

1.1 Project Background

The California State Coastal Conservancy (Coastal Conservancy), U.S. Army Corps of Engineers (Corps), and California Department of Fish and Game (DFG) (project sponsors) are proposing a salinity reduction and habitat restoration project for the 9,460-acre Napa River Unit of the Napa-Sonoma Marshes Wildlife Area (NSMWA) (Napa River Unit). The parcel was purchased with funds from the Shell Oil Spill Settlement, the State Lands Commission, the Wildlife Conservation Board, and the Coastal Conservancy. The Napa River Unit is located at the northeast edge of San Pablo Bay, adjacent to the Napa River (Figure 1-1).

The Napa River Unit was first diked off from San Pablo Bay during the 1850s for hay production and cattle grazing. Dike construction continued for several years. Much of the land was converted in the 1950s to salt ponds for salt production through the solar evaporation of bay water. In the early 1990s, Cargill Salt Company stopped producing salt in the ponds in the west side of the Napa River and sold the evaporator ponds to the State of California, which assigned ownership and management of the ponds to DFG.

On September 28, 1994, the Committee on Public Works and Transportation of the U.S. House of Representatives adopted a resolution authorizing the *Napa-Sonoma Marsh Restoration Project Phase I and Phase II Feasibility Studies for the Napa River, California* (Docket 2448), and a reconnaissance study to evaluate the federal interest in the project was completed in 1997. A reconnaissance report was issued by the Corps in August 1997 and the project sponsors initiated the feasibility study in July 1998. The feasibility study has involved development and detailed evaluation of salinity reduction and habitat restoration options as well as an evaluation of the existing conditions at the Napa River Unit. The study has included data collection, including a detailed topographic survey of the project area, hydrologic data in the slough and river system, analysis of water quality and sediment conditions within the ponds, and analysis of the sediment budget in the region. Baseline data have allowed development of a detailed hydrodynamic model of the system, which has been used to analyze salinity reduction and habitat restoration options. Hydrologic modeling is integral to the description of the salinity reduction and habitat

restoration options presented in this document and would continue throughout project design.

Restoration of the Napa River Unit has long been a vision for local resource agencies, conservationists, and planners. It is one of the largest tidal restoration projects on the west coast of the United States and one of many restoration projects throughout the San Francisco Bay area. Baywide restoration planning, including historic and existing conditions and future habitat recommendations, was conducted as part of the Baylands Ecosystem Habitat Goals Project (Goals Project 1999) and provides a regional framework for this project.

