Appendix B

Section 404(b)(1) Compliance

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Introduction

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 9,456-acre Napa River Unit of the Napa-Sonoma Marshes Wildlife Area (NSMWA) (Napa River Unit). The Napa River Unit is located at the northeast edge of San Pablo Bay, adjacent to the Napa River (Figure 1).

Background on the Napa River Unit

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. The parcel was purchased with funds from the Shell Oil Spill Settlement, the State Lands Commission, the Wildlife Conservation Board, and the Coastal Conservancy.

Project Authority and Purpose

The Napa River Salt Marsh Restoration Project is an outgrowth of the *Napa-Sonoma Marsh Restoration Project Phase I and Phase II Feasibility Studies for the Napa River, California*, which was authorized by a resolution adopted on September 28, 1994, by the Committee on Public Works and Transportation of the U.S. House of Representatives (Docket 2448).

The purpose of the project is to restore a mosaic of habitats, including tidal habitats and managed ponds, to this property 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.

Related Agreements, Programs, and Studies

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. The Coastal Conservancy and the Corps have entered into a cost-sharing agreement for the analysis and development of the project.

Baywide restoration planning programs have long considered the Napa River Unit. The key programs identifying this site for restoration include

- San Francisco Estuary Project—Comprehensive Conservation and Management Plan; and
- San Francisco Bay Joint Venture—Implementation Strategy.

Relevant studies and analysis of the project include

- *Hydrodynamic Modeling Analysis of Existing Conditions* (Philip Williams and Associates 2002a);
- *Napa Sonoma Marsh Restoration Feasibility Study Phase 2 Stage 1* and *Napa Sonoma Marsh Restoration Feasibility Study Phase 2 Stage 2* (Philip Williams and Associates 2002b, 2002c);
- *Water Quality and Sediment Characterization* (HydroScience Engineers 2002);
- *Baseline Monitoring of the Pond 2A Tidal Restoration Project* (MEC Analytical Systems 2000);
- *Science Support for Wetland Restoration in the Napa-Sonoma Salt Ponds, San Francisco Bay Estuary, 2000 Progress Report* (Takekawa et al. 2001);
- *Baylands Ecosystem Habitat Goals—A Report of Habitat Recommendations* (Goals Project 1999); and
- *Baylands Ecosystem Species and Community Profiles—Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife* (Goals Project 2000).

Alternatives Screening Process

The Napa River Salt Marsh Restoration Project includes three primary components—salinity reduction, habitat restoration, and water delivery. Each of these components had numerous alternative approaches to being implemented.

Twenty-four salinity reduction, three supplemental water delivery, and seven habitat restoration options were considered at the screening stage. Of these, 21 salinity reduction options, two water delivery options, and three habitat restoration options were eliminated from further analysis. These options are briefly described below.

Salinity Reduction Options

Salinity reduction options considered but eliminated fell into several categories. These categories and the reasons that the options were eliminated are listed below.

- *Reverse Operation of the Ponds:* These options consisted of reversing the flow so that the higher salinity (northernmost) ponds would discharge into the lower salinity ponds (closest to the bay). Hydrologic modeling indicated that reverse operation would delay the salinity reduction and habitat restoration process because desalination of the lower salinity ponds would be delayed until desalination of the higher salinity ponds had been completed. In addition, the salinity in the lower salinity ponds would increase initially as the water from the upper ponds is discharged to the lower ponds.
- *Concentration of Brine in One or More Central Ponds:* Brine would have been moved from the lower and upper ponds to centrally located holding chamber(s), which would be used to discharge the brine over time; this would have allowed restoration of the remaining ponds to occur sooner than under reverse operation. Preliminary analysis of these options indicated that one or more ponds would have a very large increase in salinity, and (in several scenarios) one or more ponds could dry out completely. In addition, very high water volumes would be required for most of these options. The loss of habitat value and potential long-term damage to one or more ponds associated with desiccation made these options unacceptable.
- *Physical Removal of the Bittern:* Bittern from Pond 7 would have been pumped out and/or scraped up, then disposed of or reused off-site, potentially expediting restoration of the upper ponds. Cost and environmental effects made these options infeasible.
- *Use of Only Recycled Water to Desalinate All Ponds:* This option was designed to eliminate potential impacts on aquatic life from use of Napa River, Napa Slough, or San Pablo Bay water for desalination. However, water-balance calculations indicated that there would not be sufficient recycled water to compensate for net evaporation, much less to desalinate all ponds.
- *Flood Event Salinity Reduction:* Under this option, brine could be discharged only during flood events (or discharged at a higher rate during such periods) since a higher volume of water would be available to dilute the brines and carry the diluted discharge to San Pablo Bay. This option is not a complete desalination option by itself, because this approach cannot be used for the bittern and may not be appropriate for the highest salinity ponds. The

use of floodwaters to help reduce salinity was integrated into two of the salinity reduction options considered in the environmental impact report/environmental impact statement (EIR/EIS) for the project.

Water Delivery Options

Water delivery options considered for salinity reduction included "maximum" recycled water delivery (a combined 15,000 acre-feet per year of recycled water from water/sanitary agencies in the region) and use of groundwater beneath the site.

The Maximum Recycled Water Delivery Option was eliminated from further consideration because the feasibility and timing of constructing a pipeline system to convey recycled water to the project site from all wastewater treatment plants (WWTPs) in the north bay region have not been determined. However, a portion of this option is currently feasible as described under "Water Delivery" in the "General Description" section of the project description below.

Use of site groundwater was eliminated from further consideration because of the relatively small volume of water available, the cost of installing the required wells and water distribution system, the risk of causing saltwater intrusion into the shallow aquifer, and the opposition of the San Francisco Bay Regional Water Quality Control Board (RWQCB) to use of limited potable water for desalination when other options are feasible. However, use of groundwater may be appropriate for select aspects of the long-term maintenance program for the project area.

Habitat Restoration Options

Habitat restoration options considered but eliminated fell into several categories. These categories and the reasons that the options were eliminated are listed below.

- *Species-Focused Options:* The site would have been restored for primary use by specific species such as waterfowl and shorebirds or by endangered species. Maximizing habitat for shorebirds and waterfowl would completely eliminate the largest likely potential for recovery of endangered species and the largest likely potential for increasing tidal marsh and associated ecosystem services (including benefits to the bay) anywhere in the north bay region. Maximizing habitat for endangered species would cause disproportionate negative impacts on shorebirds and waterfowl by eliminating excellent high tide refugia and feeding habitat for the former and substantial feeding and resting habitat for the latter. Species-focused options are particularly difficult to design and do not allow the necessary flexibility needed to manage the multispecies project area. The habitat restoration options that were retained provide suitable habitat for a wide range of existing species.

- *Land Exchange:* This habitat restoration option would have involved integrating activities at adjacent or nearby restoration sites. One option was to exchange the Cullinan Ranch parcel (owned by the U.S. Fish and Wildlife Service [USFWS]) for a DFG parcel in the project area so that land more suitable for tidal marsh restoration would be used to create tidal marsh and a deeply subsided area such as Cullinan would be used to create pond habitat. Although technically and economically sound, this option is logistically infeasible at this time because the terms of congressional funding and USFWS's purchase agreement mandated that Cullinan Ranch be restored.
- *Sediment-Import Options:* Imported sediment would have been placed into the ponds before breaching to avoid or minimize the need for sediment accretion before establishment of marsh vegetation; sediment could have been used to raise grades at the northern ponds to create upland or seasonal wetland habitat. Sediment import may not enhance the environmental values substantially over existing conditions and DFG supports only the limited use of sediment. Additionally, initial calculations have shown that there will be sufficient sediments to fill the ponds naturally. Creation of seasonal wetland or upland habitat is not part of the goals for this project.

Final Project Alternative

The four most feasible salinity reduction and habitat restoration options were then combined to create 16 possible alternatives, each with recycled water. A no-recycled-water alternative was also added. These alternatives were screened based on cost effectiveness, feasibility, environmental impacts, and achievement of overall project objectives for salinity reduction and habitat restoration. The project sponsors will formally identify the proposed project or "preferred alternative" in the final EIR/EIS for the project. However, the alternative projected as the preferred alternative is Alternative 6, "Napa River and Napa Slough Discharge with Breach of Pond 3 and 4/5, Recycled Water Delivery, and Mixture of Ponds and Tidal Marsh.

