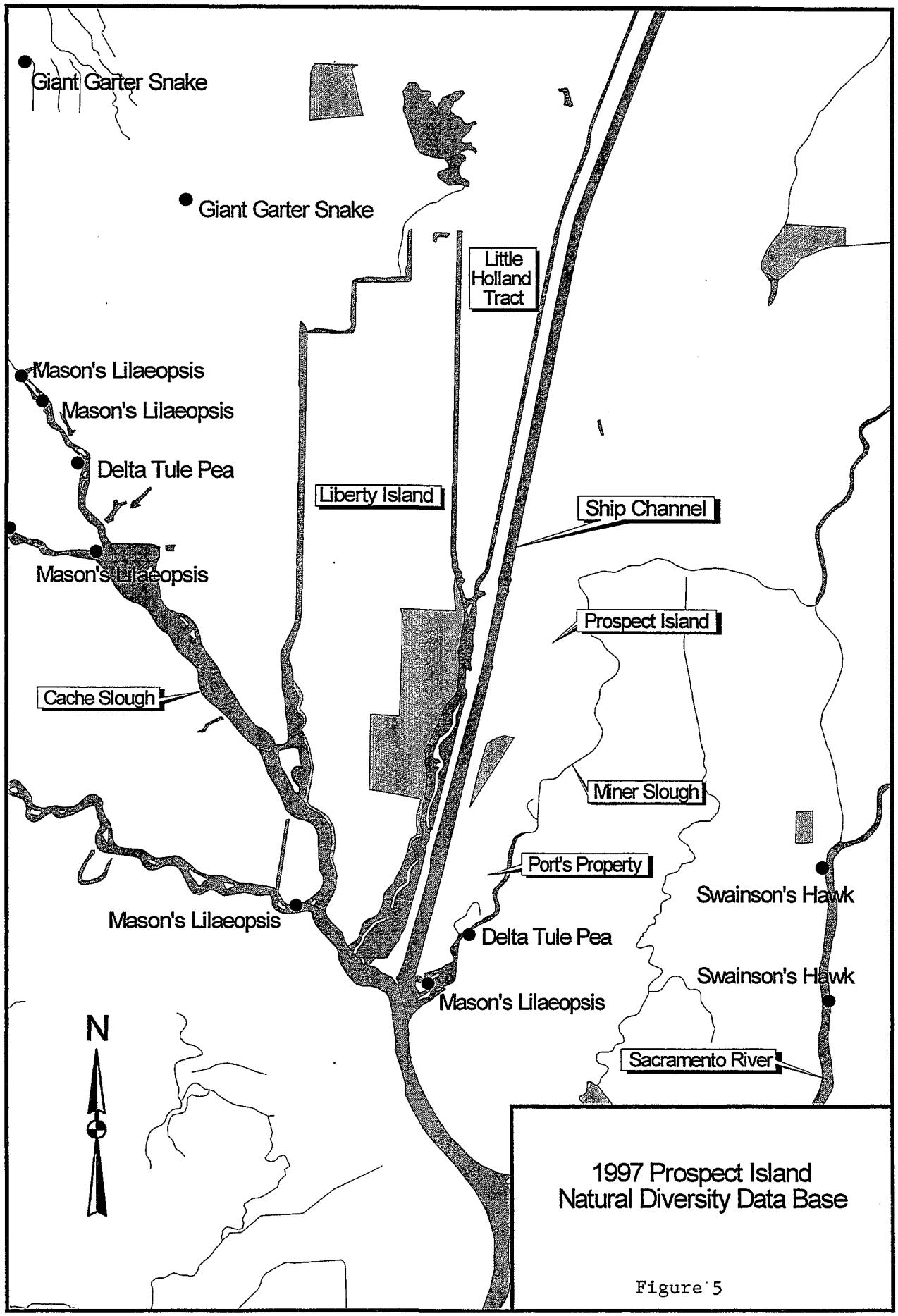
The listed and proposed fish species and their critical habitat which are likely to occur, at least occasionally, in the vicinity of the project area include the Sacramento splittail, Sacramento River winter-run chinook salmon and its critical habitat, Central Valley steelhead, delta smelt and its critical habitat, Central Valley fall-run chinook salmon and its critical habitat, and Central Valley spring-run chinook salmon and its critical habitat.

4.3.2 Environmental Effects. The effects of the restoration project on special status species were analyzed and coordinated with the FWS, the National Marine Fisheries Service (NMFS), and the State Department of Fish and Game (DFG) for this EA/IS. The effects of the restoration project are discussed in the Biological Assessment (Attachment B) and are summarized below.

No Action. Under this alternative, the habitat for endangered species would remain in its current condition.

Alternative Plan. Although breaching Prospect Island levees in two places may have a few minor effects on habitat for listed fish species, the proposed construction would not adversely affect any Federally or State listed or proposed species or critical habitats in the project area. In fact, the project would benefit the delta smelt, Sacramento splittail, Central Valley steelhead, and chinook salmon species.

However, some conditions that may be harmful to these listed species could develop within portions of the restored habitat. As a result, a monitoring program has been established to detect any problems (Attachment C). During monitoring, listed species will be taken, which will require that the Corps obtain an incidental take permit. If the monitoring shows that listed species are being exposed to environmental hazards, corrective actions will be identified, and the steps necessary to obtain funding will be taken. The Corps has entered into Section 7 consultation with both NMFS and FWS to


Giant Garter Snake
Giant Garter Snake
Little Holland Tract
Mason's Lilaeopsis
Mason's Lilaeopsis
Delta Tule Pea
Liberty Island
Ship Channel
Mason's Lilaeopsis
Prospect Island
Cache Slough
Miner Slough
Port's Property
Swainson's Hawk
Mason's Lilaeopsis
Delta Tule Pea
Swainson's Hawk
Mason's Lilaeopsis
N
Sacramento River
1997 Prospect Island
Natural Diversity Data Base
Figure 5

C-089128

obtain incidental take permits for monitoring and to address the plan of action if conditions develop that are harmful to listed species.

The DFG was consulted regarding any impacts of the project to State listed species. In a memorandum, the DFG found no effect from this project on listed species (attachment B). DFG was also consulted regarding impacts of project construction and post-project monitoring on State listed species via a letter from DWR dated January 1999 (attachment B). A response letter from DFG is pending. They are expected to concur with the Federal Biological Opinion.

While there is potential roosting habitat for bald eagles, they would only be occasional transient visitors and would not likely be adversely affected by the proposed project. The species and their critical habitats that may be affected, but would not be adversely affected, are discussed in the following paragraphs.

Critical habitat for Delta smelt. No adverse effects of the restoration plan on critical habitat for Delta smelt can be identified at this time. The species could benefit from the project because the site is near the Cache Slough mitigation area, a spawning area for Delta smelt. Fish monitoring in the constructed project site may result in potential take of smelt; however, given the species preference for shallow waters with good tidal action, the alternative is more likely to benefit the Delta smelt by providing habitat for spawning and rearing. In addition, monitoring information will be used to evaluate the project benefits to delta smelt. This information will be used in the design of future restoration projects, resulting in an overall benefit to delta smelt.

It is possible, but unlikely, that a large portion of the Delta smelt population from throughout the Delta would migrate to Prospect Island to spawn as a consequence of the restoration. Surveys during the last few years have shown that in some years Delta smelt congregate in specific areas in the Delta. In other years, small populations of the fish are found dispersed throughout the Delta. The FWS expects that the local adult Delta smelt population found in Cache Slough would most likely compose the population that would use Prospect Island and be attracted to a more favorable shallow water environment conducive to early life history stages (FWS, 1997).