1.2 Purpose and Need

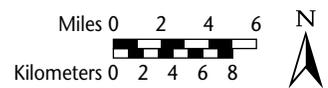
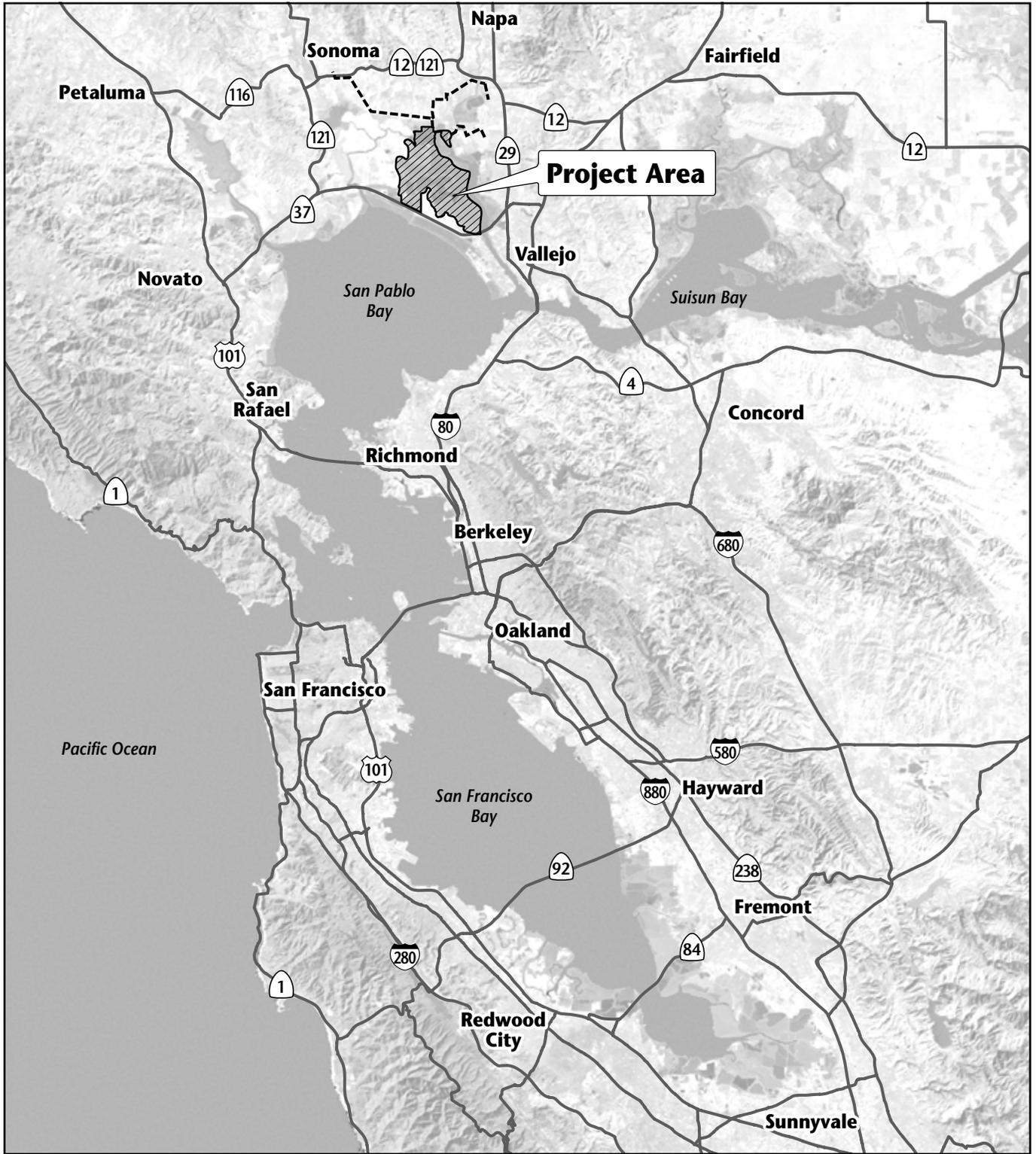
The purpose of the project is to restore a mosaic of habitats, including tidal habitats and managed ponds, to this property and provide for better management of ponds in the Napa River Unit to support populations of fish and wildlife, including endangered species, migratory waterfowl, shorebirds, and anadromous and resident fish. Other important benefits of the project include improved water quality, the potential use of recycled water, and enhanced public open space and wildlife-compatible recreation opportunities. The long-term goal is to produce a natural, self-sustaining habitat that can adjust to naturally occurring changes in physical processes with minimum ongoing intervention.

The project is needed because of

- historic losses of marsh ecosystems and habitats;
- increasing salinity and declining ecological value in several of the ponds;
- the collapse of the pond system ecology in the absence of salt production or rehabilitation as tidal habitat;
- deterioration of levees, which could lead to levee breaches and uncontrolled high-salinity discharges, resulting in potential fish kills;
- deterioration of water-control structures, which exacerbates the increase in salinity;
- increased restoration costs associated with site deterioration;
- increasing operation and maintenance costs; and
- inadequate water supply, especially during the summer months, resulting in increased salinity, acidic conditions, and drying out of some ponds in summer.

Restoring tidal wetlands, including tidal marsh, within the Napa River Unit would benefit the natural environment by creating

- a large area of contiguous tidal marsh for a diversity of fish and wildlife, including threatened and endangered species (salt marsh harvest mouse, California clapper rail, and black rail);



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- a greater variety of slough channel sizes, a large increase in slough habitat, and greater connections among San Pablo Bay, the Napa River, and the tidal salt marsh, which would benefit estuarine fish, including listed species (Delta smelt, splittail, steelhead trout, and chinook salmon) and other aquatic species, such as the Dungeness crab;
- a natural, self-sustaining system that could adjust to naturally occurring changes in physical processes, with minimum ongoing intervention;
- large tracts of tidal marsh that extend up the Napa River that allow fish and wildlife species to adjust to changes in salinity that occur seasonally and over longer periods because of variations in precipitation;
- increased tidal prism that would scour slough channels, eventually creating large tidal channels, benefiting fish and diving waterfowl;
- improved tidal circulation throughout the system, improving water quality; and
- greatly increased production of organic detritus by tidal marshes, increasing the ecological productivity of San Pablo Bay.