Project Description

General Description

Both salinity reduction and habitat restoration are required to complete the Napa River Salt Marsh Restoration Project; the appropriate options for these components of the project, along with the appropriate water delivery option (all analyzed in the EIR/EIS for the project), have been combined to create the proposed project. The following components are part of the proposed project.

Salinity Reduction: Napa River and Napa Slough Discharge, with Breach of Pond 3 and 4/5

The salinity reduction process would occur in a phased approach, decoupling desalination of the upper ponds from desalination of the lower ponds. Primary discharges from the upper ponds would be to Napa Slough, and primary discharges from the lower ponds would be to the Napa River. The use of recycled water for dilution of the upper ponds would be included in this option. The southeast corner of the Pond 3 levee would be breached for 50 feet to accelerate the salinity reduction process and reduce project costs. Subsequent to the breaching and salinity reduction of Pond 3, the east side of Pond 4 would also be breached for 50 feet. Together, these two breaches would be the fastest way to accelerate the salinity reduction process safely and reduce project costs.

Water Delivery

This project component focuses on delivery of recycled water to the project area and contains two components—one of them project-specific in nature (the "Water Delivery Project Component") and the other programmatic (the "Water Delivery Program Component"). Project-specific delivery would occur from the Sonoma Valley County Sanitation District (SVCSD) WWTP, the Napa Sanitation District (NSD) WWTP, and the City of American Canyon (CAC) WWTP (Figure 2). Programmatic recycled water delivery could come from other WWTPs in the Sonoma County Water Agency's jurisdiction (Figure 2).

Habitat Restoration: Mixture of Tidal Marsh and Managed Ponds

This option provides a balanced mix of tidal marsh habitat and managed pond habitat, with an emphasis on restoring Ponds 3, 4, and 5 to tidal marsh and maintaining the remaining ponds as managed ponds. Some design features would be employed to accelerate restoration, including limited excavation of historic slough channels and grading of levees.

Location

Salinity Reduction and Habitat Restoration

The project area was historically the marshland between the Napa River and Sonoma Creek in the north San Pablo Bay region and is now called the Napa River Unit. The Napa-Sonoma Marsh historically encompassed more than 38,000 acres extending from San Pablo Bay north to the historic limits of the tidal baylands and east to west between the Napa River and Tolay Creek. Of the 38,000 acres, 25,000 acres of the marshlands were in the Napa River watershed.

Today, approximately 36% of this acreage remains classified as wetland habitat, while 25% consists of inactive solar salt production ponds, 12% residential areas, and 20% cropland and pasture; the remaining 7% has miscellaneous uses. The salt ponds, cropland, and pasture are diked to prevent tidal and fluvial inundation under normal conditions. A majority of the remaining wetland areas are public lands and are under the management of DFG as part of the NSMWA.

Water Delivery Pipelines

The pipelines proposed under the Water Delivery Project Component of the Water Delivery Option would carry water from the SVCSD,NSD, and CAC WWTPs to the Napa River Salt Marsh Restoration Project site (Figure 2). Much of the pipeline alignment would follow the rights-of-way of existing railroad lines or public roads.

Dredged or Fill Material

General Characteristics

Levee maintenance associated with salinity reduction would require adding soil to the existing salt pond levees through either importing material or excavating the internal borrow ditch in each of the ponds. Limited dredging may be required to allow access for the barges associated with the levee repair work, as well as for the barges delivering materials and equipment to install the water control structures.

Marsh restoration under the habitat restoration effort would include some activities to accelerate marsh evolution. These components are as follows:

- **Breaches and Ditch Blocks.** A total of 23 breaches and 22 ditch blocks would enhance tidal circulation in and sediment supply to the ponds.
- **Length of Starter Channels.** The length of starter channels would be approximately 27,500 feet.
- **Increase in the Amount of Levee Lowering.** The total length of levee lowering not associated with ditch blocks would be 22,200 linear feet. This effort would further increase the acreage that would be immediately suitable for marsh vegetation establishment.

Quantity

For the salinity reduction effort, at least two rounds of material placement would be required for the northeastern section of Pond 2 because of its deteriorated condition. Final quantities have not yet been determined.

The placement of fill would be from existing on-site sources and would occur as a result of levee grading and starter channel construction.

Source

The material excavated during levee maintenance associated with salinity reduction would be placed at the sides and tops of the levees, with specific locations, soil heights, and slopes to be determined by a geotechnical engineer. Material used for levee repairs would most likely come from the internal borrow ditches adjacent to levee breaches.

Local on-site material would be used for the habitat restoration effort. Materials excavated for the starter channels would be sidecast and materials moved from the levees would be graded to allow for tidal inundation.

Excavation and Replacement Sites

Location

See “Source” under “Dredged or Fill Material” above.

Size

The total area required for excavation is less than 30 acres. Approximately 15 acres would be associated with levee work and 15 acres would be associated with channel excavation.

Confined, Unconfined, Open Water

For salinity reduction, excavation and replacement would affect confined water in borrow ditch locations internal to the salt ponds and unconfined water for the installation of the infalls and outfalls on the Napa River and Napa Slough.

Habitat

The available construction time would limited by final construction dates specified by the biological opinion. In general, these periods would include protection periods established for endangered species. To minimize impacts on wildlife and habitat from construction-related disruptions, excavation for all ponds would be conducted at the same time.

Timing and Duration of Discharge

Levee maintenance under salinity reduction would take place on an ongoing basis. The placement of fill would take place before levee breaching to minimize in-water construction. The construction period would occur several months each year.

Excavation and Replacement Method

As part of construction of the salinity reduction component, material to reinforce the levees would be excavated from the existing borrow ditches using a long-reach excavator. As it completes repairs, the excavator would move forward along the top of the levee or on barge if needed. Limited dredging may be required to allow access for the barges associated with the levee repair work, as well as for the barges delivering materials and equipment to install the water control structures.

Factual Determinations

Physical Substrate Determinations

Substrate Elevation and Slope

The subtidal and tidal habitat that borders San Pablo Bay receives substantially greater freshwater input than marshes bordering San Francisco Bay to the south; consequently, the habitats tend to be more brackish than salt marshes elsewhere in the San Francisco Bay area. The project area includes 7,190 acres of salt ponds and levees and 2,266 acres of fringing marsh and sloughs. Vegetation communities in the project area include tidal marsh, restored salt pond, abandoned salt pond, and levees. Tidal marsh communities are segregated into three elevation zones: lower tidal marsh (between mean sea level and mean high water [MHW] [3.3–5.5 feet National Annual Vertical Datum (NAVD) 88]), middle tidal marsh (between MHW and MHHW [5.5–6.0 feet NAVD 88]), and upper tidal marsh (from MHHW and up several feet [more than 6.0 feet NAVD 88]). The lower portions of the levees support upper tidal marsh species; higher elevations, above tidal influence, support riparian and upland species.

Most pond bottom elevations are below lower tidal marsh, near mean tide level, between 0.8 and 1.3 NAVD.

Habitat restoration would result in a substantial increase in subtidal habitat, intertidal mudflat, and middle marsh over the long term.

Sediment Type

With implementation of the project, the sediment type would be similar to that found in the project area now.

Dredged/Fill Material Movement

There would be a net elevation decrease in the project area. On-site fill would be used to repair levees. For habitat restoration, the intent is to grade the levees so they become suitable for colonization by marsh vegetation.

Physical Effects on Benthos

Construction of the project's water control structures and levee maintenance would require movement of substrate, which could disturb local benthic organisms. However, recolonization of the area by benthic organisms is expected to occur shortly after construction is completed. Moreover, benthic organisms are adapted to changing salinity, as long as the salinity does not increase above annual maximums. Therefore, the project would not have a significant effect on benthic organisms.

Other Effects

As water is brought into the ponds from the various intakes and tidal gates, fish or zooplankton could be entrained into the ponds. See "Aquatic Ecosystem and Organism Determinations" below.

Water Circulation, Fluctuation, and Salinity Determinations

Current Patterns and Water Circulation

There would be no work in any river currents. The Napa River would not have to be dredged as regularly as a result of the project because of an expanded tidal prism. Tidal channels on and adjacent to restored marshlands would be larger after restoration than under existing conditions, increasing the flood conveyance capacity of these channels.

