

Chapter 5

Biological Resources—Vegetation

5.1 Environmental Setting

5.1.1 Introduction and Sources of Information

This chapter describes the natural vegetation communities and plant species in the project area. It includes regulatory, regional, and project settings to provide a context for analyzing the effects of the project. Information on existing conditions is derived primarily from the following:

- *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements for Key Plants, Fish, and Wildlife* (Goals Project 2000);
- *Baseline Monitoring of the Pond 2A Tidal Restoration Project* (MEC Analytical Systems 2000);
- *Napa Salt Ponds Biological Resources* (Lewis Environmental Services and Wetlands Research Associates 1992);
- *The Natural Resources of Napa Marsh; Coastal Wetland Series #19* (Madrone Associates 1977);
- *San Pablo Bay Watershed Restoration Framework Program Final Report* (Camp Dresser & McKee 2000);
- *North Slough Marsh Restoration Project Conceptual Plan* (Environmental Science Associates 2000);
- *Status and Trends Report on Wildlife of the San Francisco Estuary* (U.S. Fish and Wildlife Service 1992);
- *State of the Estuary* (Association of Bay Area Governments 1992);
- Draft Subsequent Environmental Impact Report, March 1986, Wastewater Reclamation and Disposal Facilities (Landon, Wheeler, and Weinstein 1986);
- Stanly Ranch Specific Plan Draft EIR (Brady/LSA, August 1998), and;
- Los Carneros Recycled Water Irrigation Pipeline Initial Study/Negative Declaration (Napa Sanitation District, January 11, 1995).

Several sources were consulted to develop a list of special-status plant species that may occur in the project area or vicinity and that may be affected by the proposed project or options. Sources consulted include the documents listed above and the following:

- *Species List for the Napa River Salt Pond Restoration Project, Napa and Solano Counties, California* (U.S. Fish and Wildlife Service 2001);
- *Rarefind2: California Natural Diversity Database* (California Department of Fish and Game 2001); and
- *Electronic Inventory of Rare and Endangered Vascular Plants of California, 6th Edition* (California Native Plant Society 2001).

The DFG California Natural Diversity Database (CNDDDB) and the California Native Plant Society (CNPS) Electronic Inventory are databases of reported occurrences of special-status plants and sensitive communities. To enable development of a list of species that may occur in the project area, a search of the latest versions of each database was conducted for reported species occurrences in the USGS 7.5-minute topographic quadrangles, showing the project area and all adjacent quadrangles. Only species from these lists and the list provided by USFWS that are known to occur in the habitat types found in the project area were considered to have potential to occur in the project area and be affected by project-related activities.

5.1.2 Regulatory Setting

Several federal and state agencies have regulatory authority or responsibility over project-related activities that affect biological resources. This section describes the federal and state policies and laws relevant to biological resources in the project area. Table 5-1 summarizes project-related activities, the type of resource affected, and the government agency with regulatory authority over the activity.

5.1.2.1 Federal

Endangered Species Act

Section 7 of the federal Endangered Species Act (ESA) of 1973, as amended (16 USC 1531), requires that all federal agencies consult with USFWS and NMFS if they determine that a proposed project may affect a listed species or its habitat. The purpose of consultation with USFWS and NMFS is to ensure that the federal agencies' actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat for listed species. USFWS (with jurisdiction over plants, wildlife, and resident fish) and NMFS (with jurisdiction over anadromous fish and marine fish and mammals) oversee ESA.

Table 5-1. Summary of Regulatory Setting for Vegetation Resources

Project-Related Activity	Regulatory Authority
<ul style="list-style-type: none"> ■ Dredging or discharge of fill into wetlands or waters of the United States; ■ levee breaches; ■ structures in streams or wetlands (e.g., tide gates); and ■ other permanent or temporary alteration to wetlands. 	The Corps, permitting authority under Section 404 of the CWA
<ul style="list-style-type: none"> ■ Alteration of stream channel, bed, or bank, including dredging or discharge of fill 	DFG, permitting authority under Section 1601 (Lake or Streambed Alteration Agreement) of the California Fish and Game Code
<ul style="list-style-type: none"> ■ Alteration of navigable waters or tributaries and wetlands adjacent to navigable waters 	The Corps, permitting authority under Section 10 of the RHA
<ul style="list-style-type: none"> ■ Effects on species or the habitat of species listed or candidates for listing under ESA 	USFWS and NMFS, formal consultation and permitting authority under Section 7 of ESA
<ul style="list-style-type: none"> ■ Effects on species or the habitat of species listed or candidates for listing under CESA 	DFG, consultation and permitting authority under Section 2081 of CESA
<ul style="list-style-type: none"> ■ Effects on plants listed as rare under the California Native Plant Protection Act (CNPPA) 	DFG, reporting and consultation requirement
<ul style="list-style-type: none"> ■ Effects on wetlands 	DFG, permitting authority under Section 30411 of the California Coastal Act and California Wetlands Conservation Policy
<ul style="list-style-type: none"> ■ Effects on other special-status species, including species of concern and CNPS-listed plants 	DFG and USFWS, responsible agencies to review EIR <u>and EIS</u>

Under Section 9 of ESA, the take prohibition applies only to wildlife and fish species. However, Section 9 does prohibit the unlawful removal and reduction to possession, or malicious damage or destruction of, any endangered plant from federal land. Section 9 prohibits acts to remove, cut, dig up, damage, or destroy an endangered plant species in nonfederal areas in knowing violation of any state law or in the course of criminal trespass. Candidate species and species that are proposed or under petition for listing receive no protection under Section 9.

Section 10 of ESA requires the issuance of an incidental take permit before any public or private action may be taken that would potentially harm, harass, injure, kill, capture, collect, or otherwise hurt (i.e., take) any individual of an endangered or threatened species. The permit requires preparation and implementation of a habitat conservation plan (HCP), incidental to implementation of the project, which would offset the take of individuals that may occur by providing for the overall preservation of the affected species through specific mitigation measures.

The project sponsors ~~have~~will prepared a biological assessment for submission to USFWS and, based on the information in this report, USFWS ~~will~~ has prepared a biological opinion (BO) on the proposed project. The BO indicates that USFWS believes that the project will not jeopardize any listed species in the project area (a “No Jeopardy classification”).

Clean Water Act Section 404

The Corps and EPA regulate the discharge of dredged or fill material into wetlands and other waters of the United States under Section 404 of the CWA. *Waters of the United States* include wetlands and lakes, rivers, streams, and their tributaries. *Wetlands* are defined for regulatory purposes, at 33 CFR 328.3 and 40 CFR 230.3, as areas

inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Project proponents must obtain a permit from the Corps for all discharges of fill material into waters of the United States, including wetlands, before proceeding with a proposed action. Actions typically subject to Section 404 requirements are those that would take place in wetlands or channels conveying natural runoff, including intermittent streams, even if they have been realigned. Artificial channels that convey only irrigation water usually are not included. Section 404 regulates any discharge activity below the ordinary high-water level—the water level with a flow equal to the mean annual flood—of a stream channel. Examples of such discharge activities include placement of fill material, placement or alteration of structures that have the intended effect of functioning as fill, or any discharge activity that would affect wetlands or the surface-water conveyance or capacity of a channel.

A federal ruling issued in 2001 may affect whether wetlands are considered jurisdictional by the Corps (January 9, 2001, Solid Waste Agency of Northern Cook County [SWANCC] ruling [*SWANCC v. United States Army Corps of Engineers* (121 S.Ct. 675,2001)]). Guidance on nonnavigable, isolated and intrastate waters was published on January 19, 2001, by counsel for EPA and the Corps in response to the SWANCC ruling. The guidance essentially resulted in the determination that nonnavigable, isolated waters may not be regulated by the Corps. The entire project area has tentatively been identified as being jurisdictional wetlands, however, a final decision has not been made. As part of the wetland delineation and verification process, the Corps will determine whether the wetlands are isolated and therefore not regulated under Section 404 of the CWA.

If the wetlands are jurisdictional and could be filled as part of the project, the Corps may issue either an individual permit or general permits on a program level (more likely an individual permit if federally listed species are associated with the wetlands and given the size of the project). General permits are

authorized and issued to cover similar activities that are expected to cause only minimal individual and cumulative adverse environmental effects.

Nationwide permits are general permits that cover activities such as minor dredging, construction of temporary structures (e.g., cofferdams) and fill activities. Nationwide permits have a set of general conditions that must be met for the permits to apply to a project, as well as specific conditions that apply to each nationwide permit.

The following conditions would need to be met as part of the Section 404 permitting process:

- procurement of Section 401 water quality certification from the San Francisco Bay RWQCB;
- compliance with ESA, involving consultation with USFWS, if the project is likely to jeopardize the continued existence of a threatened or endangered species or its critical habitat; and
- compliance with the requirements of Section 106 of the National Historic Preservation Act (NHPA).

DFG will obtain a Corps permit for the portions of the project implemented by the state. A Corps project does not need a Section 404 permit; instead, the Corps conducts an equivalent evaluation in-house. This Section 404(b)(1) evaluation is described in Appendix B.

Executive Order 11990—Protection of Wetlands

Executive Order 11990 (issued in 1977) is an overall wetland policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state and local projects. It requires federal agencies to follow procedures for avoidance, mitigation, and preservation, with public input, before proposing new construction in wetlands. When federal lands are proposed for lease or sale to nonfederal parties, Executive Order 11990 requires that the lease or conveyance contain restrictions to protect and enhance the wetlands on the property. In this capacity, Executive Order 11990 can affect the sale of federal lands with wetlands.

Compliance with Section 404 permit requirements may constitute compliance with the requirements of Executive Order 11990. Evidence of compliance would be provided in the CEQA or NEPA document prepared for the proposed project or action.

For this project, the Corps would determine whether the proposed project is consistent with Executive Order 11990. The project appears consistent, as there is no federal land involved.

5.1.2.2 State

California Environmental Quality Act

CEQA is the regulatory framework by which California public agencies identify and mitigate significant environmental impacts. A project normally would have a significant environmental impact on biological resources if it would substantially

- affect a rare or endangered species or the habitat of that species;
- interfere with the movement of resident or migratory fish or wildlife; or
- diminish habitat for fish, wildlife, or plants.