Diking or filling has destroyed approximately 85–90% of the original tidal wetlands of the San Francisco Bay region. The loss of tidal wetlands has greatly reduced the amount of habitat available to many species of fish and wildlife. Several animal and plant species native to California, including the salt marsh harvest mouse (*Reithrodontomys raviventris*) and the California clapper rail (*Rallus longirostris obsoletus*), have been federally and state listed as endangered as a result of the severe reduction of wetland habitats.

Salinity is increasing and ecological values are declining in several of the ponds in the Napa River Unit. DFG's ability to maintain the levee system and to control water levels, salinity, and water quality in the ponds is limited by funding and infrastructure constraints. The primary limitations to DFG's successful management are the high operating cost to run poorly performing water intake pumps and low hydroconnectivity between ponds. The current pumps do not supply enough water to prevent a salinity concentration increase, especially during seasonal periods of low precipitation and high water evaporation. Upgraded water intake pumps combined with levee reconstruction would result in improved hydroconnectivity and would enable DFG to improve migratory waterfowl management activities.

Several of the salt pond levees are deteriorating. The ponds are considered a potential threat to the ecology of the north bay region because of the presence of high concentrations of residual salts. It has been estimated that there are currently 2–4 million tons of salt in the ponds. During the commercial production of salt, the solar evaporation system moved bay water through the ponds in sequence as the salts became concentrated. As a result, ponds further along in the system have salinity levels that exceed the salinity level of seawater (ranging from approximately 32 parts per thousand [ppt] to more than 400 ppt).

The salt production process also concentrated soluble salts other than sodium chloride. These additional salts were generally not harvested and accumulated in the pond system in solutions and precipitates known as *bittern*. The uncontrolled release of bittern would be detrimental to the aquatic environment. Additionally, the drying action that occurs within the salt ponds creates undesirable low pH (acidic) values.

Although the water lost through net evaporation can be replaced by water drawn from San Pablo Bay and the lower Napa River, these sources also contain salts that become concentrated in the ponds over time. The annual evaporative water loss from the salt ponds substantially exceeds the amount of water replaced by annual rainfall. Therefore, without the ability to provide both adequate water intake and discharge of pond water through flow-through circulation~~active water management~~, the salt ponds would become increasingly saline and turn into seasonally wet salt flats—or worse, bittern—resulting in the loss of most of their present habitat value for waterbirds and other wildlife species.

The limited capacity and high operating costs of the pumps used to draw water into the ponds are also problematic. Additional infrastructure constraints further limit DFG's ability to move replacement water into the ponds.

1.3 Overview of CEQA and NEPA Compliance

The California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 *et seq.*) and the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321; 40 Code of Federal Regulations [CFR] 1500.1) are the state and federal laws that govern the disclosure and analysis of the environmental effects of agency actions. These regulations are described briefly below.

1.3.1 California Environmental Quality Act

CEQA is regarded as the foundation of environmental law and policy in California. CEQA's primary objectives are to

- disclose to decision makers and the public the significant environmental effects of proposed activities,
- identify ways to avoid or reduce environmental damage,
- prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures,
- disclose to the public reasons for agency approval of projects with significant environmental effects,
- foster interagency coordination in the review of projects, and
- enhance public participation in the planning process.

CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. It requires that public agencies comply with both procedural and substantive requirements. Procedural requirements include the preparation of the appropriate public notices (including notices of preparation), scoping documents, alternatives, environmental documents (including mitigation measures, mitigation monitoring plans, responses to comments, findings, and statements of overriding considerations); completion of agency consultation and State Clearinghouse review; and provisions for legal enforcement and citizen access to the courts.

CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. When avoiding or minimizing environmental damage is not feasible, CEQA requires agencies to prepare a written statement of overriding considerations when they decide to approve a project that will cause one or more significant effects on the environment that can not be mitigated. CEQA establishes a series of action-forcing procedures to ensure that agencies accomplish the purposes of the law. In addition, under the direction of CEQA, the California Resources Agency has adopted regulations, known as the State CEQA Guidelines, which provide detailed procedures that agencies must follow to implement the law. ~~The Coastal Conservancy~~ DFG is the state lead agency and would use this environmental impact report/~~environmental impact statement~~ (EIR/~~EIS~~) to comply with the State CEQA Guidelines and to document CEQA compliance. The Coastal Conservancy ~~DFG~~ is a responsible agency and project sponsor and would also use this EIR/~~EIS~~ to document CEQA compliance.

1.3.2 National Environmental Policy Act

NEPA is the nation's broadest environmental law, applying to all federal agencies and most of the activities they manage, regulate, or fund that affect the environment. It requires federal agencies to disclose and consider the environmental implications of their proposed actions. NEPA establishes environmental policies for the nation, provides an interdisciplinary framework for federal agencies to prevent environmental damage, and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account.

NEPA requires the preparation of an appropriate document to ensure that federal agencies accomplish the law's purposes. The President's Council on Environmental Quality (CEQ) has adopted regulations and other guidance that provide detailed procedures that federal agencies must follow to implement NEPA. The Corps is the federal lead agency and would use a Final EIS~~this EIR/EIS~~ to comply with CEQ's regulations and document NEPA compliance.

~~1.3.3 Combined CEQA and NEPA Document~~

~~Both CEQA and NEPA encourage the preparation of combined environmental planning documents. Therefore, this joint EIR/EIS will serve to fulfill the statutory obligations of both CEQA and NEPA.~~

1.4 Intent and Scope of the EIR/EIS

The intent of this EIR/EIS is to disclose the environmental impacts associated with this restoration project. The restoration effort would have substantial habitat benefits by restoring portions of the Napa River Unit to a mosaic of wildlife habitats consisting of managed ponds and tidal marsh, but may result in significant hydrologic, water quality, and biological effects.

In accordance with ~~both CEQA and NEPA~~ regulations, this document describes the potential environmental effects caused by construction, operation, and maintenance activities related to restoring the Napa River Unit. It focuses on key issues, including hydrology, water quality, biological resources (vegetation, wildlife, and aquatic resources), and geology and soils. Other resource topics such as air quality, hazardous materials, noise, land use, recreation, and cultural resources are also addressed in this document.

1.5 Public Involvement and Scoping

The project sponsors have provided the public and public agencies with several opportunities for involvement with the project, which included discussions about key issues for the Draft EIR/EIS. These opportunities occurred at public meetings in 1998 ~~and 2001 and 2003~~, and a series of agency and restoration planning meetings between 1998 and 2002.

The public involvement process was initiated when the Coastal Conservancy issued a notice of preparation for the project on July 17, 1998, and the Corps issued a notice of intent for the project on July 16, 1998 (63 *Federal Register* [FR] 136). The first public scoping meeting was held on July 21, 1998, in the Napa County Board of Supervisors offices. The second public workshop was held on October 23, 2001, in the Napa City-County Library Community Meeting Room, Napa, California.

Specific questions raised during scoping included the following:

- How would the project affect existing species and habitat?
- Would fish be entrained in pumps or trapped in the ponds?
- Would viable populations of threatened and endangered species be maintained in the area during construction and implementation?

- Would construction of the project be planned around critical time periods for different species?
- Would the sources of fresh water be turned off when desalination is finished?
- Would the use of fresh water change the salinity balance of the system?
- Would the project sponsors coordinate with the mosquito abatement districts and other agencies, particularly the U.S. Fish and Wildlife Service (USFWS), to make sure this project does not interfere with their objectives?
- Would opening up the ponds too quickly lead to a scouring out of vegetation in the slough channels?
- Would the waters become too deep for high-tide roosting of shorebirds?
- Would wintering diving birds that use Ponds 1, 1A, 2, and 3 be adversely affected by the project?
- Is dilution the most appropriate solution?
- What other alternatives have been studied?
- What are the potential impacts on privately and publicly held adjacent lands?
- Are there public health implications associated with the use of recycled water?
- Would discharged diluted salt pond water affect the Napa River, San Pablo Bay, or sloughs of the Napa River Unit?