Normal Water Fluctuation

Breaching the levee system would open Ponds 3 and 4/5 to daily tidal flows that would result in periods of time when the ponds are deeper than under existing conditions. To prevent channel erosion and potential damage to adjacent levee systems, the project sponsors would repair unintended levee breaches.

Salinity and Other Water Quality Determinations

The project would not change the clarity, color, odor, or taste of Napa River water. Elevated levels of salinity would occur on a short-term basis, and pH, nutrients, and other parameters are not expected to adversely affect water quality. Water quality standards would be adhered to (see below), these effects are expected to be nominal.

Compliance with Applicable Water Quality Standards

Operation under the project's salinity reduction component could result in an increase in salinity in the Napa River. However, the project would be designed so that the timing of construction and the potential salinity impacts on the Napa River and sloughs resulting from project-related discharges would comply with waste discharge requirements issued by the San Francisco Bay RWQCB and stipulations imposed by the National Marine Fisheries Service (NMFS) and USFWS. Water quality modeling has been conducted to provide specific design criteria necessary to ensure that salinity changes associated with levee breaches do not exceed water quality objectives or adversely impair beneficial uses.

Suspended Particulate/Turbidity Determinations

Expected Changes in Suspended Particles and Turbidity Levels

Construction activities may cause temporary water quality impairment because of discharges to nearby water and/or drainage channels. If allowed to occur when sensitive organisms are present, discharges of soils and associated contaminants can cause adverse changes in turbidity, aquatic habitat sedimentation, or exposure to toxic substances. The extent of potential environmental impacts depends on the erodibility of soil types encountered, types of construction practices, extent of disturbed area, duration of construction activities, timing of precipitation, and proximity to drainage channels. However, the project sponsors would obtain authorization from the San Francisco Bay RWQCB under waste discharge requirements to construct proposed elements of the project. The project sponsors would prepare a stormwater pollution prevention plan (SWPPP) and require all construction contractors to implement best management practices

(BMPs) identified in the SWPPP for controlling soil erosion and discharges of other construction-related contaminants.

Short-term channel incision would likely result in increased sediment suspension and water turbidity downstream of areas where erosion is taking place. However, appropriate site-specific design should ensure that this effect would be comparatively minor and that it would decrease and disappear as the system equilibrates as part of habitat restoration.

Effects (Degree and Duration) on Chemical and Physical Properties of the Water Column

The flushing of conventional physical and chemical constituents from the salt ponds during salinity reduction could temporarily degrade water quality in the lower Napa River and sloughs. Specific modeling of fate and transport characteristics of these constituents during salinity reduction operations has not been conducted. In general, the concentration differences of conventional constituents between the ponds and background receiving water are relatively low compared to the difference in salinity between the ponds and background receiving water. However, if salinity reduction operations for the upper ponds (i.e., Pond 7) are not controlled, adverse water quality impacts could occur in receiving waters. Therefore, the project would be designed to comply with resource agency permit conditions (see "Compliance with Applicable Water Quality Standards" below).

Compliance with Applicable Water Quality Standards

As described above under "Water Circulation, Fluctuation, and Salinity Determinations" above, water quality objectives set by the San Francisco Bay RWQCB would not be violated. BMPs identified in the SWPPP to be prepared by the project sponsors would be employed to limit turbidity and sediment transport.

In general, the effluent produced by the WWTPs that may consider participating in the Water Delivery Project Component has moderate inorganic mineral content with low suspended solids and turbidity relative to the natural background conditions in the Napa River and San Pablo Bay. The pH values are neutral, and the effluent usually is in compliance with regulatory permit limits. The RWQCB prohibits effluent discharges that exceed the applicable water quality standards if the quantity of receiving water does not provide an initial dilution capacity for the effluent of at least 10:1. An exception is that effluent discharges are allowed in such situations if the effluent is used to create, restore, and/or enhance wetlands. The wetland restoration project must provide a net environmental benefit and the beneficial uses that are established in the wetland must be fully protected. The Napa River Salt Marsh Restoration Project would provide such a benefit and protect the established beneficial uses; therefore, it would comply with RWQCB requirements.

Contaminant Determinations

The results of testing indicate that organic chemicals (including pesticides, polychlorinated biphenyls [PCBs], dioxins, and semivolatile organic compounds) are encountered only rarely in the project area. When detected, they are present in concentrations well below any hazardous materials thresholds.

Conventional construction activities would include transporting construction materials, such as fuels and oils, and the use of heavy machinery. Fuel and other hazardous materials associated with the operation of the machinery would have to be transported through the sloughs for construction activities required on the island ponds (Ponds 3, 4/5, and 6/6A), increasing the potential for accidental releases of these materials into the environment. However, mitigation has been adopted to reduce this impact to a less-than-significant level.

Project construction activities may cause temporary water quality impairment because disturbed and eroded soil, petroleum products, and miscellaneous wastes could be discharged to nearby water and/or drainage channels. Construction during the winter rainfall season could increase the potential for discharges of contaminated stormwater runoff from construction sites; discharge of contaminated stormwater constitutes a violation of the water quality objectives specified in the *Water Quality Control Plan, San Francisco Bay Region*.

However, as mitigation of these effects, and as described under "Suspended Particulate/Turbidity Determinations" above, the project sponsors would prepare a SWPPP and require all construction contractors to implement BMPs identified in the SWPPP for controlling soil erosion and discharges of other construction-related contaminants. Construction would be limited to the dry weather season to the maximum extent possible.

Terrestrial Ecosystem and Organism Determinations

Short-Term Disturbance

Implementation of the project may result in a temporary reduction in sensitive communities and habitat for special-status plant species. Although nonnative smooth cord grass (*Spartina alternifolia*) could become established, invasive exotic plant species would be monitored and managed to minimize or prevent the establishment of the species in the area. Construction associated with the salinity reduction options may affect soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*), a federally listed plant species, and several federally listed and state listed wildlife species: California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis*), western snowy plover (*Charadrius alexandruinus nivosus*), northern harrier (*Circus cyaneus*), Caspian tern (*Hydroprogne caspia*), saltmarsh common yellowthroat (*Geothylpis trichas sinuosa*), San Pablo song sparrow (*Melospiza melodia samuelis*), Suisun ornate shrew (*Sorex ornatus sinuosus*), and salt marsh harvest mouse (*Reithrodontomys raviventris*).

However, mitigation has been adopted to reduce these impacts to less-than-significant levels. Wildlife could be exposed to contaminants in soil unearthed during salinity reduction, but BMPs would be implemented to reduce this impact to a less-than-significant level. Reestablishment of tidal connectivity as a result of habitat restoration could expose wildlife to contaminants in sediments and waters from San Pablo Bay and the Napa River; however, this impact would not be significant because the project would substantially increase suitable habitat and increase habitat values.

Pipeline construction under the Water Delivery Project Component could result in a reduction in sensitive vegetation and wildlife species and their habitats, or interfere with movement of wildlife species; biological surveys would be conducted before completion of final plans for design and construction of each project, trenchless construction techniques would be used, and other mitigation measures would be implemented to reduce this impact to a less-than-significant level.

Long-Term Benefit

The project would result in a long-term net increase in sensitive communities and habitat for special-status species. The project would also result in a substantial long-term increase in low and middle marsh habitat suitable for special-status wildlife species and an overall increase in the availability and quality of marsh fringe aquatic habitats.

Aquatic Ecosystem and Organism Determinations

Short-Term Disturbance

Salinity reduction could result in entrainment of fish and other aquatic organisms in the ponds, and they could be subjected to detrimental water quality conditions and predation by nonnative species. Fish that could be affected include delta smelt (*Hypomesus transpacificus*), splittail (*Pogonichthys macrolepidotus*), steelhead (*Oncorhynchus mykiss*), winter-run and spring-run chinook salmon Evolutionarily Significant Units (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*), and longfin smelt (*Spirinichus thaleichthys*).