The State CEQA Guidelines define *rare, threatened, or endangered species* as those listed under CESA and ESA as well as any other species that meet the criteria of the resource agencies or local agencies—for example, the DFG-designated “species of special concern” and CNPS-listed species. The State CEQA Guidelines state that the lead agency preparing an EIR must consult with and receive written findings from DFG concerning project impacts on species that are listed as endangered or threatened. If DFG is the lead agency, then this is done as part of certifying the Final EIR. The effects of a proposed project on these resources are important in determining whether the project has significant environmental impacts under CEQA.

California Endangered Species Act

California implemented CESA in 1984. The act prohibits the take of endangered and threatened species; however, habitat destruction is not included in the state’s definition of take. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. DFG administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected). Regarding rare plant species, CESA defers to the California Native Plant Protection Act of 1977, which prohibits importing rare and endangered plants into California, taking rare and endangered plants, and selling rare and endangered plants. State-listed plants are protected mainly in cases in which state agencies are involved in projects under CEQA. In these cases, plants listed as rare under the California Native Plant Protection Act are not protected under CESA but can be protected under CEQA. If DFG is the lead agency, then CESA compliance is done as part of certifying the Final EIR.

California State Wetlands Conservation Policy

The Governor of California issued an executive order on August 23, 1993, that created a California State Wetlands Conservation Policy. This policy is being implemented by an interagency task force that is jointly headed by the State

Resources Agency and the California Environmental Protection Agency (Cal/EPA). The policy has three goals:

- to ensure no overall net loss and a long-term net gain in wetlands acreage and values in a manner that fosters creativity, stewardship, and respect for private property;
- to reduce the procedural complexity of state and federal wetlands conservation program administration; and
- to encourage partnerships that make restoration, landowner incentives, and cooperative planning the primary focus of wetlands conservation.

Regional Water Quality Control Boards

Water Code Section 13260 requires “any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements).” *Waters of the state* is defined in the Porter-Cologne Water Quality Control Act as “any surface water or groundwater, including saline waters, within the boundaries of the state” (Water Code Section 13050[e]). The SWANCC ruling described above has no bearing on the Porter-Cologne definition. Although all waters of the United States that are within the borders of California are also waters of the state, the converse is not true (i.e., in California, waters of the United States represent a subset of waters of the state). Thus, California retains authority to regulate discharges of waste into any waters of the state, regardless of whether the Corps has concurrent jurisdiction under Section 404.

If the Corps determines that the wetland is not subject to regulation under Section 404 of the CWA, Section 401 water quality certification is not required. However, the appropriate RWQCB may impose WDRs if fill material is placed into waters of the state.

Section 1600 *et seq.* of the California Fish and Game Code

DFG has jurisdictional authority over wetland resources associated with rivers, streams, and lakes under California Fish and Game Code, Sections 1600–1607. DFG has the authority to regulate all work under the jurisdiction of the State of California that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. Activities of agencies that are project proponents are regulated under Section 1601. Activities of private individuals who are project proponents are regulated under Section 1603.

In practice, DFG marks its jurisdictional limit at the top of the stream or lake bank or the outer edge of the riparian vegetation, where present, and sometimes extends its jurisdiction to the edge of the 100-year floodplain. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland

boundaries as defined by Section 404 sometimes include only portions of the riparian habitat adjacent to a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1600 *et seq.* may encompass a greater area than that regulated under Section 404.

DFG enters into a lake or streambed alteration agreement with a project proponent and can impose conditions on the agreement to ensure that no net loss of wetland values or acreage will be incurred. The lake or streambed alteration agreement is not a permit but, rather, a mutual agreement between DFG and the project proponent.

~~The project sponsors would prepare a streambed alteration agreement for the proposed project.~~ DFG has determined that the restoration project area is not subject to Section 1600.

5.1.2.3 Special-Status Plant Species and Sensitive Communities

Special-status plant species are protected under CESA and ESA or other regulations and are considered sufficiently rare by the scientific community to qualify for such listing. For purposes of this report, *special-status plants* refers to species that

- are listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.12) and various notices in the *Federal Register* (proposed species);
- are candidates for possible future listing as threatened or endangered under ESA (64 FR 57534, October 25, 1999);
- are listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- meet the definition of rare or endangered under CEQA (State CEQA Guidelines, Section 15380);
- are listed as rare under the CNPPA (California Fish and Game Code, Section 1900 *et seq.*);
- are considered by CNPS to be “extinct, rare, threatened, or endangered in California” (Lists 1A, 1B, and 2, July 6, 2000, available at www.cnps.org/rareplants/inventory/6thEdition.htm [California Native Plant Society 2001]); and
- are listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4, July 6, 2000, available at www.cnps.org/rareplants/inventory/6thEdition.htm [California Native Plant Society 2001]), which may be included as special-status species on the basis of local significance or recent biological information.

ESA does not give plants legal protection on nonfederal lands unless a state law or regulation is being violated. ESA does prohibit malicious damage or destruction of threatened or endangered plant in any area under federal jurisdiction, and the removal, cutting, digging up, or damaging or destroying of any such species in any other area in knowing violation of any state law or regulation, or in the course of any violation of a state criminal trespass law.

Species of concern are sensitive species that have not been listed, proposed for listing, or placed in candidate status. *Species of concern* is an informal term used by some but not all USFWS offices. Species of concern receive no legal protection, and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species. Potential project-related effects on species of concern, however, are disclosed as part of this document.

California Native Plant Society Listings

CNPS tracks plant species considered rare in California and assigns them to one of five lists in an effort to categorize their degree of rarity. Project-related effects on plant species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, Section 15380) should be disclosed in EIRs and EISs. DFG recognizes that plants on CNPS Lists 1A, 1B, and 2 would qualify for listing under Sections 2062 and 2067 of CESA and recommends they be addressed in EIRs. Some of the plants on CNPS Lists 3 and 4 may also qualify for listing under Sections 2062 and 2067 of CESA, and project-related effects should be described in EIRs and EISs. However, a plant need not be listed by CNPS to be considered under CEQA if it is a *de facto* rare, threatened, or endangered species. In addition, DFG recommends, and local governments may require, protection and disclosure of impacts on plants that are regionally significant, such as locally rare species or disjunct populations of more common plants.

Sensitive Communities

Sensitive communities are considered those described as Significant Natural Areas (SNAs) by DFG, communities that are either known or believed to be of high priority for inventory in the CNDDDB because of their rarity or level of threat (California Department of Fish and Game 2001), or protected or regulated by federal, state, or local laws and regulations. In the project area, sensitive communities include tidal marshes described below.

5.1.3 Regional Setting

More than ~~79~~^{85–90}% of tidal wetlands in the Bay Area have been lost to reclamation by diking, filling, and draining vast sections of marsh for agriculture, urbanization, and salt production (Goals Project 2000). However, there are

approximately 200,000 acres of shallow-water subtidal habitats remaining; ~~and~~ approximately 171,000 acres of these are subtidal habitat and approximately 29,000 acres are tidal flats.

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 and support a more diverse plant assemblage than salt marshes elsewhere in the San Francisco Bay area.

The regional vegetation setting of the Water Delivery Option for salt pond restoration spans the entire north bay area adjacent to the San Pablo Bay. Sixty percent of this area is extensive (pastureland) and intensive (cultivated) agriculture, 23% is wildlife areas and open space, and 10% is urban lands (7% is undesignated) (San Francisco Bay Conservation and Development Commission 1997).

5.1.4 Project Setting

Vegetation communities at the Napa River Unit, the project area for the salinity reduction and habitat restoration options, are determined primarily by elevation, which in turn controls tidal influence, salinity, and water level. The area includes 7,190 acres of abandoned salt ponds and levees and 2,270 acres of fringing marsh, restored marsh, and sloughs for a total project area of 9,460 acres. Vegetation communities in the project area are described below and include tidal marsh, restored salt pond, abandoned salt pond, and levees. Note that project-specific botanical surveys have not been conducted, and following descriptions are based on habitat descriptions for other projects in the project area or on descriptions of similar habitats in the vicinity.

The study area for the Project Component of the Water Delivery Option, including the currently proposed Sonoma Pipeline, Napa Pipeline, and CAC Pipeline, follows the alignment of each pipeline. A preliminary field survey of this portion of the pipeline route was conducted in February, March, and December 2002.

The new segments of the Sonoma Pipeline begin just south of the juncture of East Eighth Street and SR 12/121 near Schellville. The pipeline crosses ruderal and grazed bayland and Schell Creek as it heads east toward the NWPRA railroad tracks. As it joins the railroad tracks, the alignment turns southeast and continues toward the Hudeman Slough Mitigation and Enhancement Wetlands (HSMEW) area. While paralleling the railroad tracks, the Sonoma Pipeline passes vineyards, farmed bayland, seasonal wetlands, and the Ringstrom Bay Unit of DFG's NSMWA. The HSMEW area contains permanent and seasonal wetlands, grasslands, and storage ponds. The pipeline continues to parallel the south side of the railroad tracks through this area.

At Skaggs Island Road, the Sonoma Pipeline route crosses underneath the railroad tracks and proceeds along the north side of the railroad to Buchli Station

Road (the access road for the Napa River Unit). The north side of the tracks is primarily vineyard uplands, with potential seasonal wetlands in swales adjacent to the tracks. As the Sonoma Pipeline route approaches Huichica Creek, it crosses a small portion of the Huichica Creek Unit of the NSMWA. This unit is mostly leveed marsh.

The Sonoma Pipeline route continues on the north side of the railroad tracks, again through vineyard uplands and seasonal wetland swales, until it turns south at the terminus of Buchli Station Road, where it proceeds along an access road to the new mixing chamber located between Ponds 7 and 7A. Habitat types along the Sonoma Pipeline alignment are illustrated in Figure 5-1.

The currently proposed Napa Pipeline would be constructed in two segments. The first segment would begin on the east side of the Napa River by connecting to an existing reclaimed water pipeline, then head west. The pipeline would tunnel under the Napa River onto the Stanly property and then travel under roads to the intersection of Las Amigas and Buchli Station Roads (Figure 2-10). Segment 1 has been evaluated in a previous environmental document (Los Carneros Recycled Water Irrigation Pipeline Initial Study/Mitigated Negative Declaration). Segment 2 would proceed south along Buchli Station Road until it intersects with the Sonoma Pipeline at the railroad tracks paralleling the northern boundary of the Huichica Creek Unit of the NSMWA. Habitat types on either side of Buchli Station Road include vineyard and ruderal. Figure 5-2 illustrates habitat types along the Napa Pipeline route.