These issues are presented and analyzed in ~~this~~ the Draft EIR/EIS for decision makers to evaluate the project. An initial study was prepared for the project and is included as Appendix A.

A public meeting on the Draft EIR/EIS was held on May 21, 2003 at the Napa City-County Library. No formal comments on the Draft EIR/EIS were provided by the public at the meeting, though the Coastal Conservancy, DFG and Corps staff responded to questions (Volume 2, Appendix A).

The Napa-Sonoma Marsh Restoration Group, a technical working group, held meetings intermittently between 1998 and 2002~~3~~ and monthly to quarterly meetings beginning in August 2001. The initial purpose of these meetings was to coordinate data collection efforts and update key stakeholders on the status of the project. More recent meetings were designed to update stakeholders on the technical analysis of the project, and obtain input and critiques of the technical analysis (e.g., salinity modeling) and habitat restoration and salinity reduction approaches to be evaluated in the Draft EIR/EIS. Members of this group included staff from the Coastal Conservancy; the Corps; DFG; the University of California, Davis (UCD); the U.S. Geological Survey (USGS); the San Francisco Estuary Institute; Save the Bay; The Bay Institute; the San Francisco Bay Regional Water Quality Control Board (RWQCB); Ducks Unlimited; Cargill, Inc.; the National Audubon Society; the Napa County Resource Conservation District; the Southern Sonoma County Resource Conservation District; USFWS; the National Marine Fisheries Service (NMFS); the Sonoma, Napa, and Solano

County Mosquito Control Districts; San Pablo Bay National Wildlife Refuge; San Francisco Bay Joint Venture; the San Francisco Bay Conservation and Development Commission (BCDC); and Sonoma County Water Agency (SCWA).

1.6 Issues of Known Controversy

The public and the resource agencies are largely supportive of the project; however, several areas of known controversy exist, particularly related to water quality and ecosystem effects. Water quality concerns relate to environmental effects on aquatic resources, including those effects resulting from the potential project discharges. The ecosystem concerns relate to the short-term impacts and the long-term evolution and use of the site by various fish and wildlife species (i.e., controversy over whether endangered species habitat [marsh] should take priority over migratory waterfowl habitat [ponds]). Two other potential areas of controversy relate to how quickly the levees are likely to deteriorate, thereby necessitating quick salinity reduction and the potential interim loss of accreted marsh habitat.

1.7 Report Organization

This EIR/EIS is organized into the following chapters:

- Chapter 1. Introduction
- Chapter 2. Site Description, Options, and Alternatives
- Chapter 3. Hydrology
- Chapter 4. Water Quality
- Chapter 5. Biological Resources—Vegetation
- Chapter 6. Biological Resources—Wildlife
- Chapter 7. Biological Resources—Aquatic Resources
- Chapter 8. Geology and Soils
- Chapter 9. Hazards and Hazardous Materials
- Chapter 10. Transportation and Circulation
- Chapter 11. Air Quality
- Chapter 12. Noise
- Chapter 13. Land Use and Planning
- Chapter 14. Public Services and Utilities
- Chapter 15. Recreation, Public Access, Visual Resources, and Public Health
- Chapter 16. Cultural Resources

- Chapter 17. Alternatives
- Chapter 18. Cumulative Impacts and Other Required Analyses
- Chapter 19. List of Recipients
- Chapter 20. List of Preparers
- Chapter 21. References Cited
- Index
- Appendices:
 - Appendix A. Initial Study
 - Appendix B. Section 404(b)(1) Compliance
 - Appendix C. Contaminants Toxic to Wildlife
 - Appendix D. Species that May Occur in the Project Area or Be Affected by the Project
 - Appendix E. Estimated Air Emissions by Option

1.8 Consultation and Other Requirements

In addition to CEQA and NEPA, the Napa River Salt Marsh Restoration Project must fulfill other federal, state, regional, and local environmental requirements as summarized in Table 1-1. As indicated in the table, the proposed project is in compliance with Executive Order 11988—Floodplain Management, and with Executive Order 12898—Environmental Justice because no minority or low-income areas or communities would be involved. In addition, the project adheres to the requirements of the Americans with Disabilities Act, Rehabilitation Act, and Architectural Barriers Act.