The number of fish entrained and proportion of the species' populations affected are likely small. However, such entrainment would be minimized in a manner consistent with the terms and conditions of take authorization provided under federal and California Endangered Species Act consultation for the project. Construction activities could reduce the suitability of aquatic habitat in the short term, but cofferdams or other barriers would be installed around the in-water portion of the intakes and outfalls to minimize this effect; water control structures would be constructed in the late spring and summer months to avoid sensitive life stages of protected species (e.g., delta smelt larvae); and the salinity of discharges from the upper ponds would be limited to protect against a reduction

in aquatic habitat suitability resulting from deterioration in water quality. Accelerated salinity reduction is preferable if within the annual variation of salinity because the potential for long-term chronic effects is reduced. Trenchless technology would be used under the Water Delivery Project Component to protect fish migration, which could otherwise be affected by pipeline construction.

Long-Term Benefit

The project would result in the reestablishment of natural features, such as cord grass, tule marsh, and shallow and deepwater habitats, which would reactivate and maintain ecological processes that sustain healthy fish, wildlife, and plant populations. There would be 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 be beneficial to estuarine fish.

Proposed Disposal Site Determination

The release of saline water from the upper pond and Pond 6 outfalls would comply with waste discharge requirements issued by the San Francisco Bay RWQCB and stipulations imposed by USFWS and NMFS. See also "Compliance with Water Quality Standards" under "Water Circulation, Fluctuation, and Salinity Determinations" above.

Determination of Cumulative Effects on the Terrestrial and Aquatic Ecosystem

Terrestrial

Implementation of the project and other restoration projects in the vicinity may result in a temporary reduction, but a long-term net increase, in sensitive communities and habitat for special-status plant species. It is considered unlikely that potential short-term effects from multiple projects would coincide such that the viability of sensitive communities or any one special-status plant species is threatened in the region. Although nonnative smooth cord grass could become established, invasive exotic plant species would be monitored and managed to minimize or prevent the establishment of the species in the area.

In addition, depending on which other restoration/mitigation projects are implemented in the region, there could be either an increase or a decrease in open-water habitat for migratory shorebirds and waterfowl; proposed U.S. Geological Survey (USGS) monitoring of the use of such habitat could provide important direction for future adaptive management decisions.

The project would also result in a long-term increase in lower and middle marsh habitat suitable for special-status wildlife species and an overall increase in the availability and quality of marsh fringe aquatic habitats throughout the San Francisco Bay area. The resulting reestablishment of tidal exchange between restored marshlands and waters of San Pablo Bay and the Napa River is expected to cause the quality of water and sediments within the ponds to become closer to the quality of water in San Pablo Bay and the Napa River; the levels of some constituents are expected to increase and others to decrease.

On a regional level, contaminants may have an adverse effect on biological resources, including reduction in reproductive success at multiple levels of the ecosystem, immune system effects, and overall reduced population viability. However, USGS would continue to monitor conditions at the project site, and the project sponsors would implement an adaptive management plan and contribute to additional mitigation of any regional problems.

Pipeline construction under the Water Delivery Project Component could result in a cumulative reduction in sensitive vegetation and wildlife species and their habitats; biological surveys would be conducted before completion of final plans for design and construction of each project, reducing this impact to a less-than-significant level.

Aquatic

The project in conjunction with other projects could result in an overall increase in the availability, and ultimately the quality, of marsh fringe aquatic habitats throughout the San Francisco Bay area. Nursery habitat for many species would be greatly enhanced by the implementation of this and other restoration efforts.

Determination of Secondary Effects on the Aquatic Ecosystem

There is a potential for releases of highly saline brines and/or bittern from Pond 7 into the environment. All Pond 7 and 7A levees would be carefully inspected and repaired as necessary to ensure that they would maintain their integrity throughout the desalination period.

Potential Effects on Human Use

Municipal and Private Water Supply

The Water Delivery Project Component would require the involvement of the SVCSD, NSD, and CAC; however, the project would not affect any municipal or private water supply.

Recreational and Commercial Fisheries

Commercial and recreational fisheries would not be adversely affected by the project. As species populations and composition increase, recreational use of the site for fishing is expected to increase.

Water-Related Recreation

Water-related recreational opportunities are expected to improve, thereby increasing public use of the site, as species populations and composition increase as a result of the project. Specifically, recreational use of the site for bird watching, hunting, and fishing is expected to increase. The two duck clubs within the project area would benefit from the project because as habitat quality increases, more waterfowl would be attracted to the site.

Aesthetics

Construction activity associated with the project would temporarily change the visual character of the area; however, it is anticipated that areas disturbed by construction would be returned to preproject conditions or better at the end of the proposed construction activities (e.g., at the end of construction, previously vegetated areas would be reseeded). Visual resources would be beneficially affected by the restoration of habitat; views from State Route 37 would be enhanced with the improvement of habitat quality, and more wildlife would be visible. The project would not create any nighttime glare or impede the quality of the scenic vista.

Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The project site is located in DFG's Napa River Unit. DFG is one of the project sponsors, and the project is consistent with DFG's use and management of the site. Proposed alignments of the Bay Trail are located along the northern and eastern periphery of the NSMWA; implementation of the project would not conflict with the Bay Trail. Given the proximity of the Bay Trail, the NSMWA might serve as a destination for Bay Trail users.

Finding of Compliance or Noncompliance with the Restrictions on Discharge for the Napa River Salt Marsh Restoration Project

Finding 1

The Section 404(b)(1) Guidelines were not substantially adapted relative to this evaluation.

Finding 2

The Napa River Salt Marsh Restoration Project is the result of extensive planning and screening of potential options. The long-term goal of the project is to produce a natural, self-sustaining habitat that can adjust to naturally occurring changes in physical processes with minimum ongoing intervention. This goal would be met by designing and engineering a restoration project that would both reduce salinity in existing salt ponds and restore tidal marsh in a way that would maximize wildlife habitat diversity. The proposed discharge has been designed to maximize beneficial environmental effects and in effect increase the amount of aquatic habitat on the site compared to existing conditions. Because the proposed discharge would not result in a net adverse impact on the aquatic habitat (in fact, the acreage of habitat would increase substantially), implementation of the project would result in a less adverse impact on the aquatic ecosystem than the No-Project Alternative.

Finding 3

The Napa River Salt Marsh Restoration Project would not violate applicable state water quality standards. To minimize adverse effects, the project would be designed in compliance with resource agency requirements; in addition, comprehensive water quality monitoring would be conducted to protect the aquatic resources of the Napa River and sloughs.

Finding 4

The restoration project would not violate any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act.

Finding 5

In general, long-term impacts of the salinity reduction and habitat restoration on endangered species and their habitats would be beneficial. Construction associated with the salinity reduction component may affect several federally listed and state-listed plant and wildlife species. However, mitigation has been adopted to reduce these impacts to less-than-significant levels.

Finding 6

The proposed project would not violate any requirement imposed by the Secretary of Commerce to protect marine sanctuaries designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972. Ocean dumping of bittern from Pond 7 was ruled out because of the cost and environmental effects of such an option. All materials dredged during project operations would be disposed of at environmentally appropriate sites.

Finding 7

Implementation of the Water Delivery Project Component for the restoration project could result in significant impacts on vegetation and wildlife species federally or state-listed or proposed as endangered, and on other sensitive species. Focused surveys for special-status species protection would be completed before construction, and other mitigation measures would be implemented if these species are present. These impacts are expected to be reduced to a less-than-significant level.

Finding 8

The Napa River Salt Marsh Restoration Project would not result in significant adverse impacts on human health and welfare, including effects on municipal and private water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites; on life stages of aquatic life and other wildlife dependent on aquatic ecosystems; on aquatic ecosystem diversity, productivity, or stability; or on recreational, aesthetic, or economic values. Therefore, the project would not cause or contribute to significant degradation of waters of the United States.

Finding 9

As a habitat restoration project, the Napa River Salt Marsh Restoration Project would result in a long-term benefit to aquatic ecosystems. Adverse impacts could result in the short term from construction of the salinity reduction and water delivery components of the project. However, mitigation measures would

be implemented to reduce these impacts to less-than-significant levels. These measures include installing cofferdams or other barriers and accelerating salinity reduction to decrease long-term water quality effects.

Finding 10

The proposed site for the discharge of dredged and fill material for the Napa River Salt Marsh Restoration Project complies with the Section 404(b)(1) Guidelines.

