

13. Botanical Resources

13.1 Introduction

This chapter describes the botanical resources setting for the Extended, Secondary, and Primary study areas. Descriptions and maps of these three study areas are provided in Chapter 1 Introduction. Botanical resources include vegetation communities, non-native invasive weed species, and special-status plant species.

Permits and authorizations for botanical resources are presented in Chapter 4 Environmental Compliance and Permit Summary. The regulatory setting for botanical resources is presented in Appendix 4A Environmental Compliance.

The regulatory setting for botanical resources is presented in Appendix 4A Environmental Compliance.

This chapter focuses primarily on the Primary Study Area. Potential impacts in the Secondary and Extended study areas were evaluated and discussed qualitatively. Potential local and regional impacts from constructing, operating, and maintaining the alternatives were described and compared to applicable significance thresholds. Mitigation measures are provided for identified potentially significant impacts, where appropriate.

13.2 Environmental Setting/Affected Environment

13.2.1 Extended Study Area

13.2.1.1 Methodology

Most of the extended study area consists of existing water storage and water delivery infrastructure. None of the Sites Reservoir Project (Project) alternatives would result in changes to vegetation communities associated with these facilities. Several wildlife refuges currently receive water delivery from the State Water Project (SWP) and Central Valley Project (CVP), and they would continue to do so under each of the alternatives. Methodology for the extended study area was therefore focused primarily on the vegetation communities associated with the refuges that would receive water delivery from the Project.

Vegetation Communities

Vegetation communities are broad categories that represent an assemblage of similar native vegetation associations that are typically defined by dominant or co-dominant species. Vegetation communities, as used in this section, are broadly based on the general vegetation categories, sometimes referred to as “series” or, “alliance” (Sawyer et al., 2009).

No vegetation community type (series or alliance) for urban or agricultural land is designated in the above source. Likewise, the California Department of Fish and Wildlife (CDFW; formerly called California Department of Fish and Game [CDFG]) Wildlife Habitat Relationships (WHR) System (CDFG, 2008) urban and agricultural types do not have any corresponding vegetation communities in the National Vegetation Classification System; these land cover types “do not meet the criteria for any wildland (native) habitat” (CDFG, 2007). Because none of the categories of native plant communities normally used for California vegetation apply in this case, no native vegetation types are discussed for the urban or agricultural lands in the Extended Study Area.

Invasive Plant Species

An invasive species is defined by the National Invasive Species Council pursuant to Executive Order 13112 as “a species that is (1) non-native (or alien) to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health” (Center for Invasive Plant Management, 2011). A noxious weed, as defined by the California Department of Food and Agriculture (CDFA), means any “species of plant that is, or is liable to be, troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate” (CDFA, 2017).

Many invasive non-native plant species occur within urban and agricultural lands in the Extended Study Area. A database of these species is not maintained by geographic area. The statewide inventories of the CDFA and California Invasive Plant Council (Cal-IPC), as well as environmental documents covering some of the service areas, were reviewed for examples of invasive species likely to be affected by increased reliability of water supply in urban and agricultural areas of the Central Valley. A “wetland/marsh/aquatic” habitat query of the overall California Cal-IPC list was conducted for the perennial wetland habitats of the wildlife refuges in the Extended Study Area.

Special-status Plant Species

Very few, if any, federally or State-listed plant species are expected to occur in urban and agricultural lands because appropriate habitat is lacking. The CDFW Rarefind 5 was used to query the February 2017 California Natural Diversity Database (CNDDDB) for all listed species in perennial wetland habitat categories in the seven counties containing wildlife refuges that receive Level 4 water deliveries. The habitat categories included were Wetland, Freshwater Marsh, Alkali Marsh, Marsh and Swamp. The counties included were Merced, Fresno, Kern, Kings, Tulare, Glenn, and Colusa; an additional condition of elevational range lower than 2,700 feet was applied to exclude montane and sub-alpine species. Species occurring only in drying seasonal vernal pools, serpentine seeps, hot springs and other specialized habitats were also omitted because they would most likely not benefit from more reliable water deliveries.

13.2.1.2 Vegetation Communities

Wildlife refuge perennial wetland or marshlands are classified as fresh emergent wetland in WHR (refer to Chapter 14 Terrestrial Biological Resources for descriptions). This habitat occurs in parts of affected National Wildlife Refuges (NWR) and Wildlife Areas (WA) from the Sacramento/Delevan NWRs in the north, to Kern and Pixley NWRs in the southern end of the San Joaquin Valley (Figure 1-4 in Chapter 1 Introduction). Fresh emergent wetland includes inland (non-coastal) alkaline wetlands, as well as completely freshwater wetland areas. Fresh emergent wetland habitats have greater than 2 percent cover by herbaceous species and less than 10 percent total cover by tree or shrub species. Because emergent wetlands are frequently flooded, their vegetation is adapted to being rooted in an anaerobic environment. Fresh emergent wetland habitats are characterized by erect, rooted water-dependent plants; dominant species are generally tall perennial grass-like plants such as cattails (*Typha*), bulrush (*Schoenoplectus*), rushes (*Juncus*), sedges (*Carex*, *Cyperus*), arrowhead (*Sagittaria*), or saltgrass (*Distichlis*) if on more alkali sites. Freshwater wetlands are relatively stable over many thousands of years, but can accumulate sediments, and become replaced by upland communities over time. Soil substrates are generally silts and clays, or sometimes organic peats, in depressions or basins within a generally level to gently rolling landscape (Mayer and Laudenslayer, 1988). Freshwater emergent wetland or marsh does not include such seasonal wetlands as vernal pools or riparian (streamside) edges by moving waters.

13.2.1.3 Invasive Plant Species

The CAL-IPC inventory includes 208 weeds of varying degrees of invasiveness that are known to occur throughout California (Cal-IPC, 2017). These occur in a wide range of habitats. Some (such as dandelion, bromes, thistles, mulleins, yellow star-thistle, and tumbleweeds) are well known from urban ruderal (i.e., weedy roadside) areas. Others, such as Johnson-grass, tall vervain, mustards, dock, or bindweed, are more common in agricultural areas, especially wet ditches and field margins. Others tend to invade riparian or wet habitats within urbanized areas, or spread into wildlands at the disturbed urban-wildland interface. A total of 197 invasive species from the CDFA 2017 list and 208 species from the Cal-IPC 2008 list are found in some part of the Extended Study Area, which includes much of California's Central Valley, but also extends into the Sierra foothills east of Oroville and Stockton, into the Bay Area, and also into southern coastal and desert lands.

The Cal-IPC query indicated that 55 invasive species are potentially present in wetland/marsh/aquatic and riparian habitats of the Extended Study Area. These species are listed in Table 13-1. This could be an underestimate because many water-tolerant riparian and upland invasive species can also occur in wetland edges.

Table 13-1
Invasive Weed Species Potentially Present in Wildlife Refuges Receiving Level 4
Water Supply in the Extended Study Area

Common Name	Scientific Name	Cal-IPC Wildland Impact Potential Rating	Habitats of Concern
Five-stamen tamarisk	<i>Tamarix chinensis</i>	High	Riparian areas
Creeping bentgrass	<i>Agrostis stolonifera</i>	Limited	Ditches, lake margins and marshes
Tree-of-heaven	<i>Ailanthus altissima</i>	Moderate	Riparian areas
Alligator weed	<i>Alternanthera philoxeroides</i>	High	Shallow water or wet soils, marshes, edges of ponds
Giant reed	<i>Arundo donax</i>	High	Riparian areas, ditch banks, moist disturbed sites
Lens-podded white-top	<i>Cardaria chalepensis</i>	Moderate	Riparian areas
Poison hemlock	<i>Conium maculatum</i>	Moderate	Moist disturbed areas
Pampasgrass	<i>Cortaderia selloana</i>	High	Riparian areas
Brass buttons	<i>Cotula coronopifolia</i>	Limited	Saline and freshwater wetlands, mudflats
Bermuda grass	<i>Cynodon dactylon</i>	Moderate	Edges of ditches, moist disturbed areas
Orchard grass	<i>Dactylis glomerata</i>	Limited	Moist disturbed areas
Cape-ivy	<i>Delairea odorata</i>	High	Riparian areas
Common teasel	<i>Dipsacus fullonum</i>	Moderate	Moist disturbed areas
Fullers teasel	<i>Dipsacus sativus</i>	Moderate	Moist disturbed areas
Brazilian egeria	<i>Egeria densa</i>	High	Streams, ponds, sloughs, lakes, Sacramento-San Joaquin Delta
Panic veldtgrass	<i>Ehrharta erecta</i>	Moderate	Moist disturbed areas
Water hyacinth	<i>Eichhornia crassipes</i>	High	Ponds, sloughs and waterways

Common Name	Scientific Name	Cal-IPC Wildland Impact Potential Rating	Habitats of Concern
Russian olive	<i>Elaeagnus angustifolia</i>	Moderate	Riparian areas
Italian ryegrass	<i>Festuca perennis</i>	Moderate	Seasonal wetlands, moist disturbed areas
Edible fig	<i>Ficus carica</i>	Moderate	Riparian areas
Mannagrass	<i>Glyceria declinata</i>	Moderate	Vernal pools, seasonal wetlands, freshwater marshes
English ivy	<i>Hedera helix</i>	High	Riparian areas
Common velvet grass	<i>Holcus lanatus</i>	Moderate	Seasonal wetlands, moist disturbed areas
Mediterranean barley	<i>Hordeum marinum</i>	Moderate	Seasonal wetlands, moist disturbed areas
Hydrilla	<i>Hydrilla verticillata</i>	High	Lakes, ponds, canals
Yellowflag iris	<i>Iris pseudacorus</i>	Limited	Riparian, wetlands, pond margins
Perennial pepperweed	<i>Lepidium latifolium</i>	High	Coastal and inland marshes, riparian areas, wetlands, moist disturbed areas
South American spongeplant	<i>Limnobium spongia</i>	High	Streams, ponds, lagoons
Uruguay water-primrose	<i>Ludwigia hexapetala</i>	High	Lake margins, wetlands
Creeping water primrose	<i>Ludwigia peploides</i>	High	Wetlands, sloughs, canals
Hyssop loosestrife	<i>Lythrum hyssopifolium</i>	Limited	wetlands, vernal pools, marsh edges
Purple loosestrife	<i>Lythrum salicaria</i>	High	Ponds, marshes, riparian areas.
Pennyroyal	<i>Mentha pulegium</i>	Moderate	Moist disturbed areas
Ngaio tree	<i>Myoporum laetum</i>	Moderate	Riparian areas
Parrotfeather	<i>Myriophyllum aquaticum</i>	High	Lakes, ponds, streams
Spike watermilfoil	<i>Myriophyllum spicatum</i>	High	Lake margins, ditches
Bristly ox-tongue	<i>Helminthotheca echioides</i>	Limited	Moist disturbed areas
Smilo grass	<i>Stipa miliacea</i> var. <i>miliacea</i>	Limited	Riparian areas, moist disturbed areas
rabbitfootgrass	<i>Polypogon monspeliensis</i>	Limited	Stream edges, wetlands, moist disturbed areas
Curled pondweed	<i>Potamogeton crispus</i>	Moderate	Ponds and streams (shallow water)
Cherry plum	<i>Prunus cerasifera</i>	Limited	Riparian areas
creeping buttercup	<i>Ranunculus repens</i>	Limited	Riparian areas, edges of marshes
Black locust	<i>Robinia pseudoacacia</i>	Limited	Riparian areas
Himalaya blackberry	<i>Rubus armeniacus</i>	High	Riparian areas, ditches, edges of canals
Curly dock	<i>Rumex crispus</i>	Limited	vernal pool, riparian areas, seasonal wetlands

Common Name	Scientific Name	Cal-IPC Wildland Impact Potential Rating	Habitats of Concern
Ravennagrass	<i>Saccharum ravennae</i>	Moderate	Marshes, ditches
Oppositeleaf Russian thistle	<i>Salsola soda</i>	Moderate	Coastal salt marshes
Giant salvinia	<i>Salvinia molesta</i>	High	Rivers, backwaters
Saltcedar	<i>Tamarix ramosissima</i>	High	Riparian areas, edges of ponds and marshes, moist disturbed areas
Chinese tallow tree	<i>Triadica sebifera</i>	Moderate	Riparian areas
Giant salvinia	<i>Salvinia molesta</i>	High	Freshwater aquatic systems
Bouncing betty	<i>Saponia officinalis</i>	Limited	Riparian areas
Smallflower tamarisk	<i>Tamarix parviflora</i>	High	Riparian areas, edges of ponds and marshes, moist disturbed areas
Common mullein	<i>Verbascum thapsus</i>	Limited	Riparian areas
Saltcedar	<i>Tamarix chinensis</i>	High	Riparian areas, edges of ponds and marshes, moist disturbed areas
Periwinkle	<i>Vinca major</i>	Moderate	Riparian areas

Notes:

Limited = Species are invasive but their ecological impacts are minor and they are considered to have low to moderate rates of invasiveness.

Moderate = Species have substantial and apparent, but generally not severe, ecological impacts and they are considered to have moderate to high rates of dispersal, although establishment is generally associated with disturbance.

High = Species have severe ecological impacts and are capable of moderate to high rates of dispersal and establishment.

Source: Cal-IPC, 2017.

13.2.1.4 Special-status Plant Species

Several special-status plant species are documented within fresh emergent wetland habitats within wildlife refuges receiving Level 4 water supply throughout the Central Valley. Thirty-four plant species on California Native Plant Society (CNPS) Rare Plant Ranked 1, 2, and 3, including several State- or federally listed species, are known to occur in lower elevation marshy habitats in the seven counties where wildlife refuges are located (CDFW, 2017). Species that are potentially present¹ in the affected wildlife refuges are listed in Table 13-2.

¹ Some of these species may not occur in the specific wildlife refuges that would benefit from a more reliable water supply because they may inhabit areas closer to the coast or in slightly different habitats or geographic areas.

**Table 13-2
Special-status Species Potentially Present in the Extended Study Area**

Common Name	Scientific Name	Federal Listing Status	State Listing Status	CNPS ^a	Habitat
Henderson's bent grass	<i>Agrostis hendersonii</i>	None	None	3.2	Valley and foothill grassland, vernal pool, wetland
Horn's milk-vetch	<i>Astragalus hornii</i> var. <i>hornii</i>	None	None	1B.1	Alkali playa, meadow and seep, wetland
Ferris's milk-vetch	<i>Astragalus tener</i> var. <i>ferrisiae</i>	None	None	1B.1	Meadow and seep, valley and foothill grassland Wetland
Alkali milk-vetch	<i>Astragalus tener</i> var. <i>tener</i>	None	None	1B.2	Alkali playa, valley and foothill grassland, wetland
Lost Hills crownscale	<i>Atriplex coronata</i> var. <i>vallicola</i>	None	None	1B.2	Chenopod scrub, valley and foothill grassland, wetland
Brittlescale	<i>Atriplex depressa</i>	None	None	1B.2	Alkali playa, chenopod scrub, meadow and seep, valley and foothill grassland, vernal pool, wetland
Watershield	<i>Brasenia schreberi</i>	None	None	2B.3	Wetland, marshes and swamps
Alkali mariposa-lily	<i>Calochortus striatus</i>	None	None	1B.2	Chaparral, chenopod scrub, desert wash, meadow and seep, Mojavean desert scrub, wetland
Pappose tarplant	<i>Centromadia parryi</i> ssp. <i>parryi</i>	None	None	1B.2	Coastal prairie, marsh and swamp, meadow and seep, valley and foothill grassland
Hispid bird's-beak	<i>Chloropyron mollis</i> ssp. <i>hispidum</i>	None	None	1B.1	Alkali playa, meadow and seep, wetland
Palmate-bracted bird's-beak	<i>Chloropyron palmatum</i>	Endangered	Endangered	1B.1	Chenopod scrub, meadow and seep, valley and foothill grassland, wetland
Slough thistle	<i>Cirsium crassicaule</i>	None	None	1B.1	Chenopod scrub, freshwater marsh, marsh and swamp, riparian scrub, wetland
Peruvian dodder	<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i>	None	None	2B.2	Wetland, marshes and swamps
Tall draba	<i>Draba praealta</i>	None	None	2B.3	Wetland, meadows and seeps
Delta button-celery	<i>Eryngium racemosum</i>	None	Endangered	1B.1	Riparian scrub, wetland
Spiny-sepaled button-celery	<i>Eryngium spinosepalum</i>	None	None	1B.2	Valley and foothill grassland, vernal pool, wetland
American manna grass	<i>Glyceria grandis</i>	None	None	2B.3	Bog and fen, marsh and swamp, meadow and seep, wetland
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	None	Endangered	1B.2	Freshwater marsh, marsh and swamp, vernal pool, wetland

Common Name	Scientific Name	Federal Listing Status	State Listing Status	CNPS ^a	Habitat
Water star-grass	<i>Heteranthera dubia</i>	None	None	2B.2	Marshes and swamps
Woolly rose-mallow	<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	None	None	2.2 ^b	Freshwater marsh, marsh and swamp, wetland
California satintail	<i>Imperata brevifolia</i>	None	None	2.1	Chaparral, coastal scrub, meadow and seep, Mojavean desert scrub, riparian forest, wetland
Coulter's goldfields	<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	None	None	1B.1	Alkali playa, marsh and swamp, salt marsh, valley and foothill grassland, vernal pool, wetland
Mud nama	<i>Nama stenocarpa</i>	None	None	2B.2	Marshes and swamps, wetland
Shining navarretia	<i>Navarretia nigelliformis</i> ssp. <i>radians</i>	None	None	1B.2	Cismontane woodland, valley and foothill grassland, vernal pool, wetland
Sanford's arrowhead	<i>Sagittaria sanfordii</i>	None	None	1B.2	Marsh and swamp, wetland
Salt Spring checkerbloom	<i>Sidalcea neomexicana</i>	None	None	2B.2	Alkali playa, chaparral, coastal scrub, lower montane coniferous forest
Marsh checkerbloom	<i>Sidalcea oregana</i> ssp. <i>hydrophila</i>	None	None	1B.2	Meadow and seep, riparian forest, wetland
Prairie wedge grass	<i>Sphenopholis obtusata</i>	None	None	2B.2	Cismontane woodland, meadow & seep, wetland
Slender-leaved pondweed	<i>Stuckenia filiformis</i> ssp. <i>alpina</i>	None	None	2.2	Marsh and swamp, wetland
San Bernardino aster	<i>Symphotrichum defoliatum</i>	None	None	1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, marsh and swamp
Wright's trichocoronis	<i>Trichocoronis wrightii</i> var. <i>wrightii</i>	None	None	2.1	Marsh and swamp, meadow and seep, riparian forest, vernal pool, wetland
Flat-leaved bladderwort	<i>Utricularia intermedia</i>	None	None	2B.2	Bog and fen, marsh and swamp, meadow and seep, vernal pool
Brazilian watermeal	<i>Wolffia brasiliensis</i>	None	None	2.3	Marsh and swamp, wetland

^aCalifornia Native Plant Society (CNPS, 2017): Rare Plant Rank 1B = plants rare, threatened, or endangered in California and elsewhere; Rare Plant Rank 2 = plants rare, threatened, or endangered in California but common elsewhere; Rare Plant Rank 3 = plants about which more information is needed to determine current status. CNPS threat codes: 0.1: Seriously endangered in California. 0.2: Moderately threatened in California; 0.3: Not very endangered in California.

13.2.2 Secondary Study Area

13.2.2.1 Methodology

Vegetation Communities

The vegetation types that could be affected by fluctuations in reservoir levels and changes in stream flow volumes are those within and around the immediate borders of the facilities included in the Secondary Study Area. A crosswalk (i.e., a cross-referencing table) for CDFW's Manual of California Vegetation (MCV) and WHR habitats was used to determine the current MCV vegetation alliances equivalent to the affected WHR habitats in the Secondary Study Area, which are: lacustrine, riverine, estuarine, valley foothill riparian, fresh emergent wetland, montane riparian (Trinity-Klamath River only), saline emergent wetland, barren, rice, irrigated grain crops, and irrigated row and field crops. The maps of each vegetation alliance (Sawyer et al., 2009) were consulted to verify that each alliance is found within the Secondary Study Area.

Invasive Plant Species

For land at margins of lakes, rivers, marshes, estuaries, and croplands, the overall Cal-IPC list was searched with a query that included wetland/marsh/aquatic and riparian habitats (Table 13-1). Similar to that described for the wetland habitats, this list is likely an underestimate because many invasive species found in similar habitats may not have been specifically listed as "riparian". Species listed as typical mostly of desert, coastal, or southern California areas were not included.

Special-status Plant Species

CDFW's Rarefind 5 program was used to query the February 2017 CNDDDB for all listed species in riparian and perennial wetland habitat categories in the 22 counties where affected CVP and SWP facilities are located. The habitat categories included were Aquatic, Estuary, Marine Bay, Klamath/North Coast flowing waters, Mud shore/flats, Riparian woodland, Riparian scrub, Sacramento/San Joaquin flowing waters and standing waters, Wetland, Swamp, Marsh/swamp, Freshwater Marsh, Brackish Marsh, Salt Marsh, and Alkali Marsh. The counties included were Alameda, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Glenn, Humboldt, Marin, Placer, Sacramento, San Francisco, San Mateo, Santa Clara, Shasta, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo, and Yuba. An additional condition of elevational range lower than 2,700 feet was applied to exclude high montane and sub-alpine species. Species occurring only in drying seasonal vernal pools were also omitted because they would likely be located in upland landforms.

In addition, species not appearing in the Rarefind 5 query, but included in DWR's rare plant survey search list for the Bay-Delta Conservation Plan surveys, were added to the list of potentially affected special-status plant species if they occurred within water-related habitats or on riparian or drainage banks.

13.2.2.2 Vegetation Communities

Table 13-3 lists the vegetation alliances identified in the MCV that are expected to be affected by the alternatives, and a correlation of vegetation types or groups of types with WHR and with Secondary Study Area Project features. Vegetation alliances listed in the MCV crosswalk (a cross-referencing table) were listed only if their mapped distribution (Sawyer et al., 2009) included Project features in the Secondary Study Area.

Table 13-3
Manual of California Vegetation Alliances in the Secondary Study Area

WHR Habitat Type	Corresponding MCV Vegetation Alliances	Project Features Likely to Support Some MCV Alliances
Valley foothill riparian (VRI)	Valley Oak Woodland, Fremont Cottonwood Forest, Red Alder Forest ^a , Oregon Ash Groves, Sitka Willow Thickets ^a , California Sycamore Woodlands, Black Willow Thickets, Red Willow Thickets, Sandbar Willow Thickets, Shining Willow Groves, Mulefat Thickets, Blue Elderberry Stands, Arroyo Willow Thickets, Button Willow Thickets and California Rose Briar Patches, Torrent Sedge Patches, Creeping Rye Grass Turfs	Feather River Sacramento River Clear Creek American River Parts of: Yolo Bypass Sutter Bypass Sacramento-San Joaquin Delta
Fresh Emergent Wetland (FEW)	Hardstem and California Bulrush Marsh, Cattail Marshes, Common Reed Marshes, Duckweed Blooms, Giant Reed Breaks, Mosquito Fern Mats, Pondweed Mats, Quillwort Beds, Pale Spikerush Marshes, Yellow Pond Lily Mats, Baltic and Mexican Rush Marshes, American Bulrush Marsh, Ditch-grass or Widgeon-grass Mats, Smartweed-Cocklebur Patches, Slough Sedge Swards, Meadow Barley Patches, Soft Rush Marshes, Creeping Rye Grass Turfs	Along edges, backwaters, and confluences of rivers and streams Parts of: Sacramento-San Joaquin Delta Suisun Bay San Pablo Bay San Francisco Bay Thermalito Complex
Saline Emergent Wetland (SEW)	Hardstem and California Bulrush Marsh, Cattail Marshes, Common Reed Marshes, Smooth or Chilean Cordgrass Marshes, California Cordgrass Marsh, Ditch-grass or Widgeon-grass Mats, Salt Marsh Bulrush Marshes, Alkali Heath Marsh, Baltic and Mexican Rush Marshes, American Bulrush Marsh, Creeping Rye Grass Turfs, Gum Plant Patches, Perennial Pepper Weed Patches, Salt Grass Flats, Slough Sedge Swards, Fields of Fat Hen and Brass Buttons	Parts of: Sacramento-San Joaquin Delta Suisun Bay San Pablo Bay San Francisco Bay
Rice	None	Parts of: Yolo Bypass Sutter Bypass
Barren	None Note: weedy species and occasional opportunistic native herbaceous species can colonize for short periods	Drawdown zones in: Lake Oroville Shasta Lake Keswick Reservoir Trinity Lake Lewiston Reservoir Whiskeytown Lake Folsom Lake Mudflats around: Suisun Bay Upper San Francisco Bay
Riverine, Lacustrine, Estuarine	None; these types consist of greater than 98 percent open water and less than 2 percent cover vegetation in shore zone	All
Irrigated row or field crops	None	Parts of: Yolo Bypass Sutter Bypass

^aAlliances in Klamath River area only

^bAlliances at Lewiston, Whiskeytown reservoirs only

The central waterway of the Secondary Study Area is the Sacramento River. Historically, the edges and floodplain of the Sacramento River supported several riparian vegetation communities. At water's edge, willow riparian scrub and annual plants occupied the shifting gravel and sand bars and banks. Well-developed multiple-storied cottonwood and sycamore riparian forests lined inner terraces, transitioning into mixed species and then valley oak cathedral forests on the somewhat higher terraces. Currently, in most of the Secondary Study Area, less than 15 percent of this original riparian corridor remains along the Sacramento River. It is now represented by narrow strips in a pattern interrupted by agriculture (mostly orchards) down to the river's edge.

13.2.2.3 Invasive Plant Species

A total of 55 species of non-native weeds of varying degrees of invasiveness are known to occur in riparian and aquatic habitats (Table 13-1). These species could potentially exist in the water-edge habitats of the Secondary Study Area. The list of invasive species included in Table 13-1 could be an underestimate, because many upland weed species may also occur along wetland edges and in riparian habitats. In addition, many additional invasive plant species may occur in the agricultural areas of the Yolo and Sutter Bypass portions of the Secondary Study Area.

Some examples of weedy species that could be affected by changes in water levels or timing of flows are stands of Poison hemlock (*Conium maculatum*) or fennel (*Foeniculum vulgare*), Pampas grass (*Cortaderia* spp.), Perennial pepperweed (*Lepidum latifolium*), Giant reed (*Arundo donax*), and Montevideo waterweed (*Ludwigia peploides* ssp. *montevidensis*) in Suisun Marsh, other locations around the edges of San Francisco Bay and the Delta, Bypass areas, and river and stream floodplains.

13.2.2.4 Special-status Plant Species

In riparian, aquatic, and wetland habitats within affected SWP and CVP areas throughout Northern California, including the Trinity/Klamath River and San Francisco Bay and Delta, numerous special-status plant species are documented. The CNDDDB includes 180 plant species with CNPS Rare Plant Ranks of 1, 2 and 3, including several State- or federally listed species, that are known to occur in lower-elevation water-related habitats in the 22 counties containing affected SWP or CVP facilities (CDFW, 2017). These species are summarized by listing status on Table 13-4 and are listed in greater detail in Appendix 13A Special-status Plant Species Potentially Occurring in Secondary Study Area Aquatic Habitats. Some of these species may not occur at the specific Project features or facilities affected by changing Project operation flows, because they may occur in slightly different habitats or geographic areas. However, these species are potentially present in the affected Secondary Study Area streamside, wetland/marsh, or aquatic areas.

Table 13-4
Number of Special-status Plant Species by Rank in the Secondary Study Area

Status		Number of Species
Federal	Endangered	21
	Threatened	4
Subtotal		25
State	Endangered	23
	Threatened	1
	Rare	4
Subtotal		28

Status		Number of Species
California Native Plant Society Rare Plant Rank*	1A	5
	1B	97
	2B	76
	3	2
Subtotal		180

*California Native Plant Society (CNPS, 2017): Rare Plant Rank 1A= plants presumed extinct in California; Rare Plant Rank 1B = plants rare, threatened, or endangered in California and elsewhere; Rare Plant Rank 2 = plants rare, threatened, or endangered in California but common elsewhere; Rare Plant Rank 3 = plants about which more information is needed to determine current status. Source: CDFW, 2017

Five smaller geographic regions within the Secondary Study Area that are based on climatic and other biogeographic differences were defined for the discussion of potentially affected special-status plant species (Figure 13-1). The numbers of special-status plant species that are expected to occur in each of these geographic regions are listed in Table 13-5.

As indicated in Table 13-5, the Bay/Delta portion of the Secondary Study Area supports the greatest number of potentially affected special-status plant species. Some of these, such as Delta button celery (*Eryngium racemosum*), a State endangered species, or Suisun Marsh aster (*Symphyotrichum lentum*) and Carquinez goldenbush (*Isocoma arguta*), both CNPS 1B species, occur only in the Bay-Delta part of the Secondary Study Area.

However, other portions of the Secondary Study Area also support special-status plant species not found in any other region. For example, several plant species are found only in the North Coast (Trinity-Klamath rivers) portion of the Secondary Study area, such as Western lily (*Lilium occidentale*), a federally endangered species, and Howell's miner's-lettuce (*Montia howellii*), a CNPS 1B species. This northwest coastal area is influenced by its unique proximity to the north coast, with Klamath region serpentine substrates and high rainfall.

Similarly, several species are known only from the Folsom area, such as federally endangered Sacramento orcutt grass (*Orcuttia viscida*), or Myers' pincushionplant (*Navarretia myersii* ssp. *myersii*), a CNPS 1B species. The Folsom area foothill-valley edge has vernal pool and gabbro/serpentine substrates that support unique sets of plant species.

Special-status plants unique to the cool mountainous Shasta area include Shasta snow wreath (*Neviusia cliftonii*) and Howell's alkali grass (*Puccinellia howellii*), both CNPS 1B species.

Special-status plants occurring mainly in the Central Valley include vernal pool species such as federally listed Greene's tuctoria (*Tuctoria greenei*) and Colusa grass (*Neostapfia colusana*), as well as highly localized foothill-valley edge species such as federally endangered Butte County meadowfoam (*Limnolobos floccosa* ssp. *californica*) and Sacramento cryptantha (*Cryptantha crinita*), a CNPS 1B species. Several species such as Palmate-bracted bird's-beak (*Chloropyron palmatum* [federally and State endangered]), Pappose tarweed (*Centromadia parryi* [CNPS 1B]), and three saltbushes (*Atriplex* spp. [all CNPS 1B]), are found in both the alkaline wetlands of the Central Valley and the brackish marsh edges of the Bay-Delta. The only potentially affected special-status plant species known from all parts of the Secondary Study Area is Sanford's arrowhead (*Sagittaria sanfordii*), a CNPS 1B species that is found at pond edges.