The CAC Pipeline would begin at the southern terminus of Mezzetta Court at the CAC WWTP. Mezzetta Court is lined by industrial businesses. It would head north for approximately 2,000 feet until it intersects with Green Island Road. The pipeline then would travel north and westward along Green Island Road. On Green Island Road, the pipeline would pass through industrial areas, upland/grassland, and vineyards. It then would traverse the former Cargill Salt property and connect with the existing ~~Cargill Salt~~ pipeline that crosses beneath the Napa River to connect with the salt ponds within the Napa River Unit. Figure 5-2 illustrates habitat types along the Napa Pipeline route.

5.1.4.1 Vegetation Communities

Open Water—Streams and Creeks

~~The pipelines proposed under the Water Delivery Option would cross a number of major creeks (Gallinas, Miller, Novato, Tolay, and Sonoma), minor creeks (Pacheco, Arroyo San Jose, Wheat, Stage Gulch, and Huichica), sloughs (Steamboat and Schell), and rivers (Napa and Petaluma). The dominant vegetation of open-water habitat are phytoplankton, including diatoms, dinoflagellates, green algae, and blue-green algae.~~

Mudflat

As the tide inundates broad shallow areas, it deposits sediments that are then exposed as the tide recedes, leaving mudflats. Vegetation in these mudflats consists of a variety of algae, algal detritus, and seeds for lower tidal marsh species.

Tidal Marsh

Levees and water control structures prevent tidal influence in most ponds and minimize it in the remaining ponds (except Pond 2A). Tidal marsh habitat was retained during the reclamation era along slough margins in the project area. Diking, however, reduced the tidal prism in the sloughs and reduced flows, resulting in increased siltation and narrowing of the channel cross section.

Tidal marsh habitat in the project area outside of Pond 2A is restricted to “~~outboard levee~~fringe marsh” habitat (i.e., between the levees and slough channels), largely on accreted sediments. Tidal marsh vegetation communities are represented in tidal sloughs. Tidal sloughs in the project area include Dutchman Slough, South Slough, China Slough, Devil’s Slough, Napa Slough, Mud Slough, and Hudeman Slough as illustrated on Figure 2-2. Tidal marsh communities are well established between the open sloughs and levees in the project area. In portions of the project area, the outboard levee habitat area is broad (more than 100 feet wide) and supports substantial areas of tidal marsh habitat.

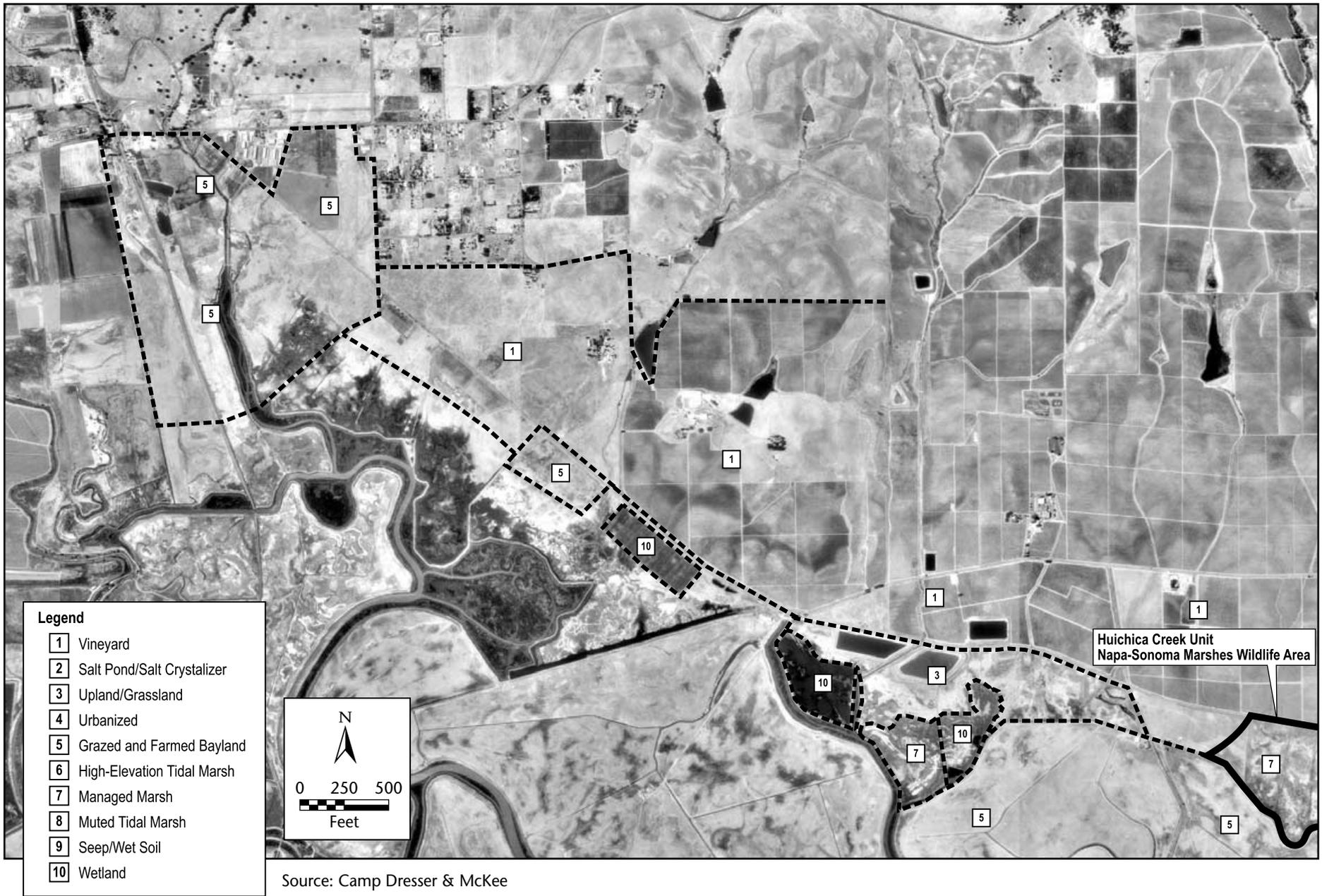
Exceptionally high productivity and biomass, but low species diversity, characterize tidal marsh communities. Relatively few plant species can tolerate the natural variations in water levels and salinity. Vegetation is generally low growing and herbaceous, either forming a low dense mat or dominated by clumps of emergent species. Tidal marshes in the project area are relatively brackish because of the influx of fresh water from the Napa River and thus support a broader range of species than true salt marshes typical of San Francisco Bay. In general, salinity decreases away from San Pablo Bay. Salinity, however, varies greatly seasonally and annually with variations in precipitation and stream discharge. Salinity increases during the summer and during drier years.

Tidal marsh vegetation communities are also represented in tidal sloughs. Tidal sloughs in the project area include Dutchman Slough, South Slough, China Slough, Devil’s Slough, Napa Slough, Mud Slough, and Hudeman Slough as illustrated on Figure 2-2.

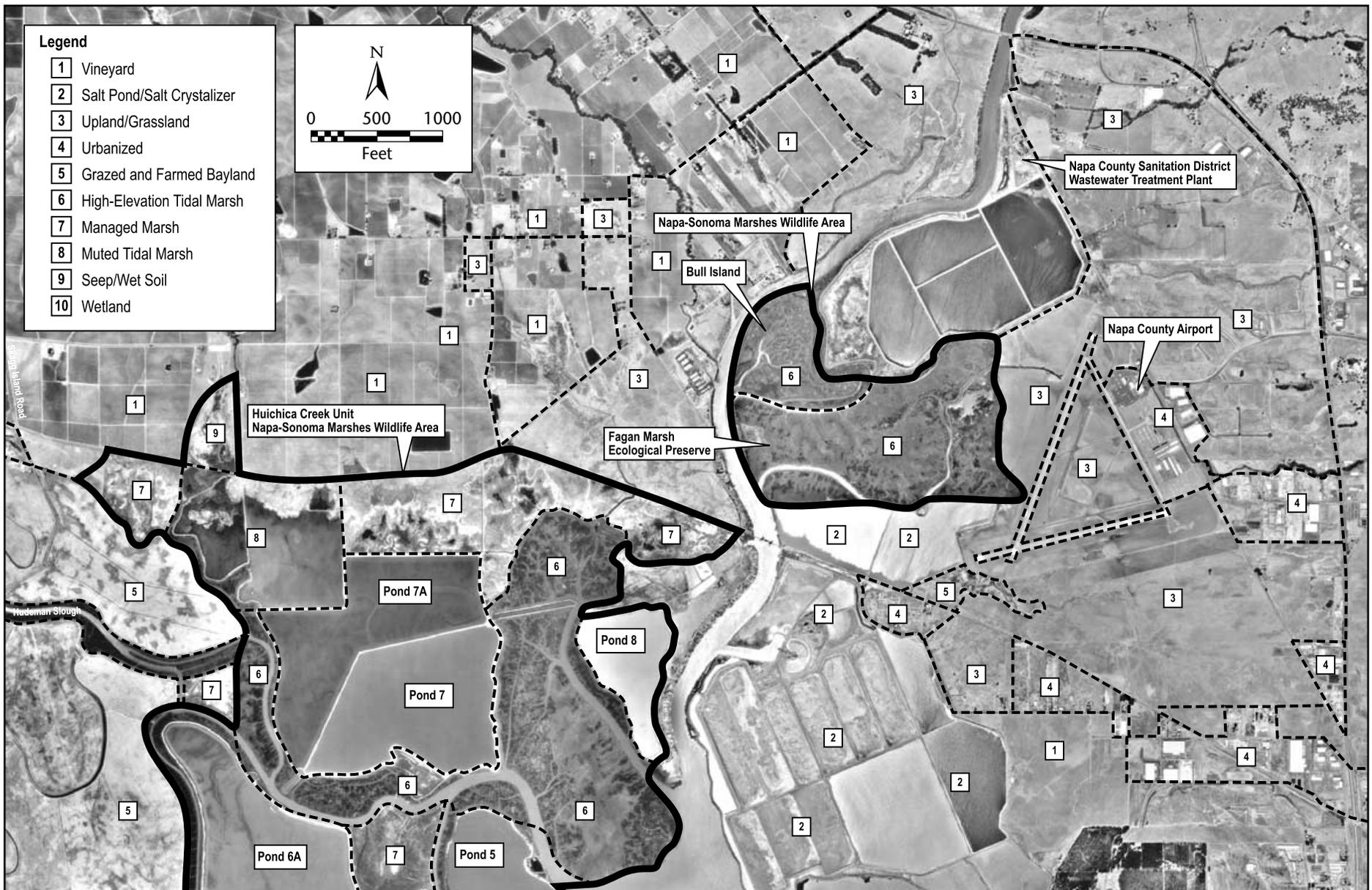
Tidal brackish marsh communities are segregated into three distinct elevation zones described below: lower, middle, and upper tidal marsh (Figure 5-3).