Specific requirements for compliance with other environmental regulations are described in the resource chapters cited below.

- Federal Requirements:
 - Endangered Species Act (Chapter 5, “Biological Resources—Vegetation”; Chapter 6, “Biological Resources—Wildlife”; and Chapter 7, “Biological Resources—Aquatic Resources”);
 - Magnuson-Stevens Fishery Conservation and Management Act (Chapter 7);
 - Fish and Wildlife Coordination Act (Chapters 5 and 6);
 - Clean Water Act Sections 404, 401, 402, and 313 (Chapter 4, “Water Quality,” and Chapters 5 and 6);
 - Clean Air Act (Chapter 11, “Air Quality”);
 - Coastal Zone Management Act (Chapter 3, “Hydrology”);

- National Historic Preservation Act (Chapter 16, “Cultural Resources”);
- Executive Order 11990—Protection of Wetlands (Chapters 5 and 6); and
- Migratory Bird Treaty Act (Chapter 6);
- State Requirements:
 - California Endangered Species Act (Chapters 5, 6, and 7);
 - McAtteer-Petris Act (Chapter 3);
 - California Fish and Game Code (Section 1600 Lake or Streambed Alteration Agreement Program) (Chapters 3, 5, 6, and 7); and
 - California Department of Transportation Encroachment Permit (Chapter 10, “Transportation and Circulation”).
- Regional and Local Requirements:
 - Bay Conservation and Development Commission Permit and Bay Plan Compliance (Chapter 3); and
 - San Francisco Bay Regional Water Quality Control Board and State Water Resources Control Board Policies and Procedures (Chapter 4).

Table 1-1. Summary of Regulatory Compliance for the Project

| Legal Statute | Status of Compliance |
|--|---|
| NEPA | Ongoing as part of this document <u>the Final EIS</u> |
| CEQA | Ongoing as part of this document |
| Federal Endangered Species Act (ESA) and California Endangered Species Act (CESA) | Ongoing as part of this document |
| Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) | Ongoing as part of this document |
| Fish and Wildlife Coordination Act (FWCA) | Ongoing; USFWS has participated in advisory groups reviewing or conducting endangered species surveys and conducting a habitat evaluation analysis for the project, and has completed a Fish and Wildlife Coordination Act Report (CAR). USFWS will continue to participate in mitigation and monitoring plan (MMP) monitoring and adaptive management. |
| Clean Water Act (CWA) | Ongoing; State Water Resources Control Board (SWRCB) will issue water quality certification after the final design and environmental documents are completed. |
| Clean Air Act (CAA) | Ongoing; conformity analysis is included as part of this document. |
| Coastal Zone Management Act | Ongoing; consistency <u>conformity</u> determination from BCDC needed |
| National Historic Preservation Act (NHPA) | Ongoing; once Section 106 review process is completed by the Corps, the project would proceed in accordance with conditions stipulated in the agreement with the State Historic Preservation Officer (SHPO) and appropriate agencies. |
| Executive Order 11988—Floodplain Management | In compliance |
| Executive Order 11990—Protection of Wetlands | In compliance |
| Migratory Bird Treaty Act (MBTA) | The Corps and Coastal Conservancy would comply with provisions of the MBTA. |
| McAteer-Petris Act | Ongoing; BCDC San Francisco Bay permit or conformity determination for minor bay fill is needed. |
| California Fish and Game Code (Section 1600 Lake or Streambed Alteration Agreement Program) | Ongoing; the project complies with Section 1600 by using this document to address expected project effects. In multiple locations, DFG has determined that the restoration project area is not subject to Section 1600 because it is in the tidal zone. |
| California Department of Transportation (Caltrans) Encroachment Permit | Ongoing; an encroachment permit would be required before construction may begin. |
| Disabilities Regulations—Americans with Disabilities Act (ADA), Rehabilitation Act, and Architectural Barriers Act (ABA) | Ongoing; the project adheres to the construction guidelines of the Uniform Federal Accessibility Standards and complies with regulations proposed for incorporation into the ADA Accessibility Guidelines. |