The North Bay Aqueduct, a water diversion plant located on Barker Slough, is about 8 miles from the confluence of Cache, Lindsey, and Miner Sloughs with the ship channel. The extent to which the plant would entrain Delta smelt has been interagency concern. The FWS wrote a biological opinion (1995) on the effects of long-term operations of Federal and State water projects on the Delta smelt. In summary, increased larval Delta smelt production associated with habitat restoration at Prospect Island would not cause additional pumping restrictions when risk to the overall population of Delta smelt is low. Wider distribution and higher numbers of rearing juveniles of Delta smelt have been shown to lower risks to this species. If these conditions exist, no additional pumping restrictions would occur due to increased larval production at the restoration site.

Delta smelt. No adverse effects of the restoration plan on the Delta smelt can be identified at this time. Habitat that may be beneficial for Delta smelt would be created

with shallow water (3 to 8 feet deep) along the edges of rivers, channels, and sloughs. The shoal regions would be created with submerged substrate such as vegetation, rocks, and roots. Dead end sloughs would be created on the northern section of the site.

Central Valley steelhead. No adverse effects of the restoration plan on the steelhead can be identified at this time. Low-elevation riparian areas created by the restoration plan could benefit this species by increasing spawning habitat. Monitoring in the project area may result in potential take of this species; however, steelhead would likely benefit from the general increase in productive shallow-water rearing habitat (FWS, 1997).

Sacramento splittail. No adverse effects of the restoration plan on the Sacramento splittail can be identified at this time. Habitat that may be beneficial to the Sacramento splittail would include riparian areas, dead end sloughs, and newly flooded vegetation. Low-elevation riparian areas created by the restoration plan could benefit this species by increasing splittail spawning habitat. Monitoring in the project area may result in potential take of splittail; however, this species would benefit from the general increase in productive shallow-water rearing habitat (FWS, 1997).

Critical habitat for chinook salmon. Winter-run, Central Valley spring-run, and Central Valley fall-run chinook salmon would probably benefit from the project due to an increase in the overall area of productive shallow water habitat in the Delta. Monitoring in the project site may result in potential take of salmon; however, the extent to which salmon would use the site for rearing would likely be limited by the indirect connection to the Sacramento River through Miner Slough and the Yolo Bypass. In addition, monitoring information will be used to evaluate the project benefits to chinook salmon. This information will be used in the design of future restoration projects, resulting in an overall benefit to chinook salmon.

During wet years, there may be sufficient flows to carry young salmon into the project site. Salmon juveniles do not necessarily require strong tidal action to stimulate outmigration. Outmigration occurs naturally in association with the physiological changes during smolting. Therefore, muted tidal action for part of the area, rather than maximum tidal action, may be of benefit in that it might retain the salmon in an area of relatively high productivity and provide habitat for other fish species which depend on deeper, less tidally influenced areas (FWS, 1997).

Chinook salmon. No net adverse effect on the listed winter-run and proposed Central Valley fall-run and Central Valley spring-run of chinook salmon is anticipated. Habitat that may be beneficial to salmon would include a migratory resting corridor with deep pools for juvenile salmon to mature in while migrating downstream from Miner Slough. SRA vegetation would provide cooling, cover, and terrestrial insects. This vegetation type would also improve the nursery value of the Delta and could improve survival and natural production upstream. The largest potential benefit to anadromous fish would be the contribution of detritus and food to juvenile fish. The open water would provide crustaceans for juvenile salmon (FWS, 1997).

Valley elderberry longhorn beetle. The valley elderberry longhorn beetle, or its host plant, is restricted to the thin band of riparian habitat bordering the northern portion of the ship channel. Because construction is not planned for this area, the proposed plan would likely have no adverse effect on this species. The shrubs would be fenced off during construction to avoid any damage to the plants. The establishment of riparian vegetation may actually benefit this species if the host elderberry plant continues to grow at this site (FWS, 1997).

Swainson's hawk. The proposed action would replace a minimal percentage of the Swainson's hawk foraging lands. Observations of this State-listed species are recorded along the Sacramento River (DFG, 1997). However, most of the land around Prospect Island is intensively farmed, and the types of crops grown make these lands valuable hawk-foraging habitat. As a result, adequate foraging habitat would remain within the vicinity of the project. Furthermore, the establishment of riparian areas in an undisturbed area may provide high quality nesting sites in the future.

4.3.3 Mitigation. Since there would be no significant adverse effects on special status species, no mitigation would be required.

4.4 Fishes

4.4.1 Baseline Conditions. When the site was under cultivation, the land was dry, and there was no surface water to provide habitat for fish. Water from irrigation drained in the ditches towards the southeast corner of the site, where there was a larger, open-water canal and a 60-horsepower drain pump that emptied into Miner Slough. Undercut banks, as well as patches of overhanging riparian and SRA vegetation growing along the ship channel side of Prospect Island levees, provide protective cover for fish.

Only during major flooding does the study site provide significant shallow water habitat for fish. At such times, the island contains fish species of the Sacramento River. As the largest river in California, the Sacramento River supports the most diverse assemblage of fish in the State. Of the 91 species known to occur in the Sacramento-San Joaquin River system, at least 28 species of fish occur at or near the site. These fish include resident and anadromous species. The anadromous fish species include chinook salmon, steelhead trout, striped bass, American shad, white and green sturgeons, and Pacific Lamprey. The resident fish can be divided into warmwater game fish (largemouth bass, sunfishes, and catfishes), coldwater game fish (rainbow trout and brown trout), and nongame fishes (squawfish, carp, and suckers) (FWS, 1997).

The FWS monitors fish at the Cache Slough mitigation area, upper end of Steamboat Slough, and North Bay Aqueduct. From the Cache Slough site, the most common of the 23 species collected include inland silverside, yellowfin goby, threadfin shad, hitch, Sacramento squawfish, prickly sculpin, Delta smelt, bigscale perch, fathead minnow, and mosquitofish. Sacramento splittail and chinook salmon have also been identified in Cache Slough. At the upper end of Steamboat Slough, juvenile chinook salmon have been documented. Adult chinook salmon have been documented in the upper end of the ship channel, even though this channel is not along a direct migration route to

spawning tributaries. Sacramento splittail have also been captured at the northern end of the ship channel (FWS, 1996).

4.4.2 Effects. The effects of the restoration project on fish were analyzed and coordinated with the FWS, NMFS, and DWR for the EA/IS. The effects of the proposed project are discussed below.

No Action. The site would provide significant shallow water habitat for fish only during major flooding. The revised water quality regulations for the Delta were designed to improve aquatic resources in the Sacramento River and tributaries (RWQCB, 1997). Aquatic resources in the Delta should stabilize, or even improve, if populations have not already dropped below critical levels for sustaining individual species.

Alternative Plan. Fish abundance and use of the site should begin immediately after construction and be enhanced as the vegetation develops. Species would be similar to those observed at the Cache Slough mitigation area, including silverside, goby, shad, hitch, squawfish, sculpin, Delta smelt, tule perch, and others.