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Appendix B

Section 404(b)(1) Compliance

Introduction

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 9,456-acre Napa River Unit of the Napa-Sonoma Marshes Wildlife Area (NSMWA) (Napa River Unit). The Napa River Unit is located at the northeast edge of San Pablo Bay, adjacent to the Napa River (Figure 1).

Background on the Napa River Unit

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. The parcel was purchased with funds from the Shell Oil Spill Settlement, the State Lands Commission, the Wildlife Conservation Board, and the Coastal Conservancy.

Project Authority and Purpose

The Napa River Salt Marsh Restoration Project is an outgrowth of the *Napa-Sonoma Marsh Restoration Project Phase I and Phase II Feasibility Studies for the Napa River, California*, which was authorized by a resolution adopted on September 28, 1994, by the Committee on Public Works and Transportation of the U.S. House of Representatives (Docket 2448).

The purpose of the project is to restore a mosaic of habitats, including tidal habitats and managed ponds, to this property 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.

Related Agreements, Programs, and Studies

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. The Coastal Conservancy and the Corps have entered into a cost-sharing agreement for the analysis and development of the project.

Baywide restoration planning programs have long considered the Napa River Unit. The key programs identifying this site for restoration include

- San Francisco Estuary Project—Comprehensive Conservation and Management Plan; and
- San Francisco Bay Joint Venture—Implementation Strategy.

Relevant studies and analysis of the project include

- *Hydrodynamic Modeling Analysis of Existing Conditions* (Philip Williams and Associates 2002a);
- *Napa Sonoma Marsh Restoration Feasibility Study Phase 2 Stage 1* and *Napa Sonoma Marsh Restoration Feasibility Study Phase 2 Stage 2* (Philip Williams and Associates 2002b, 2002c);
- *Water Quality and Sediment Characterization* (HydroScience Engineers 2002);
- *Baseline Monitoring of the Pond 2A Tidal Restoration Project* (MEC Analytical Systems 2000);
- *Science Support for Wetland Restoration in the Napa-Sonoma Salt Ponds, San Francisco Bay Estuary, 2000 Progress Report* (Takekawa et al. 2001);
- *Baylands Ecosystem Habitat Goals—A Report of Habitat Recommendations* (Goals Project 1999); and
- *Baylands Ecosystem Species and Community Profiles—Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife* (Goals Project 2000).

Alternatives Screening Process

The Napa River Salt Marsh Restoration Project includes three primary components—salinity reduction, habitat restoration, and water delivery. Each of these components had numerous alternative approaches to being implemented.

Twenty-four salinity reduction, three supplemental water delivery, and seven habitat restoration options were considered at the screening stage. Of these, 21 salinity reduction options, two water delivery options, and three habitat restoration options were eliminated from further analysis. These options are briefly described below.

Salinity Reduction Options

Salinity reduction options considered but eliminated fell into several categories. These categories and the reasons that the options were eliminated are listed below.

- *Reverse Operation of the Ponds:* These options consisted of reversing the flow so that the higher salinity (northernmost) ponds would discharge into the lower salinity ponds (closest to the bay). Hydrologic modeling indicated that reverse operation would delay the salinity reduction and habitat restoration process because desalination of the lower salinity ponds would be delayed until desalination of the higher salinity ponds had been completed. In addition, the salinity in the lower salinity ponds would increase initially as the water from the upper ponds is discharged to the lower ponds.
- *Concentration of Brine in One or More Central Ponds:* Brine would have been moved from the lower and upper ponds to centrally located holding chamber(s), which would be used to discharge the brine over time; this would have allowed restoration of the remaining ponds to occur sooner than under reverse operation. Preliminary analysis of these options indicated that one or more ponds would have a very large increase in salinity, and (in several scenarios) one or more ponds could dry out completely. In addition, very high water volumes would be required for most of these options. The loss of habitat value and potential long-term damage to one or more ponds associated with desiccation made these options unacceptable.
- *Physical Removal of the Bittern:* Bittern from Pond 7 would have been pumped out and/or scraped up, then disposed of or reused off-site, potentially expediting restoration of the upper ponds. Cost and environmental effects made these options infeasible.
- *Use of Only Recycled Water to Desalinate All Ponds:* This option was designed to eliminate potential impacts on aquatic life from use of Napa River, Napa Slough, or San Pablo Bay water for desalination. However, water-balance calculations indicated that there would not be sufficient recycled water to compensate for net evaporation, much less to desalinate all ponds.
- *Flood Event Salinity Reduction:* Under this option, brine could be discharged only during flood events (or discharged at a higher rate during such periods) since a higher volume of water would be available to dilute the brines and carry the diluted discharge to San Pablo Bay. This option is not a complete desalination option by itself, because this approach cannot be used for the bittern and may not be appropriate for the highest salinity ponds. The

use of floodwaters to help reduce salinity was integrated into two of the salinity reduction options considered in the environmental impact report/environmental impact statement (EIR/EIS) for the project.

Water Delivery Options

Water delivery options considered for salinity reduction included "maximum" recycled water delivery (a combined 15,000 acre-feet per year of recycled water from water/sanitary agencies in the region) and use of groundwater beneath the site.

The Maximum Recycled Water Delivery Option was eliminated from further consideration because the feasibility and timing of constructing a pipeline system to convey recycled water to the project site from all wastewater treatment plants (WWTPs) in the north bay region have not been determined. However, a portion of this option is currently feasible as described under "Water Delivery" in the "General Description" section of the project description below.

Use of site groundwater was eliminated from further consideration because of the relatively small volume of water available, the cost of installing the required wells and water distribution system, the risk of causing saltwater intrusion into the shallow aquifer, and the opposition of the San Francisco Bay Regional Water Quality Control Board (RWQCB) to use of limited potable water for desalination when other options are feasible. However, use of groundwater may be appropriate for select aspects of the long-term maintenance program for the project area.

Habitat Restoration Options

Habitat restoration options considered but eliminated fell into several categories. These categories and the reasons that the options were eliminated are listed below.

- *Species-Focused Options:* The site would have been restored for primary use by specific species such as waterfowl and shorebirds or by endangered species. Maximizing habitat for shorebirds and waterfowl would completely eliminate the largest likely potential for recovery of endangered species and the largest likely potential for increasing tidal marsh and associated ecosystem services (including benefits to the bay) anywhere in the north bay region. Maximizing habitat for endangered species would cause disproportionate negative impacts on shorebirds and waterfowl by eliminating excellent high tide refugia and feeding habitat for the former and substantial feeding and resting habitat for the latter. Species-focused options are particularly difficult to design and do not allow the necessary flexibility needed to manage the multispecies project area. The habitat restoration options that were retained provide suitable habitat for a wide range of existing species.

- *Land Exchange:* This habitat restoration option would have involved integrating activities at adjacent or nearby restoration sites. One option was to exchange the Cullinan Ranch parcel (owned by the U.S. Fish and Wildlife Service [USFWS]) for a DFG parcel in the project area so that land more suitable for tidal marsh restoration would be used to create tidal marsh and a deeply subsided area such as Cullinan would be used to create pond habitat. Although technically and economically sound, this option is logistically infeasible at this time because the terms of congressional funding and USFWS's purchase agreement mandated that Cullinan Ranch be restored.
- *Sediment-Import Options:* Imported sediment would have been placed into the ponds before breaching to avoid or minimize the need for sediment accretion before establishment of marsh vegetation; sediment could have been used to raise grades at the northern ponds to create upland or seasonal wetland habitat. Sediment import may not enhance the environmental values substantially over existing conditions and DFG supports only the limited use of sediment. Additionally, initial calculations have shown that there will be sufficient sediments to fill the ponds naturally. Creation of seasonal wetland or upland habitat is not part of the goals for this project.

Final Project Alternative

The four most feasible salinity reduction and habitat restoration options were then combined to create 16 possible alternatives, each with recycled water. A no-recycled-water alternative was also added. These alternatives were screened based on cost effectiveness, feasibility, environmental impacts, and achievement of overall project objectives for salinity reduction and habitat restoration. The project sponsors will formally identify the proposed project or "preferred alternative" in the final EIR/EIS for the project. However, the alternative projected as the preferred alternative is Alternative 6, "Napa River and Napa Slough Discharge with Breach of Pond 3 and 4/5, Recycled Water Delivery, and Mixture of Ponds and Tidal Marsh.