Lower Tidal Marsh

Lower tidal marsh (lower marsh) occurs above mudflats along stream and slough channels and typically is found between MTL and mean high water (MHW)

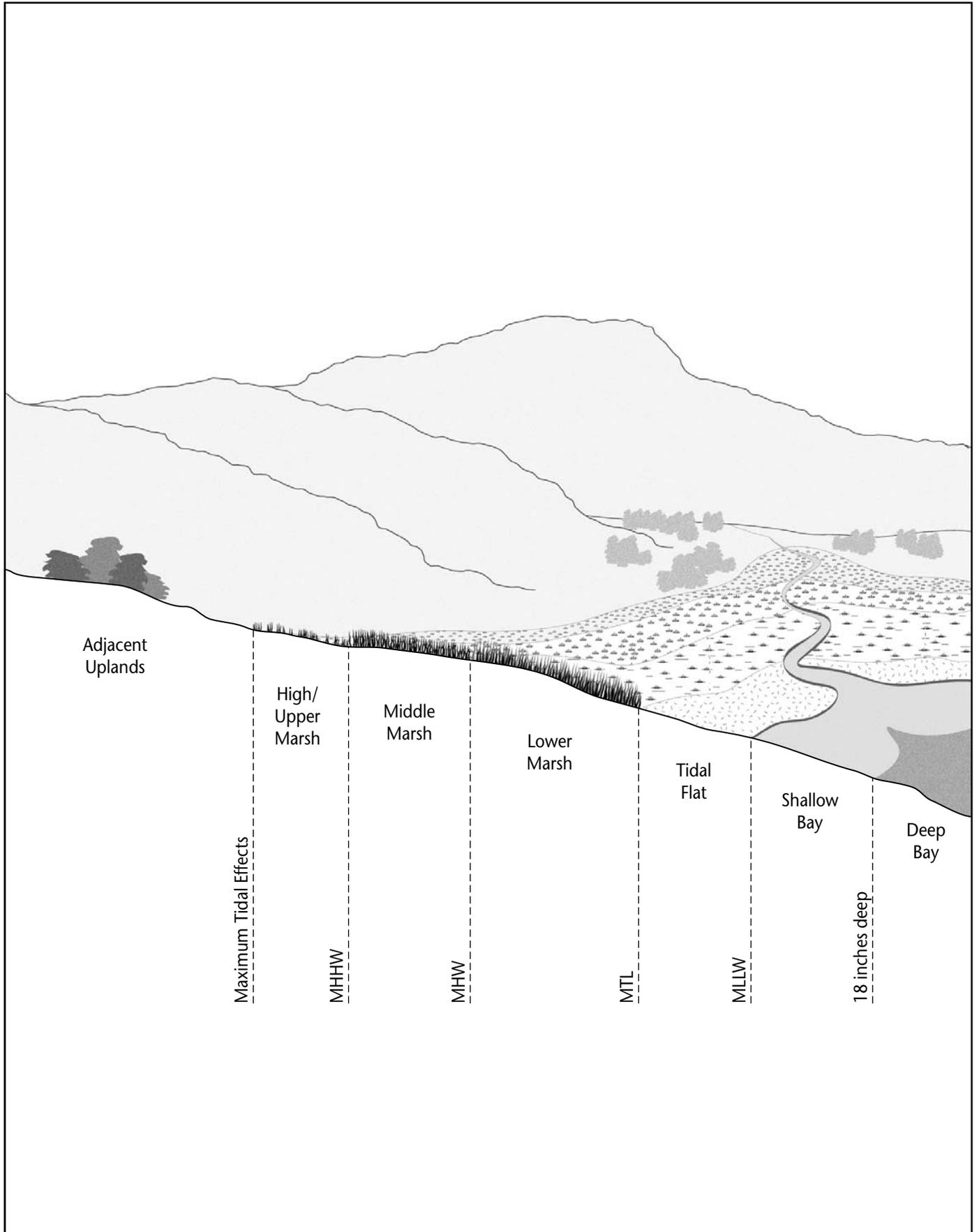


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Source: Camp Dresser & McKee

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(3.3–5.5 feet National Annual Vertical Datum [NAVD] 88). This habitat is within the range of daily tidal fluctuations, with the ground surface and low-growing plants being exposed at low tides and completely inundated at higher tides and during periods of high stream discharge.

This community typically is dominated by species of cord grass, an emergent wetland species, including California cord grass (*Spartina foliosa*). Other common species in this community include pickleweed (*Salicornia virginica*), annual pickleweed (*S. europea*), alkali bulrush (*Scirpus robustus*, *S. maritimus*), fleshy jaumea (*Jaumea carnosa*), curly dock (*Rumex crispus*), and brass buttons (*Cotula coronopifolia*). California tule (*Scirpus californicus*), hard stem tule (*S. acutus*), three-square bulrush (*S. americanus*), and cattails (*Typha angustifolia*, *T. latifolia*, and *T. dominguensis*) occur in lower-salinity areas.

Lower marshes in the region are currently threatened by invasion of smooth cord grass (*Spartina alternifolia*), which outcompetes and hybridizes with the native California cord grass. Coon Island, however, immediately adjacent to ponds in the project area, supports the best extant stand of California cord grass in the Bay Area, and smooth cord grass has not been identified during directed searches in the Napa River Unit with the exception of a small patch in Pond 2A a couple of years ago.

Middle Tidal Marsh

Middle tidal marsh (middle marsh) occurs between MHW and MHHW (5.5–6.0 feet NAVD 88). This habitat is inundated only during higher high tides. Pickleweed is typically the dominant species, forming a dense, low growing mat. Other typical species include Baltic rush (*Juncus balticus*), saltmarsh dodder (*Cuscuta salina*), frankenia (*Frankenia salina*), fat hen (*Atriplex triangularis*), brass buttons, bulrush, tules, cattails, arrow grass (*Triglochin maritima*), club rush (*Scirpus cernuus*), and fleshy jaumea. In more brackish areas located away from San Pablo Bay, tules and cattails are dominant.

Upper Tidal Marsh

Upper tidal marsh (upper marsh) occurs from MHHW and up several feet (>6.0 feet NAVD 88) to the maximum elevation of tidal effects. This habitat is inundated only during higher high tides. Salt grass (*Distichlis spicata*) and pickleweed are typical dominant species in relatively saline areas, and gum plant (*Grindelia stricta* var. *angustifolia*) ~~can also be~~ is locally dominant. Other typical species include sea lavender (*Limonium californicum*), sneezeweed (*Helenium bigelovii*), yarrow (*Achillea borealis*), ~~mugwort (*Artemisia douglasiana*)~~, frankenia, Baltic rush, fat hen, arrow grass, ~~goldenrod (*Solidago occidentalis*)~~, ~~aster (*Aster chilensis*)~~, and sedges (*Carex* spp.). Nonnative pepperweed (*Lepidium latifolium*), poison hemlock (*Conium maculatum*), and fennel (*Foeniculum vulgare*) can invade higher elevations of this community, especially along the bases of levees. Iceplant (*Carpobrotus edulis*) is one of the most abundant high marsh species found on the levees, as are native marsh baccharis (*Baccharis douglassii*) and coyote brush (*B. pilularis*). Pepperweed can form extensive, monotypic stands and outcompete native vegetation species.

Disturbed Marsh/Leveed Baylands

The marsh areas of the north bay region have often been leveed to create additional land, primarily for agriculture. These areas are considered disturbed marsh and continue to exist as several subhabitats.

Some disturbed marsh areas have been reclaimed and reopened as tidal marsh. Vegetation in these areas is similar to that of natural tidal marsh except that many of the vegetation stands are monodominant because of the lack of a natural variation in topography as a result of years of plowing and agriculture.

Disturbed marsh can also be leveed and seasonal. In this habitat, the land is dry for portions of the year and wet during the rainy season. As the rains taper off and the ponded waters begin to evaporate, the concentration of salts at the surface increases. Native vegetation such as saltgrass, frankenia, pickleweed, Baltic rush, and fat hen are found within this habitat. However, the predominant vegetation is often invasive grasses and herbs.

There are also leveed marsh areas that have a permanent water source through a mixture of rainwater and seepage. These leveed permanent marshes are dominated by saltgrass meadows. If sufficient water exists, cattails, tules, and alkali bulrush can be found.

Seasonal Wetland

Seasonal wetlands function as wetlands during the rainy season and uplands during the dry season. They typically form in shallow depressions throughout the area. Seasonal wetlands frequently develop along road and railroad corridors where adjacent swales and drainage ditches are created to aid in controlling stormwater runoff. Natural seasonal wetlands can also be found within the San Pablo baylands. Three predominant vegetation compositions exist within a seasonal wetland:

- pickleweed and brass buttons in saline seasonal wetlands,
- pickleweed and alkali bulrush in brackish seasonal wetlands, and
- rushes and sedges in freshwater seasonal wetlands.

The pipelines proposed under the Water Delivery Option would cross a number of major creeks (Gallinas, Miller, Novato, Tolay, and Sonoma), minor creeks (Pacheco, Arroyo San Jose, Wheat, Stage Gulch, and Huichica), sloughs (Steamboat and Schell), and rivers (Napa and Petaluma) that may have seasonal wetlands.

Restored Salt Ponds

Tidal influence was restored to Pond 2A, a 525-acre abandoned salt pond in the Napa River Unit (Figure 2-2), through designed levee breaches in 1995 and 1997.