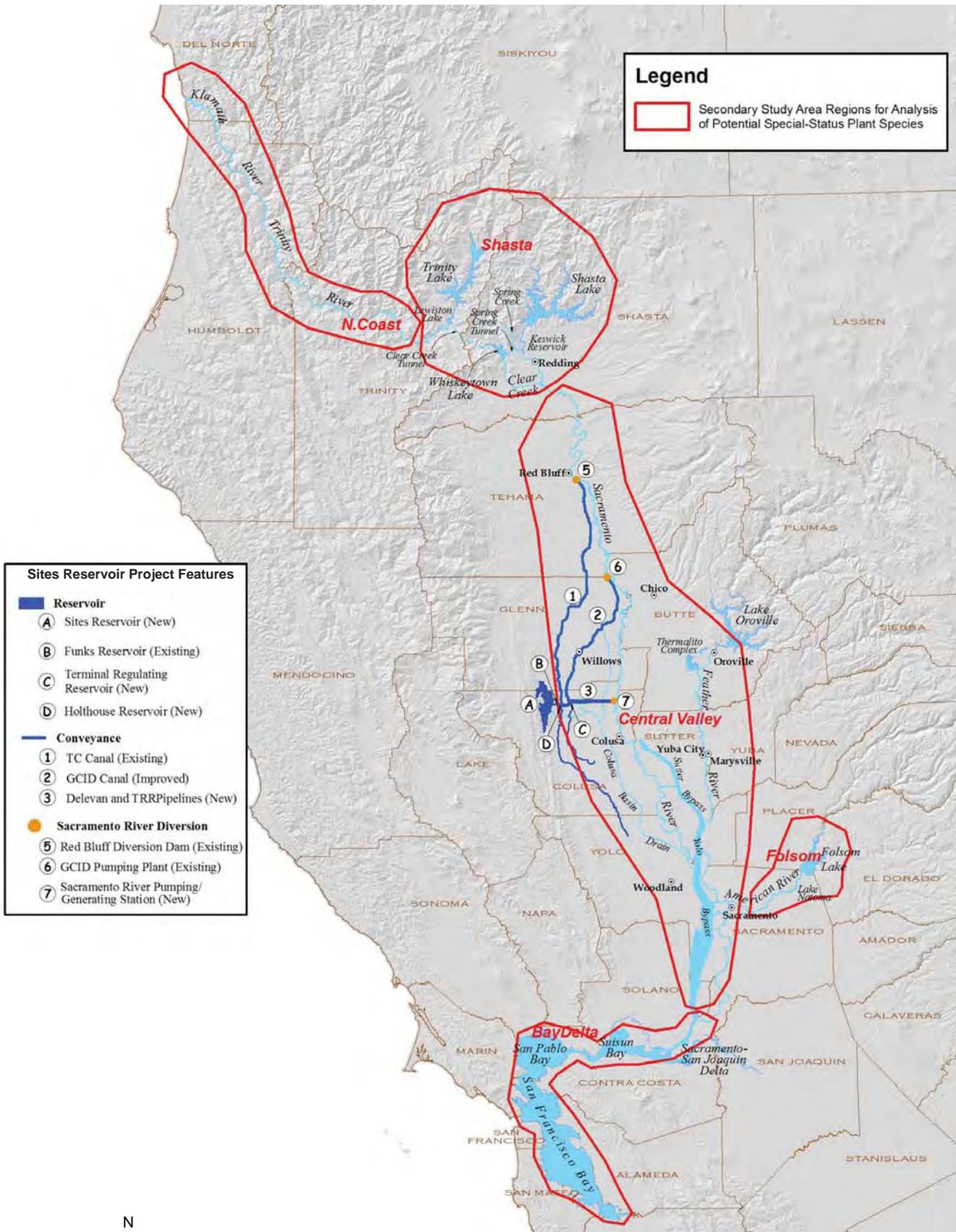


FIGURE 13-1
Secondary Study Area Regions for
Analysis of Potential Special-status
Plant Species

Sites Reservoir Project EIR/EIS

**Table 13-5
Number of Special-status Plant Species by Region and Status**

Status	Region				
	North Coast	Shasta	Central Valley	Bay/Delta	Folsom
Federal (also 1B)	1	0	7	15	0
State (also 1B)	1	3	10	14	2
CNPS 1A	0	0	0	5	0
CNPS 1B ^a	14	16	24	20	8
CNPS 2	34	21	24	21	17
CNPS 3	0	1	1	1	0
TOTAL^b	50	41	66	76	27

^aCNPS 1B plants that are also State and federal listed are not included in the numbers presented for 1B

^bTotals for the regions add up to than 180 because several of the species are present in more than one region.

Source: CDFW 2017

13.2.3 Primary Study Area

13.2.3.1 Methodology

Vegetation Communities

CNPS and CDFW have classified natural plant communities in California for broad scale resource inventory and assessment. This classification system defines characteristics for general vegetation types and for rare communities. These classifications were used as the first step to define the natural vegetation communities and associations in the Primary Study Area that may be affected by the Project features (DWR, 2005). Associations or vegetation types were added to these classifications to encompass the variation of dominant species composition and vegetation structure (density of cover) that was found in the vicinity of Project facilities, especially areas lying outside the confines of the reservoir footprints.

Vegetation within the proposed reservoir footprint was mapped in 1998 (DWR, 2005). Vegetation in and adjacent to other features, including proposed road relocation routes, conveyance routes, and recreation areas, were mapped in 2000 to 2001. Reservoir footprint vegetation types were delineated by hand on overlays over hard-copy true-color aerial photos (1:6,000; 1:12,000). The polygons were field-verified and then digitized using computer mapping software (AutoCad, converted to ArcView [ESRI, 1998]). Vegetation types in feature areas outside of the proposed reservoir footprint were delineated directly on-screen using “heads-up digitizing” in ArcView 3.x (ESRI, 2000) over geo-referenced true-color digital aerial photo images (1:7,200, 1:12,000 and 1:30,000) flown in 1997 for the Project. Interpretation of vegetation composition was based on prior familiarity from 3 years of rare plant surveys. In addition, field verification of the proposed reservoir footprint occurred after initial mapping was completed.

In vegetation mapping for features outside of the proposed reservoir footprint, vegetation types were defined somewhat more finely for dominant woody species and vegetation density than in the earlier reservoir footprint mapping. However, all vegetation types used were easily convertible, and the resulting polygons for both were integrated into a single mapping coverage (shapefile). The 2001 vegetation mapping for the Primary Study Area was partially updated in 2004 based on field observations in selected sampling sites. This original vegetation mapping included lands surrounding all Project features covered by aerial photography, a total of 104,331 acres. In addition, computer mapping software (ArcGIS v. 9.2)

was used in 2010 to obtain acreages and percent cover for each vegetation type occurring within the Primary Study Area. Acres of each vegetation type were also mapped using similar methods for the “construction disturbance area,” which represents the maximum potential ground disturbance area resulting from construction activity.

Invasive Plant Species

A list of weed species potentially occurring in and in the vicinity of the Primary Study Area was created by listing all species from the Federal Noxious Weed List (USDA, 2011), CDFA list (CDFA, 2010), and the Cal-IPC list (Cal-IPC, 2010) and adding those from the local Colusa-Glenn-Tehama Weed Management Area (CGTWMA, 2002). Also added were species of concern to the Mendocino National Forest (Ruhl, 2006, pers. comm.). This original list contained 83 species. Likelihood of occurrence of these 83 species was evaluated based on documented occurrences for Colusa and/or Glenn counties in CalFlora, CDFA, or local floras (Oswald, 2002), and whether the species was found during Project field surveys. Species known only from habitats, elevations, or geographical localities not extending into the Primary Study Area (e.g., montane species or those not known to occur west of the Sacramento River) were not included.

Species not found during surveys, but previously recorded from Glenn and Colusa counties, were assigned a medium probability of occurrence.

Special-status Plant Species

Lists of special-status plant species potentially affected by the Project were developed prior to conducting the 1998 to 2003 field surveys. The initial list of federal- and State-listed species, species of concern (CNPS 1, 2, and 3) was compiled after consulting CDFW, CNPS, and U.S. Fish and Wildlife Service (USFWS) references and regional specialists (DWR, 2005) regarding known occurrences within the Primary Study Area. The list was then updated each year prior to continuation of surveys, using the current version of Rarefind, CNDDDB, letter requests to USFWS and the updated CNPS Inventory (DWR, 2005).

To develop a baseline for a list of potentially affected species for this document, CDFW’s Rarefind Version 5 and the CNPS On-Line Inventory of Rare and Endangered Plant databases were queried in February 2017. The database searches included all listed species in all habitats, in 16 USGS 7.5-minute quadrangle maps encompassing the Primary Study Area, including: Colusa, Gilmore Peak, Hough Springs, Lodoga, Leesville, Logan Ridge, Logandale, Manor Slough, Maxwell, Moulton Weir, Princeton, Rail Canyon, Salt Canyon, Sites, Stonyford, and Williams. An additional condition of elevational range lower than 3,000 feet was applied to exclude high montane and sub-alpine species.

Field surveys were conducted for special-status plant species within the proposed Sites Reservoir footprint in 1998 and 1999, and within potential routes for conveyances, recreation areas, and road relocations in 2000 through 2003. Additional Project features (Eastside Road extension to Road 69, Holthouse Reservoir Complex, and the redesigned Delevan Pipeline Intake/Discharge Facilities) were surveyed in 2010 and 2011. Survey corridors in 2000 and 2001 were 500 feet wide for road relocation routes, and 1,000 feet wide or more for conveyance routes. Survey corridors were 1,500 feet wide for all features surveyed in 2002 and 2003. The Eastside Road extension route was surveyed in a corridor of 100 feet to either side of a centerline; for the proposed Holthouse Reservoir Complex and the Delevan Pipeline Intake/Discharge Facilities, entire footprints were surveyed. Botanical surveys were conducted according to established guidelines and protocols (Nelson, 1987; CNPS, 1994; CDFG, 1984; CDFG,

2000; CDFG, 2009; and USFWS, 1996). Pursuant to these guidelines, focused habitat-specific surveys were conducted, using wandering transect methodology, between February and October. These months coincided with the appropriate flowering and fruiting stages necessary for the identification of most plant species occurring in the area, including all special-status species (Section 13.2.3.6 Special-status Plant Species, Tables 13-9 and 13-10).

Field survey activities and plant identifications were documented throughout the multiple-year study, including dates, location, authorized property access, and assigned personnel (DWR, 2005).

Land not surveyed included properties for which authorized access was not obtained, private residences and yards, cemeteries, agricultural fields, and some bedrock stream channels and vertical slopes. Also not surveyed were areas that do not support suitable habitat for the special-status species, such as impenetrable woodland, chaparral or scrub areas, and large solid stands of Yellow star-thistle (*Centaurea solstitialis*). Some creek channels and vertical slopes were examined with binoculars where habitat appeared potentially suitable for certain species. Also not surveyed were lands outside of defined Project feature corridors. Within defined Project feature areas, lands with degraded or otherwise marginal or unsuitable habitat not warranting further surveys were surveyed less thoroughly. Areas with high quality potential habitat were prioritized and surveyed throughout the flowering period with more complete transect coverage. Habitat parameters, including mapped soils, aspect, and plant associates, defined the number of return visits and the level of coverage. In each Project feature area, small areas of potential habitat remain unsurveyed due to field season time constraints or lack of access authorization. Within time constraints of each season, 100 percent survey coverage was attempted in potential habitat known to support the special-status plant species, with special emphasis on federal- or State-listed species and those with a CNPS Rare Plant Rank of 1, 2, or 3.

Plant species were identified and recorded in the field whenever possible, or preserved in a voucher collection for identification at a later date. The voucher collection consists of plant specimens that were collected and preserved as proof for species on the plant inventory lists. Data collected for each special-status species occurrence included habitat parameters, approximate number of individuals, phenological state (stage of maturity), full location description, plant community associates, existing site conditions, and present or possible threats to the population. Occurrence definitions in this analysis follow the CNDDDB occurrence reporting standard of at least 0.25 mile separation between stands or colonies of a special-status species. Detailed descriptions of survey methodology, area surveyed, and documentation of findings are provided in the North-of-the-Delta Offstream Storage Botanical Resources Progress Report (DWR, 2005).

13.2.3.2 Plant Species Biology and Life History of Federal- or State-listed Species

None of the species presented in Table 13-9 were found during Project field surveys in the Primary Study Area. Three of the species in Table 13-9 are not likely to be present in the Primary Study Area because of lack of suitable elevation, substrate, and other habitat elements. They are Milo Baker's lupine (*Lupinus milo-bakeri* [occurs above 1,300 feet elevation]), Indian Valley brodiaea (*Brodiaea coronaria* ssp. *rosea* [occurs on serpentine soils]), and Red Mountain catchfly (*Silene campanulata* ssp. *campanulata* [occurs over 1,300 feet on serpentine substrate]).

Hoover's spurge (*Chamaesyce hooveri*), hairy orcutt grass (*Orcuttia pilosa*), palmate-bracted bird's-beak (*Chloropyron palmatum*), and Greene's tuctoria (*Tuctoria greenei*) may occur within the Primary Study Area. Palmate bracted bird's beak has been reported within a few miles of either side of the Glenn-Colusa Irrigation District (GCID) Canal in habitats similar to some of those traversed by the GCID Main Canal

(CDFW, 2017). However, palmate-bracted bird's-beak is restricted to alkali wetland habitats, which have been mostly converted to intensive agriculture in the Primary Study Area. Colusa-grass (*Neostapfia colusana*) has been extirpated (locally extinct) from the Colusa County portion of its former range (CDFW, 2017; USFWS, 2006). Potential habitat for some of these species may exist in the footprint for the proposed Holthouse Reservoir southeast of the existing Funks Reservoir.

The remaining federally listed plant species, Keck's checkerbloom (*Sidalcea keckii*), may occur within the Primary Study Area, in grassy areas within open blue oak woodland in hills around the western side of the proposed Sites Reservoir footprint. This species was not thought to occur in the northern half of California during the time of Project surveys.

Indian Valley brodiaea (*Brodiaea rosea*)

Indian Valley brodiaea, a State Endangered species, is a perennial herb in the Lily family (Liliaceae) that flowers in May and June. Its habitat includes closed-cone coniferous forest, chaparral, cismontane woodland, and valley and foothill grasslands on serpentinite soils typically at elevations ranging from 1,100 to 4,760 feet (335 to 1,450 meters), but has been observed as low as 100 feet (30 meters) (Oswald, 2002). It has been found in gravelly creek bottoms, meadows and swales, and other vernal moist sites with serpentine substrates. Eighteen occurrences of Indian Valley brodiaea have been reported in Colusa, Glenn, Lake, and Tehama counties (one of which are possibly extirpated) (CDFW, 2017). These sites are on lands owned and managed by the Bureau of Land Management (BLM), U.S. Forest Service, private parties, and unknown entities. Known populations occur within 6 miles of the Primary Study Area. Some plant species thought to occur only on serpentinite can sometimes be found downslope or downstream of serpentinite areas on contiguous non-serpentine substrate. Therefore, potential habitat may exist, but is not likely, within the western portion of the Primary Study Area. Existing threats to these populations have been identified, including inundation by reservoir construction, mining, off-road recreational vehicle activity, road or trail construction, horticultural collecting, vandalism, and dumping. Populations are protected, in part, at a BLM Area of Critical Environmental Concern in Lake County.

Hoover's spurge (*Euphorbia hooveri*)

Hoover's spurge, a federal Threatened species, is also listed on CNPS 1B. It is an annual herb in the spurge family (Euphorbiaceae) that flowers in July and August. Its habitat is limited to vernal pools at elevations ranging from 80 to 820 feet (25 to 250 meters). Its preferred substrate is deeply cracking adobe clay. Hoover's spurge has been reported from 29 occurrences in California: 20 are clustered in Butte, Glenn, and Tehama counties; three are in Stanislaus and Merced counties, and six are in Tulare County. Of the 20 occurrences north of San Joaquin County, all except four are at or near The Nature Conservancy's (TNC) Vina Plains Preserve. Known occurrences are on properties owned or managed by CDFW, USFWS, TNC, and private and unknown parties. Known populations occur within 7 miles of the Primary Study Area in the Sacramento NWR. Potential habitat may exist in parts of the Primary Study Area wherever vernal pools occur. Existing threats to this species include agriculture, altered hydrology, erosion or runoff, trampling, grazing, and competition from non-native plants. Populations are protected, in part, at the CDFW Stone Corral Ecological Reserve in Tulare County, USFWS Sacramento NWR, and TNC Vina Plains Preserve, but most occurrences of Hoover's spurge are on privately owned land (USFWS, 2002).

Palmate-bracted bird's-beak (*Chloropyron palmatum*)

Palmate-bracted bird's-beak, a State and federal Endangered species, is an annual herb in the Broom Rape family (Orobanchaceae) that flowers from May through October. Its habitat is vernal (springtime) wet open flats with chenopod (Goosefoot family) scrub on saline/alkaline soil in valley and foothill grassland

at elevations ranging from 16 to 510 feet (5 to 155 meters). Twenty-six occurrences of palmate-bracted bird's-beak are known from Alameda, Colusa, Fresno, Glenn, Madera, San Joaquin and Yolo counties (CDFW, 2017). However, the five occurrences of this species in Madera County are thought to be extirpated, and the two occurrences listed for Glenn County and one for Fresno County are recent re-introductions. The 18 remaining natural populations occur on land owned and managed by the City of Woodland, CDFW, City of Livermore, USFWS, and private parties. It is known to occur within 2 miles of the Primary Study Area; these occurrences in Colusa County (Delevan NWR) represent the northernmost occurrences in the existing natural range of this species. Potential habitat exists in the proposed Delevan Pipeline construction disturbance area, and in the proposed Holthouse Reservoir footprint. Existing threats include agriculture, urbanization, altered hydrology, competition from exotic plants, biocides, grazing, offroad vehicle use, vandalism/dumping, and road and trail construction. Populations are protected at the CDFW Alkali Sink Ecological Reserve and Mendota Wildlife Area, and at the Colusa, Delevan and Sacramento NWRs.

Milo Baker's lupine (*Lupinus milo-bakeri*)

Milo Baker's lupine, a State Threatened species, is an annual herb in the pea family (Fabaceae) that flowers from June through September. Its habitat is vernal wet gravelly depressions such as drainage channels, ditches, and often roadsides in cismontane woodland and foothill and valley grasslands at elevations ranging from 1,300 to 1,410 feet (395 to 430 meters). Milo Baker's lupine has been reported from one occurrence in Colusa county and nine in Mendocino county (CDFW, 2017). There is an occurrence of *Lupinus milo-bakeri* in Calflora approximately 7 miles SW of the town of Sites (2000) in Bear Valley/Walker Ridge. Known occurrences are on land owned and managed by Bureau of Indian Affairs, California Department of Transportation (Caltrans), and private parties. Potential habitat exists in the vicinity of the Project; the closest occurrence is in Bear Valley, approximately 7 miles southwest of the Primary Study Area and 13 miles from the town of Sites. This species is threatened by biocides, grazing, and road and trail construction.

Colusa grass (*Neostapfia colusana*)

Colusa grass, a State Endangered and federal Threatened species, is an annual grass that flowers from May to August. Its habitat is large and/or deep vernal pools and alkali playas, on uncultivated adobe and saline/alkaline clay soils, at elevations ranging from 16 to 660 feet (5 to 200 meters). Colusa grass is reported from 62 occurrences in Glenn, Colusa, Merced, Solano, Stanislaus, and Yolo counties (CDFW, 2017). However, this species is thought to be extirpated from Glenn and Colusa counties, and from some sites in Stanislaus and Merced counties. Colusa grass occurs on land owned by TNC, Solano County Farmlands and Open Space Foundation, Stanislaus County, the U.S. Department of Defense, private parties, and unknown entities. Potential habitat occurs in the vicinity of the Project; the one reported occurrence in Colusa County (now extirpated) was in alkali pools beside what is now County Road 68 between Princeton and Norman, 3 to 9 miles east of I-5, approximately 4 miles to the north of the proposed Delevan Pipeline route and 10 miles east of the proposed Sites Reservoir footprint. Potential habitat for Colusa grass also exists in the proposed Holthouse Reservoir footprint. The nearest occurrence that still exists is over 60 miles to the southeast in Yolo County. Existing threats to these populations include agricultural practices and grazing, altered flood regime and surface water diversion, biocides, competition from exotics, inundation, foot traffic, off-road vehicle activity, and road construction. Some populations are protected by TNC and Solano County Farmlands and Open Space Foundation.

Hairy Orcutt grass (*Orcuttia pilosa*)

Hairy Orcutt grass, a State and federal Endangered species, is an annual grass that flowers from May to September. Its preferred habitat is drying edges and beds of vernal pools in heavy clays, ranging in elevation from 180 to 660 feet (55 to 200 meters). Thirty-three occurrences of Hairy Orcutt grass have been reported in, Glenn, Madera, Merced, Stanislaus, and Tehama counties (CDFW, 2017). However, several of these occurrences have been extirpated. Existing populations occur on land owned by the Bureau of Reclamation (Reclamation), Caltrans, TNC, USFWS, and private parties. Potential habitat exists within the vicinity of the Project, and known populations occur within 6 miles of the Primary Study Area in the Sacramento NWR. Nine known occurrences, in and near Vina Plains, are several miles east of the Sacramento River in southern Tehama County. Existing threats include agriculture, competition from exotic plants, development, grazing, off road vehicle use, and road and trail construction. Some populations are protected at the TNC Vina Plains Preserve and at the Sacramento NWR.

Keck's checkerbloom (*Sidalcea keckii*)

Keck's checkerbloom, a federal Endangered species, is an annual herb that flowers from April to May. This plant was presumed extinct but was rediscovered in 1992, and listed at the federal level in February 2000 and added back into the CNPS online inventory in 2004 as a 1B species (U.C., 2004). Many specimens of Keck's checkerbloom, including those nearest the Primary Study Area, were originally thought to be the common fringed checkerbloom (*Sidalcea diploscypha*); these specimens were annotated to Keck's checkerbloom by Steven Hill in 2008 (U.C. Consortium, 2011). Its habitat consists of clay soils often of serpentine origin, in valley and foothill grassland and open woodland, at elevations from 394 feet (120 meters), to over 1,394 feet (425 meters). Sixteen occurrences of Keck's checkerbloom are reported in Colusa, Fresno, Merced, Napa, Solano, Tulare, and Yolo counties (CDFW, 2017). One occurrence is considered to be extirpated from Tulare County. Existing populations occur on land owned and managed by TNC, CDFW, BLM, Reclamation, private parties, and unknown entities. Potential habitat occurs along the western edge of the Primary Study Area. One occurrence is immediately northwest of the Primary Study Area, and three occurrences are in Colusa County in the vicinity of the existing East Park Reservoir. The remaining 11 occurrences are not located near the Primary Study Area. Existing threats include grazing, utility maintenance, and competition from exotic plants. The identity of the plants assigned to Keck's checkerbloom from the northern end of the species' distribution, in Colusa, Napa, Solano and Yolo counties, has not yet been confirmed by ongoing scientific investigations. The necessary molecular work needed to resolve the question of whether these plants are truly Keck's checkerbloom is still in progress as of mid-2010 (Baldwin, 2010, pers. comm.). This includes the specimens collected during Project field surveys from the hills along Grapevine Creek, at the western edge of the Primary Study Area.

Red Mountain catchfly (*Silene campanulata* ssp. *campanulata*)

Red Mountain catchfly, a State Endangered species, is a perennial herb in the carnation family (Caryophyllaceae) that flowers from May to June. Its habitat includes chaparral and lower montane coniferous forest with serpentinite or rocky soils at elevations ranging from 1,390 to 6,840 feet (425 to 2,085 meters). This subspecies is only known from seven occurrences including one in Colusa county and six in Mendocino county (CDFW, 2017). These populations occur on land owned and managed by BLM and private parties. A known population of Red Mountain catchfly grows within 5 miles of the Primary Study Area. The Project facilities are located well below the observed elevation range of the species. Existing threats include erosion or runoff, mining, and possibly logging activities.

Greene's tuctoria (*Tuctoria greenei*)

Greene's tuctoria, a federal Endangered species, is an annual grass that flowers from May to July. Its habitat consists of drying small or shallow vernal pools, or the early-drying portions of large deeper vernal pools, mostly at elevations less than 660 feet (200 meters), but can occur over 3,000 feet (1,065 meters). These sites occur mostly in open grassland, on Anita clay or reddish clays of Tuscan or other volcanic origin, but can be found on alkaline adobe clay substrate. Forty-eight occurrences of Greene's tuctoria are known (CDFW, 2017) from 11 counties. Eighteen of the occurrences are extirpated or presumably-extirpated. One occurrence, known from an herbarium specimen, exists in Glenn County on the Sacramento NWR (Oswald, 2002; U.C. Consortium, 2011). Existing populations occur on land owned and managed by TNC, USFWS, private parties, and unknown entities. Potential habitat occurs within the vicinity of the Project. The Sacramento NWR occurrence is within 10 miles of the Primary Study Area and within 7 miles of the proposed Delevan Pipeline route. Existing threats include agriculture, altered hydrology and surface water diversions, competition from exotic plants, and grazing. Populations are protected, in part, at TNC Vina Plains Preserve, and the Sacramento NWR.

13.2.3.3 Plant Species Biology and Life History of *Species of Concern*

Bent-flowered fiddleneck (*Amsinckia lunaris*)

Bent-flowered fiddleneck is a CNPS 1B species, considered to be "moderately threatened in California." This upright annual forb in the borage family (Boraginaceae) grows 1 to 3 feet tall. It flowers from March to June, and flowers must be present to distinguish it from co-occurring common look-alike species. It is found in grassy openings on slopes in oak woodlands with chaparral understories and coastal scrub. It exists at elevations of 10 to 1,500 feet (3 to 500 meters) on crumbly shale, mudstone, clay, and serpentine substrates (CNPS, 2017). There are 64 occurrences recorded for Bent-flowered fiddleneck, scattered in the central Coast Ranges from Lake County through most counties south to San Benito County (CDFW, 2017). Many recorded occurrences are old and may no longer exist. Prior to Project surveys in 2001 to 2004, the occurrences nearest to the Primary Study Area were approximately 7 miles to the west, near the Colusa/Lake County line. Three new occurrences of Bent-flowered fiddleneck were found during Project surveys in the hills to the west and east of the proposed Sites Reservoir footprint. Additional occurrences of this species may occur in suitable habitat that exists in the hills surrounding the reservoir footprint, especially the canyons along the western side. Because it is very similar in appearance to common species, this species may have been overlooked in early Project surveys in those areas. Primary Study Area occurrences represent the northeasternmost extent of the range for this species.

Jepson's milkvetch (*Astragalus rattanii* var. *jepsonianus*)

Jepson's milkvetch is a CNPS 1B species, considered to be "moderately threatened in California." This annual herb in the pea family (Fabaceae) grows from 1.5 to 12 inches tall, lying partly on the ground but with erect stem tips, and flowers from April through June. It is found in shaley mudstone or serpentinite soils in woodland, chaparral, or grassland at elevations from 1,000 to 2,000 feet (300 to 600 meters). There are 51 occurrences recorded for Jepson's milkvetch in Colusa, Glenn, Lake, Napa, San Benito, Tulare and Yolo counties (CDFW, 2017). Most occurrences are thought to still exist, but many have not been confirmed. Three occurrences are known from hills approximately 7 miles west of the Primary Study Area. Existing threats to this species include road maintenance and off-road vehicle use (CNPS, 2017). Potential habitat is present in the Primary Study Area in the hills to the west of the proposed Sites Reservoir footprint, but Jepson's milkvetch was not found during Project surveys in that area.

Ferris' milk-vetch (*Astragalus tener* var. *ferrisiae*)

Ferris' milk-vetch is a CNPS 1B species, considered to be “moderately threatened in California.” This delicate annual herb in the legume family (Fabaceae) grows from 2.5 to 11 inches tall, flowers from mid-March to May, and is endemic to California. Its habitat consists of vernal moist meadows and weakly alkaline flats on valley grasslands at elevations below 246 feet (75 meters) (CNPS, 2017). It has been found in adobe clay soils of rice fields, fallow pastures, and other low valley sites (Oswald, 2002). Most historically occupied habitat has been destroyed by agriculture. Eighteen occurrences of Ferris' milk-vetch have been reported in Solano, Yolo, Yuba, Colusa, Glenn, Sutter, and Butte counties (CDFW, 2017). Of these, five are probably extirpated, and others have not been recently observed. One 1884 occurrence is presumed extant (still in existence) in Colusa County. Most of the occurrences known to exist are on lands under public ownership in USFWS refuges, or state Wildlife Areas (e.g., Gray Lodge, Butte Sink). Known populations occur within 8 miles of the Project features at the Sacramento NWR. The main existing threat to this species has been habitat destruction due to intensive agriculture and overgrazing. Potential habitat for Ferris' milk-vetch exists in the Primary Study Area around Salt Lake (located within the proposed Sites Reservoir footprint), along the route for the proposed Delevan Pipeline, in the proposed Holthouse Reservoir footprint, and possibly adjacent to portions of the GCID Main Canal. No occurrences of this species were found during Project surveys.

Heartscale (*Atriplex cordulata* var. *cordulata*)

Heartscale is a CNPS 1B species, considered to be “moderately threatened in California.” This coarse erect annual herb in the goosefoot family (Chenopodiaceae) grows from 4 to 20 inches tall, flowers from April to October, and is endemic to California. Its habitat includes saline or alkaline soils in alkali meadow, saltbush scrub, and alkali sink communities at elevations below 1,225 feet (375 meters) (CNPS, 2017). It has been found in dry alkaline soils of grassy fields, levees, margins of seasonally flooded marshes, and other low valley sites. Sixty-six occurrences of heartscale have been reported in from Kern county north to Glenn and Butte counties (CDFW, 2017). Most are presumed extant. These sites are on lands under federal ownership in USFWS refuges, in state Wildlife Areas, other agency preserves, and private and unknown ownership. Known populations occur within 6 miles of the Primary Study Area at the Sacramento NWR (Oswald, 2002). The main existing threats to this species have been levee, road, or aqueduct right-of-way maintenance, grazing, development, and invasive weeds. Potential habitat for Heartscale exists in parts of the Primary Study Area around Salt Lake, along the route for the proposed Delevan Pipeline, in the proposed Holthouse Reservoir footprint, and possibly along portions of the GCID Main Canal. No occurrences of this species were found during Project surveys.

Brittlescale (*Atriplex depressa*)

Brittlescale is a CNPS 1B species, considered to be “moderately threatened in California.” This low-growing annual herb in the goosefoot family (Chenopodiaceae) grows from 2 to 8 inches tall, has sprawling partially prostrate stems, flowers from May to October, and is endemic to California. Its habitat consists of saline or alkaline soils in alkali meadow, saltbush scrub, and alkali sink communities at elevations below 1,050 feet (320 meters) (CNPS, 2017). It has been found in dry alkaline clay soils of grassy fields, levees, margins of seasonally flooded marshes, and other low valley sites. Sixty-one occurrences of brittlescale have been reported in the Central Valley from Glenn County south to Tulare County (CDFW, 2017). Most known occurrences are presumed to still exist, but at least 15 have not been confirmed. Known sites are on lands under federal ownership in USFWS refuges, in state Wildlife Areas, other agency preserves, and private and unknown ownership. The main existing threats to this species have been levee, road, or aqueduct right-of-way maintenance, grazing, agriculture, development, and

invasive weeds. Known populations occur within 1 to 3 miles of Project features, on the Delevan NWR (Oswald, 2002), and other sites now under intensive agriculture. Potential habitat exists in parts of the Primary Study Area around Salt Lake, along the route for the proposed Delevan Pipeline, in the proposed Holthouse Reservoir footprint, and possibly along portions of the GCID Main Canal. Three occurrences of brittlescale were found during Project surveys: two in the vicinity of (but not within) the proposed Delevan Pipeline construction disturbance area, and one to the east of the proposed Holthouse Reservoir Complex.