The presence of special-status species would vary seasonally and between years. During operation of the Yolo Bypass, the FWS expects Delta smelt to use the site for spawning and early life stage rearing. The positive relationship of splittail year-class strength to flooding of this bypass (FWS, 1997) suggests that splittail spawn predominantly on newly flooded lands within the bypass, upstream of the restoration site. As bypass floodwaters recede, larval splittail should seek out shallow emergent marsh areas such as provided by the proposed restoration project, where they would experience better growth and survival. Some juvenile salmonids (salmon and steelhead) could also be present in the site during wet years; during dry years, they would probably be absent not only due to absence of conveyance through the floodway, but also because most rearing would occur in the rivers rather than the Delta region.

4.4.3 Mitigation. The FWS has determined that the acreage and habitat value losses of temporarily flooded areas of agricultural cover type would be fully compensated by the with-project design, which involves a permanent breaching of the levees, and would not require mitigation.

4.5 Soils.

4.5.1 Baseline Conditions. Due to the recent flooding, no soils explorations have been conducted, and soils information from the 1995 reconnaissance study is used in this EA/IS. The agricultural soil types on Prospect Island include Sacramento silty clay loam, Ryde clay loam, Columbia fine sandy loam, Valdez silt loam, and dredged spoil. The surficial organic soil includes peat, varying in thickness from 2 feet at the north end of the island to 21 feet at the south end. These soft and compressible soils average 10 feet thick. This surface layer is typically underlain with a firm clay layer which varies from 4 to 29 feet thick and averages 12 feet deep. Sand is found below the clay layer. The sand varies from 5 to 10 feet thick and averages 8 feet deep. The ground-water table varies

between 1 and 4 feet below the surface, and the coefficient of permeability ranges from 0.2 to 10 feet per day (Corps, 1994).

Agriculture in the Delta has contributed to the loss of soil through erosion and oxidation. Oxidation of peat soils on most Delta islands causes levees and levee foundations to subside. This subsidence causes uneven settling and further weakening of the levees. Delta soils have a high to very high shrink/swell potential and low strength for supporting the load of embankments, dikes, and levees. The soil volume is decreased substantially under load.

Ryer Island farmers claim that every time that Prospect island has been flooded, Ryer island experiences seepage. Based on hydrologic data collected by DWR since March 1996, Reclamation has concluded that there is no significant effect on Ryer Island from flooding Prospect Island and that seepage on Ryer Island originates from Miner Slough. An in-house hydrologic analysis found a good correlation between the stage in Miner Slough and seepage on Ryer Island, but found no correlation between flooding on Prospect Island and seepage on Ryer Island (Appendix H, I and J in the ERR). During preparation of plans and specifications, explorations along the proposed interior channel cut will be made to determine site-specific conditions.

4.5.2 Effects. The effects of the restoration project on soils were analyzed for the EA/IS and are discussed below.

No Action. Most soil loss on Prospect Island, both mineral soil and organic (peat), is due to farmland management and exposing soil to wind or water erosion. Because the land would continue to be cultivated for crops, the rate of soil erosion would remain constant.

Land and levee subsidence would also continue at the current rate because the soils would remain exposed to wind erosion and to air, which results in oxidation of peat. The probability of levee failure and flooding would continue. Subsidence of peat soils is a major concern throughout the Delta. For every foot that an island drops, there is an exponential increase in water pressure on the levee. Increased water pressure increases the probability of levee failure and flooding if levees are not significantly widened.

Alternative Plan. Soils explorations have not been conducted. Peat soils could be a factor in project construction to create the islands since consolidation of the material is needed to establish specific elevations for the island and berms. To allow for consolidation, the project would be constructed over 2 years to allow for subsidence. Also, the project would include a 1,000-foot setback zone of no excavation from the toe of the interior Miner Sough levee. Very minor excavation would be allowed in this zone for grubbing and channel grading.

Soil erosion due to the construction equipment on the Miner Slough levee is not expected to cause severe damage. During construction, equipment would be located in the interior of the island and not on the levees. Soil erosion due to wind would be reduced on the site because the land would no longer be exposed to agricultural tilling and a large

part of the island would be inundated with water. Land subsidence and damage to levees due to wind erosion and oxidation processes would also decrease.

The project could affect current sediment deposition and transport processes in Miner Slough and the ship channel. Breaching the levees on the ship channel and Miner Slough would change the direction of the water and suspended sediment flow. Some of the sediment from Miner Slough would be diverted into Prospect Island. This sediment could accumulate on the site; however, this sediment is not likely to move into the ship channel because velocities within the island are very low.

Since the Corps would no longer maintain the ship channel levee, it could erode gradually into the channel. If the erosion process is rapid enough and there is insufficient water velocity in the ship channel, then sediment from the eroding levee could accumulate in the channel. This sedimentation could require additional maintenance dredging by the Corps. Maintenance dredging in the channel has been done four times since the ship channel was constructed in 1963. However, most of the eroded levee material (if any) would slough onto the in-channel berm and not into the ship channel.

Tidal flows could cause scouring within the project site and redistribution of sediment into the ship channel and Miner Slough. The main factors affecting scouring and sedimentation are water velocity and sediment size, shape, density, and cohesiveness. However, these effects are unlikely since the islands and levees would be stabilized by biotechnical plantings. Furthermore, the results of the hydrodynamic modeling indicate very low velocities within Prospect Island for both the tidal and flood simulations. Due to these low velocities and short distances, the potential for scouring and sedimentation would be negligible. Nevertheless, DWR will monitor the bathymetry of the project to measure the success of project features with regard to erosion and sedimentation.

4.5.3 Mitigation. The project would include a 1,000-foot setback zone of no excavation from the toe of the interior Miner Slough levee. Very minor excavation would be allowed to take place in this zone for grubbing and channel grading. No mitigation would be required for impacts to soils.

4.6 Air Quality

4.6.1 Baseline Conditions. The State has been divided into 14 air basins for air quality monitoring. Solano County is located within the Sacramento Valley Air Basin. This air basin is composed of Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo, and Yuba Counties. Prospect Island is located in Solano County. The air quality in Solano County is monitored by the Yolo-Solano Air Quality Management District (AQMD). According to this agency, air quality in Solano County is in attainment for all Federal and State criteria pollutants except ozone and particulate matter less than 10 microns in diameter (PM_{10}), which exceed State standards.

Airborne dust (PM_{10}) is the predominant air quality concern for the Prospect Island site. The topographic boundaries of the basin, coupled with light winds and atmospheric stability, make the basin susceptible to the accumulation of air pollutants. The typical

summer circulation system allows transport of pollutants for long distances. Particulate monitoring stations near the study area are located in Walnut Grove, Isleton, Bethel Island, Vacaville, and Elk Grove.

High concentrations of oxidants and suspended particulate matter are the major air pollution problems in the Sacramento Valley Air Basin. Both pollutants frequently exceed air quality standards. The largest source of oxidants is motor vehicles, and the major sources of suspended particulates are agriculture and lumber industries. Agricultural burning is a widely practiced procedure for cropland waste disposal and levee maintenance. In addition, current annual agricultural tillage of the entire area is producing an ongoing source of dust.

4.6.2 Effects. The State and Federal air quality parameters were identified using information from the Yolo-Solano AQMD for the EA/IS. The effects of the proposed project are discussed below.

No Action. Long-term effects on air quality from sources on Prospect Island would continue to be from those activities required to farm and to repair levees. These effects would include peat dust and agricultural burning.