Within 1 year of the breach, total vegetation cover went from less than 10% to 25–30%. Within 5 years, vegetation cover approached 90%. The dominant species include prairie bulrush (*Scirpus maritima*), California cord grass, pickleweed, and cattail. The restoration of vegetation in Pond 2A has been similar to other salt pond restoration projects in the region, where cattails, common tule, California bulrush, and alkali bulrush have quickly become established as salinity decreases. Salt grass, tules, frankenia, cattails, and fat hen are also typical early colonizers of restored ponds.

Abandoned Salt Ponds

The salt ponds in the Napa River Unit support few plant species because of the high levels of salinity in the soils. Wigeon grass (*Ruppia maritima*), salt grass, and pickleweed occur in some areas, but these habitats are mostly devoid of vegetation.

Levees

The lower portions of the levees support upper marsh species such as gum plant, salt grass, sedges, tules, and cattails. Higher elevations, above tidal influence, typically support riparian and upland species such as coyote brush (*Baccharis pilularis*), toyon (*Heteromeles arbutifolia*), poison-oak (*Toxicodendron diversilobium*), California rose (*Rosa californica*), blue elderberry (*Sambucus coerulea*), and Himalaya blackberry (*Rubus discolor*). Windrows of planted trees, such as eucalyptus (*Eucalyptus* spp.), occur along some levees and levees on Ponds 4 and 5. Iceplant is one of the most abundant high marsh species found on the levees, as are native marsh baccharis and coyote brush. The nonnative pepperweed, poison hemlock, and yellow star-thistle (*Centaurea solstitialis*) have also invaded some levees in the project area.

Upland

Grassland

Grassland vegetation is dominated by annual and perennial grasses and forbs. This vegetation includes both natives and nonnative species such as wild oats, soft chess (*Bromus hordeaceus*), filaree, California oatgrass (*Danthonia californica*), red fescue (*Festuca rubra* var. *rubra*), California needlegrass, ryegrass, and clover.

Agricultural

Most of the upland habitat within the north bay region has been converted to agriculture, including oat hay, pastureland, and more recently, vineyards. These areas support a mixture of native and nonnative vegetation in the form of annual grasses, herbs, and wildflowers, along with oat hay and grapevines.

Ruderal

Ruderal vegetation appears where repeated disturbance, such as vehicular traffic, alters the natural ecosystem. Ruderal species are typically aggressively growing, nonnative plants such as black mustard (*Brassica nigra*), field mustard (*Brassica campestris*), yellow star-thistle, poison hemlock, sweet fennel (*Foeniculum vulgare*), and prickly lettuce.

Urban

Urban vegetation is dominated by landscaped grasses, flowers, shrubs, and trees, both native and nonnative.

5.1.4.2 Special-Status Plant Species

Several special-status plant species associated with tidal marsh habitats have been reported to occur in the Napa River Unit portion of the project area and vicinity, or have high potential to occur in suitable habitat types in the project area:

- Suisun Marsh aster (*Aster lentus*),
- San Joaquin spearscale (*Atriplex joaquiniana*),
- soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*),
- Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*),
- Mason's liliaeopsis (*Liliaeopsis masonii*),
- Marin knotweed (*Polygonum marinense*), and
- California cord grass (*Spartina foliosa*).

Table 5-2 summarizes these species, their listing status, geographic distribution, habitat requirements, and potential to be affected by the project. Soft bird's-beak is described below.

Several special-status plant species also have potential to occur outside of tidal marsh habitat in the vicinity of the Napa and Sonoma Pipelines of the Water Delivery Option. These species are listed in Table 5-3.

Soft Bird's-Beak

Soft bird's-beak is a federally listed endangered and state listed rare hemiparasitic annual herb. It occurs in upper tidal marsh habitat near the upper margins of tidal influence. Typical associates include pickleweed, salt grass, fleshy jaumea, alkali heath, perennial ryegrass, arrow grass, and Suisun Marsh aster. Restricted to about nine populations and distributed over about 31 acres of occupied habitat, soft bird's-beak is reported from the margins of the Napa River Unit, the Petaluma River, Honker Bay, San Pablo Bay, and Suisun Marsh. Population sizes of soft bird's-beak fluctuate from year to year, and it is expected

Table 5-2. Special-Status Plant Species with Potential to Occur in the Project Area and Vicinity

Common and <i>Scientific Name</i>	Legal Status ¹		Geographic Distribution and Population Status	Habitat Requirements and Blooming Period	Potential to be Affected by Project
	Federal/State/ CNPS				
Suisun Marsh aster <i>Aster lentus</i>	SC/-/1B		Delta, Suisun Marsh, Suisun Bay. Contra Costa, Napa, Sacramento, San Joaquin, and Solano Counties. Seriously threatened by marsh habitat alteration and loss. Intergrades into <i>A. chilensis</i> .	Brackish and freshwater marsh, silty areas, 0–3 meters [m]. Occurs with pickleweed, arrow grass, salt bush, bulrush, soft bird’s beak, and Delta tule pea. Blooms May–November.	A population is reported 2 miles northeast of Pond 8 at Fagan Marsh Ecological Reserve on the Napa River. Other populations may occur along sloughs and the Napa River in the project area, and may be affected by ground disturbance or changes in hydrology and sedimentation.
San Joaquin spearscale <i>Atriplex joaquiniana</i>	SC/-/1B		Alameda, Contra Costa, Colusa, Glenn, Merced, Monterey, Napa, Sacramento, San Benito, Santa Clara*, San Joaquin*, Solano, Tulare*, and Yolo Counties. Threatened by grazing, agriculture, and development.	Alkali grassland, alkali scrub, alkali meadows, saltbush scrub, 1–320 m. Occurs with salt grass and alkali heath above pickleweed habitat. Blooms April–October.	A population is reported 1 mile east of Pond 4 across the Napa River. This species may occur in suitable habitat in the project area and be affected by ground disturbance and changes in hydrology or sedimentation.
Soft bird’s-beak <i>Cordylanthus mollis</i> <i>ssp. mollis</i>	E/R/1B		San Francisco Bay region, Suisun Marsh, Contra Costa, Marin*, Napa, Sacramento*, Solano, Sonoma.* Limited to nine extant populations covering a total of <31 acres, with three sites <1 acre. Threatened by erosion, marsh drainage, urbanization, collecting, invasion by pepperweed (<i>Lepidium latifolium</i>) and pollution.	Tidal salt marsh, 0–3 m. An annual, hemiparasitic herb that with fluctuating population levels. Occurs in upper tidal marsh near the limits of tidal action with pickleweed, salt grass, fleshy jaumea, alkali heath, perennial ryegrass, arrow grass, and Suisun marsh aster. Blooms July–November.	A population on degraded, marginal habitat on the south levee at the confluence of Dutchman and South Sloughs near Pond 3 had 50 individuals in 1982, but was not seen in 3 subsequent searches. This population may be extirpated. A population at Bentley Wharf 0.25 mile west of Pond 7A is considered extirpated. A 3-acre population occurs on Fagan Slough on the Napa River 2 miles northeast of Pond 8, but project activities would not affect this site. Regular surveys by DWR at the Napa River Unit have not identified new populations. A low probability exists that unknown populations occur in the project area.

Table 5-2. Continued

Common and <i>Scientific Name</i>	Legal Status ¹		Geographic Distribution and Population Status	Habitat Requirements and Blooming Period	Potential to be Affected by Project
	Federal/State/ CNPS				
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	SC/-/1B		Delta to San Francisco Bay region, Alameda, Contra Costa, Napa, Sacramento, Santa Clara*, San Joaquin, and Solano Counties. Most populations small. Threatened by agriculture, water diversions, and erosion.	Coastal and estuarine marshes, 0–4 m. Occurs with salt grass, pickleweed, arrow grass, bulrush, fleshy jaumea, Suisun marsh aster, and soft bird's-beak. Blooms May–September.	Several populations are reported from the immediate vicinity of the project area, including a 45.7-acre population at South Slough, and along the Napa River at Coon Island and Pond 8. Populations likely occur along sloughs and the Napa River in the project area, and may be affected by ground disturbance or changes in hydrology and sedimentation. Populations sometimes are ephemeral, so additional populations may turn up at the time of construction.
Mason's lilaepsis <i>Lilaeopsis masonii</i>	SC/R/1B		Southern Sacramento Valley, Delta, northeast San Francisco Bay area, Alameda, Contra Costa, Napa, Sacramento, San Joaquin, and Solano Counties. Locally common in Suisun Bay. Threatened by erosion, channel stabilization, development, flood control projects, recreation, agriculture, shading resulting from marsh succession, and competition with nonnative <i>Eichhornia crassipes</i> . Many populations ephemeral, exploiting newly deposited or exposed sediments.	Freshwater and brackish intertidal marshes, streambanks in riparian scrub, silty areas generally at mean sea level. Occurs with arrow grass, fleshy jaumea, brass buttons and pickleweed. Blooms April–November.	Populations are reported from the banks of the Napa River above and below the project site. The closest reported population is 0.25 mile across the Napa River from Pond 3. Populations are expected to occur along sloughs and the Napa River in the project area, and may be affected by ground disturbance or changes in hydrology and sedimentation.

Common and <i>Scientific Name</i>	Legal Status ¹		Geographic Distribution and Population Status	Habitat Requirements and Blooming Period	Potential to be Affected by Project
	Federal/State/ CNPS				
Marin knotweed <i>Polygonum marinense</i>	SC/-/3		Coastal Marin, Napa, Solano, and Sonoma Counties. Known from fewer than 15 occurrences. Taxonomic status uncertain, related to <i>P. aviculare</i> ; possibly synonym of <i>P. robertii</i> , a nonnative plant.	Coastal salt marsh and higher elevation coastal brackish marsh, 0–10 m. Occurs with pickleweed, salt grass, and gum plant. Blooms April–October.	3 populations are reported from the project vicinity, including Fagan Marsh about 2 miles northeast of Pond 8, and about 1 mile east of Pond 3 across the Napa River. Populations may occur in suitable habitats in project area, and ground disturbance or changes in hydrology and sedimentation may affect this species.
California cord grass <i>Spartina foliosa</i>	SC/-/-		Coastal California, including Bay Area, Del Norte, Santa Barbara, Los Angeles, Orange, and San Diego Counties. Extirpated from <u>South</u> San Francisco Bay. Threatened by habitat conversion and hybridization with nonnative smooth cord grass (<i>Spartina alternifolia</i>).	Coastal salt marsh and brackish marsh, 0–10 m (mostly 0.2–0.4 m MTL). Occurs with smooth cord grass, arrow grass, pickleweed, and alkali heath. Blooms May–July.	Coon Island immediately adjacent to several ponds in the project area supports the greatest extant population of California cord grass in the Bay Area. In other restoration projects, this species has rapidly colonized habitats >0.2 m MTL within 0–3 years. Nonnative competing cord grasses, which have adversely affected populations in most of the Bay Area, was recently reported from the project area. This species is expected to occur in the project area and vicinity in lower tidal marsh habitats.