Project Description

General Description

Both salinity reduction and habitat restoration are required to complete the Napa River Salt Marsh Restoration Project; the appropriate options for these components of the project, along with the appropriate water delivery option (all analyzed in the EIR/EIS for the project), have been combined to create the proposed project. The following components are part of the proposed project.

Salinity Reduction: Napa River and Napa Slough Discharge, with Breach of Pond 3 and 4/5

The salinity reduction process would occur in a phased approach, decoupling desalination of the upper ponds from desalination of the lower ponds. Primary discharges from the upper ponds would be to Napa Slough, and primary discharges from the lower ponds would be to the Napa River. The use of recycled water for dilution of the upper ponds would be included in this option. The southeast corner of the Pond 3 levee would be breached for 50 feet to accelerate the salinity reduction process and reduce project costs. Subsequent to the breaching and salinity reduction of Pond 3, the east side of Pond 4 would also be breached for 50 feet. Together, these two breaches would be the fastest way to accelerate the salinity reduction process safely and reduce project costs.

Water Delivery

This project component focuses on delivery of recycled water to the project area and contains two components—one of them project-specific in nature (the "Water Delivery Project Component") and the other programmatic (the "Water Delivery Program Component"). Project-specific delivery would occur from the Sonoma Valley County Sanitation District (SVCSD) WWTP, the Napa Sanitation District (NSD) WWTP, and the City of American Canyon (CAC) WWTP (Figure 2). Programmatic recycled water delivery could come from other WWTPs in the Sonoma County Water Agency's jurisdiction (Figure 2).

Habitat Restoration: Mixture of Tidal Marsh and Managed Ponds

This option provides a balanced mix of tidal marsh habitat and managed pond habitat, with an emphasis on restoring Ponds 3, 4, and 5 to tidal marsh and maintaining the remaining ponds as managed ponds. Some design features would be employed to accelerate restoration, including limited excavation of historic slough channels and grading of levees.

Location

Salinity Reduction and Habitat Restoration

The project area was historically the marshland between the Napa River and Sonoma Creek in the north San Pablo Bay region and is now called the Napa River Unit. The Napa-Sonoma Marsh historically encompassed more than 38,000 acres extending from San Pablo Bay north to the historic limits of the tidal baylands and east to west between the Napa River and Tolay Creek. Of the 38,000 acres, 25,000 acres of the marshlands were in the Napa River watershed.

Today, approximately 36% of this acreage remains classified as wetland habitat, while 25% consists of inactive solar salt production ponds, 12% residential areas, and 20% cropland and pasture; the remaining 7% has miscellaneous uses. The salt ponds, cropland, and pasture are diked to prevent tidal and fluvial inundation under normal conditions. A majority of the remaining wetland areas are public lands and are under the management of DFG as part of the NSMWA.

Water Delivery Pipelines

The pipelines proposed under the Water Delivery Project Component of the Water Delivery Option would carry water from the SVCSD,NSD, and CAC WWTPs to the Napa River Salt Marsh Restoration Project site (Figure 2). Much of the pipeline alignment would follow the rights-of-way of existing railroad lines or public roads.

Dredged or Fill Material

General Characteristics

Levee maintenance associated with salinity reduction would require adding soil to the existing salt pond levees through either importing material or excavating the internal borrow ditch in each of the ponds. Limited dredging may be required to allow access for the barges associated with the levee repair work, as well as for the barges delivering materials and equipment to install the water control structures.

Marsh restoration under the habitat restoration effort would include some activities to accelerate marsh evolution. These components are as follows:

- **Breaches and Ditch Blocks.** A total of 23 breaches and 22 ditch blocks would enhance tidal circulation in and sediment supply to the ponds.
- **Length of Starter Channels.** The length of starter channels would be approximately 27,500 feet.
- **Increase in the Amount of Levee Lowering.** The total length of levee lowering not associated with ditch blocks would be 22,200 linear feet. This effort would further increase the acreage that would be immediately suitable for marsh vegetation establishment.

Quantity

For the salinity reduction effort, at least two rounds of material placement would be required for the northeastern section of Pond 2 because of its deteriorated condition. Final quantities have not yet been determined.

The placement of fill would be from existing on-site sources and would occur as a result of levee grading and starter channel construction.

Source

The material excavated during levee maintenance associated with salinity reduction would be placed at the sides and tops of the levees, with specific locations, soil heights, and slopes to be determined by a geotechnical engineer. Material used for levee repairs would most likely come from the internal borrow ditches adjacent to levee breaches.

Local on-site material would be used for the habitat restoration effort. Materials excavated for the starter channels would be sidecast and materials moved from the levees would be graded to allow for tidal inundation.

Excavation and Replacement Sites

Location

See “Source” under “Dredged or Fill Material” above.

Size

The total area required for excavation is less than 30 acres. Approximately 15 acres would be associated with levee work and 15 acres would be associated with channel excavation.

Confined, Unconfined, Open Water

For salinity reduction, excavation and replacement would affect confined water in borrow ditch locations internal to the salt ponds and unconfined water for the installation of the infalls and outfalls on the Napa River and Napa Slough.

Habitat

The available construction time would limited by final construction dates specified by the biological opinion. In general, these periods would include protection periods established for endangered species. To minimize impacts on wildlife and habitat from construction-related disruptions, excavation for all ponds would be conducted at the same time.

Timing and Duration of Discharge

Levee maintenance under salinity reduction would take place on an ongoing basis. The placement of fill would take place before levee breaching to minimize in-water construction. The construction period would occur several months each year.

Excavation and Replacement Method

As part of construction of the salinity reduction component, material to reinforce the levees would be excavated from the existing borrow ditches using a long-reach excavator. As it completes repairs, the excavator would move forward along the top of the levee or on barge if needed. Limited dredging may be required to allow access for the barges associated with the levee repair work, as well as for the barges delivering materials and equipment to install the water control structures.

Factual Determinations

Physical Substrate Determinations

Substrate Elevation and Slope

The subtidal and tidal habitat that borders San Pablo Bay receives substantially greater freshwater input than marshes bordering San Francisco Bay to the south; consequently, the habitats tend to be more brackish than salt marshes elsewhere in the San Francisco Bay area. The project area includes 7,190 acres of salt ponds and levees and 2,266 acres of fringing marsh and sloughs. Vegetation communities in the project area include tidal marsh, restored salt pond, abandoned salt pond, and levees. Tidal marsh communities are segregated into three elevation zones: lower tidal marsh (between mean sea level and mean high water [MHW] [3.3–5.5 feet National Annual Vertical Datum (NAVD) 88]), middle tidal marsh (between MHW and MHHW [5.5–6.0 feet NAVD 88]), and upper tidal marsh (from MHHW and up several feet [more than 6.0 feet NAVD 88]). The lower portions of the levees support upper tidal marsh species; higher elevations, above tidal influence, support riparian and upland species.

Most pond bottom elevations are below lower tidal marsh, near mean tide level, between 0.8 and 1.3 NAVD.

Habitat restoration would result in a substantial increase in subtidal habitat, intertidal mudflat, and middle marsh over the long term.

Sediment Type

With implementation of the project, the sediment type would be similar to that found in the project area now.

Dredged/Fill Material Movement

There would be a net elevation decrease in the project area. On-site fill would be used to repair levees. For habitat restoration, the intent is to grade the levees so they become suitable for colonization by marsh vegetation.

Physical Effects on Benthos

Construction of the project's water control structures and levee maintenance would require movement of substrate, which could disturb local benthic organisms. However, recolonization of the area by benthic organisms is expected to occur shortly after construction is completed. Moreover, benthic organisms are adapted to changing salinity, as long as the salinity does not increase above annual maximums. Therefore, the project would not have a significant effect on benthic organisms.

Other Effects

As water is brought into the ponds from the various intakes and tidal gates, fish or zooplankton could be entrained into the ponds. See "Aquatic Ecosystem and Organism Determinations" below.

Water Circulation, Fluctuation, and Salinity Determinations

Current Patterns and Water Circulation

There would be no work in any river currents. The Napa River would not have to be dredged as regularly as a result of the project because of an expanded tidal prism. Tidal channels on and adjacent to restored marshlands would be larger after restoration than under existing conditions, increasing the flood conveyance capacity of these channels.