San Joaquin spearscale (*Extriplex joaquinana*)

San Joaquin spearscale is a CNPS 1B species, considered to be “moderately threatened in California.” This stiffly erect annual herb in the goosefoot family (Chenopodiaceae) grows from 4 to 40 inches tall, flowers from April to October, and is endemic to California. Its habitat consists of strongly saline or alkaline soils in alkali meadow, saltbush scrub, and alkali sink communities at elevations below 1,050 feet (320 meters) (CNPS, 2017). It has been found in dried vernal wet alkaline clay soils of grassy fields, levees, margins of seasonally flooded marshes, and other low valley sites. One hundred and nine occurrences of San Joaquin spearscale have been reported along the west edge of the Central Valley and the inner Coast Range margin, from Glenn County south to San Luis Obispo County (CDFW, 2017). Most known occurrences are presumed to still exist, but at least 12 have not been confirmed since the late 1800s or early 1900s. Known sites are on lands under federal ownership in USFWS refuges, in state Wildlife Areas, other agency preserves, and private and unknown ownership. The main existing threats to this species have been grazing, agriculture, development, and road maintenance. Known populations occur within 1 to 3 miles of Project features, on the Sacramento NWR (Oswald, 2002), and other sites now under intensive agriculture. Potential habitat exists in parts of the Primary Study Area around Salt Lake, along the route for the proposed Delevan Pipeline, in the proposed Holthouse Reservoir footprint, and possibly along portions of the GCID Main Canal. One occurrence of San Joaquin spearscale was found during Project surveys in the vicinity of (but not within) the proposed Delevan Pipeline construction disturbance area; inspection of 2009 aerial photos indicates that this occurrence may have been extirpated due to recent conversion to intensive agriculture.

Vernal pool smallscale (*Atriplex persistens*)

Vernal pool smallscale is a CNPS 1B species, considered to be “moderately threatened in California.” This coarse erect annual herb in the goosefoot family (Chenopodiaceae) flowers from June to October. It is found only in large alkaline vernal pools at elevations from 30 to 375 feet (10 to 115 meters) (CNPS, 2017). There are 41 occurrences recorded for vernal pool smallscale, scattered in the Central Valley from Glenn County to Tulare County (CDFW, 2017). Most occurrences are thought to still exist. Existing threats to this species include agriculture and flood control activities. The largest concentration of known occurrences is on the Sacramento NWR in Glenn County, approximately 3 miles north of the proposed Delevan Pipeline. Potential habitat exists in parts of the Primary Study Area around Salt Lake, in the proposed Holthouse Reservoir footprint, along the route for the proposed Delevan Pipeline, and possibly along portions of the GCID Main Canal. No occurrences of vernal pool smallscale were found during Project surveys.

Big-scale balsamroot (*Balsamorhiza macrolepis*)

Big-scale balsamroot is a CNPS 1B species, considered to be “moderately threatened in California.” This herbaceous perennial in the sunflower family (Asteraceae) grows from a coarse woody rootstock, with basal leaves and several flowering stems 4 to 16 inches tall. It flowers from March to June, and is found

on rocky slopes with chaparral and in foothill woodland and grasslands, often on serpentine substrates from 300 to 4,600 feet (90 to 1,400 meters) elevation (CNPS, 2017). There are 43 occurrences recorded for Big-scale balsamroot, scattered in the Coast Ranges from Shasta County in the North Coast Ranges south to Santa Clara County in the South Coast Ranges, and in the Sierra Nevada foothills from Butte County to Mariposa County (CDFW, 2017). Most occurrences are thought to still exist. The populations nearest to the Primary Study Area are 7.5 miles to the southwest of the proposed Sites Reservoir footprint on serpentine substrate along Walker Ridge. Potential habitat exists in the canyons along the western edges of the Primary Study Area, but no occurrences of this species were found during Project surveys.

Round-leaved filaree (*California macrophylla*)

Round-leaved filaree, a recent addition to CNPS 1B, is considered to be “moderately threatened in California”. This low-growing annual to biennial forb in the geranium family (Geraniaceae) grows up to 6 inches tall, and blooms from March through May. Flowers and fruits are needed for identification to distinguish Round-leaved filaree from look-alike relatives. It is found in heavy clay soils in open foothill savannas and grasslands from 50 to 3,900 feet (15 to 1,200 meters) elevation (CNPS, 2017). Round-leaved filaree is known from 162 occurrences statewide (CDFW, 2017). However, many occurrences are historic, on private lands, and have not been confirmed for decades. Grazing, urbanization, habitat alteration, vehicles, pipeline construction, feral pigs, and invasive weeds are the main existing threats to this species (CNPS, 2017). Prior to Project surveys, the nearest confirmed occurrence was 30 miles south of the Primary Study Area; three others to the north and east date to the early 1900s. One new occurrence of Round-leaved filaree was found during Project surveys in the hills immediately west of the proposed Sites Reservoir. Potential habitat for this species is common in that area.

Pink creamsacs (*Castilleja rubicundula* var. *rubicundula*)

Pink creamsacs is a CNPS 1B species, considered to be “moderately threatened in California.” This small, but showy, annual herb in the broomrape family (Orobanchaceae) flowers from April to June. It is found in annual grassland, sometimes associated with seeps and ponds, and with chaparral in foothill woodlands from 65 to 3,000 feet (20 to 900 meters) elevation (CNPS, 2017). There are 30 occurrences recorded for Pink creamsacs, scattered around the grasslands and foothills Butte, Shasta, Glenn, Colusa, Lake, and Napa counties, with an outlier population 175 miles south of the Primary Study Area in southern Santa Clara County (CDFW, 2017). Most occurrences are thought to still exist. Existing threats to this species include grazing, mining, vehicles, and road construction. The populations nearest to the Primary Study Area are 4 to 8 miles west of the proposed Sites Reservoir. Potential habitat for Pink creamsacs exists in many locations of the Primary Study Area, but no occurrences of this species were found during Project surveys.

Pappose tarplant (*Centromadia parryi* ssp. *parryi*)

Pappose tarplant, a recent addition to CNPS 1B, is considered to be “moderately threatened in California.” This coarse annual herb in the sunflower family (Asteraceae) flowers from May to November. It is found in seeps, springs, and other vernal wet places, often alkaline, in valley and foothill grasslands, coastal prairie, and chaparral from 6 to 1,400 feet (2 to 420 meters) elevation (CNPS, 2017). Pappose tarplant is known from 29 occurrences scattered through the southern Sacramento Valley, southern North Coast Ranges, and in the San Francisco Bay region (CDFW, 2017). Approximately half of the occurrences are in Solano County. There is one occurrence in Butte County and one in Glenn County, and two in Colusa County. All of the occurrences are thought to still exist. Threats to pappose tarplant

include agriculture, competition, development, grazing, habitat disturbance, and road maintenance. Prior to surveys conducted for this Project, the populations nearest to the Primary Study Area were 7.5 miles west and 17.5 miles southwest of the proposed Sites Reservoir footprint, and 12 miles east of the proposed Delevan Pipeline Intake/Discharge Facilities on the Sacramento River. One new occurrence was discovered during Project surveys, the first for Colusa County, in the vicinity of (but not within) the proposed Delevan Pipeline route, between the GCID and Tehama-Colusa canals. Potential habitat for pappose tarplant exists around Salt Lake, along the route for the proposed Delevan Pipeline, in the proposed Holthouse Reservoir footprint, and possibly adjacent to some of the GCID Main Canal, but no other occurrences of this species were found during Project surveys.

Stony Creek spurge (*Euphorbia ocellata* ssp. *rattanii*)

Stony Creek spurge is a CNPS 1B species, considered to be “moderately threatened in California.” This flat mat-forming annual forb in the spurge family (Euphorbiaceae) grows 1 to 3 inches tall, flowers from May to October, and is endemic to California. It is found in openings in grassland and chaparral from 280 to 2,600 feet (85 to 800 meters) elevation (CNPS, 2017), mostly on Lodo shale substrates, but also on creek gravels. Thirty-five occurrences have been recorded for Stony Creek spurge, only in Tehama and Glenn counties (CDFW, 2017). Most occurrences are presumed to still exist. Occurrences nearest the Primary Study Area are more than 10 miles to the northwest, near Stony Gorge Reservoir. Twelve new occurrences of Stony Creek spurge were found during Project surveys in the Newville vicinity, approximately 35 miles north of the Primary Study Area. No potential habitat for Stony Creek spurge exists in the Primary Study Area.

Dwarf soaproot (*Chlorogalum pomeridianum* var. *minus*)

Dwarf soaproot is a CNPS 1B species, considered to be “moderately threatened in California.” This herbaceous perennial member of the agave family (Agavaceae) sends up new leaves and a flowering stem each year from an underground bulb. It flowers from May to August. Dwarf soaproot is found with chaparral on serpentine substrates within oak woodlands and foothill grasslands from 1,000 to 3,300 feet (305 to 1,000 meters) elevation (CNPS, 2017). There are 18 occurrences, 14 of them in the North Coast Ranges and the other four occurrences 250 miles to the south in the South Coast Ranges of San Luis Obispo County (CDFW, 2017). All occurrences are thought to still exist. The populations nearest to the Primary Study Area are 7 miles to the west on serpentine substrate southeast of East Park Reservoir. There is no serpentine substrate within the Primary Study Area. Although the plant communities supporting dwarf soaproot exist in many parts of the Primary Study Area, no occurrences of this species were found during Project surveys.

Deep-scarred cryptantha (*Cryptantha excavata*)

Deepscarred cryptantha is a CNPS 1B species. It is considered to be “not very threatened in California” despite being known from five or fewer occurrences, four of which date back to the early 1900s. This annual member of the borage family (Boraginaceae) grows to 3 to 12 inches tall, with few to several branches. It flowers in April and May. Deepscarred cryptantha is found in sandy crumbly shale or gravelly non-serpentine soil, within foothill oak woodlands, sometimes on dry streambanks, from 300 to 1,500 feet (100 to 500 meters) elevation (CNPS, 2017). This species occurs in the inner North Coast Ranges in Colusa, Lake, Mendocino, and Yolo counties (CNPS, 2017). There are three occurrences in Colusa and Mendocino counties (CDFW, 2017). All occurrences are thought to still exist; however, they were last seen in the late 1800s, or 1968. There is an occurrence in 2016 in Calflora south of Lodoga of *Cryptantha excavata*. There are five specimens that are known to exist: one specimen from 1903 in Yolo

County, two from the late 1800s from Lake County, and two from Colusa County (U.C. Consortium, 2011). Of the two specimens from Colusa County, one 1968 collection is from near Wilbur Springs; the other is a late 1800s Katherine Brandegee collection from “Stites, Colusa Co.”. This location may be at Stites Spring, southeast of East Park Reservoir (CDFW, 2017). If so, it is the population nearest to the Primary Study Area (approximately 5 miles to the west). Although the plant communities and soils supporting deepscarred cryptantha may exist in many parts of the Primary Study Area, no occurrences of this species were found during Project surveys.

Recurved larkspur (*Delphinium recurvatum*)

Recurved larkspur is a CNPS 1B species, considered to be “moderately threatened in California.” This herbaceous perennial member of the buttercup family (Ranunculaceae) sends up new leaves and a flowering stem each year from a shallow rootstock (although not during some drought years). It flowers from March to June. Recurved larkspur is found in somewhat alkaline areas in grasslands, foothill woodlands, and saltbush scrub at elevations from 10 to 2,460 feet (3 to 750 meters) (CNPS, 2017). There are 100 reported occurrences, the vast majority of which are from the San Joaquin Valley and the adjacent South Coast Ranges (CDFW, 2017). There are only two reported occurrences in Butte County, one of which has been extirpated. Most of the other occurrences are thought to still exist, although many of them have not been re-visited for many years. Existing threats to the species include agricultural conversion and grazing. The populations of recurved larkspur nearest to the Primary Study Area are 13 miles south of the Primary Study Area near the southernmost end of Antelope Valley. Potential habitat may be found in the Primary Study Area in low-lying alkaline areas, especially along the route for the proposed Delevan Pipeline, and possibly in the proposed Holthouse Reservoir footprint. No occurrences of this species were found during Project surveys.

Norris’ beard-moss (*Didymodon norrissii*)

Norris’ beard-moss is a CNPS 2 species, considered to be “moderately threatened in California” although more widely distributed outside California. This moss is a member of the family Pottiaceae, and grows on rocks, outcrops, fields and cliffs. Norris’ beard-moss has been found on serpentine substrates and basalt rock surfaces in intermittently moist open grassland, in grassy openings in oak woodland, conifer forest, and chaparral, at elevations from 600 to 4,500 feet (200 to 1,500 meters) (USDA, 2008). There are 40 occurrences of this taxon, known from several counties throughout California, including Colusa and Lake counties (CDFW, 2017). The nearest known occurrence is from serpentine rock at the head of Doyle Canyon, approximately 12 miles southwest of the Primary Study Area. Suitable non-serpentine habitat probably occurs in scattered woodland sites in the west edge of the Primary Study Area. However, this taxon had not yet been reported from within the Project vicinity, so was not included in 1998 to 2002 Project surveys.

Brandegee’s eriastrum (*Eriastrum brandegeae*)

Brandegee’s eriastrum is a CNPS 1B species, considered to be “seriously threatened in California.” This small upright annual forb in the phlox family (Polemoniaceae) grows from 2 to 12 inches tall, blooms from April through August, and is endemic to California. It is found mainly in dry Lodo shale/ decomposing mudstone transition soils, but also in gravelly greenstone, volcanic, and serpentine-derived soils from 1,400 to 2,755 feet (425 to 840 meters) elevation (CNPS, 2017). Habitat consists of sandy volcanic soils in chaparral and woodland. Its appearance is very similar to other uncommon and co-occurring members of its genus. Brandegee’s eriastrum is known from only six occurrences all of which are in Lake County (CDFW, 2017). Grazing, competition, recreational activities, vehicles, and road

maintenance are the main threats to this species. No occurrences of Brandegee's eriastrum have been reported in the Primary Study Area.

Snow Mountain buckwheat (*Eriogonum nervulosum*)

Snow Mountain buckwheat is a CNPS 1B species, considered to be “moderately threatened in California.” This annual herb in the buckwheat family (Polygonaceae) flowers from June to September. It is found on dry serpentine outcrops and other barren stony sites in chaparral, from 980 to 7,000 feet (300 to 2,105 meters) elevation (CNPS, 2017). There are 9 known occurrences of Snow Mountain buckwheat scattered through Glenn, Colusa, Lake, Sonoma, and Napa counties (CDFW, 2017). All of these occurrences are thought to still exist. Existing threats to this species include energy development, mining, and vehicles. The occurrences nearest to the Primary Study Area are 7 miles to the west. There is no serpentine substrate within the Primary Study Area, although the plant communities supporting Snow Mountain buckwheat exist in many parts of the Primary Study Area. No occurrences of this species were found during Project surveys.

Diamond-petaled California poppy (*Eschscholzia rhombipetala*)

Diamond-petaled California poppy is a CNPS 1B species, considered to be “seriously threatened in California.” This annual herb in the poppy family (Papaveraceae) flowers from March to April. It is found on clay slopes and flats of valley and foothill grasslands, often somewhat alkaline, from zero to 3,200 feet (zero to 975 meters) elevation (CNPS, 2017). Diamond-petaled California poppy has a scattered distribution, with occurrences in Colusa County in the north, Contra Costa, Alameda, San Joaquin, and Stanislaus counties in the central part of its range, and in San Luis Obispo County to the south. There are 10 occurrences, all of which are considered to still exist (CDFW, 2017). Diamond-petaled California poppy is listed as extirpated in Contra Costa County (CDFW, 2017). Existing threats to Diamond-petaled California poppy include agriculture and grazing. Potential habitat exists in many parts of the Primary Study Area, but no occurrences of this species were found during Project surveys.

Adobe lily (*Fritillaria pluriflora*)

Adobe Lily is a CNPS 1B species, considered to be “moderately threatened in California.” This perennial bulb-forming herb in the lily family (Liliaceae) grows from 5 to 16 inches tall, blooms from February through April, and is endemic to California. It is found in heavy clay soils, in open grassland, and at semi-shaded blue oak/foothill pine/chaparral woodland edges, at elevations from 200 to 2,300 feet (60 to 705 meters) (CNPS, 2017). Adobe Lily has been reported from 107 occurrences in narrow bands along the west and east sides of the Sacramento Valley, from Tehama County to Napa County on the west side, and from Tehama County to Yolo County on the east side (CDFW, 2017). Abundance within occurrences varies widely from a few individuals to several hundred or 1,000 individuals. Several known occurrences are on federal (BLM or U.S. Forest Service) land or preserves (TNC Vina Plains), but most are on private lands. Grazing, road work, and off-road recreation are the main threats to this species. Prior to Project surveys, the nearest known occurrences of Adobe Lily were 4 miles west of the Primary Study Area. Eighteen occurrences of adobe lily were found during Project surveys, with five occurring at the west edge of the Primary Study Area, and the remaining 13 occurrences located farther north in the Newville area (northern Glenn County and southern Tehama County). Potential habitat for adobe lily exists in the hills to the west of the proposed Sites Reservoir footprint.

Hall's harmonia (*Harmonia hallii*)

Hall's harmonia is a CNPS 1B species, considered to be “moderately threatened in California.” This annual herb in the sunflower family (Asteraceae) flowers from April to June. It is found on serpentine soils, in openings in chaparral, from 1,600 to 3,000 feet (500 to 900 meters) elevation (CNPS, 2017). Hall's harmonia is known from 19 occurrences, from within a 250-square-mile area of the North Coast Ranges in Colusa, Lake, Napa, and Yolo counties (CDFW, 2017). All occurrences are thought to still exist. Existing threats to the species include mining activities. The occurrences of Hall's harmonia nearest to the Primary Study Area are 6.5 miles to the southwest on Walker Ridge. There is no serpentine substrate within the Primary Study Area, although the plant communities supporting Hall's harmonia exist along the western parts of the Primary Study Area. No occurrences of this species were found during Project surveys.

Drymaria-like western flax (*Hesperolinon drymarioides*)

Drymaria-like western flax is a CNPS 1B species, considered to be “moderately threatened in California.” This delicate annual herb in the flax family (Linaceae) flowers from May to August. It is found on serpentine soils, mostly within chaparral, and within foothill woodlands and grasslands from 320 to 3,700 feet (100 to 1,130 meters) elevation (CNPS, 2017). Drymaria-like western flax is known from 20 occurrences in the inner North Coast Ranges of Colusa, Glenn, Lake, and Napa counties (CDFW, 2017). All occurrences are thought to still exist. Existing threats to the species include mining and vehicles. The occurrences of drymaria-like western flax nearest to the Primary Study Area are 7 miles to the west along Walker Ridge. There is no serpentine substrate within the Primary Study Area, although the plant communities supporting drymaria-like western flax exist along the western parts of the Primary Study Area. No occurrences of this species were found during Project surveys.

Woolly rose-mallow or California hibiscus (*Hibiscus lasiocarpus* var. *occidentalis*)

Woolly rose-mallow or California hibiscus is considered to be “moderately threatened in California.” This herbaceous perennial member of the mallow family (Malvaceae) sends up clusters of new stems 3 to 6 feet tall each year from underground rhizomes. It flowers from June to September, but plants can generally be recognized much of the year. It is found on wet banks of streams and freshwater marshes from zero to 400 feet (zero to 120 meters) elevation (CNPS, 2017). Woolly rose-mallow or California hibiscus is known from 173 occurrences in California, in low-lying areas of the Central Valley from Butte and Glenn counties south to San Joaquin County (CDFW, 2017). Most of the occurrences are concentrated in the northern and southern ends of the range. All California occurrences are thought to still exist. Existing threats to this sub-species include development, agriculture, recreation, and channelization of the Sacramento River and its tributaries. Occurrences of woolly rose-mallow or California hibiscus nearest to the Primary Study Area are along the Sacramento River and along Butte Creek 5 miles east of the proposed Delevan Pipeline Intake/Discharge Facilities. One occurrence has also been found in the Sacramento NWR, 5 miles north of the proposed Delevan Pipeline route (Oswald, 2002). Potential habitat exists in the Primary Study Area in wet low-lying areas, but no occurrences of this species were found during Project surveys.

Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)

Coulter's goldfields is a CNPS 1B species, considered to be “seriously threatened in California.” This short annual herb in the sunflower family (Asteraceae) flowers from February to June. It is found in vernal pools and other vernal wet places, including coastal salt marshes in southern California from 3 to 4,000 feet (1 to 1,220 meters) elevation (CNPS, 2017). Coulter's goldfields is known from 97

occurrences; most of which are located in the southern third of California (CDFW, 2017). Of the two Northern California occurrences, the one in Colusa County, is represented by two collections from 1917 and 1926 from alkali plains west of Colusa and the species has not been seen in Colusa County since, though it is thought to still exist (CDFW, 2017). The other northern occurrence is reported from The Nature Conservancy's Vina Plains Preserve in Tehama County (CDFW, 2017). Approximately half of the occurrences in southern California have been extirpated by the growth of the metropolitan areas in the Los Angeles basin and in Bakersfield. Threats to the species include urbanization and agricultural development. The Colusa County location of Coulter's goldfields is 10 miles south of the proposed Delevan Pipeline route; therefore, potential habitat may exist in parts of the Primary Study Area along the route for Delevan Pipeline, and possibly in the proposed Holthouse Reservoir footprint; however, no occurrences were found during Project surveys in these areas.

Colusa layia (*Layia septentrionalis*)

Colusa layia is a CNPS 1B species, considered to be "moderately threatened in California." This short annual herb in the sunflower family (Asteraceae) flowers in April and May. It is found in chaparral, oak woodlands, and valley and foothill grasslands, often on serpentine substrates, from 325 to 3,600 feet (100 to 1,095 meters) elevation (CNPS, 2017). Colusa layia is known from 57 occurrences, most of which are scattered in the inner North Coast Ranges from Tehama County to Napa County, with a couple of isolated Sacramento Valley sites (CDFW, 2017). Almost all occurrences are thought to still exist, although one-third of them have not been re-visited in over 50 years, including the two sites in the Sacramento Valley. The main existing threat to the species is development. The two occurrences of Colusa layia nearest to the Primary Study Area are 4 to 6 miles to the west, around East Park Reservoir and by the Sites Lodoga Road west of Grapevine Pass. Potential habitat exists in many parts of the Primary Study Area, but no occurrences of this species were found during Project surveys.

Heckard's pepper-grass (*Lepidium latipes* var. *heckardii*)

Heckard's pepper-grass is a CNPS 1B species, considered to be "moderately threatened in California." This short annual herb in the mustard family (Brassicaceae) flowers from March through May. It is found in alkaline flats in valley and foothill grasslands from 30 to 650 feet (10 to 200 meters) elevation (CNPS, 2017). Heckard's pepper-grass is known from 14 Central Valley occurrences, from Glenn County south to Merced County (CDFW, 2017). All occurrences are thought to still exist. All of the Glenn County occurrences are on the Sacramento NWR, 4 miles north of the proposed Delevan Pipeline route. Potential habitat exists in the Primary Study Area in low-lying areas, especially along the route for the Delevan Pipeline, and possibly in the proposed Holthouse Reservoir footprint; however, no occurrences of this species were found during Project surveys.

Red-flowered lotus (*Acmispon rubriflorus*)

Red-flowered lotus is a federal Species of Special Concern and a CNPS 1B species, considered to be "seriously threatened in California." This low-growing small annual herb in the legume family (Fabaceae) grows up to 4 inches tall, blooms from April through June, and is endemic to California. It is found mostly in vernal moist heavy clay soils, at blue oak/foothill pine/chaparral-grassland edges at elevations from 650 to 1,400 feet (200 to 425 meters) (CNPS, 2017). Red-flowered lotus is known from only 8 widely separated occurrences in the low foothills off the west edge and northeast edge of the Sacramento Valley in Tehama, Colusa, and Stanislaus counties (CDFW, 2017). Development, grazing, and invasive weeds are the main existing threats to this species. Prior to Project surveys, the nearest known occurrences of red-flowered lotus were approximately 7 miles west of the Primary Study Area. Eight

occurrences of red-flowered lotus were found during 2001 to 2002 surveys, with six occurrences near the west edge of the Primary Study Area and two occurrences in the Newville area, approximately 35 miles north of the Primary Study Area (southwest Tehama County). Potential habitat for red-flowered lotus is common in the hills to the west of the proposed Sites Reservoir footprint.

13.2.3.4 Vegetation Communities

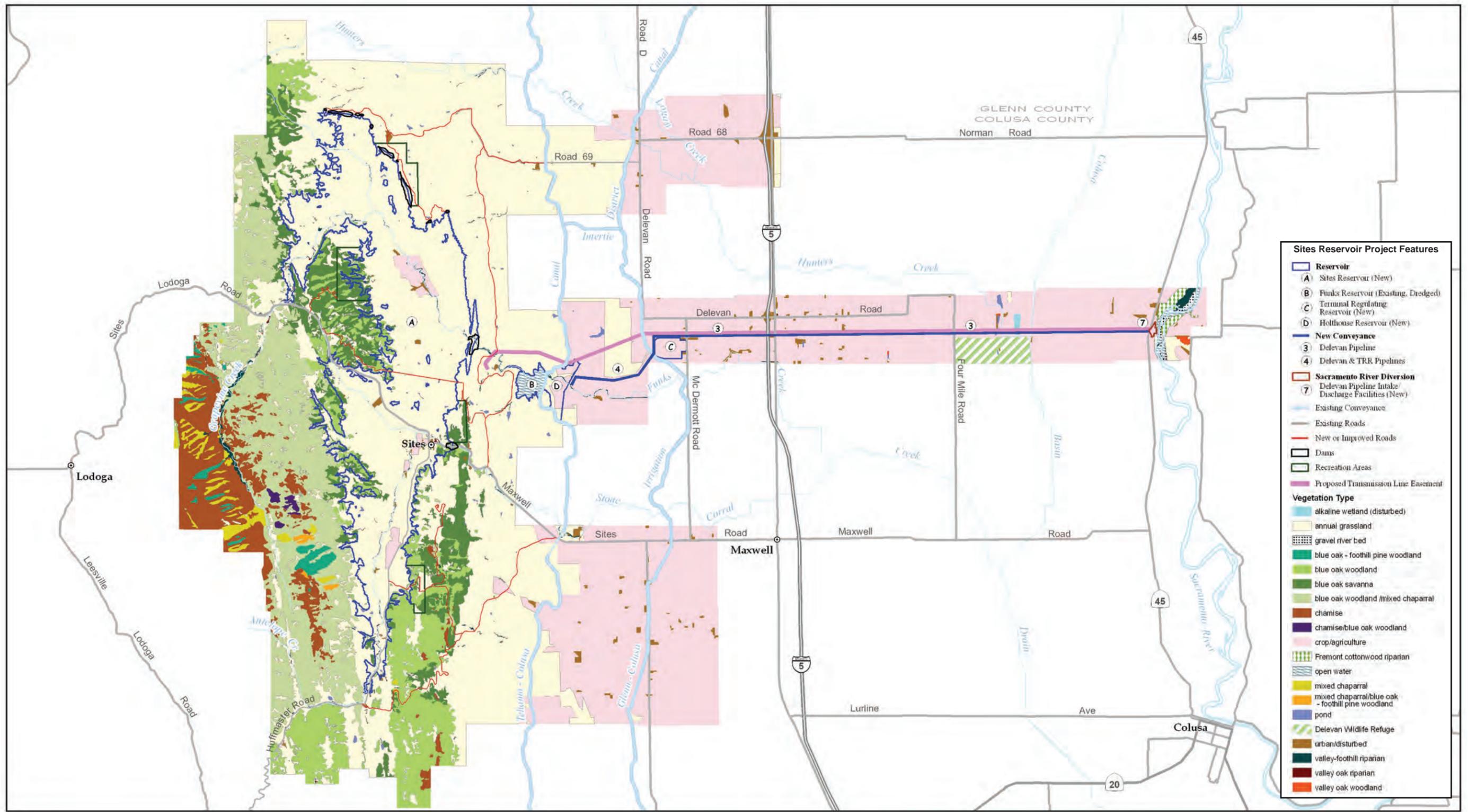
The Primary Study Area falls within the Jepson Manual's "Inner North Coast Range" geographic subdivision of the California Floristic Province (Baldwin et al., 2012) as well as the western edge of the "Sacramento Valley" subdivision of the Manual's Great Valley floristic region.

Vegetation communities are described as they typically occur over much of the northern half of California, where vegetation is strongly influenced by precipitation, temperature, soils, aspect, slope, disturbance history, and elevational changes. This area is characterized by a Mediterranean climate of hot dry summers and moderately cold wet winters. Approximately 95 percent of the annual precipitation occurs during the winter months and is influenced by the "rain shadow" of the North Coast Ranges along the west edge of the Primary Study Area. Soils of mainly marine-sedimentary origin also influence vegetation patterns within the Primary Study Area.

Localized sites in the foothills support fire-dependent stands of chamise chaparral, as well as more diverse mixed chaparrals. Unique habitats that support specialized plant associations include the vernal pools and swales found on valley floors or clay terraces, and low-elevation saline/alkaline flats. Unique plant associations adapted to certain soil types include the endemic serpentine floras (sets of plants restricted to serpentine substrates) found mostly in lower Coast Range slopes immediately west of the Primary Study Area, but also occasionally found on Lodo shale and other crumbly shale in the lower foothills within the Primary Study Area. Bear Valley, which is situated between the foothills in western Colusa County just south of the Primary Study Area, supports spring wildflower displays on its partly serpentinite-derived alluvium.

Vegetation communities in the vicinity of the Primary Study Area vary from riparian forest/scrub along the Sacramento River and its tributaries to mainly agricultural lands and occasional annual grass/forbland in the Sacramento Valley. Further west are blue oak savanna or woodland on the low foothills and mixed oak/gray pine/chaparral shrub communities in the lower slopes of the Coast Range, and finally transitioning into mixed conifer forest in the upper Coast Range elevations.

Vegetation communities mapped on land surrounding Project features include five natural vegetative community types and one non-native community. Natural communities include grassland, chaparral/shrubland, blue oak woodland, valley oak woodland, and riparian forest/woodland; agriculture comprises the non-native community. These broad communities contain 12 more specific plant associations, or vegetation types (Figure 13-2); also mapped were other land cover types, such as canals, ponds, and urbanized areas. Unique habitats supporting specialized plant associations include the vernal pools and swales found on valley floors or clay terraces, and low-elevation saline/alkaline flats. These are mapped as part of the grassland community (also refer to Chapter 15 Wetlands and Other Waters addressing wetlands, such as vernal pools or alkaline wetlands). Unique plant associations adapted to certain soil types include the endemic serpentine floras (sets of plants restricted to serpentine substrates) found mostly in lower Coast Range slopes, but these species also occasionally occur on the Lodo shale and other crumbly shales in the lower foothills, especially as part of the chaparral/shrubland community. No serpentine soils or flora are located within the Primary Study Area; soils derived from shale are found on some of the hillslopes in the Primary Study Area.



Footprint meant to show general vicinity not specific to any alternative.



FIGURE 13-2
Vegetation Types near Project
Facility Locations

Sites Reservoir Project EIR/EIS

This page intentionally left blank.