Common and <i>Scientific Name</i>	Legal Status ¹		Geographic Distribution and Population Status	Habitat Requirements and Blooming Period	Potential to be Affected by Project
	Federal/State/ CNPS				
¹ Status explanations:					
Federal					
E = listed as endangered under the federal Endangered Species Act.					
SC= species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.					
-- = no listing.					
State					
R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.					
-- = no listing.					
California Native Plant Society					
1B= List 1B species: rare, threatened, or endangered in California and elsewhere.					
3 = List 3 species: plants about which more information is needed to determine their status.					
* = Known populations believed extirpated from that County					

to be highly sensitive to changes in growing conditions and may not readily colonize new habitat in restored salt ponds.

There is one reported population of soft bird's-beak that may occur outside the south levee at the confluence of Dutchman's and South Slough, just west of Pond 3. This population has not been observed since 1982, and focused searches in 1983, 1986, and 1993 failed to reidentify this population or additional populations in the project area. Extant populations in the vicinity are located at Fagan Slough 2 miles northeast of Pond 8, Vallejo, Pinole Point, and Benicia State Park. A population at Bentley's Wharf just west of Pond 7A is considered extirpated. Soft bird's-beak is considered to have low potential to occur in the project area and vicinity in suitable upper marsh habitat.

Table 5-3. Special-Status Plant Species That May Occur in the Vicinity of the Water Delivery Pipelines

Common and Scientific Name	Legal Status ¹		Common and Scientific Name	Legal Status ¹	
	Federal/State/ CNPS			Federal/State/ CNPS	
Franciscan onion <i>Allium peninsulare</i> var. <i>franciscanum</i>	--/--/1B		Contra Costa goldfields <i>Lasthenia conjugens</i>	E/--/1B	
Mt. Tamalpais manzanita <i>Arctostaphylos hookeri</i> ssp. <i>montana</i>	--/--/1B		Delta tulle pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	SC/--/1B	
Suisun Marsh aster <i>Aster lentus</i>	SC/--/1B		Legenere <i>Legenere limosa</i>	SC/--/1B	
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	SC/--/1B		Woolly-headed lessingia <i>Lessingia hololeuca</i>	--/--/3	
San Joaquin spearscale <i>Atriplex joaquiniana</i>	SC/--/1B		Mason's lilaeopsis <i>Lilaeopsis masonii</i>	SC/SR/1B	
Big-scale balsamroot <i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>	--/--/1B		Sebastopol meadowfoam <i>Limnanthes vinculans</i>	E/E/1B	
Sonoma sunshine <i>Blennosperma bakeri</i>	E/E/1B		Mt. Diablo cottonweed <i>Micropus amphibolus</i>	--/--/3	
Tiburon Indian paintbrush <i>Castilleja affinis</i> ssp. <i>neglecta</i>	E/T/1B		Marsh microseris <i>Microseris paludosa</i>	--/--/1B	
Suisun thistle <i>Cirsium hydrophyllum</i>	E/--/1B		Baker's navarretia <i>Navarretia leucocephala</i> ssp. <i>bakeri</i>	--/--/1B	
Point Reyes bird's-beak <i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	SC/--/1B		Gairdner's yampah <i>Perideridia gairneri</i> ssp. <i>gairdneri</i>	SC/--/1B	
Soft bird's-beak <i>Cordylanthus mollis</i> ssp. <i>mollis</i>	E/CR/1B		North Coast semaphore grass <i>Pleuropogon hooverianus</i>	--/R/2	
Dwarf downingia <i>Downingia pusilla</i>	--/--/2		Marin knotweed <i>Polygonum marinense</i>	SC/--/3	
Tiburon buckwheat <i>Eriogonum luteolum</i> var. <i>caninum</i>	--/--/3		Rayless ragwort <i>Senecio aphanactis</i>	--/--/2	
Fragrant fritillary <i>Fritillaria liliacea</i>	SC/--/1B		Point Reyes checkerbloom <i>Sidalcea calycosa</i> ssp. <i>Rhizomata</i>	--/--/1B	
Diablo rock rose <i>Helianthella castanea</i>	SC/--/1B		California sea blite <i>Suaeda Californica</i>	E/--/3	
Hayfield tarplant <i>Hemizonia congesta</i> ssp. <i>Leucocephala</i>	--/--/3		Showy Indian clover <i>Trifolium amoenum</i>	E/--/1B	
Brewer's western flax <i>Hesperolinon breweri</i>	--/--/1B		Saline clover <i>Trifolium depauperatum</i> var. <i>hydrophilum</i>	--/--/1B	
Santa Cruz tarplant <i>Holocarpa macradenia</i>	T/E/1B				

¹Status explanations:

Federal

- E = listed as endangered under the federal Endangered Species Act.
- T = listed as threatened under the federal Endangered Species Act.
- SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
- = no listing.

State

- E = listed as endangered under the California Endangered Species Act.
- T = listed as threatened under the California Endangered Species Act.
- R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
- = no listing

CNPS

- 1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
- 2 = List 2 species: plants rare, threatened, or endangered in California but more common elsewhere.
- 3 = List 3 species: plants about which more information is needed to determine their status.

5.2 Environmental Impacts and Mitigation Measures

5.2.1 Methodology and Significance Criteria

Potential impacts of the project on vegetation resources were characterized qualitatively by evaluating direct, indirect, temporary, and permanent impacts. Direct impacts include the direct removal of vegetation within the footprints of ground-disturbing actions such as levee breaches. An indirect impact results from changes to habitat that are incidental to project implementation. An example would be the establishment of a nonnative invasive weed species because of ground disturbance during project implementation, and the weed species outcompeting native vegetation.

Temporary impacts have a short duration, and the vegetation would be expected to recover within a few years after implementation. An example would be the removal of vegetation to repair or redesign a water pump or inlet structure, and vegetation recolonizing the repair site. A permanent impact would involve the long-term alteration of habitat quality and vegetation because the project would result in the removal or change in the vegetation type. An example would be the permanent removal of a levee section that currently supports vegetation, or the conversion of lower tidal marsh habitat to middle or upper marsh habitat.

Criteria based on the State CEQA Guidelines ~~and the NEPA Guidelines~~ were used to determine the significance of vegetation impacts. The following general criteria were considered in determining whether an impact on botanical, wetland, and wildlife resources would be considered significant:

- federal or state legal protection of the resource or species,
- federal or state agency regulations and policies,
- documented resource scarcity and sensitivity both locally and regionally, and
- local and regional distribution and extent of biological resources.

The project would have a significant impact on botanical resources if it would result in

- substantial reduction in local population size attributable to direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation of plant species that are
 - listed as endangered, threatened, or proposed for listing under CESA or ESA;
 - listed as rare under CNPPA; or
 - qualified as rare or endangered under CEQA; or

- the removal or alteration of substantial portions of a sensitive vegetation community, any vegetation community of particular public or regulatory concern, or other natural vegetation community, such that the viability of the community is threatened in the project area or vicinity.

5.2.2 No-Project Alternative

5.2.2.1 Impact V-1: Loss of Common and Sensitive Vegetation Communities and Special-Status Plants as a Result of Levee Failure and Emergency Repairs

The No-Project Alternative would result in direct impacts on vegetation in the event of a levee failure and during emergency repairs. Levee failure and related repair activities would remove vegetation in the failed section and in adjacent areas used for construction-related repair actions. Vegetation types that may be affected include lower, middle, and upper tidal marsh on the outboard sides of levees and common vegetation types on the levee structures. Slough channel scouring and erosion because of levee failure may indirectly affect tidal marsh vegetation and populations for several special-status plant species that may occur in outboard levee habitats. These special-status species include Suisun marsh aster, Delta tule pea, Marin knotweed, California cord grass, and Mason's liliaeopsis. The federally listed soft bird's-beak is considered unlikely to occur in areas of potential levee failure and adjacent slough channels. No populations of special-status plants are reported from the areas within or adjacent to areas of potential levee failure (Figure 5-1).

The loss of common or sensitive communities from isolated or localized failures is not expected to result in the substantial loss of these habitat types and is not expected to jeopardize the existence of these habitat types in the project area and vicinity. For this reason, and because this alternative would result in no project being implemented, this impact is considered less than significant. No mitigation is required.

The loss of individuals or portions of populations of Suisun marsh aster, Delta tule pea, Marin knotweed, California cord grass, and Mason's liliaeopsis as a result of levee failure is not expected to substantially reduce the population size of these species in the project vicinity, and is not likely to threaten the viability of these species in the project area or contribute to a trend toward listing these species. Potential habitat for these species occurs throughout the project area and vicinity, and levee failures are expected to remove only a small fraction of potentially suitable habitat. Moreover, the project area is outside the main distribution area of these species, and the loss of a local population is not expected to affect the overall population size or distribution of these species. Therefore, this impact is considered less than significant. For this reason, and because this alternative would result in no project being implemented, no mitigation is required.

5.2.3 Salinity Reduction Option 1A: Napa River and Napa Slough Discharge

5.2.3.1 Impact V-2: Temporary Alteration of Common Vegetation and Sensitive Communities

The installation of water intakes, outlets, and other water control structures would result in a direct, permanent impact on vegetation in the area of ground disturbance, channel excavation, and other construction activities. This option would remove small portions of sensitive tidal marsh habitat and, depending on the location of the structures, may directly and indirectly affect special-status plant populations. The loss of individuals or portions of populations of Suisun marsh aster, Delta tule pea, Marin knotweed, and California cord grass as a result of the installation of water intakes, outfalls, and levee maintenance would not substantially reduce the population size of these species in the project vicinity and is not likely to threaten their viability in the project area or contribute to a trend toward listing them. Moreover, the project area is outside the main distribution of these species, and the loss of a local population is not expected to affect the species' overall population size or distribution. Therefore, this impact is considered less than significant. No mitigation is required.