Normal Water Fluctuation

Breaching the levee system would open Ponds 3 and 4/5 to daily tidal flows that would result in periods of time when the ponds are deeper than under existing conditions. To prevent channel erosion and potential damage to adjacent levee systems, the project sponsors would repair unintended levee breaches.

Salinity and Other Water Quality Determinations

The project would not change the clarity, color, odor, or taste of Napa River water. Elevated levels of salinity would occur on a short-term basis, and pH, nutrients, and other parameters are not expected to adversely affect water quality. Water quality standards would be adhered to (see below), these effects are expected to be nominal.

Compliance with Applicable Water Quality Standards

Operation under the project's salinity reduction component could result in an increase in salinity in the Napa River. However, the project would be designed so that the timing of construction and the potential salinity impacts on the Napa River and sloughs resulting from project-related discharges would comply with waste discharge requirements issued by the San Francisco Bay RWQCB and stipulations imposed by the National Marine Fisheries Service (NMFS) and USFWS. Water quality modeling has been conducted to provide specific design criteria necessary to ensure that salinity changes associated with levee breaches do not exceed water quality objectives or adversely impair beneficial uses.

Suspended Particulate/Turbidity Determinations

Expected Changes in Suspended Particles and Turbidity Levels

Construction activities may cause temporary water quality impairment because of discharges to nearby water and/or drainage channels. If allowed to occur when sensitive organisms are present, discharges of soils and associated contaminants can cause adverse changes in turbidity, aquatic habitat sedimentation, or exposure to toxic substances. The extent of potential environmental impacts depends on the erodibility of soil types encountered, types of construction practices, extent of disturbed area, duration of construction activities, timing of precipitation, and proximity to drainage channels. However, the project sponsors would obtain authorization from the San Francisco Bay RWQCB under waste discharge requirements to construct proposed elements of the project. The project sponsors would prepare a stormwater pollution prevention plan (SWPPP) and require all construction contractors to implement best management practices

(BMPs) identified in the SWPPP for controlling soil erosion and discharges of other construction-related contaminants.

Short-term channel incision would likely result in increased sediment suspension and water turbidity downstream of areas where erosion is taking place. However, appropriate site-specific design should ensure that this effect would be comparatively minor and that it would decrease and disappear as the system equilibrates as part of habitat restoration.

Effects (Degree and Duration) on Chemical and Physical Properties of the Water Column

The flushing of conventional physical and chemical constituents from the salt ponds during salinity reduction could temporarily degrade water quality in the lower Napa River and sloughs. Specific modeling of fate and transport characteristics of these constituents during salinity reduction operations has not been conducted. In general, the concentration differences of conventional constituents between the ponds and background receiving water are relatively low compared to the difference in salinity between the ponds and background receiving water. However, if salinity reduction operations for the upper ponds (i.e., Pond 7) are not controlled, adverse water quality impacts could occur in receiving waters. Therefore, the project would be designed to comply with resource agency permit conditions (see "Compliance with Applicable Water Quality Standards" below).

Compliance with Applicable Water Quality Standards

As described above under "Water Circulation, Fluctuation, and Salinity Determinations" above, water quality objectives set by the San Francisco Bay RWQCB would not be violated. BMPs identified in the SWPPP to be prepared by the project sponsors would be employed to limit turbidity and sediment transport.

In general, the effluent produced by the WWTPs that may consider participating in the Water Delivery Project Component has moderate inorganic mineral content with low suspended solids and turbidity relative to the natural background conditions in the Napa River and San Pablo Bay. The pH values are neutral, and the effluent usually is in compliance with regulatory permit limits. The RWQCB prohibits effluent discharges that exceed the applicable water quality standards if the quantity of receiving water does not provide an initial dilution capacity for the effluent of at least 10:1. An exception is that effluent discharges are allowed in such situations if the effluent is used to create, restore, and/or enhance wetlands. The wetland restoration project must provide a net environmental benefit and the beneficial uses that are established in the wetland must be fully protected. The Napa River Salt Marsh Restoration Project would provide such a benefit and protect the established beneficial uses; therefore, it would comply with RWQCB requirements.

Contaminant Determinations

The results of testing indicate that organic chemicals (including pesticides, polychlorinated biphenyls [PCBs], dioxins, and semivolatile organic compounds) are encountered only rarely in the project area. When detected, they are present in concentrations well below any hazardous materials thresholds.

Conventional construction activities would include transporting construction materials, such as fuels and oils, and the use of heavy machinery. Fuel and other hazardous materials associated with the operation of the machinery would have to be transported through the sloughs for construction activities required on the island ponds (Ponds 3, 4/5, and 6/6A), increasing the potential for accidental releases of these materials into the environment. However, mitigation has been adopted to reduce this impact to a less-than-significant level.

Project construction activities may cause temporary water quality impairment because disturbed and eroded soil, petroleum products, and miscellaneous wastes could be discharged to nearby water and/or drainage channels. Construction during the winter rainfall season could increase the potential for discharges of contaminated stormwater runoff from construction sites; discharge of contaminated stormwater constitutes a violation of the water quality objectives specified in the *Water Quality Control Plan, San Francisco Bay Region*.

However, as mitigation of these effects, and as described under "Suspended Particulate/Turbidity Determinations" above, the project sponsors would prepare a SWPPP and require all construction contractors to implement BMPs identified in the SWPPP for controlling soil erosion and discharges of other construction-related contaminants. Construction would be limited to the dry weather season to the maximum extent possible.

Terrestrial Ecosystem and Organism Determinations

Short-Term Disturbance

Implementation of the project may result in a temporary reduction in sensitive communities and habitat for special-status plant species. Although nonnative smooth cord grass (*Spartina alternifolia*) could become established, invasive exotic plant species would be monitored and managed to minimize or prevent the establishment of the species in the area. Construction associated with the salinity reduction options may affect soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*), a federally listed plant species, and several federally listed and state listed wildlife species: California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis*), western snowy plover (*Charadrius alexandruinus nivosus*), northern harrier (*Circus cyaneus*), Caspian tern (*Hydroprogne caspia*), saltmarsh common yellowthroat (*Geothylpis trichas sinuosa*), San Pablo song sparrow (*Melospiza melodia samuelis*), Suisun ornate shrew (*Sorex ornatus sinuosus*), and salt marsh harvest mouse (*Reithrodontomys raviventris*).

However, mitigation has been adopted to reduce these impacts to less-than-significant levels. Wildlife could be exposed to contaminants in soil unearthed during salinity reduction, but BMPs would be implemented to reduce this impact to a less-than-significant level. Reestablishment of tidal connectivity as a result of habitat restoration could expose wildlife to contaminants in sediments and waters from San Pablo Bay and the Napa River; however, this impact would not be significant because the project would substantially increase suitable habitat and increase habitat values.

Pipeline construction under the Water Delivery Project Component could result in a reduction in sensitive vegetation and wildlife species and their habitats, or interfere with movement of wildlife species; biological surveys would be conducted before completion of final plans for design and construction of each project, trenchless construction techniques would be used, and other mitigation measures would be implemented to reduce this impact to a less-than-significant level.

Long-Term Benefit

The project would result in a long-term net increase in sensitive communities and habitat for special-status species. The project would also result in a substantial long-term increase in low and middle marsh habitat suitable for special-status wildlife species and an overall increase in the availability and quality of marsh fringe aquatic habitats.

Aquatic Ecosystem and Organism Determinations

Short-Term Disturbance

Salinity reduction could result in entrainment of fish and other aquatic organisms in the ponds, and they could be subjected to detrimental water quality conditions and predation by nonnative species. Fish that could be affected include delta smelt (*Hypomesus transpacificus*), splittail (*Pogonichthys macrolepidotus*), steelhead (*Oncorhynchus mykiss*), winter-run and spring-run chinook salmon Evolutionarily Significant Units (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*), and longfin smelt (*Spirinichus thaleichthys*).