Alternative Plan. In general, the conversion from agriculture to wetlands and associated habitat would reduce or eliminate the need for agricultural tillage and thereby reduce the amount of dust produced. Conversion from agriculture to a wildlife site would alter land management practices, which may result in improved air quality. Agricultural activities such as tilling and agricultural waste burning, which are important sources of particulate matter, would be reduced. In addition, there would be fewer applications of pesticides, which are commonly applied to agricultural crops.

Table 3. Total Construction Emissions for the Prospect Island Restoration.

Equipment (ID Number)	Total Hours	Pounds of Emissions				
		ROG	CO	NOx	SOx	PM10
Crane, 18 ton 4WD	27	1.43	4.86	11.91	3.86	0.84
Crane, 22 Ton	276	14.63	49.68	121.72	39.47	8.56
Crane, truck mounted, 60 ton	45	2.40	8.10	19.84	6.44	1.40
Grader, cat-12	153	5.97	23.10	8.26	13.16	9.33
Loader, 3.75 CY capacity	792	182.16	453.02	1504.80	144.14	134.64
Loader, 5.35 CY capacity	34	7.82	19.45	64.60	6.19	5.78
Roller, 11 tire	48	3.12	14.40	41.76	3.22	2.40
Roller, 15 ton	106	6.89	31.80	92.22	7.10	5.30
Roller, 12 ton, 3 wheel	106	6.89	31.80	92.22	7.10	5.30
Scraper, 14-20 CY, 24 ton	3512	948.24	4390.00	13486.08	1615.52	1439.92
Dozer D-7	5947	892.05	4460.25	10109.90	2081.45	981.26

Dozer D-8	597	89.55	402.98	1014.90	208.95	98.50
Truck, rear dump 8 CY	153	35.19	87.52	290.770	27.85	26.01
Truck (flat bed)	212	38.16	758.96	269.24	19.08	29.68
Water truck	48	9.12	96.40	200.16	21.60	12.48
Truck, pickup	212	9.12	381.60	200.16	21.60	12.48
Truck, 3 axle	306	58.14	550.80	1276.02	137.70	79.56
Automobiles, workers	5400	54.00	1296.00	216.00	8.10	16.20
Other:						
Fugitive dust						33,000
Totals						
	lbs/yr	13020.7	2364.9	29020.5	4372.5	35869.6
	tons/yr	7.0	1.2	14.5	2.2	17.9

Table 4. Maximum Daily Construction Emissions (pounds/day) for Prospect Island

Source	Number	Pounds/Hour/Vehicle Emissions				
		CO	ROG	NOx	SOx	PM10
Equipment Type						
Crane	1	0.180	0.053	0.441	0.143	0.031
Grader, cat-12	1	0.151	0.039	0.054	0.086	0.061
Loader, 5.35 CY capacity	1	0.572	0.230	1.900	0.182	0.170
Scraper, 14-20 CY, 24 ton	2	1.250	0.270	3.840	0.460	0.410
Dozer D-7	3	0.675	0.150	1.700	0.3350	0.165
Truck, rear dump 8CY	1	0.572	0.230	1.900	0.182	0.170
Water truck	1	1.800	0.190	4.170	0.450	0.260
Truck, pickup	2	1.800	0.190	4.170	0.450	0.260
Automobiles, workers	15	0.235	0.014	0.036	0.002	0.003
OTHER						
TOTALS	lb/hr	14.9	2.3	30.1	3.9	19.8
	lb/day	119.4	18.6	241.0	31.5	137.5

Table 5. Comparison of Project Construction Emissions with Local and Federal Thresholds.

Criteria Pollutant	Project Emissions		Threshold Levels	
			Solano County	Federal
	lbs/day	tons/year	lbs/day	tons/year
CO	119	7	550	100
ROG	15	1	82	100
NOx	241	14	82	100
SOx	32	2	82	100
PM_{10}	138	18	82	100

Construction activities are expected periodically over a 2-year period, 9-hour work days, 5-day work weeks. About 21 pieces of equipment would be used during the construction phase. Construction emissions including fugitive dust and worker vehicle emissions would not exceed Federal *de minimis* standards for any criteria pollutants. However, nitrogen oxides and PM_{10} emissions would occasionally exceed local standards. Table 3 shows total construction emissions; Table 4 shows maximum daily construction emissions; and Table 5 compares total daily construction emissions with local and Federal standards.

4.6.3 Mitigation. The proposed project is not expected to violate any standard, increase violations in the project area, exceed the U.S. Environmental Protection Agency's general conformity *de minimis* threshold, or hinder the attainment of air quality objectives in the local air basin. The Corps has determined that the proposed actions would have no adverse effects on the future air quality of the project area and are in compliance with this act. Best available control practices would be used to minimize the adverse effects of construction on the region. All standard practices and procedures that are set by the Yolo-Solano AQCD to minimize emissions would be used during construction. In this way, construction emissions would be reduced to less than significant levels.

Measures to minimize construction equipment and materials emissions include the following measures:

a. Properly maintain all equipment and engines.
b. As a general rule, keep all equipment and engines idling below 10 minutes.
c. Substitute electric-powered equipment for internal combustion-powered equipment, where feasible.
d. Develop a comprehensive construction activity management plan to minimize the pieces of construction equipment operating and the extent of the site area worked during any given time, especially during the smog season.
e. Use new technologies to control ozone precursor emissions as the technologies become available and feasible.

f. Avoid construction-related burning by using chipping, composting, and recycling.
g. Suspend construction equipment operations during second stage smog alerts.
h. Use methanol, natural gas, propane, or butane-powered construction equipment, instead of diesel or gasoline.
I. Use gasoline-powered equipment that have catalytic converters.
j. Schedule the movement of construction materials during off-peak hours for travel.
k. Use electricity from power poles rather than temporary generators.

Measures to minimize construction dust include the following measures:

a. Use water trucks or sprinkler systems to reduce airborne dust from leaving the site. Require increased watering frequency whenever wind speeds exceed 15 miles per hour. Emphasis should be placed on the watering of unpaved roadways during periods of high vehicle movement.
b. Enclose, cover, or water twice daily all soil piles, or install an automatic sprinkler system on all soil piles.
c. Limit the speed for all construction equipment to 10 miles per hour on any unpaved surface.
d. Stabilize all disturbed soil areas not subject to revegetation or paving with approved chemical soil binders, jute netting, or other methods approved in advance by the APCD.
e. Do not excavate or grade soils during periods in which wind speeds are greater than 20 miles per hour averaged over 1 hour.
f. Water all exposed soil at least twice daily, and water exposed soil with adequate frequency to keep soil moist at all times.
g. Water all haul roads at least twice daily, and/or pave all haul roads.
h. Maintain at least 2 feet of freeboard on trucks hauling loads of excavated materials, and cover load of all haul/dump trucks securely.

4.7 Water Quality

4.7.1 Baseline Conditions. Taking advantage of 1997 flood conditions, the DWR collected water quality data on Prospect Island from May through November 1997 and June through September 1998. A map of the survey sites is shown in Figure 6, and some of the data collected are listed in Table 6. Monitoring results indicate no apparent degradation of water quality conditions (dissolved oxygen, temperature, and electrical conductivity) from the spring through summer period in the northern reach of Prospect Island. Water circulation resulting from tidal and wind mixing appears adequate with two southern breaches (DWR, 1997).