5.2.3.2 Impact V-3: Removal of Soft Bird's-Beak

The installation of water intakes and outlets and other ground-disturbing work may directly and indirectly affect soft bird's-beak, a federally listed endangered plant species historically reported to occur in the project area. Erosion of slough channels may indirectly affect soft bird's-beak by altering outboard levee tidal marsh habitats. None of the proposed water control structures would be located in the vicinity of the single historical population reported in the project area at the confluence of Dutchman Slough and South Slough, and erosion of slough channels and adjacent outboard tidal marsh habitat is not predicted to occur in this area.

Unidentified populations of this species may be directly affected by ground disturbance associated with installation, maintenance, and repair activities and indirectly affected by habitat modification that would result from localized channel scouring adjacent to intake or outlet structures. In addition, this option may create conditions favorable to the establishment of peppergrass and other exotic species that would prevent soft bird's-beak from colonizing restored habitats and reoccupying its historical range. Because of the small number of extant populations and the limited distribution of soft bird's-beak, the loss of any individuals or populations as a result of construction activities, slough erosion, or exotic species invasion is considered substantial. Therefore, this impact is considered significant. Implementation of Mitigation Measure V-1 would reduce this impact to a less-than-significant level.

Mitigation Measure V-1: Avoid Ground Disturbance in Populations of Soft Bird's-Beak

The project sponsors will conduct preconstruction botanical surveys to USFWS protocols to map and inventory any populations of soft bird's-beak in the area of ground disturbance and the surrounding area that would be directly and indirectly affected by construction, maintenance, repairs, and slough channel scouring. If no populations of soft bird's-beak are located in the affected habitats, the project would have no impact on this species, and no additional mitigation is required. If populations are found, the site of the structures and ground disturbance will be relocated, if feasible, to avoid direct and indirect impacts on the identified populations and individuals. Implementation of this mitigation measure is expected to avoid adverse impacts on soft bird's-beak. If it is not feasible to avoid adverse effects on individuals or occupied habitat for soft bird's-beak while still meeting the purpose and need of the project, the project sponsors will consult with USFWS and DFG under Section 7 of ESA and the CNPPA, respectively, to develop appropriate impact avoidance measures or additional mitigation measures.

5.2.3.3 Impact V-4: Removal of Other Special-Status Species

Installation and operation of water control structures may directly and indirectly affect other special-status plant species in the area of ground disturbance, including Delta tule pea, Mason's lilaepsis, Marin knotweed, San Joaquin spearscale, California cord grass, and Suisun Marsh aster. The extent of ground disturbance is expected to be small relative to the amount of existing habitat and populations of these special-status species in the project area and vicinity.

The direct or indirect loss of individuals or a portion of a population of Delta tule pea, Mason's lilaepsis, Marin knotweed, San Joaquin spearscale, California cord grass, and Suisun Marsh aster is not expected to be substantial and would not be extensive enough to threaten the viability of these species in the project area or vicinity. Project actions are not expected to substantially reduce the availability of suitable habitat for these species. The restoration of tidal marsh habitat in abandoned salt ponds would result in a long-term, permanent substantial increase in the area and connectivity of potential habitat for these species in the project area. Therefore, this impact is considered less than significant. No mitigation is required.

5.2.4 Salinity Reduction Option 1B: Napa River and Napa Slough Discharge and Breach of Pond 3

Impacts on vegetation under Salinity Reduction Option 1B (Impacts V-2, V-3, and V-4) are nearly the same as those under Salinity Reduction Option 1A. Breaching Pond 3 would require less construction, but the breach could result in

direct effects on outboard marsh areas that are breached, and an indirect loss of tidal marsh habitat near the breaches because channel scouring would erode some portions of outboard levee tidal marsh habitat. However, levee lowering also would increase lower marsh vegetation colonization opportunities. The impact determinations and associated mitigation measures, however, are the same as those under Salinity Reduction Option 1A.

5.2.5 Salinity Reduction Option 1C: Napa River and Napa Slough Discharge with Breaches of Ponds 3 and 4/5

Impacts on vegetation under Salinity Reduction Option 1C are nearly the same as those under Salinity Reduction Option 1A for Impacts V-2, V-3, and V-4. Breaching Pond 3 and 4/5 would require less construction, but the breach could result in direct effects on outboard marsh areas that are breached and an indirect loss of tidal marsh habitat near the breaches because channel scouring would erode some portions of outboard levee tidal marsh habitat. However, levee lowering also would increase lower marsh vegetation colonization opportunities. The impact determinations and associated mitigation measures, however, are the same as those under Salinity Reduction Option 1A.

5.2.6 Salinity Reduction Option 2: Napa River and San Pablo Bay Discharge

Impacts on vegetation under Salinity Reduction Option 2 (Impacts V-2, V-3, and V-4) are nearly the same as those under Salinity Reduction Option 1A. Installation of a siphon between Pond 6 and Pond 2 would result in similar temporary effects on vegetation. The impact determinations and associated mitigation measures, however, are the same as those under Salinity Reduction Option 1A.

5.2.7 Water Delivery Option

The Project Component of the Water Delivery Option has been designed to use existing pipelines, roads, disturbed road margins, and railroad corridors as much as possible to reduce impacts on special-status species and sensitive and natural vegetation communities.

5.2.7.1 Impact V-2: Temporary Alteration of Common Vegetation and Sensitive Communities

Water Delivery Project Component (Sonoma Pipeline)

Construction-related impacts associated with the Sonoma Pipeline would include

- direct removal of vegetation during grading, trenching, and jack-and-boring,
- direct disturbance of vegetation during any off-road vehicle trips, and
- indirect disturbance of wetland hydrology through alterations in topography resulting from soil compaction by construction equipment or backfilling of the pipe trench.

The Sonoma Pipeline would include trenching and related construction activities for a new segment of pipeline and the installation of pump stations. New construction on the Sonoma Pipeline would begin in the Schellville area, just south of SR 12/121. The initial portion of the pipeline will cross ruderal and grazed bayland (Figure 5-1). The Sonoma Pipeline alignment crosses seven streams; however, jack-and-bore or other trenchless construction methods would be used to pass the pipeline beneath the streams to avoid direct effects on sensitive resources, including wetlands.

A portion of the new segment of pipeline would also extend through a section of the Huichica Creek Unit of the NSMWA; consequently, construction activities may affect tidal marsh habitat. Construction on the Huichica Creek Unit of the NSMWA would include the use of jack-and-bore or other trenchless methods to avoid or minimize impacts on sensitive marsh habitat.

Direct impacts on special-status plant species and indirect impacts on wetlands and other sensitive habitats that may occur in the construction area are considered significant. Therefore, this impact is considered significant. Implementation of Mitigation Measure V-2 would reduce this impact to a less-than-significant level.

Mitigation Measure V-2: Conduct Preconstruction Surveys and Implement Impact Avoidance, Minimization, and Mitigation Measures

Before final plans are completed for pipeline design and construction, SCWA will complete an initial biological survey, jurisdictional determination, and wetlands delineation to confirm the presence/absence of special-status plant species and sensitive habitats along the route. If these resources occur, the impact avoidance and minimization measures described below will be implemented. If avoidance and minimization measures still result in impacts, additional mitigation measures described below will be implemented to reduce overall impacts to a less-than-significant level.

Preconstruction surveys will be conducted by qualified biologists with the necessary permits from state and/or federal resources agencies and will be completed during the appropriate survey season. The results of the investigations will be submitted to, and/or otherwise coordinated with, USFWS and DFG. If

wetlands under state or federal jurisdiction occur in the construction areas and involve the placement of fill or dredged materials or other alteration, the necessary and appropriate permits and approvals from responsible resources agencies will be secured. As appropriate for the type of permit to be considered, options that avoid, minimize, or mitigate potential impacts on jurisdictional wetlands will be evaluated.

Avoidance or impact reduction measures will include, but not be limited to, the use of jack-and-bore or other trenchless methods to reduce the need for surface construction within identified sensitive habitats and exclusion zones, and the restriction of construction activities and vehicles to a specified ROW. For areas where it is not feasible to completely avoid construction-related impacts on special-status species or sensitive habitats, one or more of the following measures will be implemented as necessary:

- Exclusion zones and buffer areas will be used where practicable and feasible to avoid construction impacts on identified sensitive vegetation. Where avoidance is not possible, minimizing ground disturbance to the extent practicable and feasible will reduce impacts. The locations of habitats and species to be avoided will be clearly identified in the contract documents (plans and specifications).
- Preproject topography will be restored.
- Construction activities in wetlands will be restricted to the dry season.
- Before clearing and grubbing commences, construction and staging areas will be flagged to clearly define the limits of the work area. These areas will be clearly identified on the contract documents (plans and specifications).
- Sensitive areas outside of the construction corridor will be so labeled on construction documents (plans and specifications) as “Sensitive Biological Resources—Do Not Disturb.”
- Where possible, trenches will be worked from only one side to minimize impacts on adjacent habitat.
- Watering of exposed earth will be conducted consistent with good construction practices to minimize dust production.
- Construction zones at or within 50 feet of wetland areas will be temporarily fenced with 6-foot chain link fencing and posted with “No Trespassing” signs. Fence posts will be driven, not cemented, into the ground. Fence breaks will be provided at channel crossings. All fencing will be removed upon completion of that phase of construction.
- A qualified biologist will be on-site to observe construction activities as appropriate when construction in or adjacent to sensitive habitat occurs.
- Contractors awarded contract packages will sign a document stating that they have read, agree to, and understand the required resource avoidance measures, and will have construction crews participate in a training on sensitive vegetation resources.

In areas of special-status species and sensitive habitats where direct and indirect impacts cannot be reduced to a less-than-significant level by the above measures, SCWA will consult with USFWS and/or DFG to design and implement additional mitigation measures such as the following:

- reseeding the trench line with native vegetation appropriate for the affected habitat type and/or using a double-trenching technique through wetland habitat to help preserve the existing seedbank; and
- if impact avoidance is not possible, mitigating in the form of on-site or off-site habitat restoration/revegetation, or purchase of mitigation bank credits.