1.9 Other Pertinent Studies and Documents

San Pablo Bay, including the Napa River Unit, has been studied extensively. A complete list of pertinent studies and documents developed through the year 2000 is provided in *Napa River, Salt Marsh Restoration Feasibility Study Biophysical Bibliography* (Tetra Tech 2000). Key pertinent studies and documents for this project include those listed below.

1.9.1 Physical and Modeled Analysis

1.9.1.1 Hydrodynamic and Geomorphologic Analysis

Philip Williams and Associates (PWA) has conducted extensive modeling of the proposed project area as part of the hydrodynamic and geomorphologic analysis. One document recently released entitled *Hydrodynamic Modeling Analysis of Existing Conditions* (Philip Williams and Associates 2002a) was prepared to characterize the baseline or existing hydrodynamic conditions and construct a hydrodynamic model to simulate these conditions. In addition, geomorphic interpretation of the response of slough channels to the tidal restoration of the marsh system was investigated.

The existing physical conditions characterized include parameters such as water surface elevation and salinity and sediment transport, using a combination of one- and two-dimensional computational modeling. One-dimensional (1-D) computational modeling is used to describe the predominantly 1-D flow through the network of slough channels and rivers (the Napa River and Sonoma Creek), and two-dimensional (2-D) computational modeling is used to describe the predominantly 2-D mixing processes in the former salt ponds. This study is closely connected to other recent projects that are described in more detail in Chapter 3, "Hydrology."

PWA also concurrently prepared the *Napa Sonoma Marsh Restoration Feasibility Study Phase 2 Stage 1* report (Philip Williams and Associates 2002b), which describes and evaluates the salinity reduction alternatives, and the *Napa River Salt ~~Sonoma~~ Marsh Restoration Habitat Restoration Preliminary Design Feasibility Study Phase 2 Stage 2 of the Hydrology and Geomorphology Assessment in Support of the Feasibility Report* ~~report~~ (Philip Williams and Associates 2002c), which describes and evaluates the habitat restoration alternatives. PWA and DHI Water and Environment conducted additional 2-dimensional modeling of Pond 4 and the Upper Ponds in May 2003 with follow-up field sampling conducted in the fall of 2003. This modeling was conducted to better assess the near field mixing associated with the breach of Pond 4 and the diffusers on the Upper Ponds. These studies provide the foundation for the hydrodynamic and geomorphologic analysis in the EIR/~~EIS~~.

1.9.1.2 Water Quality and Sediment Characterization

An extensive water quality and sediment characterization study was prepared for the Napa River Unit by HydroScience Engineers, Inc. This study is described in the report *Water Quality and Sediment Characterization* (HydroScience Engineers 2002). This report details the sampling analysis plan and the quality assurance project plan prepared to ensure consistency and quality control throughout the data collection process. The San Francisco Bay RWQCB approved the sampling approach. The report includes detailed information on the quality of receiving water, pond water, and pond sediment. The water quality analysis focused on general water quality parameters, volatile organic

compounds, semivolatile organic compounds, metals, and organics. In the Coastal Conservancy's and DFG's restoration efforts in the South San Francisco Bay, it became apparent that there were inaccuracies in the laboratory analysis of aqueous metals samples due to elevated levels of salinity. Therefore, a new sampling and metal evaluation procedure was proposed for Pond 4, 7, 7A, and 8 in the project area. The 2003 sampling results by Frontier Geosciences revealed that metals were not as high as previously estimated. These studies and the modeling conducted by PWA provide the foundation for the water quality analysis in the EIR/EIS.

1.9.1.3 Baseline Monitoring of Pond 2A Tidal Restoration Project

Pond 2A of the NSMWA was opened to tidal action in 1995. PWA and MEC Analytical Systems, Inc. (MEC Analytical Systems 2000), monitored the physical and biological evolution of the marsh in this pond. Over a 4-year period, data was collected on the levee breaches, sediment chemistry and grain size, sedimentation rates, tidal range and response, water quality, fish usage, avian usage, and plant colonization. These data are helpful in evaluating the effects of future breaches.