Currently, there are no official water quality monitoring sites located at or near Miner Slough or the ship channel. The closest monitoring sites to either location are an

TABLE 6

Prospect Island
Water Quality Field Data

1997

Date	Time	Location	Depth (inches)	EC (µS/cm)	DO (mg/L)	Temp (oC)	Grab Sample?	Turbidity (NTU)	Secchi (inches)
5/14/97	1000	1	34	223.8	7.6	20.8	Yes	40	
5/14/97	1020	2	28	205.4	8.2	20.0	Yes	52	
5/14/97	1031	3	16	225.1	7.4	20.4	Yes	108	
5/14/97	1040	4	48	210.5	7.4	20.5	Yes	116	
5/14/97	1050	5	42	229.0	7.8	20.1	No		
5/14/97	1120	6	> 72	175.8	7.3	21.1	No		
5/14/97	1143	7	> 72	174.7	6.9	20.9	Yes	36	
5/14/97	1401	8	> 72	191.4	8.3	22.2	Yes	24	
5/14/97	1413	9	> 72	191.3	8.9	22.0	No		
			34	203.0	7.7	20.9		63	
5/30/97	1025	1	36	207.5	7.6	21.8	Yes	52	
5/30/97	1039	2	42	210.4	7.5	22.5	Yes	68	
5/30/97	1046	3	30	223.6	7.2	23.5	Yes	120	
5/30/97	1101	4	18	225.2	7.3	22.6	Yes	104	
5/30/97	1109	5	48	223.2	7.4	22.3	No		
5/30/97	1212	6	60	186.3	7.6	23.7	No		
5/30/97	1226	7	> 72	174.8	7.9	22.6	No		
5/30/97	1246	8	> 72	163.2	7.1	21.8	Yes	12	
5/30/97	1255	9	> 72	183.3	7.2	22.4	No		
			39	199.7	7.4	22.6		71	
7/11/97	909	1	24	165.5	7.8	21.5	No		
7/11/97	918	2	41	156.7	8.0	21.4	No		
7/11/97	927	3	26	133.9	8.2	21.1	No		
7/11/97	936	4	42	161.9	7.8	21.4	No		
7/11/97	950	5	44	191.4	8.1	21.4	No		
7/11/97	1003	6	40	192.0	8.1	21.4	No		
7/11/97	1034	7	56	135.0	8.1	22.2	No		
7/11/97	1045	8	52	147.2	8.1	22.1	No		
7/11/97	1125	9	99	136.6	8.1	22.7	No		
7/11/97	1133	10	68	134.8	8.0	22.9	No		
			52	155.5	8.0	21.8			
8/8/97	1106	1	88	150.8	8.2	22.6	No		
8/8/97	1113	2	33	159.8	8.0	23.0	No		8
8/8/97	1124	3	67	183.0	6.9	24.9	No		4
8/8/97	1137	4	44	190.3	7.1	25.0	No		4
8/8/97	1146	5	43	181.3	7.9	23.8	No		6
8/8/97	1255	6	66	142.8	8.0	23.3	No		16
8/8/97	1224	7	66	141.6	8.2	22.9	No		15
8/8/97	1241	8	77	138.6	7.9	23.0	No		18
8/8/97	1249	9	67	142.2	7.9	23.0	No		16
			61	158.9	7.8	23.5			11
9/25/97	1413	1	20	225.3	8.3	25.1	Yes	56	8
9/25/97	1348	2	30	225.0	8.5	25.7	Yes	56	8
9/25/97	1339	3	36	234.5	7.9	26.4	Yes	72	8
9/25/97	1356	4	27	235.0	8.2	26.5	Yes	62	7
9/25/97	1400	5	20	229.7	8.4	25.5	Yes	56	10
9/25/97	1434	6	60	185.4	8.0	22.3	Yes	17	16
9/25/97	1538	7	63	183.0	7.8	22.4	Yes	15	18
9/25/97	1500	8	72	188.3	9.2	23.1	Yes	14	16
9/25/97	1456	9	72	194.4	8.6	23.4	Yes	17	16
			44	211.2	8.3	24.5		41	12
10/27/97	1322	1	31	171.0	9.5	15.9	Yes	44	10
10/27/97	1334	2	36	172.5	9.3	15.6	Yes	76	7
10/27/97	1341	3	45	181.1	9.4	15.5	Yes	61	6
10/27/97	1354	4	30	183.8	8.8	16.4	Yes	68	8
10/27/97	1402	5	26	174.0	10.0	15.7	Yes	56	5

TABLE 6 (cont)

10/27/97	1509	6	60	168.7	8.4	16.1	Yes	13	22
10/27/97	1431	7	61	166.9	8.3	16.1	Yes	12	20
10/27/97	1442	8	73	161.0	8.3	17.1	Yes	14	15
10/27/97	1459	9	71	161.5	8.9	17.0	Yes	16	21
			48	171.2	9.0	16.2		40	13
11/24/97	1318	1	30	183.9	9.2	14.1	Yes	36	10
11/24/97	1331	2	46	182.6	9.5	14.1	Yes	28	14
11/24/97	1415	3	46	183.3	9.8	13.8	Yes	24	15
11/24/97	1401	4	32	182.4	11.8	14.5	Yes	26	12
11/24/97	1349	5	19	183.5	10.7	15.0	Yes	36	12
11/24/97		6	not sampled due to imminent rain						
11/24/97		7	not sampled due to imminent rain						
11/24/97		8	not sampled due to imminent rain						
11/24/97		9	not sampled due to imminent rain						
			35	183.1	10.2	14.3		30	13

1998

Date	Time	Location	Depth (inches)	EC (µS/cm)	DO (mg/L)	Temp (oC)	Grab Sample?	Turbidity (NTU)	Secchi (inches)
6/3/98	1340	1	34	141.3	8.6	18.4	Yes	62	5
6/3/98	1350	2	50	136.4	8.8	18.2	Yes	74	6
6/3/98	1355	3	50	146.3	8.6	18.6	Yes	66	6
6/3/98	1305	4	32	154.5	8.7	18.4	Yes	70	5
6/3/98	1324	5	37	142.4	8.6	18.3	Yes	70	4
6/3/98		6	not sampled due to time limitation						
6/3/98		7	not sampled due to time limitation						
6/3/98		8	not sampled due to time limitation						
6/3/98		9	not sampled due to time limitation						
			41	144.2	8.7	18.4		68	5
7/8/98	1117	1	42	141.6	7.9	22.7	Yes	81	5
7/8/98	1128	2	48	144.4	7.0	23.3	Yes	102	5
7/8/98	1140	3	48	140.4	7.3	23.9	Yes	102	5
7/8/98	1050	4	30	157.3	7.5	22.0	Yes	84	8
7/8/98	1100	5	36	156.5	8.1	22.7	Yes	87	8
7/8/98	1233	6	62	135.3	7.4	21.9	Yes	57	7
7/8/98	1158	7	53	131.2	7.9	22.9	Yes	72	6
7/8/98	1216	8	68	117.8	8.1	22.1	Yes	36	8
7/8/98	1225	9	66	112.9	7.9	22.0	Yes	18	13
			50	137.5	7.7	22.6		71	7
8/28/98	1301	1	23	171.9	8.0	21.1	Yes	70	7
8/28/98	1230	2	24	180.3	6.8	21.8	Yes	87	7
8/28/98	1223	3	23	181.7	7.3	22.8	Yes	84	6
8/28/98	1239	4	18	179.8	7.7	24.8	Yes	99	5
8/28/98	1251	5	24	178.4	7.3	22.2	Yes	87	7
8/28/98	1326	6	45	165.6	6.3	21.5	Yes	72	7
8/28/98	1405	7	55	162.2	9.4	25.0	Yes	36	7
8/28/98	1356	8	57	156.1	8.2	25.4	Yes	33	11
8/28/98	1344	9	55	153.7	7.3	20.3	Yes	45	9
			36	170.0	7.6	22.8		68	7
9/29/98	1150	1	28	169.5	8.5	17.5	Yes	108	4
9/29/98	1320	2	40	172.4	7.8	18.4	Yes	108	6
9/29/98	1225	3	24	182.7	8.1	18.4	Yes	124	5
9/29/98	1215	4	24	181.5	8.4	18.1	Yes	144	4
9/29/98	1207	5	33	173.5	8.4	17.7	Yes	124	4
9/29/98		6	not sampled due to high winds						
9/29/98		7	not sampled due to high winds						
9/29/98		8	not sampled due to high winds						
9/29/98		9	not sampled due to high winds						
			30	175.9	8.2	18.0		122	5