The number of fish entrained and proportion of the species' populations affected are likely small. However, such entrainment would be minimized in a manner consistent with the terms and conditions of take authorization provided under federal and California Endangered Species Act consultation for the project. Construction activities could reduce the suitability of aquatic habitat in the short term, but cofferdams or other barriers would be installed around the in-water portion of the intakes and outfalls to minimize this effect; water control structures would be constructed in the late spring and summer months to avoid sensitive life stages of protected species (e.g., delta smelt larvae); and the salinity of discharges from the upper ponds would be limited to protect against a reduction

in aquatic habitat suitability resulting from deterioration in water quality. Accelerated salinity reduction is preferable if within the annual variation of salinity because the potential for long-term chronic effects is reduced. Trenchless technology would be used under the Water Delivery Project Component to protect fish migration, which could otherwise be affected by pipeline construction.

Long-Term Benefit

The project would result in the reestablishment of natural features, such as cord grass, tule marsh, and shallow and deepwater habitats, which would reactivate and maintain ecological processes that sustain healthy fish, wildlife, and plant populations. There would be 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 be beneficial to estuarine fish.

Proposed Disposal Site Determination

The release of saline water from the upper pond and Pond 6 outfalls would comply with waste discharge requirements issued by the San Francisco Bay RWQCB and stipulations imposed by USFWS and NMFS. See also "Compliance with Water Quality Standards" under "Water Circulation, Fluctuation, and Salinity Determinations" above.

Determination of Cumulative Effects on the Terrestrial and Aquatic Ecosystem

Terrestrial

Implementation of the project and other restoration projects in the vicinity may result in a temporary reduction, but a long-term net increase, in sensitive communities and habitat for special-status plant species. It is considered unlikely that potential short-term effects from multiple projects would coincide such that the viability of sensitive communities or any one special-status plant species is threatened in the region. Although nonnative smooth cord grass could become established, invasive exotic plant species would be monitored and managed to minimize or prevent the establishment of the species in the area.

In addition, depending on which other restoration/mitigation projects are implemented in the region, there could be either an increase or a decrease in open-water habitat for migratory shorebirds and waterfowl; proposed U.S. Geological Survey (USGS) monitoring of the use of such habitat could provide important direction for future adaptive management decisions.

The project would also result in a long-term increase in lower and middle marsh habitat suitable for special-status wildlife species and an overall increase in the availability and quality of marsh fringe aquatic habitats throughout the San Francisco Bay area. The resulting reestablishment of tidal exchange between restored marshlands and waters of San Pablo Bay and the Napa River is expected to cause the quality of water and sediments within the ponds to become closer to the quality of water in San Pablo Bay and the Napa River; the levels of some constituents are expected to increase and others to decrease.

On a regional level, contaminants may have an adverse effect on biological resources, including reduction in reproductive success at multiple levels of the ecosystem, immune system effects, and overall reduced population viability. However, USGS would continue to monitor conditions at the project site, and the project sponsors would implement an adaptive management plan and contribute to additional mitigation of any regional problems.

Pipeline construction under the Water Delivery Project Component could result in a cumulative reduction in sensitive vegetation and wildlife species and their habitats; biological surveys would be conducted before completion of final plans for design and construction of each project, reducing this impact to a less-than-significant level.

Aquatic

The project in conjunction with other projects could result in an overall increase in the availability, and ultimately the quality, of marsh fringe aquatic habitats throughout the San Francisco Bay area. Nursery habitat for many species would be greatly enhanced by the implementation of this and other restoration efforts.

Determination of Secondary Effects on the Aquatic Ecosystem

There is a potential for releases of highly saline brines and/or bittern from Pond 7 into the environment. All Pond 7 and 7A levees would be carefully inspected and repaired as necessary to ensure that they would maintain their integrity throughout the desalination period.

Potential Effects on Human Use

Municipal and Private Water Supply

The Water Delivery Project Component would require the involvement of the SVCSD, NSD, and CAC; however, the project would not affect any municipal or private water supply.

Recreational and Commercial Fisheries

Commercial and recreational fisheries would not be adversely affected by the project. As species populations and composition increase, recreational use of the site for fishing is expected to increase.

Water-Related Recreation

Water-related recreational opportunities are expected to improve, thereby increasing public use of the site, as species populations and composition increase as a result of the project. Specifically, recreational use of the site for bird watching, hunting, and fishing is expected to increase. The two duck clubs within the project area would benefit from the project because as habitat quality increases, more waterfowl would be attracted to the site.

Aesthetics

Construction activity associated with the project would temporarily change the visual character of the area; however, it is anticipated that areas disturbed by construction would be returned to preproject conditions or better at the end of the proposed construction activities (e.g., at the end of construction, previously vegetated areas would be reseeded). Visual resources would be beneficially affected by the restoration of habitat; views from State Route 37 would be enhanced with the improvement of habitat quality, and more wildlife would be visible. The project would not create any nighttime glare or impede the quality of the scenic vista.

Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The project site is located in DFG's Napa River Unit. DFG is one of the project sponsors, and the project is consistent with DFG's use and management of the site. Proposed alignments of the Bay Trail are located along the northern and eastern periphery of the NSMWA; implementation of the project would not conflict with the Bay Trail. Given the proximity of the Bay Trail, the NSMWA might serve as a destination for Bay Trail users.

Finding of Compliance or Noncompliance with the Restrictions on Discharge for the Napa River Salt Marsh Restoration Project

Finding 1

The Section 404(b)(1) Guidelines were not substantially adapted relative to this evaluation.

Finding 2

The Napa River Salt Marsh Restoration Project is the result of extensive planning and screening of potential options. The long-term goal of the project is to produce a natural, self-sustaining habitat that can adjust to naturally occurring changes in physical processes with minimum ongoing intervention. This goal would be met by designing and engineering a restoration project that would both reduce salinity in existing salt ponds and restore tidal marsh in a way that would maximize wildlife habitat diversity. The proposed discharge has been designed to maximize beneficial environmental effects and in effect increase the amount of aquatic habitat on the site compared to existing conditions. Because the proposed discharge would not result in a net adverse impact on the aquatic habitat (in fact, the acreage of habitat would increase substantially), implementation of the project would result in a less adverse impact on the aquatic ecosystem than the No-Project Alternative.

Finding 3

The Napa River Salt Marsh Restoration Project would not violate applicable state water quality standards. To minimize adverse effects, the project would be designed in compliance with resource agency requirements; in addition, comprehensive water quality monitoring would be conducted to protect the aquatic resources of the Napa River and sloughs.

Finding 4

The restoration project would not violate any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act.

Finding 5

In general, long-term impacts of the salinity reduction and habitat restoration on endangered species and their habitats would be beneficial. Construction associated with the salinity reduction component may affect several federally listed and state-listed plant and wildlife species. However, mitigation has been adopted to reduce these impacts to less-than-significant levels.

Finding 6

The proposed project would not violate any requirement imposed by the Secretary of Commerce to protect marine sanctuaries designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972. Ocean dumping of bittern from Pond 7 was ruled out because of the cost and environmental effects of such an option. All materials dredged during project operations would be disposed of at environmentally appropriate sites.

Finding 7

Implementation of the Water Delivery Project Component for the restoration project could result in significant impacts on vegetation and wildlife species federally or state-listed or proposed as endangered, and on other sensitive species. Focused surveys for special-status species protection would be completed before construction, and other mitigation measures would be implemented if these species are present. These impacts are expected to be reduced to a less-than-significant level.

Finding 8

The Napa River Salt Marsh Restoration Project would not result in significant adverse impacts on human health and welfare, including effects on municipal and private water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites; on life stages of aquatic life and other wildlife dependent on aquatic ecosystems; on aquatic ecosystem diversity, productivity, or stability; or on recreational, aesthetic, or economic values. Therefore, the project would not cause or contribute to significant degradation of waters of the United States.

Finding 9

As a habitat restoration project, the Napa River Salt Marsh Restoration Project would result in a long-term benefit to aquatic ecosystems. Adverse impacts could result in the short term from construction of the salinity reduction and water delivery components of the project. However, mitigation measures would

be implemented to reduce these impacts to less-than-significant levels. These measures include installing cofferdams or other barriers and accelerating salinity reduction to decrease long-term water quality effects.

Finding 10

The proposed site for the discharge of dredged and fill material for the Napa River Salt Marsh Restoration Project complies with the Section 404(b)(1) Guidelines.

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