1.9.2 Biological Analysis

1.9.2.1 *Science Support for Wetland Restoration in the Napa-Sonoma Salt Ponds*

The most recent biological study of the project area was conducted by USGS to provide basic information on the habitats, species abundance, and processes within the Napa River Unit. The report, entitled *Science Support for Wetland Restoration in the Napa-Sonoma Salt Ponds, San Francisco Bay Estuary, 2000 Progress Report* (Takekawa et al. 2000), provides important baseline information on the productivity and habitat values in the existing marsh and salt pond system.

The report was prepared as an interim summary of a 2-year study of the Napa River Unit. The final report has not yet been released; however, the interim report provides useful data for assessing the effects of the project. USGS scientists selected six of the 12 ponds across a range of salinities for intensive studies. The existing site conditions and ponds, including pond numbering, are provided in Chapter 2, "Site Description and Options." These ponds included low salinities, moderate salinities, and high salinities; the recently restored Pond 2A was also evaluated. Salinity ranges for the ponds during the 2000 field season varied from 7.8 to 264 ppt, depending on rainfall. Surveys were conducted for birds, and sampling was conducted for fish, invertebrates, and water quality within each pond bimonthly. (Takekawa et al. 2000.)

1.9.2.2 *Baylands Ecosystem Habitat Goals—A Report of Habitat Recommendations*

This report presents recommendations for the kinds, amounts, and distribution of wetlands and related habitats needed to sustain diverse and healthy communities of fish and wildlife resources in the San Francisco Bay area (Goals Project 1999). The Goals Project began in 1995 and involved more than 100 participants representing local, state, and federal agencies, academia, and the private sector. The process for developing the goals involved the selection of key species and key habitats, assembling and evaluating information, preparing recommendations, and integrating recommendations into the goals.

1.9.2.3 *Baylands Ecosystem Species and Community Profiles—Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife*

The companion volume to the *Report of Habitat Recommendations* (Goals Project 2000), this report is a reference volume for the 120 species of invertebrates, fish, amphibians, reptiles, mammals, and birds evaluated as part of the Goals Project. It provides a detailed overview of each species' historic and modern distribution, use of habitats, migration, relationship and interaction with other species, conservation and management issues, research needs, and habitat recommendations.

1.9.3 Management Plans and Strategies

1.9.3.1 Comprehensive Conservation and Management Plan

The San Francisco Estuary Project developed a Comprehensive Conservation and Management Plan (CCMP) for San Francisco Bay with input from more than 100 representatives from the public and private sectors, including government, industry, business, and environmental interests, as well as elected officials from all 12 San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) counties.

The CCMP presents a blueprint of 145 specific actions to restore and maintain the chemical, physical, and biological integrity of the bay and Delta. It seeks to achieve high standards of water quality; to maintain an appropriate indigenous population of fish, shellfish, and wildlife; to support recreational activities; and to protect the beneficial uses of the Bay-Delta estuary.

1.9.3.2 Implementation Strategy of the San Francisco Bay Joint Venture

The San Francisco Bay Joint Venture (SFBJV) is a partnership of public agencies, environmental organizations, the business community, local governments, the agricultural community, and landowners working cooperatively to protect, restore, increase, and enhance wetlands and riparian habitat in San Francisco Bay and adjoining watersheds. The SFBJV shares the following objectives:

- secure, restore, and improve wetlands, riparian habitat, and associated uplands by applying incentives and using nonregulatory techniques;
- strengthen and promote new sources of funding for such efforts;
- improve habitat management on public and private lands through cooperative agreements and incentives; and
- support the monitoring and evaluation of habitat restoration projects and research to improve future restoration projects.

The implementation strategy is a blueprint for acquiring, enhancing, and restoring bay habitats, seasonal wetlands, and creeks and lakes. Over the next two decades SFBJV partners plan to protect 63,000 acres, restore 37,000 acres, and enhance another 35,000 acres of bay habitats that include tidal flats, marshes, and lagoons.