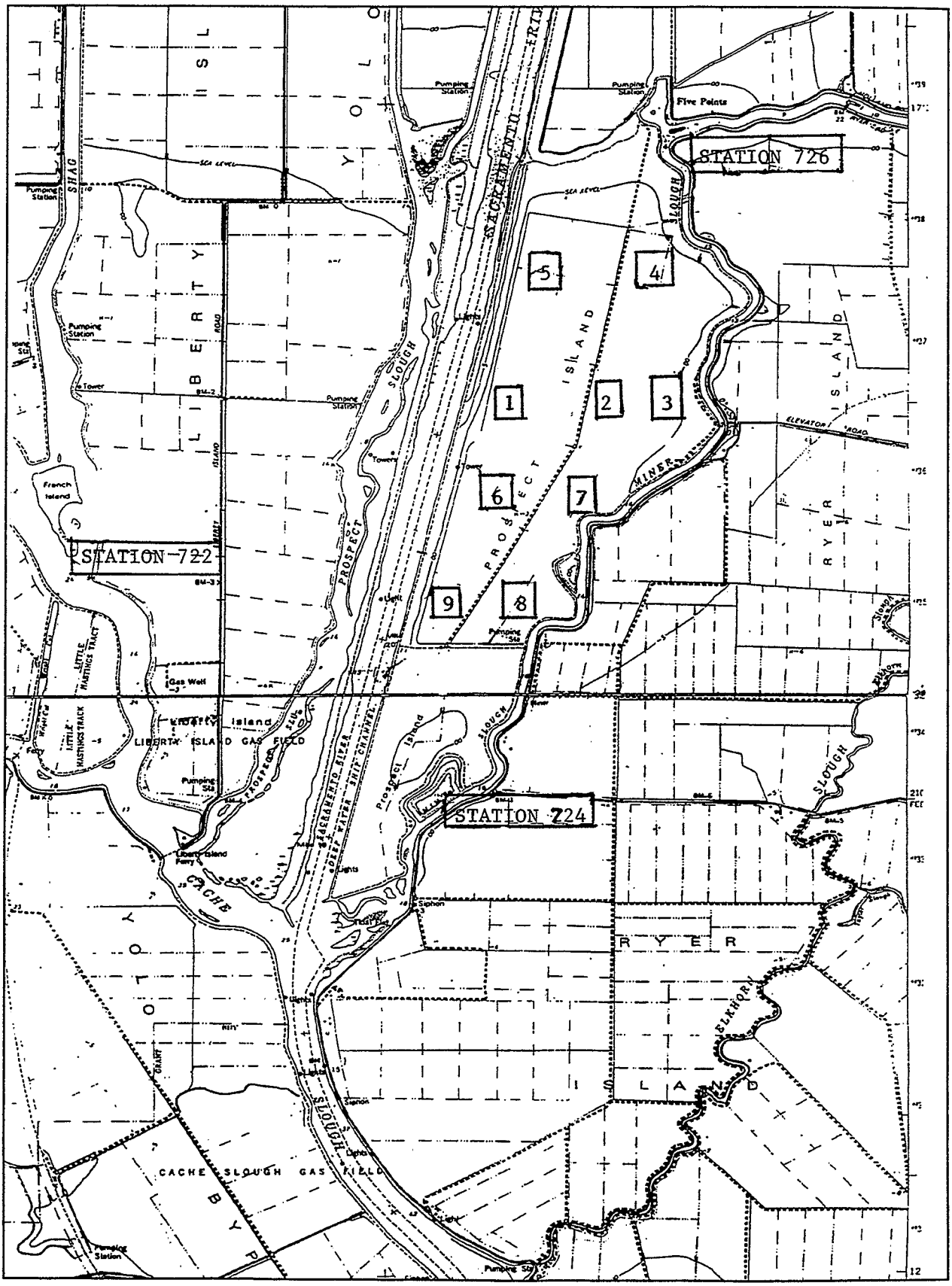


Figure 6 DWR Water Quality Test Sites and North Bay Aqueduct Stations

C-089141

electric conductivity site located on Steamboat slough on the east side of Ryer Island and one DWR site located on Cache Slough by the northwest corner of Hastings Tract (DWR, 1997).

4.7.2 Effects. The effects of the restoration project on the water quality near the project site were coordinated with the Sacramento Valley Region Water Quality Control Board for the EA/IS. The effects for the proposed project are discussed below.

No Action. Water quality is not expected to change significantly with the no-action alternative. New water quality standards set in December 1994 for the San Francisco Bay - Sacramento-San Joaquin Delta estuary may result in future improved water quality.

Alternative Plan. The alternative plan restores riparian ecosystems and converts the site from agriculture to a native wetland community. A healthy wetland system would have a beneficial effect on water quality. Wetlands can improve water quality by retaining pollutants or delaying their movement as water circulates through the system. These pollutants include excess nutrients, toxic chemicals, and disease-causing micro-organisms. Some pollutants may settle out in the marsh and be converted by biochemical processes to less harmful forms. Some pollutants may remain trapped in the sediments or be taken up by plants and recycled or transported from the marsh. The FWS's CAR indicates that the high surface-to-volume ratio of the shallow wetlands would improve water quality by enhancing oxygen levels and providing for the absorption of excess nutrients by sediments and emergent plants (FWS, 1997).

Another benefit of the project would be a reduction in agricultural drainage water. Agricultural drainage from peat soils in the Delta has been shown to contain elevated levels of dissolved organic carbon and disinfection byproduct precursors (DWR 1994). Disinfection byproduct precursors are humic materials that form carcinogenic compounds upon water treatment. Reducing agricultural drainage may reduce the formation of these compounds; however, the contribution of wetlands to disinfection byproduct precursors has not been studied. After construction, DWR plans to monitor disinfection byproduct precursor concentrations in Prospect Island.

A potential water quality effect from the project could be an increase in dissolved organic carbon concentrations, which might increase the cost of treating drinking water for North Bay Aqueduct water users. As part of the proposed monitoring plan, the Interagency Ecological Program Prospect Island Project Work Team plans to monitor dissolved organic carbon concentrations in water discharged from Prospect Island.

Construction of the restoration would take place under dry conditions. Therefore, an evaluation relative to section 404 (b)(1) guidelines to determine compliance with the Clean Water Act is not needed. The levees would be breached so that the proposed action would not result in placement of dredged or fill material into waters of the United States or associated wetlands. Standard construction measures would be taken to prevent construction equipment spills of oil and gas or debris from entering the water.