Water Delivery Project Component (Napa Pipeline)

Construction-related impacts associated with the Napa Pipeline would be the same as listed above for the Sonoma Pipeline. The Napa Pipeline would include jack-and-bore or other trenchless technology for the first segment of pipeline that crosses the Napa River. New construction on the Napa Pipeline would begin on the east bank of the Napa River just north of the Napa WWTP. The entry pit of the pipeline would be excavated in upland habitat on the east bank, posing little potential for impacts on any extant special-status plant species. The exit pit of the pipeline would be excavated in potentially sensitive habitat on the west bank, resulting in the potential for impacts on any extant special-status plant species found adjacent to the Napa River. The next portion of the first segment of pipeline would extend through the Stanly Ranch in grassland habitat, and possibly portions of diked historic baylands that support marsh habitats. Consequently, construction activities would affect this habitat, also posing the potential for impacts on any resident special-status species therein. Once across the Stanly Ranch, the remainder of Segment 1 and the entire portion of Segment 2 would be constructed within roadways, avoiding sensitive vegetation and habitats.

Direct impacts on special-status plant species and indirect impacts on wetlands and other sensitive habitats that may occur in the construction area are considered significant. Therefore, this impact is considered significant. Implementation of Mitigation Measure V-2 would reduce this impact to a less-than-significant level.

Water Delivery Project Component (CAC Pipeline)

The CAC Pipeline would begin at the CAC WWTP and proceed north in Mezzetta Court until it intersects with Green Island Road. At this point the CAC Pipeline would turn northwest and run beneath Green Island Road, passing through upland/grassland and vineyard habitat, developed areas, and inactive salt crystallizer beds.

The final segment of the CAC Pipeline would use an existing pipeline that extends between the inactive salt drying beds and the salt ponds west of the Napa River. This pipeline segment does not require new construction. No impacts on

special-status plants or sensitive habitats are expected to occur along the CAC Pipeline. Therefore, impacts are considered less than significant.

Water Delivery Program Component

The exact alignments and construction methods for the Program Component pipelines have not yet been determined. However, the potential future pipelines from the LGVSD, Novato SD, and City of Petaluma WWTPs are anticipated to parallel roadways, railroads, and eventually turn east across the Wingo and Ringstrom Bay Units of the NSMWA. Construction of these routes may affect several habitat types: open water, upland (agriculture, ruderal, and urban), tidal marsh, disturbed marsh/leveed baylands, and seasonal wetlands. Impacts on these habitats are expected to be temporary and limited to construction-related activities. This impact is considered significant. Implementation of Mitigation Measure V-2, “Conduct Preconstruction Surveys and Implement Impact Avoidance, Minimization, and Mitigation Measures,” would reduce this impact to a less-than-significant level. This measure is described under “Water Delivery Project Component (Sonoma Pipeline)” above.

5.2.8 Habitat Restoration Option 1: Mixture of Tidal Marsh and Managed Ponds

Impacts under Habitat Restoration Option 1 (Impacts V-2, V-3, and V-4) are nearly the same as those under Salinity Reduction Options 1A and 1B, except that this option could result in slough erosion and site-specific vegetation removal associated with levee breaching and restoration. The impact determinations and associated mitigation measures, however, are the same as those under Salinity Reduction Option 1A. Additional impacts are described below.

5.2.8.1 Beneficial Impact V-5: Long-Term Enhancement of Common Vegetation and Sensitive Communities

Habitat restoration would result in a substantial increase in subtidal habitat, intertidal mudflat, and middle marsh over the long-term. The increase in these habitats would provide greater habitat diversity, complexity, extent, and connectivity compared to existing conditions. Substantial new habitat for common vegetation and sensitive communities for plants and plant-dependent wildlife would be created. The restoration of these habitats would create a complex and diverse marsh ecosystem similar to the ecosystem that previously existed in the northern San Pablo Bay. This impact is considered beneficial. No mitigation is required.

5.2.8.2 Impact V-6: Short-Term Impacts on Common Vegetation and Sensitive Communities

After the initial breaching of the levees, Ponds 3 through 5 would be open to substantial tidal exchange and the restoration process would begin. In general, the slough channels are expected to erode fairly quickly, with approximately 100 acres of the fringe lower marsh and middle marsh along the sloughs and Napa River eroding within 5 years, an additional 90 acres within 10 years, and 40 acres within 20 years (240 acres total); however, these losses would be largely offset by the formation of new marsh. The extent of marsh erosion compared to the 1850 historical shoreline varies by slough. In some sloughs, the channel is predicted to remain narrower than the historical channel. In others, the channel ~~may be predicted to~~ widen beyond the historical size, sometimes beyond the corridor defined by the adjacent levees in the vicinity of Dutchman Slough.

Lower marsh vegetation is expected to colonize quickly, primarily in Pond 3, creating approximately 50 acres of new lower marsh habitat by year 5 and 260 acres of additional new lower marsh habitat by year 10. Middle marsh habitat would also become established quickly. Approximately 100 acres of additional new habitat would form by year 5, 500 acres of additional new habitat by year 30, and approximately 1,170 acres of additional new middle marsh habitat would form by year 50.

The estimated net result is a temporary loss of middle marsh habitat of 90 acres after 10 years and 100 acres after 20 years. However, this trend would be reversed between years 20 and 30 when no net loss is expected within 30 years, and a net increase of approximately 1,000 acres is expected within 50 years (Figure 2-16 and Table 2-2).

The temporary deficit of middle marsh habitat would be offset by the restoration of a surplus of lower marsh habitat, and the project ultimately would result in a substantial, long-term increase in the availability and connectivity of middle marsh habitat in the project area.

These changes in habitat types and locations simulate natural systems and evolution. Though some of these changes would occur quickly, over a 5–30 year period, they are expected to occur in a timeframe that would allow the dispersal and reestablishment of common and sensitive communities. Furthermore, the monitoring and adaptive management program proposed in the project description would ensure that potential adverse effects are minimized. Therefore, this impact is considered less than significant. No mitigation is required.

5.2.8.3 Impact V-7: Invasion of Nonnative Species

Restoring the abandoned salt ponds would create conditions favorable to the establishment of invasive, nonnative species of cord grass, including smooth cord grass (*Spartina alterniflora alterniflora*), Chilean cord grass (*S. densiflora*), and salt-meadow cord grass (*S. patens*). The project would create extensive areas of

lower tidal marsh habitat that is most suitable for smooth cord grass, which poses the greatest competitive threat to the native California cord grass and other native tidal marsh plant species. Higher elevation habitats at the base of retained levees or on design structures may provide habitat for other exotic species of pepperweed.

The risk of nonnative cord grass species invading and becoming established in the project area increases with the number of other populations in the project vicinity and with the length of time required for native plant colonization. Populations adjacent to the project area are likely seed sources; therefore, the best predictor of native and nonnative cord grass colonization of a restoration site is the distribution of cord grasses in the project vicinity. One of the best remaining stands of native California cord grass occurs at Coon Island, adjacent to Ponds 4, 5, 7, and 8. California cord grass was the only species of cord grass recorded during the monitoring of the restoration of Pond 2A (1998–2000). Nonnative cord grass species, however, are known to occur in the surrounding region and have potential to quickly invade and dominate new marsh habitat. Smooth cord grass is considered the most invasive and is especially prevalent in San Francisco Bay. A four-foot diameter population of a nonnative cordgrass was recently reported from ~~the project area~~ in Pond 2A and was removed immediately by applying an herbicide.

Recent restoration experience in Pond 2A indicates that native California cord grass is considered the most likely cord grass species to become established in the project area. Nonetheless, the potential for invasion of nonnative cord grass is considered high because the long project duration increases the probability that an invasive, nonnative species could become established in the project area or vicinity. Nonnative species would outcompete natives, prevent native habitat restoration, and adversely affect wildlife habitats; therefore, this impact is considered significant. Implementation of Mitigation Measure V-3 would reduce this impact to a less-than-significant level.

Pepperweed is well established in the project area and vicinity on higher elevation habitats such as upper tidal marsh and adjacent levee structures. Marsh restoration, including levee breaches and grading, would reduce the suitable habitat for pepperweed in the project area. The project is not expected to create conditions favorable to the expansion of pepperweed; therefore, this impact is considered less than significant. No mitigation is required.

Mitigation Measure V-3: Monitor and Manage Invasive Exotic Plant Species

The project sponsors will coordinate with existing programs, particularly the Introduced Spartina Project, to monitor and manage nonnative invasive cordgrass species. If nonnative cordgrass becomes established in the project area, the project sponsors will support eradication efforts including periodic hand removal or chemical treatment of small populations, and implementing other adaptive management measures to minimize conditions favorable to the establishment of nonnative species.

5.2.9 Habitat Restoration Option 2: Tidal Marsh Emphasis

Impacts under Habitat Restoration Option 2 (Beneficial Impact V-5 and Impacts V-2, V-3, V-4, V-6, and V-7) are nearly the same as those under Habitat Restoration Option 1, except that this option could result in more slough erosion and site-specific vegetation removal associated with levee breaching, and that substantially greater tidal marsh habitat would be created in the long run. The impact determinations and associated mitigation measures, however, are the same as those under Habitat Restoration Option 1.

5.2.10 Habitat Restoration Option 3: Pond Emphasis

Impacts under Habitat Restoration Option 3 (Beneficial Impact V-5 and Impacts V-2, V-3, V-4, V-6, and V-7) are nearly the same as those under Habitat Restoration Option 1, except that this option could result in less slough erosion and site-specific vegetation removal because fewer ponds would be restored. This would maintain more of the existing habitats, but would not reestablish the habitat diversity historically provided in the project area. The impact determinations and associated mitigation measures, however, are the same as those under Habitat Restoration Option 1.

5.2.11 Habitat Restoration Option 4: Accelerated Restoration

Impacts under Habitat Restoration Option 4 (Beneficial Impact V-5 and Impacts V-2, V-3, V-4, V-6, and V-7) are nearly the same as those under Habitat Restoration Option 1, except that this option would result in

- site-specific vegetation removal associated with increased levee lowering breaching earlier in the project,
- a greater probability of accelerated tidal marsh habitat formation, and
- decreased probability of nonnative species invasion because of the accelerated tidal marsh habitat creation.

The impact determinations and associated mitigation measures, however, are the same as those under Habitat Restoration Option 1.