Grassland

The mapping unit termed “Annual grassland” primarily includes Associations dominated by brome (*Bromus*) – Annual Brome Grasslands and wild oats (*Avena*) – Wild Oats Grasslands. Annual grassland best fits the description for the Annual Grassland (AGS) WHR habitat type. The grassland community is typically dominated by introduced (non-native) annual grass species, such as brome (*Bromus* spp.) wild oats (*Avena* spp.), barleys (*Hordeum* spp.), and ryegrass (*Festuca* spp.), with a small minority (less than 15 percent relative cover) of native perennial species. This vegetation community also supports areas of native herbaceous spring annuals, sometimes called “wildflower fields,” and native perennial bunchgrasses, such as hook three-awn (*Aristida ternipes* ssp. *hamulosa*) or needlegrass (*Stipa* spp.). Trees comprise less than 10 percent total cover, with occasional small groupings or individuals of valley or blue oaks. Areas dominated by noxious weeds, such as yellow star-thistle (*Centaurea solstitialis*), are common. The annual grassland vegetation community dominates valley bottomlands and rolling hills immediately adjacent to the valleys. It can make a slow transition into adjacent wooded areas by forming a mosaic, occurring as understory in open oak savanna, or can transition abruptly to woodland. Within the grassland vegetation type, vernal pools and swales occurring over clay hardpans, or vernal moist saline or alkaline soils on the valley floor, may support unique native floras that sometimes include several distinctive special-status plant species. Annual grassland comprises 45 percent of the mapped vegetation in the Primary Study Area (Figure 13-2), and approximately 75 percent of the Project’s construction disturbance area (Table 13-6). Annual grassland is common throughout California; this community in the Primary Study Area represents less than 1 percent of the state’s annual grasslands.

Table 13-6
Vegetation Types within the Primary Study Area

Vegetation Type	Acreage	
	Primary Study Area ^a	Percent of Primary Study Area Total
Annual grassland	14,765.0	75.4
Alkaline wetland	14.0	0.1
Blue oak woodland	831.5	4.2
Blue oak savanna	645.9	3.3
Blue oak/Mixed chaparral	54.5	0.3
Canal	22.4	0.1
Chamise	2.5	0 ^b
Crops/agriculture	2,964.8	15.1
Fremont Cottonwood riparian	1.1	0.0 ^b
Freshwater marsh	4.5	0.0 ^b
Open water	1.6	0.0 ^b
Mixed Chaparral	2.6	0.0 ^b
Ponds	28.8	0.2
Urban/Disturbed	136.8	0.7
Valley-foothill riparian	86.0	0.5
Valley oak riparian	26.5	0.1
Valley Oak Woodland	3.5	0.0 ^b
TOTAL	19,592.0	100

^aThe Primary Study Area includes the proposed Alternative C facility footprints, and the construction disturbance area for the Road Relocations, Sites/Delevan Overhead Power Line, Delevan and terminal regulating reservoir (TRR) pipelines, TRR to Funks Creek Pipeline, Holthouse to Tehama-Colusa Canal Pipeline, and GCID Main Canal Facilities Modifications. This total does not include acreage occupied by existing facilities, namely Funks Reservoir and the GCID Main Canal, or other proposed facilities that include no affected natural vegetation communities.

^bRepresents less than 0.1 percent of total.

Area vegetated by annual grassland can vary over the years as more or less acreage is converted to agriculture within the Primary Study Area. For example, in the 12 years between the 1997 aerial imagery used for Project vicinity mapping and the 2009 National Agricultural Imagery Program (NAIP) imagery, over 200 acres of grassland were converted to agriculture (all dryland grain) inside the proposed Sites Reservoir footprint area, and approximately 1,000 acres outside of the proposed Sites Reservoir (northeast of Funks Reservoir) were converted, mostly to dryland grain, and also to rice, orchards, and irrigated fields (DWR, 2004).

Chaparral/Shrubland

Shrub-dominated vegetation communities consist mainly of chaparral types that are either dominated by chamise (*Adenostoma fasciculatum*) or that are a mixed chaparral composed of a diverse assemblage of species such as manzanita (*Arctostaphylos* spp.), buckbrush (*Ceanothus cuneatus*), scrub oak (*Quercus berberidifolia*), and poison oak (*Toxicodendron diversilobum*). Both vegetation types are sometimes found with an over-story of sparsely scattered blue oaks and/or gray pines. The chamise type usually occurs as nearly pure stands or with a minor component of buckbrush, and is found in small and large patches in the Coast Range foothills at the west edge of the Primary Study Area. Mixed chaparral is also sporadically distributed in the low foothills at the western edge, but is more common among the higher wooded hills farther to the west. Both types are often interspersed within a mosaic of blue oak woodlands and grassland openings. On substrates of decomposing shale, the mixed chaparral community occasionally includes some California juniper (*Juniperus californicus*) and may contain several special-status plant species. The chamise vegetation type comprises 4 percent of the vegetation mapped around the Primary Study Area (Figure 13-2), and less than 1 percent of the state's patchy, but extensive, chamise shrubland. Mixed chaparral accounts for approximately 1 percent of vegetation mapped around the Primary Study Area. Both types of chaparral/shrublands occupy less than 1 percent of the Project's construction disturbance area. Such non-chamise-dominated chaparral shrublands are not rare in the state, but are distributed in bands and discontinuous patches that vary in species composition geographically. This vegetation within the Primary Study Area represents less than 1 percent of the state's mixed chaparral shrublands.

Blue Oak Woodland

The blue oak woodland vegetation community, dominated by blue oak (*Quercus douglasii*), is the most common vegetation in the low foothills in the western portion of the Primary Study Area. These woodlands vary from open grassy stands of blue oaks on south facing slopes and ridge tops to moderately to very dense stands of small blue oak trees mixed with interior live oak (*Quercus wislizenii*) on north facing slopes. In the low foothills, the woodlands can also include some chaparral species and/or an open overstory of sparsely scattered Gray pines (*Pinus sabiniana*). Special-status plant species are sometimes found in clay or crumbly shale soils where grasslands transition into woodlands, or where chaparral shrubs are present as a woodland understory. Weedy areas often contain localized infestations of Italian thistle (*Carduus pycnocephalus*). Approximately 20 percent of the vegetation mapped around the Primary Study Area is blue oak woodland of varying density; more than half of this woodland includes an extensive mixed chaparral understory (Figure 13-2). Blue oak woodland, with and without a chaparral understory, accounts for approximately 7 percent of the Project's construction disturbance area (Table 13-6). Blue oak woodland in the Primary Study Area represents 1 percent of the state's existing blue oak woodlands. Blue oak woodland with gray pine represents less than 1 percent of the vegetation in the Primary Study Area, and much less than 1 percent of this vegetation type in the state. The character of blue oak woodland in the Primary Study Area has changed during the 12 years from 1997 to 2009. A comparison of the hillslopes in the 1997 aerial imagery used for mapping the vegetation for this analysis

to the same slopes in the 2009 NAIP imagery shows that many acres of moderately dense blue oak woodland have been converted to open grassland or extremely sparse oak savanna, due to cutting for firewood. At least 2,000 acres of mapped vegetation in the Primary Study Area have been affected, located mostly on the hillslopes around the northwest corner of the proposed Sites Reservoir footprint.

Valley Oak Woodland

Valley oak woodland and savanna (dominated by Valley oak (*Quercus lobata*) are occasionally found on stream terraces where the larger creeks emerge from the foothills onto the valley floors. These areas, with scattered large individual trees or with denser stands closer to creeks, are not common or very large in the Primary Study Area. Weedy areas within valley oak woodlands include localized patches of Milk thistle (*Silybum marianum*), Bull thistle (*Cirsium vulgare*), Italian thistle, or star thistle (*Centaurea* spp.). Some of the valley oak woodlands can be very disturbed by livestock and ranching activities because these operations tend to concentrate in the larger valley bottoms where most of these woodlands are found. No special-status plant species are known from this vegetation community within the region. Valley oak woodlands account for a fraction of 1 percent of the vegetation mapped around the Primary Study Area and Project construction disturbance area vegetation, and also account for less than 1 percent of the Valley Oak woodland in the state.

Riparian

Riparian forest or woodland is found intermittently in the Primary Study Area, usually as very narrow strips, with the exception of larger areas along the edges of the Sacramento River. These narrow strips are most frequently found along creeks and near springs higher than the coast range foothills up and away from the valley floors. Riparian vegetation can be dominated by Fremont cottonwood (*Populus fremontii*), occasionally by Valley oak, by tree willows (*Salix gooddingii*, *S. laevigata*) or shrubby willows (*S. exigua* and others), often with a varied shrub, vine, and herbaceous understory. Most of the patches of riparian habitat within the Primary Study Area (including springs) are small, sparse, and degraded by intensive cattle use. This disturbed riparian habitat does not support special-status plant species. Intermittent creeks across interior valley floors tend to be almost barren or lined by narrow interrupted strips of sparse riparian vegetation. Many of the larger trees along these disturbed creeks are not native, such as walnut (*Juglans* spp.), fig (*Ficus carica*), and tree-of-heaven (*Ailanthus altissima*).

Well-developed multiple-storied native riparian vegetation occurs in small remnant patches along foothill portions of a few of the Primary Study Area's larger creeks, and in a few large patches along the Sacramento River.

The riparian woodland vegetation community comprises less than 1 percent of the vegetation mapped around the Primary Study Area, and less than 1 percent of the Project's construction disturbance area. Riparian vegetation communities are not common in the rest of the state relative to other vegetation communities; riparian vegetation within the Primary Study Area represents approximately 0.4 percent of the state's riparian woodlands.

Freshwater Marsh

Marsh (freshwater), or emergent wetland, occurs in two places in the Primary Study Area: in a strip along the northern edge of the Delevan NWR, and very infrequently at edges of riparian areas, ponds, or irrigation ditches. Other than the Delevan NWR strip, this community was rarely mapped in the Primary Study Area, due to the extremely small size of marshy sites. Freshwater marsh/emergent wetland is typically dominated by cattails (*Typha* spp.), rushes (*Schoenoplectus* spp.) and sometimes sedges (*Carex*

spp.) and spikerush (*Eleocharis* spp.), and often has patchy willow shrubs (*Salix* spp.). The strip of managed wetland along the Delevan NWR boundary consists of both wet and temporarily dry areas, depending on where water is directed. Freshwater marsh accounts for less than 1 percent of the vegetation mapped around the Primary Study Area and also within the Project's construction disturbance area.

Alkaline Wetland

Alkaline (and probably weakly saline) marsh and wetlands are present at two locations within the Primary Study Area: one parcel north of the Delevan NWR within the Delevan Pipeline construction disturbance area, and a second site located southeast of Funks Reservoir. Alkaline marshes support many of the same species as those in freshwater marsh (such as spikerush, rush), but also support a unique flora (such as saltgrass [*Distichlis spicata*]) tolerant of saline and alkaline conditions. These wetlands are a remnant of a much more extensive patchwork of saline/alkaline wetlands that once existed on the Central Valley floor and western edges, and can support several sensitive plant species. Alkaline wetland accounts for less than 1 percent of the vegetation mapped around the Primary Study Area and also within the Project's construction disturbance area. Wetlands are considered in more detail in Chapter 15 Wetlands and Other Waters.

Agriculture

Agriculture accounts for much of the land cover in the Sacramento Valley between the Sacramento River and the Coast Range foothills. In addition, the smaller interior valleys have scattered hayfields, pastures, and small orchards. Crops on larger farms include rice, irrigated grains and row crops, pastures, hayfields, and deciduous orchards. Agricultural lands account for 27 percent of the vegetation around the Primary Study Area, as originally mapped for this Project in 2002. Because this land cover type is so extensive in California, the agricultural lands within the Primary Study Area represent only a fraction of 1 percent of the state's total agricultural land. Agricultural fields account for approximately 16 percent of the Project's construction disturbance area.

Agricultural land uses contract and expand over time, and the type of crop under cultivation can change in any given year. GIS analysis of the Primary Study Area over 2009 NAIP imagery shows that in the years since vegetation was first mapped for this Project (2002), approximately 200 acres of annual grasslands within the proposed Sites Reservoir footprint have been converted to dryland grain fields. Outside of the proposed Sites Reservoir footprint, more than 1,000 additional acres northeast of Funks Reservoir have been converted from annual grasslands to mostly dryland grain, with smaller acreages of orchard, rice, and irrigated crops.

Vegetation mapped around the Primary Study Area (shown in Figure 13-2) was also analyzed according to distribution within the confines of Project facilities, i.e., "footprints" of land within which all Project-related ground disturbance would occur. The total acreage affected by Project facilities, and the percent that each vegetation type represents of the total Project acreage, are presented in Table 13-6. Acreage totals are based on the largest Project alternative (Alternative C) and reflect baseline conditions. Acreage totals represent a combination of the facility footprints and the defined construction disturbance area for Delevan Pipeline.

Table 13-7 shows the presence of the above vegetation types within the anticipated disturbance areas for Project features.

**Table 13-7
Vegetation Types at Each Project Facility Location**

Project facility	Annual Grassland	Alkaline Wetland	Blue Oak Woodland	Blue Oak Savanna	Blue Oak/Mixed Chaparral	Canal	Chamise	Crops/Agriculture	Fremont Cottonwood Riparian	Mixed Chaparral	Open Water (Stream or River Only)	Ponds	Urban/Disturbed	Valley-Foothill Riparian	Valley Oak Riparian	Valley Oak Woodland
Sites Reservoir and Dams	X		X	X	X			X				X	X	X	X	X
Recreation Areas	X		X	X	X		X					X				
Road Relocations and South Bridge	X		X	X	X	X	X	X		X		X	X	X	X	
Sites Pumping/Generating Plant and Sites Reservoir Inlet/Outlet Structure	X											X	X	X		
Sites Electrical Switchyard	X															
Tunnel from Sites Pumping/Generating Plant to Sites Inlet/Outlet Structure ^a																
Field Office Maintenance Yard	X															
Holthouse Reservoir Complex ^b	X	X				X		X			X			X		
GCID Main Canal Facilities Modifications ^c																
GCID Main Canal Connection to the TRR						X		X								
Terminal Regulating Reservoir						X		X					X			
TRR Pumping/Generating Plant and TRR Electrical Switchyard								X								
TRR Pipeline and TRR Pipeline Road						X		X								
Sites/Delevan Overhead Power Line ^c	X	X				X		X				X	X	X		
Delevan Pipeline ^d and Delevan Pipeline Electrical Switchyard		X				X		X				X	X			
Delevan Pipeline Intake/Discharge Facilities						X		X	X		X		X	X		
Project Buffer	X		X	X	X	X	X	X	X		X		X	X		X

^aAlkaline wetland in Delevan Pipeline construction disturbance area is now managed as freshwater wetland.

^bAlkaline wetland in the Holthouse Reservoir footprint is a small part of a continuous 13-acre alkaline wetland extending to the southeast.

^cThese Project facilities disturb only areas within existing structures, so have no 'footprint' on surrounding lands; overhead power line corridors and impacts vary between Alternative D and all other alternatives; Alternative D would not impact botanical resources associated with wetlands or waters.

^dAlkaline wetland in the Delevan Pipeline construction disturbance area is managed as freshwater wetland.

13.2.3.5 Invasive Plant Species

Table 13-8 shows that 49 species of noxious weeds either are known to occur in the Primary Study Area because they were found during Project surveys, or are likely to occur there because they have been documented from Glenn or Colusa counties and occur in similar habitats. Twenty-eight of those 49 species have been identified in the Primary Study Area during botanical resource surveys for the Project. Among the species in Table 13-8 are two CDFA “A” species and eight “B” species (the State’s weed categories of greatest concern for invading natural areas). Also represented are 12 species of “High” concern and 25 species of “Medium” concern for Cal-IPC in terms of invasiveness. Also included on Table 13-8 are most of the weed species of concern on the lists of the Mendocino National Forest and the local Weed Management Area.

Table 13-8
Noxious Weed Species Known or Likely to Occur in the Primary Study Area

Likely to Occur in Primary Study Area ^a	Common Name Scientific Name	CDFA List ^b	Cal-IPC List ^c	Local WMA List ^d	Mendocino NF ^e List	Habitat (Elevation)
H	Barbed Goatgrass <i>Aegilops triuncialis</i>	B	H	X	X	Disturbed sites, cultivated fields, roadsides (<1,000 m)
M	Bermuda Buttercup <i>Oxalis pes-caprae</i>		M			Disturbed places, grasslands (<500 m)
H	Bermuda Grass <i>Cynodon dactylon</i>	C	M			Disturbed sites (<900 m)
H	Black Locust <i>Robinia pseudoacacia</i>		L			Roadsides, canyon slopes, stream banks (50 to 1,900 m)
M	Broad-Leaved Peppergrass <i>Lepidium latifolium</i>	B	H	X		Saline soils, roadsides (<1,900 m)
H	Bull Thistle <i>Cirsium vulgare</i>	C	M			Disturbed places (<2,300 m)
H	California Bur-Clover <i>Medicago polymorpha</i>		L			Disturbed grasslands (<1,500 m)
M	Canada Thistle <i>Cirsium arvense</i>	B	M		X	Disturbed places (<1,800 m)
M	Cheat Grass <i>Bromus tectorum</i>		H			Open, disturbed places (<2,200 m)
M	Crispate-Leaved Pondweed <i>Potamogeton crispus</i>		M			Shallow water, ponds, reservoirs, streams (<2,100 m)
H	Cutleaf Geranium <i>dissectum</i>		M			Moist disturbed grassy areas (<1,200 m)
M	Dalmation Toadflax <i>Linaria genistifolia</i> ssp. <i>dalmatica</i>	A	M			Disturbed places, pastures, fields (generally <1,000 m)
H	Edible Fig <i>Ficus carica</i>		M			Disturbed, moist areas (<800 m)
H	Field Bindweed <i>Convolvulus arvensis</i>	C	D			Orchards, gardens (gen <1,500 m)
M	Field Mustard <i>Brassica rapa</i> [= <i>B. campestris</i>]		L			Fields, disturbed areas (<1,500 m)

Likely to Occur in Primary Study Area ^a	Common Name Scientific Name	C DFA List ^b	Cal-IPC List ^c	Local WMA List ^d	Mendocino NF ^e List	Habitat (Elevation)
M	Five-Horn Bassia <i>hyssopifolia</i>		L			Disturbed sites, fields, roadsides (<1,200 m)
H	Giant Reed <i>Arundo donax</i>	B	H	X		Moist places, seeps, ditch banks (<500 m)
H	Hedgehog Dogtail Grass <i>Cynosurus echinatus</i>		M			Open disturbed sites (<1,000 m)
H	Himalayan Blackberry <i>Rubus armeniacus</i> [= <i>R. discolor</i>]		H			Disturbed moist areas (<1,600 m)
H	Italian Thistle <i>Carduus pycnocephalus</i>	C	M		X	Roadsides, pastures, waste areas (<1,000 m)
H	Johnson Grass <i>Sorghum halepense</i>	C				Disturbed areas, ditch banks, roadsides (<800 m)
H	Jointed Goatgrass <i>Aegilops cylindrica</i>	B			X	Disturbed dry sites, cultivated fields (<1500 m)
M	Klamathweed/St. John's-Wort <i>Hypericum perforatum</i>	C	M	X	X	Pastures, abandoned fields, disturbed places (<1,500 m)
M	Mediterranean Mustard <i>Hirschfeldia incana</i>		M			Roadsides, moist waste places, gravel tailings (<1,600 m)
H	Medusa-Head <i>Taeniatherum caput-medusae</i>	C	H	X	X	Grassy slopes and flats (<2,100 m)
H	Milk Thistle <i>Silybum marianum</i>		L			Roadsides, ditches, pastures, disturbed places (<500 m)
H	Olive <i>Olea europaea</i>		L			Disturbed places (<200 m)
M	Pampas Grass <i>Cortaderia selloana</i>		H			Disturbed sites (<300 m)
M	Pennyroyal <i>Mentha pulegium</i>		M			Moist areas, ditches (<1,000 m)
M	Poison Hemlock <i>Conium maculatum</i>		M			Moist, disturbed places (<1,000 m)
M	Puncturevine <i>Tribulus terrestris</i>	C				Roadsides, railways, vacant lots, dry, disturbed areas (<100 m)
H	Red Brome <i>Bromus madritensis</i> ssp. <i>rubens</i>		H			Open, disturbed places (<2,200 m)
H	Ripgut Brome <i>Bromus diandrus</i>		M			Open, disturbed places (<2,200 m)
H	Rose Clover <i>Trifolium hirtum</i>		M			Roadsides, fields, disturbed places (<2,060 m)
H	Rough Cat's-Ear <i>Hypochaeris radicata</i>		M			Disturbed areas (<500 m)
M	Russian Knapweed <i>Acroptilon repens</i>	B	M			Disturbed areas (<1,900 m)
H	Russian Olive <i>Elaeagnus angustifolia</i>		M			Disturbed, moist areas (<1,500 m)

Likely to Occur in Primary Study Area ^a	Common Name Scientific Name	CDFA List ^b	Cal-IPC List ^c	Local WMA List ^d	Mendocino NF ^e List	Habitat (Elevation)
M	Sheep Sorrel <i>Rumex acetosella</i>		M			Disturbed moist areas (<3,000 m)
M	Tall Fescue <i>Festuca arundinacea</i>		M			Disturbed places (<2,700 m)
M	Tamarisk, Salt Cedar <i>Tamarix parviflora</i> , <i>T. ramosissima</i> , <i>T. chinensis</i> , <i>T. gallica</i>	B	H	X		Washes, streambanks, ditches (<800 m)
M	Tasmanian Blue Gum <i>Eucalyptus globulus</i>		M			Disturbed areas (<300 m)
H	Tocalote <i>Centaurea melitensis</i>	C	M			Disturbed fields, open woods (<2,200 m)
H	Tree of Heaven <i>Ailanthus altissima</i>	C	M			Disturbed urban areas, waste places, riparian areas, grasslands (<1,250 m)
H	Tree Tobacco <i>Nicotiana glauca</i>		M			Open disturbed sites (<1,100 m)
H	Water Primrose <i>Ludwigia peploides</i>		H			Sloughs and backwaters along the Sacramento River (30 to 60 m)
M	White Horsenettle/ Silverleaf Nightshade <i>Solanum elaeagnifolium</i>	B	D	X		fields, dry disturbed places (<1,200 m)
M	Wild Fennel <i>Foeniculum vulgare</i>		H			Roadsides, waste places (<350 m)
H	Woolly Mullein <i>Verbascum thapsus</i>		L			Disturbed areas (<2,200 m)
H	Yellow Star-Thistle <i>Centaurea solstitialis</i>	C	H	X	X	Pastures, roadsides, disturbed grassland or woodland (<1,300 m)

^aLikelihood of occurring in the Primary Study Area vicinity west of the Sacramento River

H = High; on species checklist from 1998 to 2003 plant surveys

M = Medium; not on Project survey checklist but documented from Colusa and/or Glenn County in CalFlora, CalIPC, CDFA, or Oswald

^bCalifornia Department of Food & Agriculture List of Noxious Weeds:

List A - Most invasive wildland pest plants - eradication, containment, or other holding action at the State-county level

List B - Includes species less widespread and more difficult to contain - eradication, containment, control, or other holding action at the discretion of the Commissioner

List C - Weeds that are so widespread that the agency does not endorse State- or county-funded eradication except in nurseries

^cCalifornia Invasive Plant Council (Cal-IPC, 2017) California Invasive Plant Inventory:

H = High: invasive species with most severe wildland ecological impacts, widespread

M = Moderate: invasive species with substantial wildland impacts; local to widespread

L = Low: invasive species with minor wildland ecological impacts; limited distribution, although may be locally problematic

D = Evaluated, but not listed, due to low ecological impacts

^dOn "Dirty Dozen" Noxious Weeds List for Colusa, Glenn, and Tehama County Weed Management Area (CGTWMA, 2002).

^eOn list of weed species of greatest concern and target weed species for Mendocino National Forest (Ruhl, 2006, pers. comm.).

Note:

m = meter(s)

Nearly all plant communities within the Primary Study Area have invasive and/or noxious weeds as a component. Some habitats have more serious invasive weed infestations than others. For example, valley annual grassland has 25 to 30 percent exotic species (DWR, 2005), which may include multiple invasive species, such as ripgut (*Bromus diandrus*) or other bromes (*Bromus* spp), hedgehog dogtail (*Cynosurus echinatus*), or medusahead (*Elymus caput-medusae*), resulting in adverse ecological impacts on the native grassland. Certain weed species of greatest concern tend to invade riparian habitats almost exclusively; examples are salt-cedar (or tamarisk - *Tamarix* spp.), giant reed grass (*Arundo donax*) and scarlet wisteria (*Sesbania punicea*). Others invade sensitive wetlands, marsh edges, or vernal wet areas; for example, purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus armeniacus*), pennyroyal (*Mentha pulegium*), tree of heaven (*Ailanthus altissima*), or edible fig (*Ficus carica*).

Invasive plants potentially occurring in the Primary Study Area that tend to infest still waters (at riparian edges or ponds) include water hyacinth (*Eichhornia crassipes*) (a Cal-IPC “Alert” species²), water iris (*Iris pseudacorus*), water primrose (*Ludwigia peploides*), and hydrilla (*Hydrilla verticillata*) (a Cal-IPC “Alert” species and the only species potentially found in the Primary Study Area that is on the federal weed list). Although water primrose is the only one of these aquatic species known to occur in the Primary Study Area, the others are in the Sacramento River watershed and could infest the area at any time. Upland habitats, such as disturbed areas by roads in grassy foothill blue oak woodlands, can become infested with milk thistle (*Silybum marianum*), European olive (*Olea europaea*), California bur-clover (*Medicago polymorpha*), Klamathweed (*Hypericum perforatum*), cutleaf geranium (*Geranium dissectum*), or some of the thistles (*Cirsium* and *Centaurea* spp.), or mustards (*Brassica* spp.). Edges of agricultural fields, ranches or homesteads, and roadsides through agricultural areas are also vulnerable to infestations of many invasive weed species.

Banks and terraces along the Sacramento River near the Primary Study Area have infestations of varying sizes of giant reed grass (*Arundo donax*). Other invasive weed species found within the riparian corridor along the river include edible fig (*Ficus carica*), Himalayan blackberry (*Rubus armeniacus*), and occasional tree tobacco (*Nicotiana glauca*). Scarlet wisteria (*Sesbania punicea*) (a Cal-IPC “Alert” species), has been spotted along the Sacramento River and Feather River and could be spreading downstream in these watersheds into the Primary Study Area. Adjacent sloughs and backwaters along the Sacramento River often are infested by the non-native subspecies of water primrose (*Ludwigia peploides*) and other weedy species. Areas of human habitation along the river often are infested by tree of heaven (*Ailanthus altissima*).

Yellow star-thistle (*Centaurea solstitialis*) is widespread in the proposed Sites Reservoir footprint, as well as in other locations of the Primary Study Area. Many other exotic species of varying degrees of invasiveness (many rated “Moderate” on the current Cal-IPC list) occur in the extensive annual grasslands of the proposed Sites Reservoir footprint and recreation areas. Most of the grassland contains brome (*Bromus*) species and medusahead (*Elymus caput-medusae*) (rated “High” in ecological impacts by Cal-IPC). Italian thistle (*Carduus pycnocephalus*) infestations appear to be spreading rapidly in the foothill canyons at the proposed Sites Reservoir’s western edges. Bull thistle (*Cirsium vulgare*) and minor amounts of other thistles occur in scattered small infestations throughout the grassland-oak woodland edges of the proposed Sites Reservoir.

² A Cal-IPC Alert species is a species that has an urgent need for eradication.

13.2.3.6 Special-status Plant Species

Federal- or State-listed Species

During field surveys, no known federal- or State-listed species were found within the Primary Study Area. However, plants observed in the western edges of the Primary Study Area in oak savanna/mixed chaparral have the potential to be identified as Keck's checkerbloom (*Sidalcea keckii*), a federally endangered species. During field surveys, voucher collections were made for plants thought at the time to be the common Northern California species fringed checkerbloom (*Sidalcea diploscypha*). The two species are similar in appearance and habitat; until 2009, Keck's checkerbloom was understood to occur only in southern California. However, at least one of the Project survey voucher specimens has been annotated to "*cf S. keckii*" (U.C., 2004). This means that plants from this part of western Colusa County could be the federally endangered member of this look-alike pair. The potential for occurrence of Keck's checkerbloom in the Primary Study Area will be determined when ongoing molecular studies are completed. As of March 2011, there is some potential that Keck's checkerbloom does occur in the western edges of the Primary Study Area.

Species of Concern

Tables 13-9 and 13-10 provide lists of federal- and State-listed plant species and Species of Concern potentially present in the Primary Study Area. The former federal category "Species of Concern" has been dropped to be consistent with current practices of the CNDDDB (CDFW, 2017). In this chapter, "Species of Concern" refers to plant species with a CNPS Rare Plant Rank of 1, 2, and 3; List 4 species are not mapped or tracked by quadrangle map in the CNDDDB, so are not included in Table 13-10. As shown in Table 13-9, nine federal- and/or State-listed species potentially occur in the Primary Study Area. For all species listed in Table 13-9, habitat, range, threats, and likelihood of occurrence in the Primary Study Area are discussed in more detailed Life History accounts. For the 30 Species of Concern with potential to occur in the Primary Study Area, habitat information is summarized in Table 13-10.

Table 13-9
Federal- and State-listed Plant Species with Potential to Occur in the Primary Study Area

Species	Federal Status ^a	State Status ^b
Federal- and State-listed Plant Species		
Indian Valley Brodiaea (<i>Brodiaea coronaria</i> ssp. <i>rosea</i>)	None	SE
Hoover's Spurge (<i>Euphorbia hooveri</i>)	T	None
Palmate-Bracted Birds Beak (<i>Chloropyron palmatum</i>)	E	SE
Milo Baker's Lupine (<i>Lupinus milo-bakeri</i>)	None	ST
Colusa Grass (<i>Neostapfia colusana</i>)	T	SE
Hairy Orcutt Grass (<i>Orcuttia pilosa</i>)	E	SE
Keck's Checkerbloom (<i>Sidalcea keckii</i>)	E	None
Red Mountain Catchfly (<i>Silene campanulata</i> ssp. <i>campanulata</i>)	None	SE
Greene's Tuctoria (<i>Tuctoria greenei</i>)	E	SR

^aFederal Status: T=Threatened, E=Endangered, SC=Species of Concern

^bState Status: SR=State-Listed Rare, ST=State-Listed Threatened, SE=State-Listed Endangered

Source: CDFW, 2017.