The Sacramento Valley Regional Water Quality Control Board was also consulted for a more definitive analysis of the effect of the project on water quality. The Board found that the project would benefit the water quality in the area and would have no adverse effects.

4.7.3 Mitigation. The proposed action is in compliance with the Clean Water Act. No mitigation for water quality is required.

4.8 Public Health

4.8.1 Baseline Conditions. Historically, tidal marshes in Solano County were prolific sources of mosquitos. In addition to direct abatement, water management practices have been developed by the Solano Mosquito Vector Control to prevent the production of mosquitos in tidal marshes. The principal prevention method consists of the construction of ditches to circulate tidal water into sloughs and bays to avoid ponding. Most mosquitos in California are relatively harmless, causing no threat to public health and becoming a nuisance only in large numbers. However, two mosquito species can transmit serious diseases to humans. *Anopheles frebornia* is a vector of malaria, and *Culex tarsalis* is a vector of Western Equine Encephalitis and St. Louis Encephalitis (Litchtenberg and Getz, 1985).

Both the Solano and Yolo Abatement Districts advise that the mosquito *Aedes melanimon* has demonstrated the ability to vector both Western Equine Encephalitis and California Encephalitis, and *Anopheles punctipennis* is a vector of malaria. Both species exist in Yolo County, a neighboring county. Other mosquitos may also be capable of transmitting diseases to humans (Corps, 1994).

Several types of land use in Yolo, Solano, and Sacramento Counties produce habitat suitable for mosquitos. These uses include rice fields, irrigated pasture, and seasonal, permanent, and tidal wetlands. In well-functioning wetland ecosystems, mosquito populations are controlled by mosquito predators, parasites, and diseases which occur naturally in mosquito breeding habitats (Garcia, 1983). Conditions which may lead to high mosquito populations are water habitats with high levels of organic matter, fluctuating water height and shallow margins, full exposure to the sun, and few predators. The Prospect Island is not treated for mosquito abatement at this time.

Mosquito abatement districts are very active in mosquito control efforts in the Delta. Integrated pest management combines cultural practices and biological control with the use of chemicals. The main biological control agent for mosquitos is the mosquitofish, *Gambusia affinis*. This fish is particularly effective in mosquito control when alternative fish foods (vegetation and microfauna) are limited. Chemical treatments rely heavily on regular inspections to determine when the appropriate threshold mosquito levels have been reached and chemicals should be applied.

4.8.2 Effects. The effects of the restoration project due to mosquito production on the public health were analyzed and coordinated with the Solano Mosquito Vector Control for the EA/IS. The effects for the proposed project are discussed below.

No Action. No change in mosquito production is expected with the no-action alternative. Therefore, this alternative would have no significant effect on public health.

Alternative Plan. This study proposes to restore freshwater wetlands in the Delta. Creation of wetlands and associated communities may affect potential mosquito breeding habitats and mosquito populations at the proposed site. However, this site was designed to replenish the water supply every 2 days and eliminate stagnant pools of water. A significant increase in the mosquito population is not expected because of this restoration project.

4.8.3 Mitigation. No mitigation for public health is required.

4.9 Hazardous, Toxic, and Radiological Waste

4.9.1 Baseline Conditions. When the Bureau of Reclamation purchased Prospect Island, there were no hazardous, toxic, or radiological waste sites present within the project area. Since the purchase, no new sources of contamination have been introduced (Keck, 1999).

4.9.2 Effects. Since there are no hazardous materials or other sources of contamination present on the site, implementation of either alternatives would have no effects on hazardous, toxic, and radiological waste..

4.9.3 Mitigation. No mitigation for HTRW is required.

4.10 Recreation.

4.10.1 Baseline Conditions. Prospect Island is Federally or privately owned, and the Reclamation land is normally used for agriculture. Prospect Island may occasionally be trespassed for activities such as fishing access to the ship channel. Although the ship channel is used by recreational boaters, there are no recreational facilities such as docks, launching areas, picnic grounds, or restrooms on the ship channel near Prospect Island. Recreational boaters use Miner Slough. The commercial Arrowhead Marina is located on Miner Slough.

Recreational opportunities near Prospect Island are minimal due to limited public recreational facilities, as well as private levees and farmlands surrounding the public waterways.

4.10.2 Effects.

No Action. No change in recreation is expected with the no-action alternative.

Alternative Plan. The conversion of farmland to wetland would expand the habitat of many important recreational and commercial fish species and provide opportunities for fishing. Although not designed for such activities, the proposed project could provide opportunities for bird watching.

4.10.3 Mitigation. No mitigation for recreation is required.

4.11 Cultural Resources

4.11.1 Baseline Conditions. The project site has not been previously surveyed for cultural resources although the southern portion of Prospect Island and levees along the ship channel have been surveyed. There were several farm buildings or structures on the island. Reclamation evaluated the buildings and determined that they were not eligible for the National Register of Historic Places. The State Historic Preservation Officer concurred with that determination, and the buildings were removed. Also, a power line on wooden poles crosses the island to a power distribution tower located close to the ship channel levee. A records check was requested from the Northwest Information Center for previously identified cultural resources sites. No sites were identified during the records check (Corps, 1997).

Owens (1991) identified two potential historic resources on Prospect Island as part of his cartographic and literature review of the Delta. These sites were not field checked or evaluated for the National Register of Historic Places.

4.11.2 Effects. Coordination for the restoration project on the cultural resources has been initiated with the State Historic Preservation Officer for the EA/IS (see Attachment F).

No Action. No change in cultural resources is expected with the no-action alternative.

Alternative Plan. Because the island has been under water, an archaeological survey could not be conducted. The Corps intends to survey a sample of the island prior to implementation of the project. Should cultural resources be discovered during the survey, they would be evaluated for the National Register of Historic Places. If any sites are determined eligible, a determination of effect would be made in consultation with State Historic Preservation Officer.

4.11.3 Mitigation. Mitigation of any adverse effects to cultural resources would be accomplished under a Memorandum of Agreement between the Corps, local sponsor, State Historic Preservation Officer, and the Advisory Council on Historic Properties as required by section 106 of the National Historic Preservation Act of 1996, as amended; implementing regulations 36 CFR 800; and Engineering Regulation 1105-2-100. Avoidance or preservation of significant cultural resources would be given foremost consideration. Other mitigation measures could include data recovery through scientific excavation, archival research, recordation, and relocation.

5.0 ENVIRONMENTAL COMMITMENTS

Environmental commitments are the mitigation measures or design/operational actions incorporated into the project to avoid, minimize, or compensate for significant

environmental effects. These commitments are described under mitigation in Sections 4.1 through 4.11.

6.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

6.1 Federal

Clean Air Act of 1972, as amended, 42 U.S.C. 7401, et seq. Section 176(c) of this act prohibits Federal action or support of activities which do not conform to a State Implementation Plan. The proposed project is not expected to violate any standards, increase violations in the project area, exceed the U.S. Environmental Protection Agency's general conformity *de minimis* threshold, or hinder the attainment of air quality objectives in the local air basin. The Corps has determined that the proposed action would have no adverse effect on the future air quality of the project area and is in compliance with this act.

Clean Water Act of 1972, as amended, 33 U.S.C. 1251, et seq. The levees would be breached so that the proposed action would not result in placement of dredged or fill material into waters of the United States or associated wetlands. Consequently, an evaluation relative to section 404 (b)(1) guidelines to determine compliance with the Clean Water Act is not needed. The proposed action is in compliance with the Clean Water Act.

Endangered Species Act of 1973, as amended, 16 U.S.C. 1531, et seq. In accordance with section 7(c), coordination with the FWS and the NMFS has been initiated to determine whether listed species are likely to be adversely affected by this project. The Corps has submitted biological assessments to the FWS and NMFS and is requesting concurrence from these agencies with each assessment's finding of no adverse effects of the proposed action on listed species. Consultation is expected to be completed prior to construction. Habitat restoration is expected to assist the recovery of listed fish and provide potential habitat for mammals, reptiles, and waterfowl.

Fish and Wildlife Coordination Act of 1958, as amended, 16 U.S.C. 661, et seq. The FWS has participated as an active member of the study team in formulating the project. The FWS prepared a draft CAR, which describes the anticipated effects of the project and FWS recommendations. The FWS anticipates that the project would benefit biological resources in the area. The FWS supports implementation of the project as expressed in their CAR. The final CAR will be completed after the Section 7 consultation is completed.

National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, et seq. This EA/IS and associated documents are in compliance with this act.

National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470. In accordance with 36 CFR 800, the implementing regulations for section 106 of the act, the Corps will delineate the Area of Potential Effect and will consult with the State Historic Preservation Officer once Prospect Island has been pumped dry prior to construction to confirm that the proposed action will have no effect on cultural resources.

Farmland Protection Policy Act of 1981, as amended in 1994. The proposed action would restore the entire 1,316-acre project site of "prime" and "unique farmland" to fish and wildlife habitat. Although the Federal Conversion Impact Rating exceeds 160, there would be no significant adverse effect to farmland resulting from implementation of the proposed action as discussed in Section 4.1.2.

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898. The basic premise of the executive order is that Federal agencies should identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. In addition, the order requires all Federal agencies to develop agency-wide strategies to implement these principles. This project should not adversely affect minority and low-income populations since the study area is predominantly uninhabited agricultural and Delta wetlands.

6.2 State

California Environmental Quality Act, California Public Resources Code, Section 21000, et. seq. This act requires the lead governmental agency to identify potential significant adverse effects of the project on the environment through preparation of an IS or environmental impact report. If the IS shows that the project would have no significant effects on the environment, the lead agency uses the study to document reasons to support its findings and prepares a Negative Declaration for the project. This EA/IS would be adopted as a joint document and would fully comply with the requirements of this act.

State Water Resources Control Board, Division of Water Quality, and the California Regional Quality Control Board, Bay Delta Region. The State Water Resources Control Board and the California Regional Water Quality Board for the Bay Delta Region review activities that affect water quality in the Bay Delta Region. The Boards administer the requirements mandated by State and Federal law (Clean Water Act). The Regional Water Quality Control Board establishes water quality standards and reviews individual projects for compliance with the standards.

California Department of Fish and Game. Generally, the DFG administers the State laws providing protection of fish and wildlife resources, including the California Endangered Species Act of 1984, California Fish and Game Code, Section 2080 ct. seq. This act requires that the non-Federal lead sponsor obtain a permit for the take of State listed species or obtain a determination that a permit obtained under the Federal ESA is consistent with State law for species listed under both the State and Federal ESA. The non-Federal sponsor has sent a letter to DFG to obtain a determination of consistency with the Federal biological opinions or begin the application process if necessary (see attachment B).

The DFG requires a Streambed Alteration Agreement for any activity that would "divert or obstruct the natural flow of water, or change the bed, channel or bank of any river, stream, or lake, or proposing to use any material from a streambed." Any person, business, governmental agency, or public utility that proposes such an activity is required

to inform the DFG of their actions. Based on the information submitted by the applicant and a possible field inspection, the DFG may require and negotiate a streambed alteration agreement with the applicant designed to protect and conserve the fish and wildlife resources of the State. The Corps and DWR would ensure that the stream alteration agreement is negotiated before the project is constructed (McIntire, 1997).

7.0 COORDINATION AND REVIEW OF THE EA/IS

Public involvement and coordination for this project began in April 1994. Several scoping meetings and site tours were held throughout the study. A multi-disciplinary team in the Sacramento District, other experts in various biological and engineering fields, and local interests participated in project design development. Team members made site visits to verify site conditions, determine the need for habitat restoration, and formulate possible alternatives.

Early in the study, the Corps met with many separate interest groups including the FWS, Reclamation, Bureau of Land Management, NMFS, DWR, DFG, Port, Category III, Solano County Water Agency, the Trust for Public Lands (TPL), and private landowners. A multi-agency panel participated in the formulation of this study and met about once a month to discuss issues. Furthermore, consultations were held with other participants, including Ducks Unlimited, Wildlife Conservation Board, Department of Boating and Waterways, University of California at Davis, University of Washington, Aquatic Habitat Institute, and Coastal America.

Coordination with local landowners included a scoping meeting on April 7, 1997 and follow-up meetings on February 19, June 29, and September 30, 1998 to discuss the concerns of farmers on Ryer Island.

The draft EA/IS and Finding of No Significant Impact/Negative Declaration were circulated for 30 days to agencies, organizations, and individuals known to have a special interest in the project. Copies of the draft EA/IS were made available for viewing at several local libraries. All comments received during the comment period were considered and incorporated into the final EA/IS, as appropriate. Copies of letters and Corps responses are included in Attachment E.

8.0 CONCLUSIONS

Adverse effects of implementation of the restoration project are not considered to be significant. An agreement with FWS will be completed according to Section 7 consultation for any threatened or endangered fish affected during the Interagency Monitoring Program. In accordance with Federal and State environmental protection and environmental quality requirements, a Finding of No Significant Impact/Negative Declaration would be appropriate.

9.0 LIST OF PREPARERS AND REVIEWERS

Numerous Corps and DWR personnel were involved in the development, preparation, and review of the ERR and EA/IS. A wide range of experience and subject expertise were represented, including engineering, biology, ecology, social science, and real estate. The primary individuals who prepared and/or reviewed the EA/IS are:

Matt Davis, Biologist, Corps
Elizabeth Dyer, Environmental Resources Planner, Corps
Jerry Fuentes, Historian/Social Scientist, Corps
Robert Koenigs, Biologist, Corps
Lynne Stevenson, Environmental Writer, Corps
Katie Wadsworth, Environmental Specialist, DWR
Collette Zemitis, Environmental Specialist, DWR
Leo Winternitz, Environmental Program Manager, DWR

The individuals who prepared and/or reviewed the ERR and appendixes are:

Tom Catarella, Civil Engineer, Corps
Patrick Dwyer, Realty Specialist, Corps
Miki Fujitsubo, Landscape Architect, Corps
Jeff Harris, Hydrologic Engineer, Corps
Lena Hsia, Landscape Architect, Corps
Don Helsby, Hydraulic Engineer, Corps
Sid Jones, Landscape Architect, Corps
Kevin Leahy, Cost Engineer, Corps
Leslie Lew, Landscape Architect, Corps
Ken Patterman, Geotechnical Engineer, Corps
Dave Ricketts, Geotechnical Engineer, Corps
John Russ, Cost Engineer, Corps
Randall Smith, Civil Engineer, Corps
Don Twiss, Hydraulic Engineer, Corps
Elizabeth Youn, Realty Specialist, Corps

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Wadsworth, K. Environmental Specialist, Department of Water Resources, August, 1997.

Witzman, J. Biologist, Department of Water Resources, August, 1997.