Table 13-10
CNPS Rare Plant Rank 1, 2, and 3 Plant Species with Potential to Occur in the Primary Study Area

Common name Species ^a	CNPS Status ^b	Habitat Type and Typical Elevation Range
Adobe Lily <i>Fritillaria pluriflora</i> ^c	1B.2	Chaparral, woodland, grassland/adobe clay, often cool exposures; 60 to 705 meter elevation
Baker's navarretia <i>Navarretia leucocephala</i> ssp. <i>bakeri</i>	1B.1	Vernal pools and swales; adobe or alkaline soils; 5 to 1,740 meter elevation
Bent-Flowered Fiddleneck <i>Amsinckia lunaris</i> ^c	1B.2	Sunny steeply-sloping openings in woodland, grassland/clay-loam with some weathered mudstone; 3 to 500 meter elevation
Big-Scale Balsamroot <i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>	1B.2	Chaparral, woodland, grassland/sometimes serpentinite; 90 to 1,400 meter elevation
Bolander's Horkelia <i>Horkelia bolanderi</i>	1B.2	Chaparral, valley and foothill grassland, meadows and seeps; 450 to 1,100 meter elevation
Brandegee's Eriastrum <i>Eriastrum brandegeeeae</i>	1B.2	Chaparral, woodland/volcanic or clay-shale soil transition zone; 305 to 1,030 meter elevation
Brittlescale <i>Atriplex depressa</i> ^c	1B.2	Chenopod scrub, meadows, playas, grassland, vernal pools/alkaline, clay; 1 to 320 meter elevation
California alkali grass <i>Puccinellia simplex</i>	1B.2	Alkaline, vernal mesic. Sinks, flats, and lake margins; 1 to 915 meter elevation
Coast Range Bindweed <i>Calystegia collina</i> ssp. <i>tridactylosa</i>	1B.2	Chaparral/woodland/serpentinite, gravelly or rocky openings; zero to 600 meter elevation
Colusa Layia <i>Layia septentrionalis</i>	1B.2	Chaparral, woodland, grassland/sandy, serpentinite; 100 to 1,095 meter elevation
Coulter's Goldfields <i>Lasthenia glabrata</i> ssp. <i>coulteri</i> ^c	1B.1	Coastal salt marsh, saline vernal pools, playas, alkali flats; 1 to 1,220 meter elevation
Deep-Scarred Cryptantha <i>Cryptantha excavata</i> ^c	1B.3	Cismontane woodland, sandy or gravelly soil; 100 to 500 meter elevation
Diamond-Petaled California Poppy <i>Eschscholzia rhombipetala</i>	1B.1	Grassland/alkaline, clay; zero to 975 meter elevation
Drymaria-Like Western Flax <i>Hesperolinon drymarioides</i>	1B.2	Chaparral, woodland, grassland/serpentinite; 100 to 1,130 meter elevation
Dwarf Soaproot <i>Chlorogalum pomeridianum</i> var. <i>minus</i>	1B.2	Chaparral/serpentinite; 305 to 1,000 meter elevation
Ferris' Milk-Vetch <i>Astragalus tener</i> var. <i>ferrisiae</i> ^c	1B.1	Meadows, grassland, sub-alkaline flats; 5 to 75 meter elevation
Hall's Harmonia <i>Harmonia hallii</i>	1B.2	Chaparral/serpentinite; 500 to 900 meter elevation
Heartscale <i>Atriplex cordulata</i> var. <i>cordulata</i> ^c	1B.2	Chenopod scrub, meadows, grassland, saline/alkaline; 1 to 375 meter elevation
Heckard's pepper-grass <i>Lepidium latipes</i> var. <i>heckardii</i>	1B.1	Grassland, and sometimes vernal pool edges. Alkaline soils; 2 to 200 meter elevation

Common name Species ^a	CNPS Status ^b	Habitat Type and Typical Elevation Range
Jepson's Milk-Vetch <i>Astragalus rattanii</i> var. <i>jepsonianus</i>	1B.2	Woodland, grassland/often serpentinite or shaley mudstone dry creek banks; 320 to 600 meter elevation
Norris' Beard-Moss <i>Didymodon norrissi</i> ^f	2.2	Cismontane woodland; 600 to 1,973 meter elevation
Pappose Tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i> ^f [= <i>Hemizonia parryi</i> ssp. <i>parryi</i> in Jepson Manual]	1B.2	Vernally moist alkaline areas in valley and foothill grassland, chaparral, meadows, seeps; 2 to 420 meter elevation
Pink Creamsacs <i>Castilleja rubicundula</i> sspvar. <i>rubicundula</i>	1B.2	Grassy openings in chaparral, woodland, meadows, grassland/serpentinite; 20 to 900 meter elevation
Porter's navarretia <i>Navarretia paradoxinota</i>	1B.3	Serpentinite, openings, vernal mesic meadows, seeps and often drainages; 165 to 840 meter elevation
Recurved Larkspur <i>Delphinium recurvatum</i>	1B.2	Chenopod scrub, woodland, grassland/alkaline; 3 to 750 meter elevation
Red-Flowered Lotus <i>Acmispon rubriflorus</i> ^c	1B.1	Openings in woodland, grassland/heavy clay; 200 to 425 meter elevation
Round-Leaved Filaree <i>California macrophylla</i> ^c [= <i>Erodium macrophyllum</i> in Jepson Manual]	1B.1	Woodland, grassland/clay; 15 to 1,200 meter elevation
Shining navarretia <i>Navarretia nigelliformis</i> ssp. <i>radians</i>	1B.1	Cismontane woodland, valley and foothill grassland, vernal pools; 60 to 975 meter elevation
San Joaquin Spearscale <i>Extriplex [Atriplex] joaquiniana</i> ^c	1B.2	Chenopod scrub, meadows, playas, grassland, vernal pools/alkaline; 1 to 320 meter elevation
Snow Mtn. Buckwheat <i>Eriogonum nervulosum</i>	1B.2	Chaparral/serpentinite; 300 to 2,105 meter elevation
Stony Creek Spurge <i>Euphorbia ocellata</i> ssp. <i>rattanii</i>	1B.2	Chaparral, grassland/sandy, rocky or steep shale slopes, gravelly creek edges; 85 to 800 meter elevation
Three-fingered morning-glory <i>Calystegia collina</i> ssp. <i>tridactylosa</i>	1B.2	Rocky, gravelly openings in serpentine chaparral and woodlands; 605 to 705 meter elevation
Tracy's Eriastrum <i>Eriastrum tracyi</i>	1B.2	Chaparral, woodland; 315 to 975 meter elevation
Vernal Pool Smallscale <i>Atriplex persistens</i> ^c	1B.2	Vernal pools/alkaline; 10 to 115 meter elevation
Water star-grass <i>Heteranthera dubia</i>	2B.2	Alkaline, still or slow-moving water; requires a pH of 7 or higher, usually in slightly eutrophic waters; 30 to 1,495 meter elevation
Woolly Rose-Mallow <i>Hibiscus lasiocarpus</i> ssp. <i>occidentalis</i>	1B.2	Freshwater marsh, slough edges; zero to 120 meter elevation

^aNomenclature corresponds to CNPS, 2017

^bCalifornia Native Plant Society (CNPS, 2017): Rare Plant Rank (RPR) 1B = plants rare, threatened, or endangered in California and elsewhere; RPR 2 = plants rare, threatened, or endangered in California but common elsewhere; CNPS threat codes: 0.1: Seriously endangered in California. 0.2: Moderately threatened in California; 0.3: Not very endangered in California.

^cSpecies reported to occur (CDFW, 2017) near the Primary Study Area, or found during Project surveys.

Seven CNPS Rare Plant Rank 1B species were found during field surveys that were conducted within the Primary Study Area (Table 13-11). New occurrences of Adobe lily (*Fritillaria pluriflora*), Bent-flowered fiddleneck (*Amsinckia lunaris*), Round-leaved filaree (*California macrophylla*), and Red-flowered lotus (*Lotus rubriflorus*) were found in the western edges of the Primary Study Area in blue oak savanna. The Red-flowered lotus was not known from the area prior to Project surveys; the nearest known occurrences was 7 miles west of the proposed Sites Reservoir footprint. Brittle scale (*Atriplex depressa*), San Joaquin spearscale (*Extriplex joaquiniana*), and *Centromadia parryi* (both subspecies) were found at the eastern edge of the Primary Study Area in weakly saline/alkaline flats. Table 13-11 lists the special-status species found during field surveys, with number of occurrences per species.

Table 13-11
Special-status Plant Species and Occurrences Found during Field Surveys by Species
for Surveyed Primary Study Area

Status	Special-status Plant Species	Number of Occurrences Found Within Project Features (Species/ Occurrences) (Number of Plants)	Number of Occurrences Found Outside Project Features (Species/ Occurrences) (Number of Plants)	Grand Total (Species/ Occurrences) (Number of Plants)
Federal Endangered	Keck's Checkerbloom <i>Sidalcea keckii</i> ^a (possible)	0	1 (11-100)	1/1 (11-100)
CNPS Rare Plant Rank (RPR) 1B	Bent-flowered Fiddleneck <i>Amsinckia lunaris</i>	4 (100-1000)	0	4 (101-1000)
	Brittle scale <i>Atriplex depressa</i> ^b	0	3 (101-1000)	3 (101-1000)
	San Joaquin Spearscale <i>Extriplex joaquiniana</i>	0	1 (11-100)	1 (11-100)
	Round-leaved Filaree <i>California macrophylla</i>	1 (11-100)	0	1 (11-100)
	Pappose Tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i>	0	1 (1-10)	1 (1-10)
	Adobe Lily <i>Fritillaria pluriflora</i>	5 (11-100)	0	5 (11-100)
	Red-flowered Lotus <i>Acmispon rubriflorus</i>	6 (over 1000)	0	6 (over 1000)
	Total RPR 1B	4/15	3/5	7/20

^aNot on the search list during 1998 to 2003 Project surveys, but included on search lists used in 2010 and 2011.

^bOne or more occurrences found during 2010 and 2011 surveys.

Note:

All occurrences found in 1998 to 2003 surveys unless otherwise noted with ^b.

None of the other special-status species listed in Tables 13-9 and 13-10, as having potential to occur in the Primary Study Area were found during Project field surveys. Six CNPS 1B species known from saline/alkaline vernal wetlands or flats in the Sacramento Valley, mostly in and around the Sacramento, Colusa, and Delevan NWRs near the Primary Study Area (CDFW, 2017), were not found during Project field surveys.

Project field surveys were all floristic (all plants observed were identified to species and recorded). A complete list of plant species found by Project feature location is included in the Botanical Progress Reports prepared during the course of these studies (DWR, 2005).

13.3 Environmental Impacts/Environmental Consequences

13.3.1 Evaluation Criteria and Significance Thresholds

Significance criteria represent the thresholds that were used to identify whether an impact would be potentially significant. Appendix G of the *CEQA Guidelines* suggests the following evaluation criteria for botanical resources:

Would the Project:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS?
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS?
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The evaluation criteria used for this impact analysis represent a combination of the Appendix G criteria and professional judgment that considers current regulations, standards, and/or consultation with agencies, knowledge of the area, and the context and intensity of the environmental effects, as required pursuant to NEPA. For the purposes of this analysis, an alternative would result in a potentially significant impact if it would result in any of the following:

- A substantial adverse effect, including loss, conversion to non-native vegetation, on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS, or any native plant community known to be rare, unusual, or becoming uncommon in the biogeographic region of the Project (for the Primary Study Area, the Inner North Coast Range/Sacramento Valley edge).
- A substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.
- An increase in potential for the invasion or spread of noxious weed species.
- Indirect impacts on native plants from disturbance due to construction or operations of the proposed alternatives.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local or regional habitat conservation plan, or conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

13.3.2 Impact Assessment Assumptions and Methodology

Combinations of Project facilities were used to create Alternatives A, B, C, C₁, and D. In all resource chapters, the Sites Project Authority (Authority) and Reclamation described the potential impacts associated with the construction, operation, and maintenance of each of the Project facilities for each of the five action alternatives. Some Project features/facilities and operations (e.g., reservoir size, overhead power line alignments, provision of water for local uses) differ by alternative, and are evaluated in detail within each of the resource areas chapters. As such, the Authority has evaluated all potential impacts with each feature individually, and may choose to select or combine individual features as determined necessary.

Impacts associated with the construction, operation, and maintenance for Alternative C₁ would be the same as Alternative C and are therefore not discussed separately below.

13.3.2.1 Assumptions

The following assumptions were made regarding Project-related construction, operation, and maintenance impacts on botanical resources:

- Direct Project-related construction, operation, and maintenance activities would occur in the Primary Study Area.
- Direct Project-related operational effects would occur in the Secondary Study Area.
- The only direct Project-related construction activity that would occur in the Secondary Study Area is the installation of two additional pumps into an existing bay at the Red Bluff Pumping Plant.
- The only direct Project-related maintenance activity that would occur in the Secondary Study Area is the sediment removal and disposal at the intakes of the GCID Main Canal and Tehama-Colusa Canal.
- No direct Project-related construction or maintenance activities would occur in the Extended Study Area.
- Direct Project-related operational effects that would occur in the Extended Study Area are related to San Luis Reservoir operation; increased reliability of water supply to agricultural, municipal, and industrial water users; and the provision of an alternate Level 4 wildlife refuge water supply. Indirect effects to the operation of certain facilities that are located in the Extended Study Area, and indirect effects to the consequent water deliveries made by those facilities, would occur as a result of implementing the alternatives.
- The existing bank protection located upstream of the proposed Delevan Pipeline Intake/Discharge Facilities would continue to be maintained and remain functional.
- No additional channel stabilization, grade control measures, or dredging in the Sacramento River at or upstream of the Delevan Pipeline Intake/Discharge Facilities would be required.
- Borrow areas for dam construction materials would be located within the proposed Sites Reservoir footprint, or materials would be obtained from commercial sources outside of the Primary Study Area.
- Frequent Sites Reservoir water level fluctuations would create a barren drawdown zone.

- For all Project facilities that do not have a defined construction disturbance area, an additional 10 percent of the facility footprint acreage is assumed to be the size of the associated disturbance area.
- Periodic maintenance of the proposed pipelines and overhead power lines would be conducted on foot and/or by using established roads for vehicle access, and would not require vehicle access over established or restored vegetation.

13.3.2.2 Methodology

Existing conditions and the future No Project/No Action alternatives were assumed to be similar in the Primary Study Area given the generally rural nature of the area and limited potential for growth and development in Glenn and Colusa counties within the 2030 study period used for this EIR/EIS as further described in Chapter 2 Alternatives Analysis. As a result, within the Primary Study Area, it is anticipated that the No Project/No Action Alternative would not entail material changes in conditions as compared to the existing conditions baseline.

With respect to the Extended and Secondary study areas, the effects of the proposed action alternatives would be primarily related to changes to available water supplies in the Extended and Secondary study areas and the Project's cooperative operations with other existing large reservoirs in the Sacramento watershed, and the resultant potential impacts and benefits to biological resources, land use, recreation, socioeconomic conditions, and other resource areas. The Department of Water Resources has projected future water demands through 2030 conditions that assume the vast majority of CVP and SWP water contractors would use their total contract amounts, and that most senior water rights users also would fully use most of their water rights. This increased demand in addition to the projects currently under construction and those that have received approvals and permits at the time of preparation of the EIR/EIS would constitute the Existing Conditions/No Project/No Action Condition. As described in Chapter 2 Alternative Analysis, the primary difference in these projected water demands would be in the Sacramento Valley; and as of the time of preparation of this EIR/EIS, the water demands have expanded to the levels projected to be achieved on or before 2030.

Accordingly, existing conditions and the No Project/No Action alternatives are assumed to be the same for this EIR/EIS and as such are referred to as the Existing Conditions/No Project/No Action Condition, which is further discussed in Chapter 2 Alternatives Analysis. With respect to applicable reasonably foreseeable plans, projects, programs and policies that may be implemented in the future but that have not yet been approved, these are included as part of the analysis of cumulative impacts in Chapter 35 Cumulative Impacts.

Impacts on native vegetation communities were assessed in relation to lost,³ altered,⁴ or disturbed⁵ vegetation. Impacts on special-status plant species were evaluated relative to both habitat loss and loss or disturbance to known occurrences. Impacts relative to noxious weeds were also addressed in terms of potential for increase and spread. Analysis of the impacts of human disturbance to native plants included consideration of the impacts of human disturbance to special-status plant species. Direct impacts on vegetation communities include permanent loss, disruption of hydrological regime, and mechanical disturbance. Indirect impacts include ground-disturbing activities that result indirectly from the Project

³ Lost vegetation communities cannot be restored.

⁴ Altered vegetation communities are communities that have been manipulated.

⁵ Disturbed vegetation communities are communities that have been damaged or compromised (such as by trampling or driving through) but are still the same vegetation type.

(i.e., erosion, dust, or trampling from increased foot traffic or human pet use), as well as changes to habitat suitability due to accidental introduction of invasive weeds. Impacts can be positive or negative, and can be short-term (temporary) or long-term (permanent). In some cases, apparently short-term/temporary impacts can be equivalent to long-term impacts, where a disturbed area does not return to its original state after construction activities cease.

Approximately 15 percent of the total footprint of each Recreation Area would be subject to permanent disturbance. Because the exact location and area affected by the construction of the recreation areas is not known, the extent of permanent vegetation loss was estimated by applying a 15 percent multiplier to each vegetation type present.

Of the 200-foot-wide total construction disturbance area associated with road construction, an approximate average of 60 feet (30 percent) would result in the permanent loss of native vegetation. A 30 percent multiplier was, therefore, applied to each vegetation type present.

For the Sites/Delevan Overhead Power Line, a worst-case scenario of 144 overhead power line towers/poles with a concrete pad for a base along the entire length of the overhead power line was used to calculate the area of permanent disturbance for Alternatives A and C. A worst-case scenario of 40 overhead power line towers/poles with a concrete pad for a base for the length of the overhead power line was used to calculate the area of permanent disturbance for Alternative B. For the Delevan Overhead Power Line for Alternative D, the number of towers/poles is not yet known; however, based on the length as compared to the west-east alignment, there would be approximately 114 overhead power line towers/poles needed for Alternative D plus the 40 towers/poles needed from the existing transmission lines for the Sites Pumping/Generating Plant (as for Alternative B).

Calculated acres of natural habitats and agricultural lands represent the baseline conditions (i.e., the Existing Conditions/No Project/No Action Condition). As described above under Section 13.2.3.1 Methodology, a variety of research and field survey methods were used to sample botanical resources. Vegetation communities were identified through research including general literature searches, consultation with agency and species experts, aerial photo habitat interpretations, and field review. Invasive plant species were identified by reviewing federal, state, and local lists and consultation with appropriate agencies as well as from Project field surveys. The potential for special status plant species was determined through identifying listed federal- and State-listed species, species of concern (CNPS 1, 2, and 3) and through consulting CDFW, CNPS, and USFWS references and regional specialists regarding known occurrences within the Primary Study Area in addition to field surveys.

Field surveys described above were intended to characterize the potential for botanical species in the Primary Study Area. While conditions are not expected to change in a meaningful way in the near term, additional botanical surveys prior to Project construction will be conducted. It is recognized that the distribution of special-status species or important habitat features may change during the period prior to construction, which could influence the location and extent of mitigation.

The botanical resources impact assessment also relied on hydrologic and operational modeling performed using CALSIM II to provide a quantitative basis from which to assess the potential impacts of the alternatives on vegetation communities in portions of the Extended and Secondary study areas. Monthly river flows and end-of-month reservoir storages from CALSIM II provided a quantitative basis to assess the potential impacts of operations on vegetation communities as compared to the Existing Conditions/No Project/No Action Condition for the period of simulation extending from water year 1922 through 2003

(82-year simulation period). Detailed discussion of the CALSIM II model results is provided in Appendix 6B Water Resources System Modeling.

Further, in assessing the impacts on the valley foothill riparian vegetation along the Sacramento River in the Secondary Study Area, modeling specific to riparian vegetation, including results from the SRH-1DV and SacEFT models, was used.

The SRH-1DV model simulates the establishment, growth, and mortality of vegetation, in addition to computing hydraulics and groundwater surface in the riparian zone near the river. The simulation tracks daily vegetation changes through 82 years of simulated flow within the 107 river miles of Sacramento River from upstream of Red Bluff to Colusa. The SRH-1DV analysis focuses on four key valley foothill riparian vegetation types: cottonwood, mixed forest, Gooding's black willow, and narrow leaf willow. The detailed description of the SRH-1DV model and the associated alternatives evaluation for Alternatives A, B, and C is provided in Appendix 8A Sedimentation and River Hydraulics Modeling. As described in Chapter 8 Fluvial Geomorphology and Riparian Habitat, daily flow input values are used in the SRH-1DV model, and the daily flow values are similar for Alternatives A, B, C, and D; therefore, it is anticipated that results for Alternative D would be similar to those presented for Alternatives A, B, and C.

The SacEFT is a decision support tool that links flow management actions on the Sacramento River to changes in the physical habitats for several focal species of concern. It specifically includes performance measures for evaluating the effects of various flow scenarios on the initiation success and post-initiation scour risk of the Fremont Cottonwood seedlings. These performance measures are used as a general indicator for assessing the impacts on riparian vegetation along the Sacramento River in the Secondary Study Area. The detailed description of the SacEFT model and the associated alternatives evaluation is provided in Appendix 8B Sacramento River Ecological Flows Tool. As described in Chapter 8 Fluvial Geomorphology and Riparian Habitat, daily flow input values are used in the SacEFT model, and the daily flow values are similar for Alternatives A, B, C, and D; therefore, it is anticipated that results for Alternative D would be similar to those presented for Alternatives A, B, and C.

13.3.3 Topics Eliminated from Further Analytical Consideration

Because no Project facilities would be constructed or maintained within the Extended Study Area, only operational impacts associated with Alternatives A, B, C, and D are discussed in the impacts analysis for the Extended Study Area for the four alternatives.

As indicated in the Environmental Setting/Affected Environment discussion, no native vegetation types are described for the urban or agricultural lands included in the water delivery service areas of the Extended Study Area. They are, therefore, not evaluated.

Project-related activities that would occur within the Secondary Study Area at the Red Bluff Pumping Plant on the Sacramento River were not evaluated because those activities would occur within the footprint of the existing pumping plant facility, and therefore, are not anticipated to affect botanical resources. Because no construction or maintenance activities would occur within the remainder of the Secondary Study Area, only operational impacts associated with Alternatives A, B, C, and D are discussed in the impacts analysis for the reservoirs and waterways included in the Secondary Study Area for the four alternatives.

The Tunnel from Sites Pumping/Generating Plant to Sites Reservoir and Existing Funks Reservoir Dredging (both facilities would be located within the Primary Study Area) were not evaluated because

construction, operation, and maintenance of these facilities would occur within the footprint of the existing facility, or would have no associated above-ground disturbance, and therefore, are not anticipated to affect botanical resources.

Because the Primary Study Area Project facilities with an above-ground footprint would result in permanent vegetation loss during their construction, the impact of the operation and maintenance of those facilities on vegetation communities (**Impact Bot-1**) is not discussed. Similarly, when the permanent loss of a vegetation community resulting from Project facility construction would make that location unsuitable for, or unable to support, specific special-status plant species, the impact of the operation and maintenance of that facility on the species (**Impact Bot-2**) is not discussed.

13.3.4 Impacts Associated with Alternative A

13.3.4.1 Extended Study Area – Alternative A

Overall the Project under Alternative A would result in either no impacts or potentially less-than-significant impacts on botanical resources in the extend study area when compared to the Existing Conditions/No Project/No Action Condition.

Construction, Operation, and Maintenance Impacts

Wildlife Refuge Water Use

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Level 4 water supply currently benefits numerous native plant species and plant associations that use fresh emergent wetland habitat on the wildlife refuges. The historical practice of purchasing Level 4 water supplies on interim water transfers would continue under Alternative A. The Project would replace at least some volume of Level 4 water supplies with a more reliable water supply than interim water transfers, but would not change the volume of water delivered to the refuges under either Level 2 or Level 4. Therefore, the provision of an alternate source of wildlife refuge water supply would have **no impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

The Project would replace at least some volume of Level 4 water supplies with a more reliable water supply than interim water transfers, but would not change the volume of water delivered to the refuges under either Level 2 or Level 4. Therefore, the provision of an alternate source of wildlife refuge water supply would have **no impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Because an alternate source of Level 4 water supply with Alternative A would not affect plant communities in the refuges, there would be **no impact** on the spread of noxious weed species in the

wildlife refuges from water level changes, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with the provision of an alternate source of Level 4 water supply. Therefore, there would be **no impact** on native plants, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

The provision of an alternate source of wildlife refuge water supply would not affect areas of native vegetation, and wildlife refuges are not covered by HCPs, NCCPs, or local ordinances. Therefore, Alternative A would result in **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

San Luis Reservoir

San Luis Reservoir currently experiences relatively severe water level fluctuations. Operational modeling for Alternative A, when compared to the Existing Conditions/No Project/No Action Condition, indicates that operation of the Project would cause San Luis Reservoir water levels to fluctuate more often but be within the current range of fluctuations.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Severe water level fluctuations could adversely affect the wetland and riparian scrub vegetation that exists within the tributary drainages in the drawdown zone. However, these patches of vegetation are located in areas that have their own hydrology. The existing vegetation in tributary drainage bottoms within the drawdown zone is already adapted to fluctuating water levels. Increases in such fluctuations could cause some of the small amounts of existing native woody vegetation to die off and be replaced by herbaceous non-native vegetation that can tolerate higher levels of disturbance; however, fluctuations would be within the general range of those which currently occur. Changes or reductions in this vegetation resulting from the more frequent or larger fluctuations associated with implementation of Alternative A would represent a **less-than-significant impact** on existing riparian or wetland vegetation within the San Luis Reservoir drawdown zone, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

No native vegetation communities or associated special-status plant species are supported in the drawdown zone of San Luis Reservoir, and no special-status plant species are recorded for this location (CDFW, 2017). Therefore, the changes in surface water elevations at San Luis Reservoir resulting from

implementation of Alternative A, when compared to the Existing Conditions/No Project/No Action Condition, would have a **no impact** on special-status plant species.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Existing large water level fluctuations in the drawdown zone of San Luis Reservoir already spread non-native vegetation around in its available exposed substrate. The more severe changes in surface water elevations at San Luis Reservoir would only reinforce the current disturbance, resulting in a **less-than-significant impact** on invasion or spread of noxious weed species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with fluctuating surface water levels (associated with Project operation) in the Extended Study area at San Luis Reservoir. Therefore, there would be **no impact**, when compared to Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

San Luis Reservoir is not covered by an adopted HCP, NCCP, or local ordinance protecting biological resources. In addition, anticipated changes in water surface elevation at San Luis Reservoir resulting from implementation of Alternative A would be similar to the Existing Conditions/No Project/No Action Condition. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

13.3.4.2 Secondary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake

Operational modeling for Alternative A, when compared to the Existing Conditions/No Project/No Action Condition, indicates that operation of the Project would provide increased operational flexibility to Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake. Storage at these reservoirs would be improved in all months of all years, including during May through October in Dry and Critical year conditions. In other years, larger releases would be made to stabilize fall flow conditions. Seasonal and monthly improvements in storage would occur in comparison to Existing Conditions/No Project/No Action Condition. In addition to improved storage conditions, operational modeling indicates that these reservoirs would experience a reduced range of change in fluctuations, resulting in less severe drawdowns.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

The shorelines of these reservoirs have the potential to support native wetland and lake-edge riparian vegetation. However, the availability of water in the shoreline root-zone decreases as water surface elevation decreases, so changes in reservoir surface water elevation fluctuations have the potential to

adversely affect the colonization of native plants. Frequent and severe drawdowns tend to favor the establishment of upland plant communities and disturbance-tolerant non-native plants along the shoreline, rather than native riparian vegetation. The reduction in the reservoir level fluctuations resulting from the implementation of Alternative A has the potential to allow the establishment of native riparian plant communities in these shoreline areas. Although changes in operations at Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake would result in improved storage and reduced water level fluctuations, the effects would have **no impact** to native riparian (lake-edge) plant communities and associated native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status plant species associated with shoreline plant communities or found in upland plant communities close to the water's edge at Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake would be expected to be affected by changes in reservoir water levels. Examples could be *Neviusia cliftonii* (Shasta snow-wreath) at Shasta Lake, *Gratiola heterosepala* (Boggs-Lake hedge-hyssop) at Folsom Lake, and *Clarkia* species at Oroville (CDFW, 2017). The native plant communities that these special-status species depend on are most likely to persist intact where water levels do not fluctuate and consequently expose plants to inundation or desiccation. Water level changes also tend to favor the establishment of disturbance-tolerant non-native plants along the shoreline, rather than native vegetation. Therefore, changes in operations resulting from implementation of Alternative A at Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake would result in reduced water level fluctuations. However, these fluctuations would have **no impact** to special-status species associated with lake-edge native plant communities, when compared to the Existing Conditions/No Project/No Action Condition, whether those plant communities are riparian/littoral (water dependent) or are in the forest or other upland communities existing in that area prior to construction of the reservoirs.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Existing water level fluctuations in the drawdown zones of Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake spread non-native vegetation around in the available exposed substrate. The less severe changes in surface water elevations at these lakes resulting from implementation of Alternative A would reduce the current disturbance levels, resulting in **no impact** on the invasion or spread of noxious weed species, when compared to the Existing Conditions/No Project/No Action Condition. This would mean a reduced likelihood for new arrivals to the area to invade the lake edges, and for existing infestations to spread into the lake arms and other adjacent lands.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with improved storage conditions at these reservoirs. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Anticipated changes to the flow regime or storage conditions of Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake resulting from implementation of Alternative A would be within the historical range of operation, and would not adversely affect areas of native vegetation. In addition, the operation of these reservoirs is not covered by adopted HCPs, NCCPs, or local ordinances. Therefore, Alternative A would result in **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, and the Thermalito Complex

Operational modeling was performed for Whiskeytown Lake; however, it is expected to operate as it has historically as a regulating reservoir for flow coming through the Clear Creek Tunnel. Operational modeling was not performed for Lewiston Lake, Keswick Reservoir, Lake Natoma, or the Thermalito Complex (which includes the Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay). They are also expected to continue to operate as they have historically, as regulating reservoirs for upstream reservoirs. No change in operation is expected at any of these reservoirs as a result of Project operation.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Because no change in surface water elevations at Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, or the Thermalito Complex is expected, Project operations associated with Alternative A would result in **no impact** on bordering native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Because no change in surface water elevations at Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, or the Thermalito Complex is expected, when compared to the Existing Conditions/No Project/No Action Condition, Project operations associated with Alternative A would result in **no impact** on special-status plant species.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Because no change in surface water elevations at Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, or the Thermalito Complex is expected, when compared to the Existing Conditions/No Project/No Action Condition, Project operations associated with Alternative A would result in **no impact** on the invasion or spread of noxious weed species.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with operations in the Secondary Study Area at Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, or the Thermalito Complex, when compared to the Existing Conditions/No Project/No Action Condition. Therefore, there would be **no impact**.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Because no change in operation is expected at any of these reservoirs as a result of Project operations, when compared to the Existing Conditions/No Project/No Action Condition, there would be no conflict with any HCPs, NCCPs, or local plans and would, therefore, be **no impact**.

Trinity River, Klamath River downstream of the Trinity River, Spring Creek, and Clear Creek

Operational modeling indicates that operations associated with Alternative A would result in little or no change in existing flow regime for the Trinity River, Klamath River downstream of the Trinity River, Spring Creek, and Clear Creek. For the Trinity River, operational modeling indicates that flows would meet or exceed the Trinity River Record of Decision requirements in all scenarios, with or without the Project. Project operations could change the timing of flows through the Clear Creek Tunnel, but not the amount supplied. Modeling results show little change from the existing flow schedule, and the small amount of change would rarely occur. For the Klamath River, no flow regime changes are indicated.

Operational modeling was not performed for Spring Creek; Spring Creek runoff is diluted by flows from Whiskeytown Lake through the Spring Creek Tunnel before it enters the Sacramento River. Those flows are diluted again by releases from Keswick Reservoir once they enter the Sacramento River. Operation of the Project would not change operation of Whiskeytown Lake or Keswick Reservoir, and therefore, is not expected to affect the released flows that dilute Spring Creek runoff. For Clear Creek, modeling indicates that flow requirements would be met or exceeded in all scenarios.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Because no change in flow regimes is expected from implementation of Alternative A, when compared to Existing Conditions/No Project/No Action Condition, its operation would result in **no impact** on native stream-edge native plant communities on the Trinity River downstream of Lewiston Lake, on the Klamath River downstream of the Trinity River, on Spring Creek, and on Clear Creek.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Refer to **Impact Bot-1** discussion. That discussion would also be applicable to special-status plant species.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Refer to **Impact Bot-1** discussion. That discussion would also be applicable to noxious weed species.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with flow regime changes in the Secondary Study Area along the Trinity River downstream of Lewiston Lake, on the Klamath River downstream of the Trinity River, on Spring Creek, and on Clear Creek, when compared to Existing Conditions/No Project/No Action Condition. Therefore, there would be **no impact**.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Anticipated changes to the flow regime of the Trinity River downstream of Lewiston Lake, the Klamath River downstream of the Trinity River, Spring Creek, and Clear Creek, would be within the historical range of their operations, and would, therefore, not adversely affect native plant species and communities, when compared to the Existing Conditions/No Project/No Action Condition. Therefore, Alternative A would result in **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Sacramento River

Operational modeling indicates that Sacramento River flows would meet or exceed the *Biological Opinion for the Long-term Central Valley Project Operations Criteria and Plan* requirements with or without the Project (USFWS, 2008). When compared to the Existing Conditions/No Project/No Action Condition, Alternative A operations would result in changes to the flow regime upstream of the Project diversions as a result of changes in operations at Shasta Lake that result from integration with Project operations. Systematic changes in flows downstream of each of the Project diversions would occur as a result of the combination of the changes in operation of Shasta Lake, as well as the diversion of up to 5,900 cubic feet per second (cfs) at the Project intakes when diversions would occur.

Modeling results indicate that there would be no change in the frequency or severity of flood events, and consequently no large change in the movement of sediment or timing of scour events, as the modeling inputs purposely avoided effects to the river from regulation and diversion when the flow is between 15,000 and 25,000 cfs. For Sacramento River upstream of the Project diversions, Project operations would result in stage fluctuations of approximately -0.6 to 0.5 feet using the Bend Bridge location as the indicator, when compared to the Existing Conditions/No Project/No Action Condition. September flows would be variable in the amount of increases. Downstream of Project diversions, July and August flow changes would be negligible. Using Wilkins Slough stage as an indicator for this reach, there would be changes in the stage of approximately -2.3 to 2.8 feet if Alternative A is implemented, when compared to the Existing Conditions/No Project/No Action Condition. The reduction in stage would mainly occur in the winter and spring months, when the water is diverted from the Sacramento River to Sites Reservoir; higher stage values occur in the summer and fall months because of the releases from the Sites Reservoir to the river. Fall flows from Shasta Lake to the Project intakes would decrease, but Project releases would stabilize fall flows downstream of the intakes, especially in Dry years.

Modeling performed using SRH-1DV and SacEFT indicates that the coverage of the valley foothill riparian vegetation alliance along the Sacramento River would increase or remain similar if Alternative A is implemented relative to the Existing Conditions/No Project/No Action Condition.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Modifications to the existing flow regime could affect the establishment of new riparian vegetation or reduce the survival rate of early successional stages of existing riparian vegetation. An increase in river stage has the potential to cause partial inundation of some shrubs. However, the shrubs likely to be affected are already subjected to seasonal inundation, and the increase in river stage during the winter months would fall within the historical range of conditions. Project operational modeling, including modeling that is specific to riparian vegetation, indicates a minimal effect to early or mid-seral stage riparian plant communities (cottonwood forest) resulting from the described changes in the flow regime. Riparian vegetation would not be expected to be adversely affected, when compared to the Existing Conditions/No Project/No Action Condition.

Modeling results indicate that there would be no change in the frequency or severity of flood events, and up to a 2- to 4-inch increase in winter season river stage. Because the higher winter stage is within the historical range of river stage experienced by existing riparian vegetation, this slight increase is not expected to cause changes in riparian plant communities. River stage in June would be increased 4 to 6 inches, which has the potential to prolong wetting of cottonwood seedlings that survive May inundation and scouring. However, this brief increase in root-zone water is unlikely to affect cottonwood establishment rates, considering the much greater effects of earlier scouring and later desiccation due to sudden summer dropoff in river stage (Mahoney & Rood, 1998).

It should be noted that, although modeling results indicate that there would be minimal change to riparian vegetation when compared to the Existing Conditions/No Project/No Action Condition, the Existing Conditions/No Project/No Action Conditions are not necessarily favorable for riparian forest, other riparian plant communities, and associated native plant species. Project operations are not expected to aggravate these conditions, but also are not expected to improve them. Therefore, the impact of modifications of the existing flow regime of the Sacramento River resulting from operation of Alternative A would have a **less-than-significant impact** on riparian plant communities along the Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Analysis of recorded special-status plant species from within 100 feet of the Sacramento River downstream of Shasta Lake (CDFW, 2017) indicates that there are three special-status plant species that could be affected by changes in flow regime on the Sacramento River between Keswick Dam and the Delta: *Cryptantha crinita* (silky cryptantha), *Hibiscus lasiocarpus* var. *occidentalis* (California hibiscus), and *Woffia brasiliensis* (Brazilian watermeal). All other potentially affected species are extirpated (e.g., *Juglans hindsii*, *Trichocoronis wrightii*), or occur only in adjacent upland habitats such as upper-terrace vernal pool landscapes that would not be subjected to river stage changes. The first species,

silky cryptantha, is known only from gravel bars on tributaries of the Sacramento River, well away from the mouth, and would not be affected by the seasonal stage changes expected from operation of Alternative A.

The California hibiscus has been reported along the river edge only from the southern end of the valley in Sutter and Sacramento counties, and is not likely to experience any effects of the June 4- to 6-inch stage increase from Project operations. The Brazilian watermeal is known from one river site near Chico in an off-channel slough; it has been observed there through November, so a slight temporary increase in river stage in June is unlikely to affect this species of calm backwaters. One other species, *Carex comosa* (bristly sedge) is known from marshy areas in the Delta and Shasta County but not along the Sacramento River edge. Therefore, the impact of modifications of the existing flow regime of the Sacramento River resulting from operation of Alternative A would have a **less-than-significant impact** on special-status plant species along the Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Existing water level fluctuations along the banks of the Sacramento River already spread non-native vegetation downstream along exposed banks, especially after high flow events when fresh silt and seed are deposited on banks. The expected slight seasonal changes in surface water elevations resulting from implementation of Alternative A would only reinforce the current disturbance and continue the existing spread of bordering non-native vegetation, and therefore, would have a **less-than-significant impact** on the invasion or spread of noxious weed species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with flow regime changes in the Secondary Study Area along the Sacramento River. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

The Natomas Basin HCP is currently the only adopted wildlife habitat plan adjacent to the Sacramento River. It does not cover activities in the riparian vegetation communities along the river and would not be affected by changes in flows in the Sacramento River. In addition, the anticipated changes to the flow regime of the Sacramento River resulting from implementation of Alternative A would be within the historical range of operation and would not adversely affect native plant species and communities. Consequently, Alternative A would not conflict with any HCPs, NCCPs, or local ordinances, and would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Feather River

Operational modeling indicates that Feather River flows would meet or exceed the Federal Energy Regulatory Commission Settlement Agreement's minimum flow requirements in all scenarios, with or without operation of the Project. The operational flexibility provided by the Project would result in a Feather River flow regime that would be less reactive to Delta conditions during summer and fall months.

Consequently, when compared to the Existing Conditions/No Project/No Action Condition, flows in June through September in drier years would be improved. However, flows would generally be decreased during October, November, and December.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

The higher Feather River flows that are released during summer months to improve Delta conditions (i.e., Existing Conditions) have the tendency to scour or inundate riparian vegetation, preventing growth of mature woody riparian vegetation (DWR, 2007). Implementation of Alternative A would return the river to a flow regime that is more stable during summer and fall months. Lower and more stabilized flows would reduce the risks of these adverse effects on riparian vegetation growth. The lower summer flows resulting from implementation of Alternative A would not likely have a substantial adverse effect on established riparian vegetation, and could be beneficial in drier years when flows would be higher than the Existing Conditions/No Project/No Action Condition. The reduced summer flows would also not be likely to adversely affect the hydrology of backwater habitats, and the resulting reduction in the velocity and temperature of the river flows could be beneficial to some native vegetation. Because the modification of the existing flow regime in the Feather River from implementation of Alternative A is not expected to adversely affect riparian vegetation, the expected changes would have a **less-than-significant impact** on native vegetation on the Feather River downstream of Lake Oroville, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Because modification of the existing flow regime in the Feather River resulting from implementation of Alternative A is not expected to adversely affect riparian vegetation, and may benefit native plant communities along the water's edge, riparian-associated plant species are not expected to be adversely affected. Therefore, the expected changes to the flow regime would have a **less-than-significant impact** on riparian-associated special-status plant species on the Feather River downstream of Lake Oroville, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

The higher Feather River flows that are released during summer months to improve Delta conditions (i.e., Existing Conditions) have the tendency to scour or inundate riparian vegetation, tending to result in colonization of non-native species that are tolerant of repeated disturbance (DWR, 2007). Lower and more stabilized flows associated with implementation of Alternative A would reduce the risks of this adverse effect. Therefore, the expected changes to the flow regime would have a **less-than-significant impact** on the spread of noxious weed species on the Feather River downstream of Lake Oroville, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with changes to the flow regime in the Secondary Study Area along the Feather River. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

There are no adopted HCPs or NCCPs as of date that cover the Feather River. In addition, anticipated changes to the flow regime of the Feather River resulting from implementation of Alternative A would be within the historical range of operation and would not adversely affect native plant species and communities. Consequently, these changes would not conflict with any HCPs, NCCPs, or local ordinances, and would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Sutter Bypass and Yolo Bypass

Operation of Alternative A would result in the diversion of up to 5,900 cfs from the Sacramento River during winter flows. These diversions would occur at the Tehama-Colusa and GCID Main Canal intakes and Delevan Pipeline intake, all of which are (or would be) located upstream of, and therefore, would affect the hydrology of, both the Sutter and Yolo bypasses. The spills into the Sutter Bypass would consequently be reduced by up to 5,900 cfs, which would reduce the velocity and volume of incoming water, and could delay the point at which the weirs begin to spill. Likewise, operational modeling indicates that there would be a reduction in the duration and magnitude of flows entering into the Yolo Bypass if Alternative A is implemented.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Approximately 80 percent of the Sutter NWR is located in the Sutter Bypass, and the Yolo Bypass includes the Yolo WA. The riparian and floodplain wetland habitats within both the Sutter and Yolo bypasses support numerous species of native (and non-native) plants that are adapted to various degrees of inundation, and occur in various patterns relative to receding floodwaters. A reduction of the velocity and volume of floodwaters entering the bypasses from the Sacramento River would reduce the amount of flooding that the NWR and WA experience; the Sutter NWR can at times be covered with up to 12 feet of water. If Alternative A is implemented, reduction in the velocity and volume of water could benefit riparian and wetland vegetation by reducing the duration of inundation and the amount of seedling scour that occurs during high flows. Although the modification of the existing flow regime of the Sutter and Yolo bypasses would result in reduced velocity and volume of incoming floodwaters, the effects would have **no impact** to native plant communities and native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

One special-status plant species known to exist at or adjacent to the edges of the Sutter Bypass, and four special-status species known to occur in the interior of the Yolo Bypass, are described in the Bypass impact analyses for the Existing Conditions/No Project/No Action Condition. Although there is the possibility of increased longevity in the Sutter and Yolo bypass water-related native plant communities due to expected flow modifications, operation of Alternative A would have **no impact** on special-status plant species associated with Sutter and Yolo bypass riparian or wetland plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Although there is the possibility of decreased scouring and increased longevity in the Sutter and Yolo bypass' stream-edge and interior wetland native plant communities, due to expected reduced flow levels and velocities, operation of Alternative A would reduce the invasion or spread of noxious weed species in the two bypasses resulting in **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with changes to the flow regime in the Secondary Study Area in the Sutter and Yolo bypasses. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

There are no adopted HCPs or NCCPs covering the Sutter and Yolo bypasses. In addition, anticipated changes to the flow regime of the bypasses resulting from implementation of Alternative A would be within the historical range of operation and would not adversely affect native plant species and communities. Consequently, these changes would not conflict with any HCPs, NCCPs, or local ordinances, and would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

American River

Operational modeling indicates that operation of Alternative A would have effects on the American River that are similar to those described for the Feather River. The operational flexibility provided by implementation of Alternative A would result in an American River flow regime that would be more consistent with hydrologic conditions, rather than reactive to Delta conditions. Consequently, when compared to the Existing Conditions/No Project/No Action Condition, flows would generally be decreased during June through September with the largest reductions in July. However, in drier years, flows would be improved from June through September when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

The channel edges and backwater sloughs of the American River support mature riparian forests, as well as early to middle seral-stage riparian vegetation. Modifications to the existing flow regime of the American River have the potential to adversely affect these native plant communities. However, operation of Alternative A would return the river to a flow regime that is more stable during summer months. Under Existing Conditions, the higher flows that are released during summer months to improve Delta conditions have the potential to scour or inundate riparian vegetation. Lower and more stabilized flows would reduce risks of scouring. The lower summer flows associated with implementation of Alternative A would not be likely to have a substantial adverse effect on established riparian vegetation, and could be beneficial in drier years when flows in June through September would be higher than for the Existing Conditions/No Project/No Action Condition. Consequently, flow regime modifications resulting from implementation of Alternative A would have a **less-than-significant impact** on riparian native plant communities along the American River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

As indicated in **Impact Bot-1**, the lower summer flows associated with implementation of Alternative A would not be likely to have a substantial adverse effect on established riparian vegetation, and could be beneficial in drier years when June through September flows would be higher than for the Existing Conditions/No Project/No Action Condition. Consequently, flow regime modifications would not be likely to have a substantial adverse effect on special-status plant species associated with riparian vegetation. Therefore, flow regime modifications resulting from implementation of Alternative A would have a **less-than-significant impact** on riparian-associated special-status plant species along the American River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

As indicated in the **Impact Bot-1** discussion, operation of Alternative A would return the river to a flow regime that is more stable during summer months, reducing the area of exposed banks that are vulnerable to weed invasions. Flow regime modifications resulting from implementation of Alternative A would, therefore, have a **less-than-significant impact** on the invasion or spread of noxious weed species along the American River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with flow regime changes in the Secondary Study Area along the American River. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

There are no adopted HCPs or NCCPs covering the American River. In addition, anticipated changes to the flow regime of the American River resulting from implementation of Alternative A would be within the historical range of operation and would not adversely affect native plant species and communities. Consequently, these changes would not conflict with any HCPs, NCCPs, or local ordinances, and would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Sacramento-San Joaquin Delta

Operational modeling indicates that operation of Alternative A would result in a flow reduction in the Delta in December and January, resulting in a 1- to 2-kilometer shift in the position of X2. However, this shift would occur during wet months when X2 position is well within compliance of salinity standards for the Delta, and would, therefore, fall within the historical range of species tolerance for plant and animal life. Project operational modeling also indicates an improvement in salinity conditions in August through October, and increased inflows into the Delta during Critically Dry years.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Modification of the flow regime associated with implementation of Alternative A would result in a shift in the X2 position that would still be within the historical range of tolerance of existing native plant communities. In addition, Delta salinity would be reduced in August through October, as well as in Critically Dry years. These conditions would result in a **less-than-significant impact** on native plant communities in the Delta, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

The conditions described in the **Impact Bot-1** discussion that would occur from implementing Alternative A would result in a **less-than-significant impact** on special-status plant species in the Delta, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

The conditions described in the **Impact Bot-1** discussion that would occur from implementing Alternative A would result in a **less-than-significant impact** on the invasion or spread of noxious weed species in the Delta, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with changes to the flow regime in the Secondary Study Area within the Delta, so there would be no human disturbance associated with these activities. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

The San Joaquin County Multi-Species Conservation Plan (an adopted HCP) and the East Contra Costa County HCP/NCCP cover lands that are located within the Sacramento-San Joaquin Delta. These plans are intended to facilitate orderly development and the protection of special-status species and open space. Implementation of Alternative A would not result in substantial environmental changes or any construction activities within the boundaries of these plans that could conflict with their provisions or objectives. The anticipated changes to the flow regime of the Delta resulting from implementation of Alternative A would be within the historical range of operation and would not adversely affect the ongoing implementation of these plans. Therefore, it is unlikely that these projects would be in conflict with adopted HCPs and NCCPs or with local policies or ordinances. Alternative A would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Suisun Bay

Operational modeling indicates that the diversions associated with Alternative A would substantially increase electrical conductivity (EC) (a measure of salinity levels) in the Suisun Marsh in December. However, for the Existing Conditions/No Project/No Action Condition, EC would be very low in December, so the substantial increase in EC associated with implementation of Alternative A would result in overall EC levels that would be within the historic range of species tolerance.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Modifications to the existing flow regime of the bay and marsh could potentially result in adverse effects to Suisun Bay's and Marsh's extensive native wetland plant communities. However, because the modification of the flow regime associated with operation of Alternative A would result in an increase in Suisun Bay EC that would be within the historic range of tolerance of the plant communities, there would be a **less-than-significant impact** on native plant communities in Suisun Bay and Marsh, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

The extensive native wetland plant communities of Suisun Bay and Marsh support many endemic and special-status plant species. Modifications to the existing flow regime of the bay and marsh could adversely affect these special-status species. However, because the modification of the flow regime associated with operation of Alternative A would result in an increase in Suisun Bay EC that would be within the historic range of tolerance of species, there would be a **less-than-significant impact** on special-status species in Suisun Bay and Marsh, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Modifications to the existing flow regime of the bay and marsh could potentially create conditions more favorable to non-native or invasive plant species. However, because the modification of the flow regime associated with operation of Alternative A would result in an increase in Suisun Bay EC that would be within the historic range of tolerance of species in existing plant communities, there would be a **less-than-significant impact** on the invasion or spread of noxious weed species in Suisun Bay and Marsh, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with changes to the flow regime in the Secondary Study Area within the Suisun Bay and Marsh, so there would be no human disturbance associated with these activities. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Anticipated changes to the flow regime of the Suisun Bay and Marsh would fall within the historical range of operation and would not adversely affect native plant species and communities. Consequently, these changes would not conflict with any HCPs, NCCPs, or local plans and would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

San Pablo Bay and San Francisco Bay

Operation of Alternative A is not expected to affect the hydrology of San Pablo and San Francisco bays.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Because there would be no effect on hydrology within San Pablo or San Francisco bays from operation of Alternative A, there would be **no impact** on bordering native plant communities along edges of the bays, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Because no effect on hydrology from operation of Alternative A is expected within San Pablo or San Francisco bays, there would be **no impact** on special-status plant species along edges of the bays, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Because there would be no effect on hydrology within San Pablo or San Francisco bays from operation of Alternative A, there would be **no impact** on the invasion or spread of noxious weed species along edges of the bays, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

No Project-related human disturbance would be associated with flow regime changes in the Secondary Study Area within San Pablo and San Francisco bays, so there would be no human disturbance associated with these activities. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Because Project operation is not expected to affect the flow regime of San Pablo and San Francisco bays, there would be no conflict with any HCPs, NCCPs, or local plans and would, therefore, be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

13.3.4.3 Primary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Sites Reservoir Inundation Area and Sites Reservoir Dams

The construction of a 1.3-million acre-feet (MAF) Sites Reservoir would also require the construction of Sites Dam, Golden Gate Dam, and seven saddle dams. Construction-related ground-disturbing activities, vegetation removal, and the subsequent filling of the reservoir, would result in the direct and permanent loss of native plant communities and special-status plants within the inundation area, i.e., facility footprint (Table 13-12). Varying extents of several vegetation communities would be replaced by either standing water or sterile subsoil.

**Table 13-12
Permanent Vegetation Loss Due to the Construction of the
1.3-MAF Sites Reservoir and Associated Dams: Alternative A**

Vegetation Type	Permanent Loss (Acres)
Annual grassland	11,654.6
Blue oak woodland	182.3
Blue oak savanna	163.1
Blue oak/mixed chaparral	8.1
Cropland	267.9
Ponds	20.2
Urban/disturbed	76.1
Valley foothill riparian	64.0
Valley oak riparian	17.5
Valley oak woodland	3.4
TOTAL	12,457.2

Vegetation located outside of the facility footprint would also be temporarily disturbed during Project construction. This construction disturbance area would be located on the north and east sides of the reservoir in the vicinity of Sites and Golden Gate dams, and could consist of as much as 1,000 additional acres of land. The majority of vegetation that would be disturbed in those areas is annual grassland, but

valley foothill riparian, and possibly wetland vegetation within the grasslands, could also be disturbed. Disturbed areas would be restored to their original habitat type following completion of construction.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland

The grassland landscape in and around the Sites Reservoir footprint supports some vernal pools and other vernal wet areas; for impacts on these and other wetland features, refer to Chapter 15 Wetlands and Other Waters. Construction of Sites Reservoir would result in the permanent loss of annual grassland, as described below.

Valley Edges

Although the grassland in the Sites Reservoir footprint area is mostly highly disturbed, the hillslopes around the footprint edges support a more diverse flora. The hillslopes around the Sites Reservoir footprint fall within the grassland-blue oak woodland edge. Because the floor and the edges of the reservoir footprint are composed of grasslands of such different ecological and botanical value, it is useful to distinguish them in terms of degree of impact from the Project. The loss of approximately 2,500 acres of footprint-edge (moderately high quality) annual grassland would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Valley Floor

In contrast to the reservoir edges, the reservoir footprint floor has been subject to such intensive human use that it is unlikely to have the capacity to support botanically rich or diverse native grassland in the foreseeable future. A substantial acreage of this valley floor is also often converted to hayfields, pasture and other agricultural uses from time to time, and other parts have been heavily grazed for many decades. Loss of over 9,000 acres of highly disturbed (very low quality) annual grassland in the footprint floor would be a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Salt Lake Wetlands

An exception to the botanically degraded Sites Reservoir footprint is the Salt Lake saline/alkaline wetland area, including additional seasonal vernal wet flats both upstream and downstream of the existing Salt Lake impoundment. Along with other wetland features, this area was mapped as part of the Annual Grassland community which surrounds it, and its acreage (approximately 20 acres) is included within the “annual grassland” type. Salt Lake and the adjacent flats are fed by warm saline springs that are also within the 520 foot expected water surface elevation of the Sites Reservoir. Inundation of the Salt Lake area would represent permanent loss of a rare habitat supporting unique saline-substrate flora. The related “Alkaline Meadow” vegetation association has a State Rank of 2.1 - “Imperiled by rarity due to very restricted range, steep declines, and other factors” (CNPS, 2011). Although the Salt Lake area is heavily compacted and disturbed by cattle, occasional representatives of the saline flora were found during Project surveys, indicating that the saline/alkaline habitat can support this suite of species. The loss of this saline/alkaline wetland vegetation would be a **potentially significant impact** on native plant

communities, when compared to the Existing Conditions/No Project/No Action Condition. For more detail on this long-term direct loss, refer to Chapter 15 Wetlands and Other Waters.

Construction Staging Area

Disturbance to, and partial loss of, up to 1,000 acres of grassland outside of the Sites Reservoir footprint to the east and northeast due to reservoir and dam construction activities would occur in an area (in the northeast) containing seasonal wetlands. Some of this grassland, although also disturbed, is less disturbed than the interior of the reservoir footprint, and part of a vernal pool-seasonal wetland landscape. Therefore, losses of grassland in the reservoir's construction disturbance area could have a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Blue Oak Woodland

Blue oak woodland, blue oak savanna, and blue oak/mixed chaparral would be permanently lost from filling the Sites Reservoir. These wooded vegetation communities, mostly concentrated around the western and some southeastern edges of the reservoir footprint, support some of the most diverse native flora in the vicinity. They also represent a dwindling vegetation type in California, as more acres of blue oak woodlands are urbanized, converted to wine-grape vineyards, or cut for firewood, with slow to no regeneration in many grazed areas (U.C., 2007; U.C., 2008; U.C., 2011). The loss of more than 180 acres of blue oak woodland would be a **potentially significant impact** on this inner coast-range foothills plant community, when compared to the Existing Conditions/No Project/No Action Condition. Likewise, the loss of more than 160 acres of blue oak savanna and approximately 8 acres of blue oak woodland supporting a substantial mixed-chaparral understory would each be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Riparian Vegetation

Construction of Sites Reservoir would result in the permanent removal of riparian vegetation. Approximately 64 acres of valley-foothill and 17 acres of valley-oak riparian vegetation would be removed by clearing and filling of the 1.3-MAF Sites Reservoir. The riparian vegetation would be lost from mostly small (0.1- to 1-acre) fragments of woody streamside vegetation in highly disturbed and interrupted narrow ribbons along the edges and banks of Funks, Grapevine, and Antelope creeks. The largest areas (all under 3 acres in size) of well-developed riparian vegetation that would be lost are in the northwest part of the reservoir footprint along Grapevine Creek. The 81-acre total of riparian vegetation represents a remnant of these communities along watercourses in the Antelope Valley. Loss of any one of these small areas of riparian woodland and associated mixed native and non-native shrub and herbaceous flora would be a **less-than-significant impact** on native plant communities in this part of the state, when compared to the Existing Conditions/No Project/No Action Condition. However, the loss of the 81 acres, combined with the additional acres subject to disturbance in the construction staging area, would be a **potentially significant impact** on this vegetation community that is already greatly diminished in the state (SRCAF, 2003) and recognized as a sensitive habitat (CDFW, 2017), when compared to the Existing Conditions/No Project/No Action Condition.

Valley Oak Woodland

Construction of Sites Reservoir would result in the permanent removal of valley oak woodland. Approximately 3.4 acres of valley oak woodland would be removed by construction and filling of the 1.3-MAF reservoir. The valley oak woodland occurs in small sites each smaller than 1.5 acres, and is in

some cases a mixture of valley oak and other (possibly non-native) tree species such as walnut. The 3.4 acres of valley oak woodland lost to the reservoir footprint represent 100 percent of this vegetation type in the vicinity of the reservoir. Because this vegetation type is considered “Imperiled by rarity due to very restricted range, steep declines and other factors” (State Rank 2.1) (CNPS, 2011), its loss would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Other Land Cover Types

Agricultural fields, ponds, and urban/disturbed land support almost no native flora. The exceptions are a few of the stock ponds, which are mostly unvegetated, but in some seasons support small amounts of water-dependent vegetation. However, field observations indicate that most of this vegetation is also non-native (e.g., dock, cocklebur, and similar species). Construction impacts on these vegetation types would represent a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

CNPS 1B and State- or Federally Listed Species

Construction and filling of the 1.3-MAF Sites Reservoir would result in no loss of known occurrences of any CNPS 1B species or State- or federally listed species. However, two species with suitable habitat around the reservoir footprint edges were likely not adequately included in the reservoir footprint surveys of 1998-99, and therefore, may occur within the footprint: *Amsinckia lunaris* (AMLU - CNPS 1B) and *Sidalcea keckii* (SIKE - CNPS 1B and federally endangered). The possibility of these species occurring in the Project vicinity was reported after surveys were completed (2000 for AMLU when it was discovered adjacent to Project feature footprints, and 2008 for SIKE when specimens from an adjacent site were annotated to this taxon). It is possible that one or both occur in the similar habitat of grassland slopes within blue oak savanna or just downslope from blue oak woodland, located around the western and southeastern edges of the Sites Reservoir footprint. It is possible that these rare species were observed during the 1998-99 Project surveys, but entered to the species inventory list under the name for the common look-alikes (i.e., *Amsinckia intermedia* for AMLU, *Sidalcea diploscypha* for SIKE), for which occurrence locations are not documented. Because surveys targeting these species have not been completed, their presence must be assumed. Loss of occurrences of one or both of these rare species would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

One occurrence of an additional CNPS 1B species, *Lotus rubriflorus*, is located approximately 150 feet uphill from the maximum expected water surface elevation for the 1.3-MAF reservoir footprint. Although outside of the reservoir’s inundation area, this rare occurrence could easily be disturbed or destroyed by Project construction or recreation activities. The disturbance or loss of this species would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

During filling of Sites Reservoir and after it reaches full pool, it is possible that on some of the more gently sloping hillsides, especially within concave drainage areas, water-related vegetation that does not now occur in the Antelope Valley could grow. Most of this vegetation would be ephemeral, due to fluctuations in water levels. The added groundwater pressure of the reservoir could induce not only this type of annual riparian or wetland vegetation, but also some scattered annual herbaceous growth in fill-line-related bands around the barren draw-down zone, or “bath-tub ring”. Much of this volunteer growth would be non-native species that responds to infertile, continually disturbed soil conditions. The reservoir footprint would thus become a productive substrate for many invasive species already occurring in the area, as well as others that have not yet invaded (e.g., thistles, bindweed, cocklebur, amaranth, and other species typical of reservoir edges). These populations would become a potential seed source for further invasion of surrounding grasslands and foothill environments, which would have a **potentially significant impact** on the invasion or spread of noxious weed species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts to Native Plants from Human Disturbance

Native plants may be directly or indirectly affected by dust generated from Project-related construction, operation, and maintenance. Construction activities would include the use of large equipment, and would result in temporarily increased dust, which could coat plants and lead to short-term decreased vigor in occurrences of native plants, including special-status plants potentially growing within 100 feet of the reservoir maximum expected water surface elevation. However, due to its temporary nature the human disturbance associated with construction, operation, and maintenance of these facilities would have a **less-than-significant impact** on native plants adjacent to the reservoir and dams, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

The Primary Study Area is not included in any HCPs or NCCPs. The Colusa County Voluntary Oak Woodlands Management Plan provides guidelines for voluntary participation, and Project mitigation for oak woodlands would exceed those guidelines. Therefore, there is no conflict with this plan and consequently **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Recreation Areas and Associated Electrical Distribution Lines

The Antelope Island, Lurline Headwaters, Stone Corral, Peninsula Hills, and Saddle Dam recreation areas all have footprints that represent the total area within which land-based recreation could occur. However, only approximately 15 percent of each footprint (approximately 175 acres total) would experience a permanent loss of vegetation cover as a result of the construction of facilities, such as boat ramps, picnic areas, roads, fire rings, restroom facilities, and campgrounds. The remainder of the acreage within each recreation area footprint could experience indirect impacts from ongoing recreational activities.

Three of the recreation areas also have associated electrical distribution lines. The total acreage of plant communities affected by each recreation area and its associated electrical distribution line is presented in Table 13-13.

Table 13-13
Permanent Vegetation Loss and Temporary Disturbance Due to the Construction of Recreation Areas and Associated Electrical Distribution Lines: Alternative A

Vegetation Type	Total Number of Acres Affected						Permanent Loss ^a
	Saddle Dam	Peninsula Hills	Stone Corral	Antelope Island	Lurline Headwaters	TOTAL Disturbance	
Annual grassland	271.6	78.2	132.8	12.3	79.2	574.1	86.1
Blue oak woodland	0.0	115.3	102.3	20.3	96.4	334.3	50.0
Blue oak savanna	0.0	185.9	0.0	13.5	48.2	247.6	37.0
Blue oak/mixed chaparral	0.0	0.0	0.0	3.1	11.6	14.7	2.2
Chamise	0.0	0.0	0.0	0.0	1.0	1.0	0.2
Ponds	1.2	0.0	0.0	0.0	0.0 ^b	1.2	0.2
TOTAL	272.8	379.4	235.1	49.2	236.4	1,172.9	175.7

^aPermanent loss is calculated as 15 percent of the total construction disturbance area.

^bThis recreation area footprint has a pond with a total area of less than 0.1 acre.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland

Annual grasslands within the footprints of the proposed Antelope Island, Lurline Headwaters, Stone Corral, and Peninsula Hills recreation areas have similar value to native plant communities as the “edge” grasslands described in the impact assessment for Sites Reservoir and Dams. This grassland is relatively high quality because it is much less disturbed than grassland located within the reservoir footprint, has remnant native bunchgrass components, and is at or within the grassland-blue oak woodland edge. Annual grassland in the Saddle Dam Recreation Area footprint is also high quality, despite its grazing history and lack of blue oak woodland, because it is part of a surrounding landscape with abundant seasonal wetlands, vernal pools and saline/alkaline wetlands. The potential disturbance of up to 574 acres and permanent loss of approximately 86 acres of annual grasslands in these recreation area footprints during construction of the recreation areas would represent a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Blue Oak Woodland

Blue oak woodlands within the footprints of the proposed Antelope Island, Lurline Headwaters, Stone Corral, and Peninsula Hills recreation areas and their associated transmission lines vary from savanna to woodland, with and without a substantial mixed chaparral understory. These woodlands are of the same value to native plant communities as those described in the impact assessment for Sites Reservoir and Dams. All types of blue oak woodland in these recreation area footprints are high quality because they have not been heavily grazed. The potential disturbance of up to almost 600 acres and the permanent loss

of 89 acres of blue oak woodlands around the slopes above Antelope Valley during construction of the recreation areas would represent a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Chamise

Chamise shrubland occurs within the transmission line route for the Lurline Headwaters Recreation Area. This densely vegetated plant community is very common in the Coast Range and has a low diversity of native plant species. Potential disturbance of 1 acre and virtually no permanent loss of chamise on these slopes above Antelope Valley during construction of the recreation areas would represent a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Other Land Cover Types

Ponds support almost no native flora. The ponds are stock ponds, which are mostly unvegetated, but may in some seasons support small amounts of water-dependent vegetation. However, field observations indicate that most of this vegetation is also non-native (e.g., dock, cocklebur, and similar species). Construction impacts on this vegetation type would represent a **less-than-significant impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

CNPS 1B and State- or Federally Listed Species

No habitats for, or occurrences of, any of the vernal pool-related special-status plant species occur in the five recreation area footprints, so there would be **no impact** on these species, when compared to the Existing Conditions/No Project/No Action Condition. Suitable habitat for the special-status plant species associated with heavy clay or crumbly clay-loam hillside oak woodland/grassland edges (*Fritillaria pluriflora*, *Amsinckia lunaris*, *California macrophylla*, or *Lotus rubriflorus*) occurs in most or all of the recreation areas and associated distribution line footprints. The federally endangered *Sidalcea keckii* is also potentially present. No occurrences of the first four species were found during Project surveys.

One small occurrence of *Lotus rubriflorus* was found in the footprint of the Peninsula Hills Recreation Area during Project surveys. All or part of this small occurrence, found just above the western 520-foot contour above Antelope Valley, would likely be lost, either from direct destruction during construction of Sites Reservoir, or construction of recreation areas within the reservoir footprint, because the occurrence is located where the two footprints meet. *Lotus rubriflorus* was not known from the Sites Reservoir area prior to Project surveys. The two nearest known occurrences were 7 miles west of the reservoir footprint, and more than 40 miles to the northeast. However, during Project surveys, an abundant occurrence of *L. rubriflorus* was discovered approximately 4 miles southwest of the Peninsula Hills Recreation Area footprint along Grapevine Creek. Loss of the one small occurrence at the Peninsula Hills Recreation Area edge would diminish the numbers of *L. rubriflorus* in this part of its range to a minor degree, which would have a **potentially significant impact** on this special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Sidalcea keckii, *Amsinckia lunaris* or *California macrophylla* can be easily overlooked or misidentified. The *Amsinckia* was not included on the 1998 to 2000 survey search lists, and some parts of some of the recreation area footprints were not surveyed. The *Sidalcea* was not included on any of the survey search lists because it was thought to be either extinct or to occur only in southeastern California. Therefore, it is possible that occurrences of one or all three species exist in the Antelope Island, Stone Corral, Peninsula Hills, or western portion of Lurline Headwaters recreation areas, and could be affected by construction of the recreation areas. Loss or disturbance to any of these three species would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition, because very few occurrences of these species are known from the portion of their ranges near Project features.

It should be noted that some adverse effects to occurrences of special-status plant species in adjacent lands could occur due to competition and habitat alteration resulting from invasion of noxious weed species (refer to the **Impact Bot-3** discussion). The known occurrences that could be affected are those of *Amsinckia lunaris* and *California macrophylla* in the hills 0.2 to 0.3 mile west of the Peninsula Hills Recreation Area. Other as yet undiscovered occurrences of these species, and possibly *Lotus rubriflorus* or *Sidalcea keckii*, could also be affected if they exist in lands surrounding the recreation areas.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance in the grasslands and open blue-oak woodland slopes of the recreation area footprints would result in many small edges and areas of bare soil. On their own, these disturbed areas would revegetate with mostly non-native annual plant species, with high potential for spread or new colonization by common noxious weeds in the surrounding foothills and valley, such as yellow star-thistle, Italian plume-thistle, barbed goat-grass, mustards and milk thistle. Revegetation by native species in disturbed ground is very unlikely, due to the rapid growth rates and other superior competitive abilities of most invasive weedy species. Therefore, even temporary disturbance of up to 1,000 acres of land while constructing the five recreation areas, as well as potential ground-disturbance associated with recreational activities during operation, and maintenance activities such as road grading, would increase the probability of the spread of noxious weeds. These weed populations would not only displace native vegetation, but would then become a potential seed source for further invasion of surrounding grasslands and foothill environments, which would have a **potentially significant impact** on the remaining native vegetation, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Native plants may be directly or indirectly affected by Project-related construction, operation, and maintenance, and recreation activities associated with the five proposed recreation areas. Indirect impacts from increased human use and vehicle traffic would affect some portion of the grasslands and woodlands. Construction activities would include the use of large equipment, and would result in temporarily increased dust, which could coat plants and lead to short-term decreased vigor in occurrences of native plants. Potential indirect impacts also include introduction of noxious weeds, death of shrubs or trees from disruption of water sources or drainage patterns, disturbance or destruction of bulbs and roots by digging pets, disturbance of plants, and degradation of soil by off-road vehicle compaction. Indirect impacts from human recreational activities, such as hiking, camping in undesignated areas, and off-road vehicle or mountain bike use, and from human trampling could erode and introduce weeds into much of the area surrounding the facilities. Because special-status plant species not included in Project surveys may occur in at least four of the five recreation area footprints, human disturbance could have a

potentially significant impact on native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Road Relocations and South Bridge

The road relocations and South Bridge include portions of the existing Huffmaster, Peterson, Maxwell Sites, Sites Lodoga, and private property roads; new access roads to facilities, such as recreation areas and dams; connections between existing and new roads; and an approach to a new bridge.

The 200-foot-wide construction disturbance area includes the surface areas of more than 35 miles of roads, the associated shoulders and cut and fill slopes, plus additional area for equipment staging and other construction activities. Both sides of the roads are proposed to be fenced. Construction of the road relocations and South Bridge would result in direct and permanent loss of existing vegetation within the entire construction disturbance area, as well as some temporary loss. Areas disturbed only during Project construction would be allowed to return to their original vegetation cover following completion of construction. Acreage for the South Bridge is not included in this analysis because the bridge would not have an on-the-ground footprint. The construction disturbance area for the bridge would fall within the footprint of Sites Reservoir, and is, therefore, already accounted for in the permanent loss of habitat associated with the reservoir.

Of the 200-foot total construction disturbance area width, an approximate average of 60 feet (30 percent) would result in the direct and permanent loss of native plant communities and other land cover resulting from the footprint of the roads and the required cut and fill. The permanent loss of habitat would, therefore, be approximately 285 acres. The majority of the acreage affected by construction of the roads would be annual grassland and blue oak woodlands.

The acres of each vegetation type that would be affected by the road relocations and South Bridge are listed in Table 13-14.

Table 13-14
Permanent Vegetation Loss and Temporary Disturbance Due to the Construction of the Road Relocations and South Bridge: Alternative A

Vegetation Type	Total Number of Acres Affected	Permanent Loss* (Acres)
Annual grassland	719.9	216.0
Blue oak woodland	98.9	29.7
Blue oak savanna	84.6	25.3
Blue oak/mixed chaparral	12.3	3.7
Canal	0.6	0.2
Chamise	1.5	0.4
Cropland	15.9	4.8

Vegetation Type	Total Number of Acres Affected	Permanent Loss* (Acres)
Mixed chaparral	2.6	0.8
Pond	0.5	0.2
Urban/disturbed	9.7	2.9
Valley foothill riparian	4.0	1.2
Valley oak riparian	0.2	0.1
TOTAL	950.7	285.3

*Permanent loss is calculated as 30 percent of the total construction disturbance area.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland

Annual grasslands within the footprint and construction disturbance area of the proposed road relocations have similar value to native plant communities as the “edge” grasslands as described in the impact assessment for Sites Reservoir and Dams. This grassland is relatively high quality because it is much less disturbed than the grassland in the reservoir footprint, has remnant native bunchgrass components, and is at or within the grassland-blue oak woodland edge. Annual grassland in the road relocation footprint of the North Road to Saddle Dam Road is also high quality, despite its grazing history and lack of blue oak woodland, because it is part of a surrounding landscape with abundant seasonal wetlands, vernal pools and saline/alkaline wetlands. The road relocation route in this area would be immediately adjacent to several wetland features within surrounding grasslands. Disturbance of up to 719 acres of moderately high quality annual grasslands, of which approximately 285 acres would be a permanent loss, due to construction of the proposed road relocations would represent a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Blue Oak Woodland

Blue oak woodlands within the footprint and construction disturbance area of the road relocations vary from savanna to woodland both with and without a substantial mixed chaparral understory. These woodlands are of the same value to native plant communities as those described in the impact assessment for Sites Reservoir and Dams and for four of the five Recreation Areas. All types of blue oak woodland in the road route disturbance area are high quality because they have not been heavily grazed, and their grassland edges are potential habitat for special-status plant species. The road disturbance area contains almost 100 acres of blue oak woodland (very little shrub understory), approximately 85 acres of more open blue oak savanna, and approximately 12 acres of blue oak woodland with a substantial mixed chaparral understory. Temporary disturbance of blue oak woodlands of any type can result in long-term or permanent conversion to another type of vegetation cover (usually of weedy grassland or shrubland), due to the slow and problematic regeneration of blue oak as a species. The disturbance and potentially permanent loss of up to almost 200 acres of blue oak woodlands from road relocation construction would represent a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Chamise

Chamise shrubland within the footprint and construction disturbance area of the road relocations occurs only within the route serving the Communication towers north of the Lurline Headwaters Recreation Area (Com Road). The densely vegetated chamise shrubland plant community is very common in the Coast Range and has low diversity of native plant species. Areas temporarily disturbed during Project construction activities in the disturbance area would be likely to revegetate readily with chamise. The permanent loss of approximately 0.4 acre of chamise on these slopes above Antelope Valley during road construction would be less than 1 percent of the 114 acres of this plant community mapped east of Logan Ridge in the Project vicinity. The chamise community is very common in the main ridges of the Coast Range. Therefore, this loss would represent a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Mixed Chaparral

Mixed chaparral shrubland within the footprint and construction easement of the road relocations occurs only within the route serving the south end of the reservoir (Sulfur Gap Road to Lurline Road to Huffmaster Road segment). The densely vegetated chaparral plant community is not potential habitat for any special-status species. Mixed chaparral is very common in the Coast Range, although not common on the east side of Antelope Valley. Its edges can support a high diversity of native plant species, some unique to chaparral. The 2.6 acres that would be temporarily disturbed during construction activities in the corridor would likely revegetate readily with chaparral species. The permanent loss of 0.8 acre of mixed chaparral represents approximately 7 percent of the 11.8 acres of this plant community mapped on these slopes above the east edge of Antelope Valley. Construction activities in the road relocation corridor would result in a **less-than-significant impact** on native plant communities and associated native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Riparian Vegetation

Riparian woodland, either mixed species or dominated by valley oak, within the footprint and construction disturbance area of the road relocations occurs in various locations around the Primary Study Area where the road route crosses Funks, Lurline, Antelope, and unnamed creeks. Although this plant community is not potential habitat for any special-status species, it is an ecologically important and sensitive plant community and potentially supports a unique set of native plant species. Disturbance to the seven stream crossings with mixed riparian growth, and one crossing of the south end of Antelope Creek with valley-oak-dominated riparian forest, would most likely be permanent, rather than temporary; mature woody riparian vegetation would likely return as weedy herbaceous growth after completion of construction. The loss of 4.2 acres of riparian vegetation during road construction would represent a **potentially significant impact** on native plant communities and associated native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Other Land Cover Types

Canal, crops/agriculture, ponds, and urban/disturbed land support almost no native flora; the ponds are stock ponds, which are mostly unvegetated, but may in some seasons support small amounts of water-dependent vegetation. However, field observations indicate that most of this is also non-native (e.g., dock, cocklebur, and similar species). Construction impacts on these vegetation types would represent a **less-than-significant impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

CNPS 1B and State- or Federally Listed Species

Ground disturbance along the road relocation disturbance area during Project construction would result in no direct impact on any known occurrences of special-status species that are State or federally listed or on CNPS 1B. However, the road relocation disturbance area traverses through potential habitat for the federally endangered *Sidalcea keckii* (SIKE), which was added to survey search lists after Project surveys were conducted, and may, therefore, be present in areas surveyed before 2010. Potential habitat is associated with all road segments except for the Eastside Road (property north of Golden Gate Dam to North Road segment). The road segments with the highest probability of impacting SIKE would be those on the west side of the reservoir footprint in the Peninsula Hills Recreation Area vicinity; SIKE could also be present in other segments of the road construction disturbance area. If occurrences of this rare species are found within the road relocation disturbance area, any direct loss resulting from Project construction would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Known occurrences of CNPS 1B special-status species were avoided when designing the location of the road relocation route based upon estimates of land required for cut-and-fill and the road surface. However, when the route was expanded to a 200-foot-wide construction disturbance area, parts of two occurrences of *Amsinckia lunaris* (AMLU), a CNPS 1B species, were included within the road relocation segments to the west and south of the Peninsula Hills Recreation Area. In addition, one occurrence of *California macrophylla* (CAMA), also a CNPS 1B species, is located immediately adjacent to the expanded construction disturbance area of the road relocation west of the Peninsula Hills Recreation Area. Any loss in either AMLU occurrence or the CAMA occurrence during road construction would represent a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Other than the overlap with AMLU, as long as all construction-related ground disturbance occurs within the 200-foot construction disturbance area, there should be **no impact** of construction-related direct loss or direct disturbance to known occurrences of CNPS 1B species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance along the road relocation corridor during Project construction would result in many small edges and areas of bare soil. These disturbed areas would likely revegetate with mostly non-native annual plant species, with high potential for spread or new colonization in the surrounding foothills and valley by common noxious weeds, such as yellow star-thistle, Italian plume-thistle, barbed goat-grass, mustards and milk thistle. Spontaneous revegetation by native species in disturbed ground is very unlikely, due to the rapid growth rates and other superior competitive abilities of many invasive weedy species. Therefore, even temporary disturbance of up to 950 acres of land while constructing the road relocations, as well as the potential ground disturbance associated with vehicles driving on the shoulder during operation and road maintenance, would increase the probability of spread of noxious weeds. These weed populations would not only displace native vegetation, but would then become a potential seed source for further invasion of surrounding grasslands and foothill environments, affecting the remaining

native vegetation, including potentially present special-status plant species. Some adverse effects to occurrences of special-status plant species in adjacent lands could occur due to competition and habitat alteration. The known occurrences which could be affected include those of *Amsinckia lunaris*, *California macrophylla*, and *Hesperivax caulescens* (HECA) in the hills within 1 mile of the Peninsula Hills Recreation Area. Other as yet undiscovered occurrences of these species, and possibly *Lotus rubriflorus* or *Sidalcea keckii*, could also be affected if they exist in lands surrounding Antelope Valley. Other special-status species potentially affected by weed infestations from road construction include *Navarretia heterandra* (NAHE) in the area southeast of the Lurline Headwaters Recreation Area, and *Navarretia nigelliformis*, NAHE and HECA along the Eastside Road connecting Road 69 with the dam facilities road system near Funks Reservoir. The high potential for new weed infestation and spread from the road relocation construction to these special-status occurrences and their remaining habitats would be a **potentially significant impact** on native vegetation and plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

As a result of Project-related construction, operation, and maintenance activities, or potential lack of fence maintenance, indirect impacts from increased human use and vehicle traffic would also affect some portion of these grasslands, woodlands, shrublands, and riparian creek crossings, including habitat areas for adjacent or nearby special-status plant species. Potential indirect impacts include introduction of noxious weeds, death of shrubs or trees or the decline of native species from disruption of water sources or drainage patterns, disturbance or destruction of bulbs and roots, disturbance of plants, and degradation of soil by off-road vehicle compaction. These indirect impacts would be minimized where the road is fenced on both sides; however, the indirect effects along any portions of the route where fencing is not maintained would represent a **potentially significant impact** on native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard

The construction of the Sites Pumping/Generating Plant, Sites Reservoir Inlet/Outlet Structure, Sites Electrical Switchyard, and the Field Office Maintenance Yard would require ground-disturbing activities that would result in the direct and permanent loss of grassland and riparian plant communities. The acreage of land cover lost to Project construction of these facilities represents the actual footprint of the facilities, and would result in complete loss of existing ground cover (Table 13-15).

Table 13-15
Permanent Vegetation Loss Due to Construction of the Sites Pumping/Generating Plant,
Sites Reservoir Inlet/Outlet Structure, Sites Electrical Switchyard, and the
Field Office Maintenance Yard: Alternative A

Habitat	Permanent Loss (Acres)
Annual grassland	81.6
Pond	0.2
Urban/disturbed	4.3
Valley foothill riparian	3.1
TOTAL	89.2

Additional acreage of temporary disturbance (to occur only during the construction period) would be required; assuming an additional requirement of 10 percent of footprint acreage, the construction disturbance area would be approximately 9 acres. The majority of land occupied by the construction disturbance area would be adjacent grassland.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland

Annual grassland within the footprint of the Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard has the same value to native plant communities and native plants as described in the impact assessment for Sites Reservoir and Dams; this grassland area has a very low botanical value because it is very disturbed and consists almost totally of non-native weedy grasses and invasive species. This grassland is not a wetland or vernal pool landscape, and supports no special-status plant species. The permanent loss of 81.6 acres and the potential temporary disturbance of an additional 9 acres of annual grassland resulting from the construction of these facilities would be a **less-than-significant impact** on native plants communities in the Project vicinity, when compared to the Existing Conditions/No Project/No Action Condition.

Riparian Vegetation

Riparian vegetation within the footprint of the Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard has the same value to native plant communities and native plants as described in the impact assessment for Sites Reservoir and Dams. Construction of these facilities would permanently displace riparian vegetation within approximately 0.2 mile of Funks Creek's natural channel upstream of Funks Dam, in two sites (Figure 13-3), when compared to the Existing Conditions/No Project/No Action Condition.

One of the two sites consists of the flooded area of the creek channel upstream of Funks Reservoir, and supports almost no riparian vegetation. The second site of spotty interrupted riparian vegetation consists of a thin ribbon of very few riparian trees (cottonwood, willow) and small patches of introduced trees such as walnut, fig, or tree-of-heaven, separated by stretches having little or no vegetation. Weedy non-native herbaceous vegetation is also common along this stretch of Funks Creek, parts of which are



0 0.025 0.05 0.075 0.1
Miles

FIGURE 13-3
Riparian Sites along Funks Creek
Impacted by Dams

Sites Reservoir Project EIR/EIS

very disturbed by cattle crossings. This site supports no special-status plant species. Disturbance of these 3 acres of riparian land (most of which is open water) during construction of these facilities would represent a **less-than-significant impact** on native plant communities due to the degraded nature of the existing riparian community at this site, when compared to the Existing Conditions/No Project/No Action Condition.

Other Land Cover Types

Ponds and urban/disturbed land support almost no native flora; the ponds are stock ponds, which are mostly unvegetated, but may in some seasons support small amounts of water-dependent vegetation. However, field observations indicate that most of this is also non-native (e.g., dock, cocklebur, and similar species). Permanent loss of these ponds and urbanized areas during construction of these facilities would represent a **less-than-significant impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status Plant Species

Construction of the Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard would result in **no impact**, direct or indirect, to any known occurrences of special-status species that are State or federally listed or on any CNPS Rare Plant Rank 1B or 2B, when compared to the Existing Conditions/No Project/No Action Condition. In addition, no special-status plant species were found during Project surveys of the footprint areas for these facilities.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance due to construction activities within the footprints for the Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard and construction disturbance area would result in many areas of bare soil. These disturbed areas would likely revegetate with mostly non-native annual plant species, with high potential for spread or new colonization in the surrounding foothills and valley by common noxious weeds, such as yellow star-thistle, Italian plume-thistle, barbed goat-grass, mustards and milk thistle. Spontaneous revegetation by native species in disturbed ground is highly unlikely due to the abundance of non-native species in surrounding land. Therefore, even temporary disturbance of up to 90 acres of land while constructing the facilities would increase the probability of spread of noxious weeds. These weed populations would not only displace the little remaining native vegetation in the area, but would then become a potential seed source for further invasion of surrounding grasslands and foothill environments and affect the remaining native vegetation, which would represent a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Operation and maintenance of these facilities would not be expected to result in additional ground disturbance, and would, therefore, have a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Grasslands adjacent to the footprints for the Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard may be directly or indirectly affected by Project-related human activities, such as increased road traffic, dust, possible introduction of non-native plant species, or other disturbance during construction, operation, and maintenance. However, due to the already highly disturbed nature of these footprint areas and the absence of any special-status plant species, increased human activity around these facilities would have a **less-than-significant impact** on native plants, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Holthouse Reservoir Complex

Construction of Holthouse Reservoir Complex would result in the direct and permanent loss of native and non-native plant communities (Table 13-16). This group of facilities within the Complex includes the Holthouse Reservoir and Dam, the breached Funks Dam, as well as the associated Holthouse Spillway and Stilling Basin, Holthouse Pumping Plant, Tehama-Colusa Canal Discharge Dissipater, and the Funks Bypass Pipeline, and the Holthouse to the Tehama-Colusa Canal Pipeline. Except for the 24-acre Tehama-Colusa Canal discharge pipeline construction disturbance area, the acreage lost represents the direct impact area; i.e., only the footprint of the facilities. Construction of the Holthouse to the Tehama-Colusa Canal Pipeline would result in the temporary disturbance of non-native vegetation (Table 13-16). Areas disturbed only during Project construction would be allowed to return to their original vegetation cover following completion of construction.

Table 13-16
Permanent Vegetation Loss and Temporary Disturbance Due to the Construction of the Holthouse Reservoir Complex: Alternative A

Habitat	Temporary Disturbance* (Acres)	Permanent Loss (Acres)
Annual grassland	9.7	112.7
Alkaline wetland	0	0.5
Canal [existing Tehama-Colusa Canal]	0.4	7.3
Crops/agriculture	14.2	212.3
Urban/disturbed [existing Funks Dam]	0	0.6
Valley foothill riparian	0	7.0
TOTAL	24.3	340.4

*Acreage represents temporary disturbance associated with the defined construction disturbance area of the Holthouse to the Tehama-Colusa Canal Pipeline.

Additional acreage of temporary disturbance would occur as a result of a construction disturbance area for these facilities. The construction disturbance areas for the Sites/Delevan Overhead Power Line and the Delevan and TRR pipelines would be located immediately adjacent to the footprint of the Holthouse Reservoir Complex facilities. The construction disturbance area for these facilities would be approximately 36 acres in size, but could overlap with the pipeline construction disturbance area. Areas of temporary disturbance would be restored to their original land cover type following completion of Project construction. The majority of vegetation affected by these facilities would be agricultural fields, with some annual grassland.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland

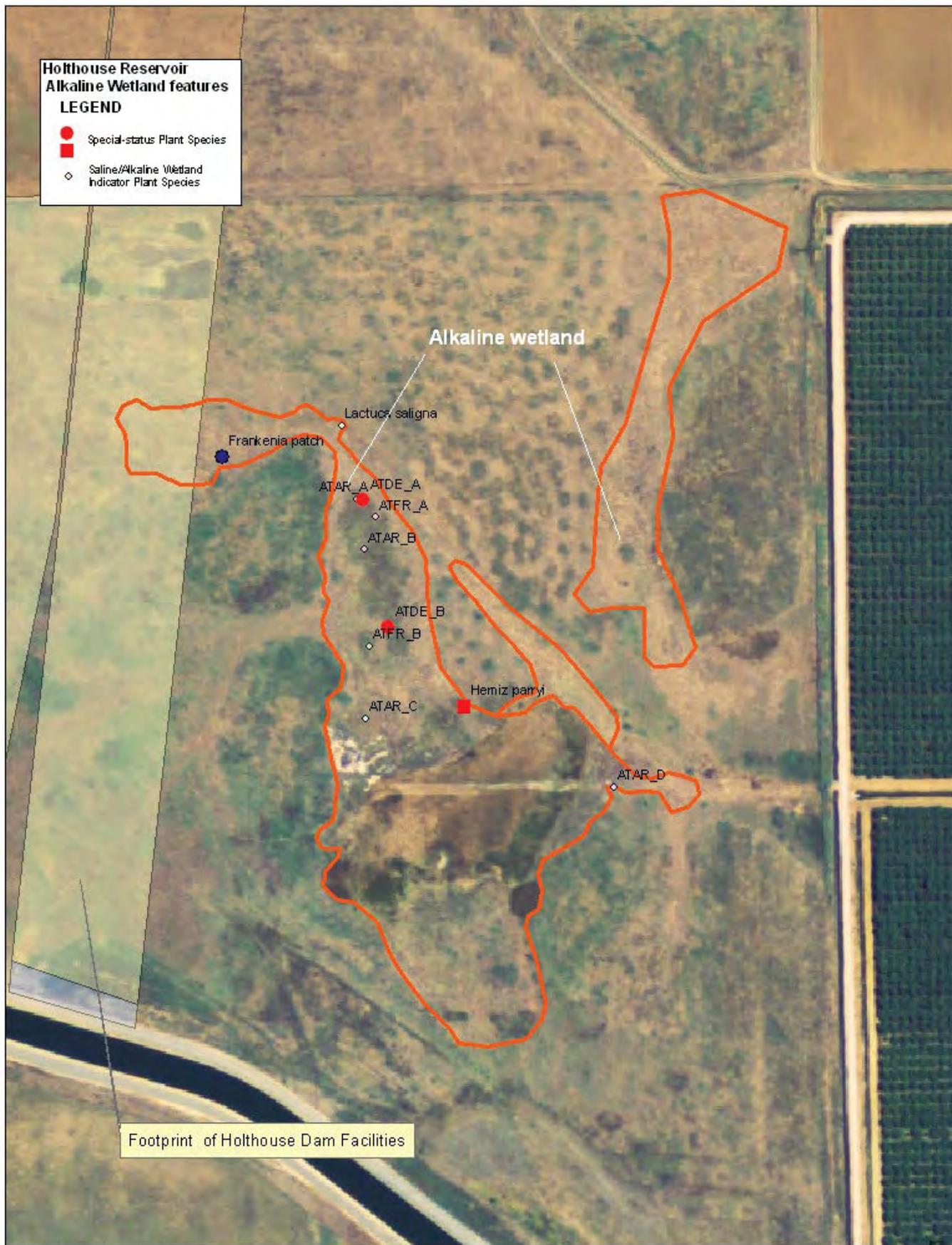
Annual grassland within the footprint of each of the Holthouse Reservoir facilities has similar value to native plant communities and native plants as described in the impact assessment for Sites Dam and Reservoir facilities; most of this grassland area has a very low botanical value because it is very disturbed and consists almost totally of non-native weedy grasses and forbs, and is not a wetland or vernal pool landscape. However, there is an area of unknown acreage of grassland within the Tehama-Colusa Canal discharge pipeline construction disturbance area, and possibly extending into parts of the Holthouse Dam footprint, that supports the headwaters of an alkaline wetland swale that extends to the southeast (Figure 13-4). Permanent loss or disturbance of this acreage could disrupt the water supply to the swale. Therefore, direct loss of this portion of the Holthouse Reservoir Complex grassland during construction would be a **potentially significant impact** on native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Riparian Vegetation

Riparian vegetation within the footprint of the Holthouse Reservoir facilities consists of approximately 7 acres along Funks Creek downstream of Funks Dam. Much of this strip is narrow, but at least 2 acres immediately downstream of the dam outlet supports a patch of mature and diverse multi-storied riparian vegetation. The remainder is also dotted with mature woody growth, mostly of fairly tall trees and some shrubs and minor amounts of herbaceous understory. Permanent loss of these 7 acres of riparian vegetation during construction would be a **potentially significant impact** on native plant communities and native plant species in the area, when compared to the Existing Conditions/No Project/No Action Condition.

Alkaline Wetland

Direct and permanent loss of up to 0.5 acre of saline/alkaline wetland swale within the grasslands affected by construction of the Holthouse Reservoir facilities would be a loss of a sensitive plant community. The Holthouse Reservoir Complex could block or otherwise disrupt the water supply (whether overland or underground or both) to this alkaline wetland swale. It is also a sensitive and rare native vegetation community (CNPS, 2011) and feeds into a larger saline/alkaline marsh to the southeast. The direct and permanent loss of up to 0.5 acre of saline/alkaline wetland swale within the grasslands affected by construction of Holthouse Reservoir Complex would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.



0 100 200 300 400
Feet



FIGURE 13-4
Alkaline Wetland Area Overlapping
with Holthouse Reservoir Complex

Sites Reservoir Project EIR/EIS

Once Holthouse Reservoir is filled, the weight of the water behind the dam would likely change the level and probably the chemistry of the groundwater in the adjacent lands to the south and east (refer to Chapter 10 Groundwater Resources). Because the water in Holthouse Reservoir would be fresh water originating from the Sacramento River, leakage of this water into the groundwater to the east would likely raise the water table with much less saline water than has existed in the past. This change would be likely, over time, to convert the alkaline wetland, vernal pools, flats and swales into a freshwater marsh plant community. Such conversion from rare alkaline meadow/wetland to freshwater seasonal wetland would most likely cause disappearance of most of the saltgrass and other plant species of the current plant community; moisture-loving non-native species already occurring in adjacent weedy fields and ditches would likely invade the area. This probable conversion away from alkaline wetland due to groundwater pressure from Holthouse reservoir would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Other Land Cover Types

Canal, crops/agriculture, and urban/disturbed land support almost no native flora. Construction impacts on these vegetation types would represent a **less-than-significant impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status Plant Species

Construction of the Holthouse Reservoir facilities would result in **no impact** (no direct loss) to any known occurrences of special-status species that are State or federally listed or on any CNPS rare plants, when compared to the Existing Conditions/No Project/No Action Condition. No special-status plant species were found during field surveys in the Holthouse Reservoir Complex footprint area.

However, after inundation the weight of the water behind Holthouse Dam would have a high potential to leak fresh water into adjacent groundwater tables to the east, converting the existing alkaline wetlands, flats, swales, and vernal pools to a freshwater marsh plant community, with moisture-loving weed infestations also likely. Such conversion from rare alkaline meadow/wetland to freshwater seasonal wetland would most likely cause disappearance of all of the special-status plant species that now occur around the saltgrass-dominated plant community and alkaline wetland swales, such as brittle scale (*Atriplex depressa* – CNPS 1B). Other special-status species known from nearby and likely to occur in this area, but suppressed by non-native vegetation growth, include San Joaquin spearscale (*Extriplex joaquiniana* – CNPS 1B) and pappose tarplant (*Centromadia parryi* ssp. *parryi* – CNPS 1B). This eventual conversion from alkaline wetland and loss of special-status plant species due to groundwater pressure from Holthouse Reservoir would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance due to construction activities within the Holthouse Reservoir facilities footprints and the Tehama-Colusa Canal pipeline construction disturbance area would result in many areas of bare soil. The Holthouse Dam and Reservoir would have the potential to contribute to weedy growth because the dam would be an earthen structure. In addition, the 24-acre pipeline construction disturbance area would

remain with an exposed disturbed surface. This strip would typically revegetate with mostly non-native annual plant species, with high potential for spread or new colonization in the surrounding foothills and valley by common noxious weeds, such as yellow star-thistle, Italian plume-thistle, barbed goat-grass, mustards, and milk thistle. Spontaneous revegetation by native species in disturbed ground is highly unlikely due to the abundance of non-native species in surrounding land. Therefore, even temporary disturbance of up to 24 acres of land while constructing the pipeline would increase the probability of spread of noxious weeds. Operation of these facilities would not be expected to result in additional ground disturbance, but maintenance of the earthen dam and associated roads could result in ground disturbance and therefore also increase the probability of spread of noxious weeds. These weed populations would not only displace the little remaining native vegetation in the area, but would then become a potential seed source for further invasion of surrounding grasslands and adjacent sensitive wetland swales and affect the remaining native vegetation, which would represent a **potentially significant impact** on native plant communities and species, including special-status species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Grasslands adjacent to the Holthouse Reservoir facilities may be directly or indirectly affected by Project-related human activities such as increased road traffic, dust, possible introduction of non-native plant species, or other disturbance such as foot traffic during construction, operation, and maintenance. Due to the already highly disturbed nature of most of the footprint area, this activity would not have much impact. However, due to the proximity of sensitive wetland swales and the presence within them of special-status plant species, increased human activity around these facilities would have a **potentially significant impact** on native plants, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Glenn-Colusa Irrigation District Canal Facilities Modifications

Modifications to the GCID Main Canal would result in the temporary disturbance of the existing facilities and existing water surface, and could affect adjacent urban/disturbed areas (Table 13-17).

Table 13-17
Temporary Disturbance of Vegetation Communities Due to Modifications of the
Glenn-Colusa Irrigation District Canal Facilities: Alternative A

Vegetation Type	Temporary Disturbance (Acres)
Canal (existing GCID Main Canal)	3.1
Urban/disturbed	1.6
TOTAL	4.7

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Other Land Cover Types

Canals and urban/disturbed land support almost no native flora. Construction impacts on these vegetation types would represent a **less-than-significant impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition. However, if any material is sidecast onto toe drain areas, some vernal wet areas could be adversely affected and wetland-related or vernal pool-related vegetation could be affected. For more detail on these and other wetland-related vegetation impacts, refer to Chapter 15 Wetlands and Other Waters.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

If any material is sidecast onto toe drain areas, some vernal wet areas could be adversely affected and special-status plant species which potentially occur in those habitats (e.g., *Extriplex joaquiniana* or *A. depressa*, CNPS 1B species) could be affected.

However, because ground disturbance is expected to occur within the footprint of the existing canal at this Project facility location, it is expected that there would be **no impact** on special-status plant species during construction, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Because ground disturbance is expected to occur within the footprint of the existing canal, there would be no expected increase in invasion or spread of noxious weed species during construction, resulting in **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Because the GCID facilities are existing facilities and operation and maintenance of the facilities with the Project are expected to be similar to what currently occurs, **no impact** on native plant communities or species from human disturbance would occur, when compared to the Existing Conditions/No Project/No Action Condition.

Terminal Regulating Reservoir, Terminal Regulating Reservoir Pumping/Generating Plant, Terminal Regulating Reservoir Electrical Switchyard, and Glenn-Colusa Irrigation District Canal Connection to the Terminal Regulating Reservoir

Construction of the TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, and GCID Main Canal Connection to the TRR facilities would require ground-disturbing activities that would result in the direct and permanent loss of ground cover (Table 13-18). Construction of the TRR to Funks Creek Pipeline would result in temporary disturbance to ground cover (Table 13-18). However, none of the Project construction activities would disturb areas of native vegetation.

Table 13-18
Permanent Vegetation Loss and Temporary Disturbance Due to the Construction of the
Terminal Regulating Reservoir Facilities: Alternative A

Vegetation Type	Temporary Disturbance* (Acres)	Permanent Loss (Acres)
Canal (existing GCID Main Canal)	0.0	0.9
Crops/agric.	13.6	194.0
Urban/disturbed	0.8	0.0
TOTAL	14.4	194.9

*Acreage represents temporary disturbance associated with the defined construction disturbance area of the TRR to Funks Creek Pipeline.

Additional temporary ground disturbance would occur as a result of a construction disturbance area for these facilities. Two sides of the reservoir are surrounded by the construction disturbance area for the Delevan and TRR pipelines, which overlap with the footprint of the reservoir. The construction disturbance area acreage would be approximately 19 acres in size, but could overlap with the adjacent pipeline construction disturbance area. Disturbed areas would be restored to their original habitat type following completion of construction.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Other Land Cover Types

Because the ground that would be disturbed for the TRR-related facilities is in urban, canal, or agricultural land uses that do not support native plant communities or species, construction of the TRR facilities would have **no impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status Plant Species

Because the ground that would be disturbed for the TRR-related facilities is in urban, canal or agricultural land uses, construction of the TRR facilities would have **no impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Because the TRR facilities would be surrounded on all sides by developed land, their construction, operation, and maintenance would have **no impact** on spread of noxious weeds, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Because the TRR facilities would be surrounded on all sides by developed land, their construction, operation, and maintenance would have **no impact** of the disturbance of native plants or their habitats by

an increase in human activities at this location, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Delevan Pipeline, Terminal Regulating Reservoir Pipeline, Terminal Regulating Reservoir Pipeline Road, and Delevan Pipeline Electrical Switchyard

The Delevan Pipeline would connect the proposed Delevan Pipeline Intake/Discharge Facilities to the Holthouse Reservoir Complex. The TRR Pipeline would be aligned parallel to the Delevan Pipeline, and would be completely within the construction disturbance area of the Delevan Pipeline. The TRR Pipeline Road would be located atop the length of the TRR Pipeline, and the Delevan Pipeline Electrical Switchyard would be located where the Delevan Pipeline would cross the existing Pacific Gas and Electric Company (PG&E) transmission line. The construction of the pipelines would require ground-disturbing activities that would result in temporary disturbance; the construction of the TRR Pipeline Road and Delevan Pipeline Electrical Switchyard would require ground-disturbing activities that would result in permanent loss, of mostly agricultural lands (Table 13-19). Areas of temporary disturbance would be restored to their original cover after construction is completed. Temporary disturbance of the alkaline wetland vegetation type would result in long-term conversion to other plant communities or permanent loss because wetland vegetation is unlikely to return to its original state after major mechanical disturbance and disruption of its water regime.

Table 13-19
Permanent Vegetation Loss and Temporary Disturbance Due to the Construction of the Delevan and Terminal Regulating Reservoir Pipelines, Terminal Regulating Reservoir Pipeline Road, and Delevan Pipeline Electrical Switchyard: Alternative A

Vegetation Type	Temporary Disturbance (Acres)	Permanent Loss (Acres)
Alkaline wetland	14.0	0.0
Canal	8.2	0.1
Crops/agriculture	2,225.6	8.2
Ponds	5.1	0.0
Urban/disturbed	36.8	0.0
Freshwater emergent marsh	4.5	0.0
TOTAL	2,294.2	8.3

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Alkaline Wetland

Temporary disturbance from constructing the Delevan Pipeline to the 14-acre parcel of disturbed alkaline wetland located approximately 3 miles west of the Sacramento River and adjacent to the Delevan NWR could affect native plant communities and native plant species. Saline or alkaline wetland meadows represent a disappearing sensitive native plant community. However, a 2011 field survey indicated that this parcel has been altered, and the water regime and vegetation have been managed as an artificial freshwater seasonal wetland. Disturbance of this parcel during Delevan Pipeline construction would be a **less-than-significant impact** on native plant communities and native plant species if the parcel is still highly manipulated at the time of Project construction, when compared to the Existing Conditions/No Project/No Action Condition.

Freshwater Emergent Marsh

A narrow strip of moisture-dependent vegetation, with some woody species, has colonized the roadside depression and irrigation ditch adjacent to the Delevan NWR on the southern edge of the Delevan Pipeline construction disturbance area (Figure 13-5). Although this strip is located outside of the NWR, this emergent vegetation likely consists of many of the wetland species present in the NWR (tules, cattails, rushes, sedges, small willows). Temporary disturbance of these 4.5 acres of freshwater emergent marsh during Delevan Pipeline construction would likely result in the long-term absence or permanent loss of this vegetation and would represent a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

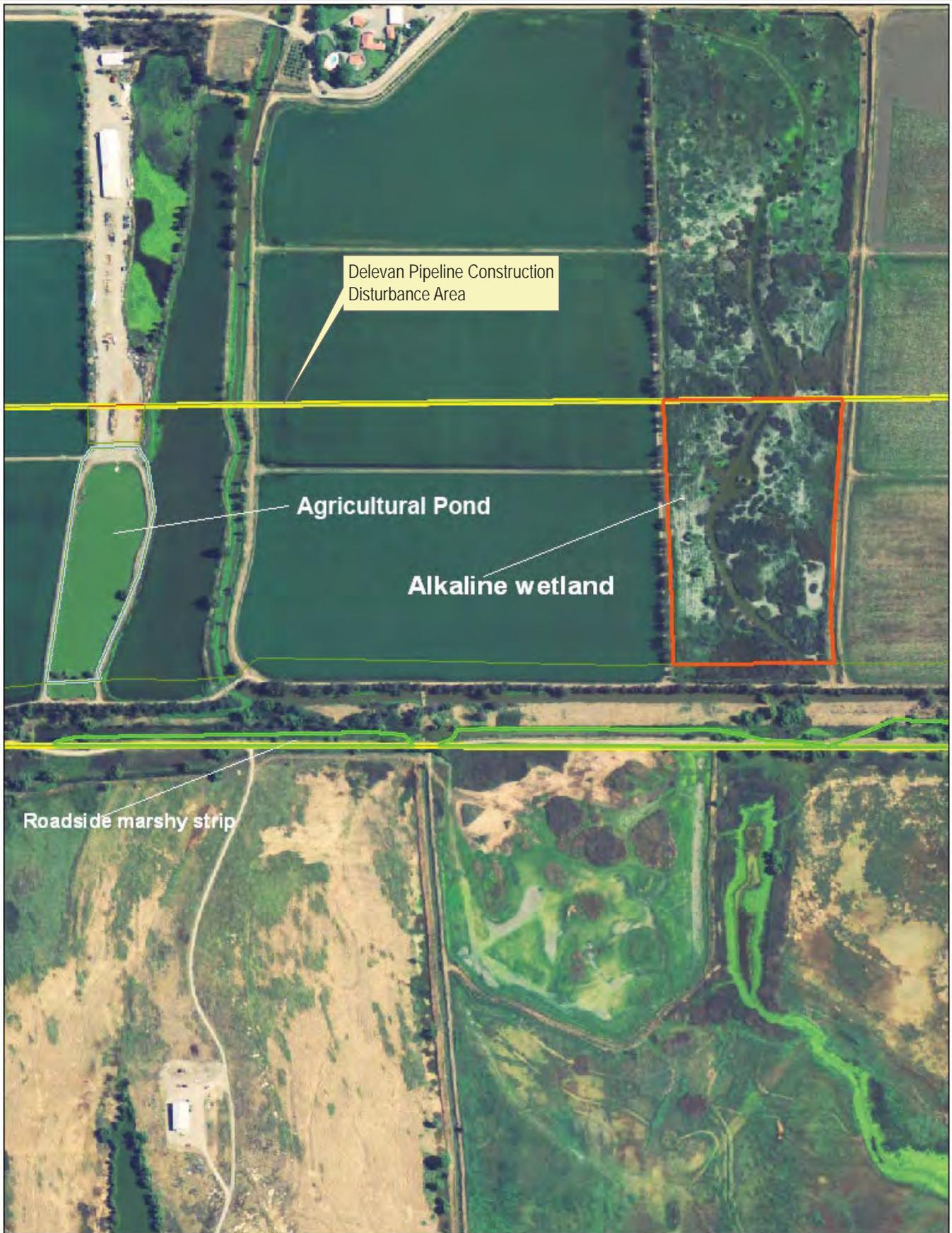
Other Land Cover Types

Other vegetation or land types that would be temporarily displaced from construction of the Delevan and TRR pipelines, and permanently disturbed by construction of the TRR Pipeline Road and Delevan Pipeline Electrical Switchyard, would include agricultural fields, urban/disturbed land, and stock ponds or irrigation ditches (refer to Figure 13-5 for the location of the 5-acre agricultural pond). All of these vegetation or land cover categories support almost no native flora. The exception may be the edges of some of the canals that may support native wetland-type vegetation. Almost all of the canal loss would be temporary because the agricultural land uses could be reestablished after construction is complete, resulting in a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status Plant Species

No special-status plant species are known or expected to occur within the entirely agricultural areas within the footprint or construction disturbance area of these facilities, with the exception of the vicinity of the 14-acre alkaline wetland parcel mentioned previously along the Delevan Pipeline route. Construction of these facilities and most of the Delevan Pipeline would result in **no impact** on known occurrences of special-status species that are State or federally listed or on any CNPS Rare Plant Rank 1B or 2B, when compared to the Existing Conditions/No Project/No Action Condition.



0 200 400 600 800 Feet



FIGURE 13-5
Former Alkaline Wetland in Delevan Pipeline Construction Disturbance Area

Sites Reservoir Project EIR/EIS

Around the vicinity of the 14-acre alkaline wetland parcel, some possibility exists for presence of special-status plant species associated with a saline/alkaline wetland or meadow habitat, which are known to occur less than 2 miles to the south in the Delevan NWR. These species include *Cordylanthus palmatus* and *Atriplex depressa*. Other special-status plant species known from the Sacramento NWR approximately 6 miles to the northwest include *Astragalus tener* var. *ferrisiae*, *Atriplex cordulata*, *Extriplex joaquiniana*, *A. persistens*, *Chamaesyce hooveri*, *Hibiscus lasiocarpus* var. *occidentalis*, *Lepidium latipes* var. *heckardii*, *Neostapfia colusana*, *Orcuttia pilosa*, and *Tuctoria greenei* (CDFW, 2017). Also known from this vicinity are both subspecies of *Centromadia parryi*. Potential disturbance or loss of any of these species due to construction within the Delevan Pipeline construction disturbance area would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition. Field surveys conducted in late summer 2011 indicate no presence of any of the above species or their suitable habitat within the highly manipulated wetland in this parcel, which is being managed as a duck hunting club. However, the presence of *Centromadia parryi* ssp. *rudis* around berms, road edges, and other disturbed sites indicates that a degree of vestigial saline wetland habitat remains, at least for species adapted to disturbance. Therefore, construction of the Delevan Pipeline through the area around this parcel would have a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance due to construction activities within the construction disturbance area of these facilities would result in many areas of newly exposed bare soil. This strip would typically revegetate with mostly non-native annual plant species, with high potential for spread or new colonization in the surrounding valley by common noxious weeds, such as yellow star-thistle, Italian plume-thistle, mustards, milk thistle, sow-thistle, and many other invasive species. Spontaneous revegetation by native species in the disturbed ground is highly unlikely due to abundance of non-native species in surrounding land. Therefore, even temporary disturbance of more than 2,000 acres of land while constructing these facilities would increase the probability of spread of noxious weeds. Operation of these facilities would not be expected to result in additional ground disturbance, but ground disturbance would occur during maintenance of the gravel road and could increase the probability of spread of noxious weeds. Spread of these weed populations would introduce more weeds into surrounding agricultural areas, and would also become a potential seed source for further invasion of adjacent sensitive wetlands of the Delevan NWR, a **potentially significant impact** on native plant communities and species, including special-status species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Throughout most of its length, the Delevan and TRR pipeline construction disturbance area is surrounded on all sides by agricultural and other developed land. The TRR Pipeline Road and Delevan Pipeline Electrical Switchyard are also surrounded by agricultural land. Because no native vegetation communities occur adjacent to the construction disturbance area, an increase in human activity associated with construction, operation, and maintenance would be expected to have **no impact** on native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

The exception to this is in the vicinity of the Delevan NWR, where an increase in vehicle use, foot traffic, possible siltation from erosional damage, litter, dust, and other disturbances associated with Delevan Pipeline construction could temporarily disturb native plant communities and special-status plant species in the NWR. Although restricted to the Project construction period, these indirect effects could degrade

the NWR habitat, and represent a **potentially significant impact** on the NWR's native plant communities and species, when compared to Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Sites/Delevan Overhead Power Line

The Sites/Delevan Overhead Power Line would parallel, and be located completely within, the construction disturbance area of the Delevan Pipeline, with the exception of the westernmost approximately 4 miles. Because the impacts of the eastern approximately 9 miles of the overhead power line construction disturbance area are already accounted for in the impact assessment for the Delevan Pipeline, only the temporary ground disturbance of the remaining 4 miles of the overhead power line are discussed in this section. Disturbed habitats would be restored to their original habitat type following the completion of construction. The construction disturbance area of the Sites/Delevan Overhead Power Line would result in the temporary disturbance of several vegetation communities (Table 13-20).

Table 13-20
Temporary Disturbance of Vegetation Due to the Construction of the
Sites/Delevan Overhead Power Line: Alternative A

Vegetation Type	Number of Acres Affected for the Entire Length of the Overhead Power Line	Number of Acres Affected for the Section of the Overhead Power Line Outside of the Delevan Pipeline Construction Disturbance Area
Annual grassland	69.5	69.5
Alkaline wetland	2.1	0.0
Canal	1.5	1.2
Crops/agriculture	203.7	2.0
Pond	1.04	0.0
Urban/disturbed	1.1	0.0
Valley foothill riparian	1.1	1.1
TOTAL	280.0	73.8

Although the overhead power line would be an above-ground feature and have no associated permanent ground disturbance, the footings of the overhead power line towers/poles would result in the permanent loss of vegetation or ground cover. Based on a worst-case scenario, the total permanent vegetation loss associated with the footings would be approximately 5.0 acres of a combination of rice and annual grassland vegetation.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland

Annual grassland within the footprint of the Sites/Delevan Overhead Power Line has the same value to special-status plant species habitat as was described in the impact assessment for the proposed Road Relocations. This grassland is almost completely composed of non-native species and supports no wetland vegetation communities. This portion of the overhead power line route would traverse some lands that were not included in original Project surveys; the probability of special-status species occurring in these grasslands is low. The temporary disturbance of 69.5 acres and the potential permanent loss of up to 5.0 acres of annual grassland resulting from the construction of the overhead power line would represent a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Riparian Vegetation

Valley foothill riparian vegetation within the construction disturbance area of the Sites/Delevan Overhead Power Line has the same value to native plant communities as described in the impact assessment for the Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard. The small segments of riparian vegetation are located at two crossings of Funks Creek, both of which support moderate to large individual trees. These trees could be relatively easily avoided during construction of the overhead power line. However, even temporary disturbance of 1.1 acres of valley foothill riparian vegetation resulting from the construction of the Sites/Delevan Overhead Power Line would be a **potentially significant impact** on the remnant riparian plant community in this area, when compared to the Existing Conditions/No Project/No Action Condition.

Other Land Cover Types

Concrete-lined canal and agricultural land support virtually no native flora. Temporary disturbance or small amounts of permanent loss of canal or agricultural areas during overhead power line construction would have **no impact** on native plants or native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status Plant Species

Construction within the Sites/Delevan Overhead Power Line construction disturbance area would result in **no impact** of direct loss to any known occurrences of special-status species that are State or federally listed or on any CNPS Rare Plant Rank 1B or 2B. No special-status plant species were found during field surveys conducted in most of the areas traversed by the overhead power line route.

Small seasonal wetlands, depressions, or swales, including some with slightly alkaline soils, are scattered in the annual grasslands in the vicinity of the unsurveyed portion of the Sites/Delevan Overhead Power Line route. Special-status plant species may occur in seasonal wetland habitats potentially present in the unsurveyed area. CNPS-listed species potentially present include *Astragalus*, *Navarretia* or *Hemizonia* (= *Centromadia*) spp. Even temporary disturbance of small patches of seasonal wetland habitat for some CNPS 1B species resulting from the construction of the Sites/Delevan Overhead Power Line would be a

potentially significant impact on special-status plant species in this area, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance due to construction activities within the Sites/Delevan Overhead Power Line construction disturbance area would result in areas of bare soil. However, parts of the 74-acre overhead power line construction disturbance area (the portion outside of Delevan Pipeline construction disturbance area) would remain with an exposed disturbed surface. This strip would typically revegetate with mostly non-native annual plant species, with high potential for spread or new colonization in the surrounding foothills and valley by common noxious weeds, such as yellow star-thistle, Italian plume-thistle, barbed goat-grass, mustards and medusahead. Spontaneous revegetation by native species in disturbed ground in this area is highly unlikely due to abundance of non-native species in surrounding land. Therefore, even the temporary disturbance of up to 74 acres of land while constructing the overhead power line would increase the probability of spread of noxious weeds. These weed populations could not only displace the little remaining native vegetation in the area, but would then become a potential seed source for further invasion of surrounding grasslands. East of the Tehama-Colusa Canal, the weed infestations could also affect sensitive alkaline wetland swales and known special-status plant occurrences approximately 0.25 mile to the north of the overhead power line construction disturbance area, resulting in a **potentially significant impact** on native plant communities and species, including special-status species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Grasslands adjacent to the Sites/Delevan Overhead Power Line construction disturbance area may be directly or indirectly affected by Project-related human activities, such as increased dust, possible introduction of non-native plant species, or other disturbance, such as foot traffic. Due to the already highly disturbed nature of the grassland area, this activity would not have much impact, and the activity would be limited to the construction period. Human activity associated with construction and maintenance is unlikely to extend north by 0.25 mile to the sensitive alkaline swales. The overhead power line would be operated remotely, and therefore, would not have human disturbance associated with its operation. Increased human activity during Project construction and maintenance could temporarily disturb the Funks Creek riparian crossings; however, because they are already highly disturbed, this would be a **less-than-significant impact** on native plants and native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Delevan Pipeline Intake/Discharge Facilities

Alternative A includes a fish screen and pumping/generating facility that has a 2,100-cfs diversion capacity and 1,500-cfs release capacity, to be located on the Sacramento River. The construction of the Delevan Pipeline Intake/Discharge Facilities would require ground-disturbing activities that would result in the direct and permanent loss of native vegetation communities (Table 13-21).

Table 13-21
Permanent Vegetation Loss Due to the Construction of the
Delevan Pipeline Intake/Discharge Facilities: Alternative A

Vegetation Type	Permanent Loss (Acres)
Canal	0.6
Crops/agriculture	11.1
Fremont cottonwood riparian	1.1
Open water (Sacramento River)	1.6
Urban/disturbed	4.2
Valley foothill riparian	0.5
TOTAL	19.1

Additional acreage of temporary disturbance would occur as a result of a construction disturbance area for these facilities. The construction disturbance area for the Delevan Pipeline Intake/Discharge Facilities would be approximately 1.9 acres in size. The construction disturbance area of the Delevan Pipeline is located immediately adjacent to these facilities and could be used as a staging area. Disturbed areas would be restored to their original habitat type following completion of construction. The vegetation affected by the construction disturbance area proposed for the intake facilities would be agricultural (orchards).

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Riparian Scrub

The riparian vegetation that would be permanently lost due to construction of the Delevan Pipeline Intake/Discharge Facilities includes a 0.5-acre strip of mostly herbaceous growth on the existing levee bank. The herbaceous growth is a dense mixture of native and non-native plant species, mainly Johnson-grass (*Sorghum halepense*), mustards, horseweed (*Conyza* sp), cocklebur (*Xanthium* sp.), *Verbena* species, mugwort (*Artemisia douglasiana*) and occasional willow shrubs. Because this vegetation has colonized the levee slope over the years, it is a product of disturbance, and its loss during construction would be a **less than-significant-impact** on native plant communities and species, when compared to the Existing Conditions/No Project/No Action Condition.

Fremont Cottonwood Forest

The Fremont cottonwood-dominated riparian forest area that would be permanently lost due to construction of the Delevan Pipeline Intake/Discharge Facilities is a small remnant of previously more extensive forests along this part of the Sacramento River. It consists of Fremont cottonwoods (*Populus fremontii*) that are more than 60 feet tall and wild grape (*Vitis californica*), with a mid-story of box elder (*Acer negundo*) and tree willows (Red willow, *Salix laevigata*). Occasional large valley oaks grow at the outer edges of this area. The permanent loss of 1.1 acres of this remnant mature and multi-layered riparian forest during construction of the intake facilities would be a **potentially significant impact** on the continuity of the remaining riparian forest along the Sacramento River and to native plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Special-status Plant Species

No special-status plant species were found during field surveys conducted in the footprint area of these facilities. Construction within the Delevan Pipeline Intake/Discharge Facilities footprint would result in **no impact** of direct loss to any known occurrences of special-status plant species that are State or federally listed or on any CNPS Rare Plant Rank 1B or 2B, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Ground disturbance due to construction activities within the Delevan Pipeline Intake/Discharge Facilities construction disturbance area would result temporarily in areas of bare soil. Most of the exposed area would be quickly covered with facility structures. However, edges would remain as disturbed soil. Spontaneous revegetation by a few native species in disturbed ground in this area is possible, due to abundance of both native and non-native species in adjacent riparian vegetation and upstream seed sources via river flows. However, these disturbed edges would tend to revegetate with mostly non-native plant species, with high potential for spread or new colonization along the river and in the edges of adjacent riparian forests by common noxious weeds, such as Johnson-grass, cocklebur, horsetweed, telegraph weed, verbenas, and even giant reed (*Arundo donax*). Therefore, even temporary disturbance of up to 19 acres of land while constructing the intake facilities would increase the probability of spread of noxious weeds. These weed populations could not only displace the remaining native vegetation in the area, but would then become a potential seed source for further invasion, especially downstream, and would be a **potentially significant impact** on native plant communities and species, when compared to the Existing Conditions/No Project/No Action Condition.

Operation and maintenance activities would not be expected to result in additional ground disturbance, and therefore, would have a **less-than-significant impact** on the spread of noxious weed species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Riparian forests adjacent to the Delevan Pipeline Intake/Discharge Facilities construction area may be directly or indirectly affected by Project-related human activities such as increased dust, refuse, fire, pollutants, possible introduction of non-native plant species, or other disturbance such as foot traffic. The increased activity would be limited to the construction period because operation and maintenance would take place entirely within the facility perimeters. Increased human activity during construction would be a **less-than-significant impact** on native plants and native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Project Buffer

Exception for fence construction, demolition of existing structures, and the creation of a fuelbreak, the native plant species and vegetation communities within the Project Buffer would not be subject to construction activities. The acreage of vegetation types included within the Project Buffer, but outside of facility footprints, is presented in Table 13-22.

Table 13-22
Acres of Vegetation Types Within the Project Buffer*: Alternative A

Vegetation Type	Acres within Project Buffer
Annual grassland	8,083.1
Agriculture	403.0
Blue oak woodland	4,180.1
Canal	15.8
Chamise	1.9
Open water	0.1
Ponds	17.2
Urban/disturbed	35.4
Valley foothill riparian	63.4
TOTAL	12,800.0

*Calculated by subtracting the acreage of permanent disturbance associated with each Project facility that is surrounded by the Project Buffer, the acreage of existing Funks Reservoir, and the acreage of the portion of the existing GCID Main Canal that is surrounded by the Project Buffer, from the total acreage of land that would be acquired for the Project.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Annual Grassland, Blue Oak Woodland, Canal, Chamise, Ponds and Valley-Foothill Riparian

The above-listed vegetation or land cover types within the Project Buffer have the same value to native plant communities and species as described for other Project features, and would not be altered or converted to other vegetation or land cover types. Construction activities associated with fence building would have a negligible impact on these vegetation types because the footprint of the fence posts would be small, and a large portion of the Project Buffer is already fenced. However, the potential creation and maintenance of a fuelbreak would require vegetation clearing that, if maintained around the entire perimeter of the buffer, could result in a substantial adverse effect due to the loss of native plant communities and portions of native plant species populations. Therefore, the potential loss of native vegetation associated with construction of the Project Buffer fuelbreak resulting from implementation of Alternative A would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Agriculture

The agricultural land cover within the Project Buffer would not be maintained as agricultural lands following Project implementation. In the absence of active management these lands would likely revert to annual grassland. The conversion of 211.4 acres of agricultural land cover to fallow field and eventually

annual grassland would have **no impact** on natural vegetation communities when compared to the Existing Conditions/No Project/No Action Condition.

Urban/Disturbed

The urban/disturbed habitat within the Project Buffer consists of roads and structures. Construction activities within the Project Buffer would include the demolition of existing structures; following demolition, the urban/disturbed areas would be converted to natural vegetation, most likely to annual grassland. This habitat conversion would benefit native species, and no native plant species would be adversely affected (because they do not occur in urban or disturbed lands). Demolition of structures within the Project Buffer resulting from implementation of Alternative A would be a **beneficial effect** to native plant communities and species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

The only Project-related activities within the Project Buffer that could result in the potential loss of special-status plant species would be the creation and maintenance of a perimeter fuelbreak. Loss of both individuals and habitat of some special-status plant species, in particular *Sidalcea keckii*, *Lotus rubriflorus* or *Amsinckia lunaris*, could occur in these fuelbreak impact areas. The extent of this potential disturbance or loss is unknown because much of the land within the Project Buffer has not been surveyed. However, the grasslands within the buffer provide suitable habitat for these species. Therefore, construction and maintenance of a perimeter fuelbreak within the Project Buffer resulting from implementation of Alternative A would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

Construction activities associated with fence building would result in areas of ground disturbance around the footprint of the fence posts. The potential creation and maintenance of a fuelbreak would require vegetation clearing that, if maintained around the entire perimeter of the buffer, could result in a substantial amount of ground disturbance. This disturbed ground, if not actively restored to its original condition, could result in the spread of weed species. The demolition of existing structures and their foundations could result in areas of bare ground that, if not actively restored to a pre-determined vegetation community, would have the potential for invasion by weed species. Therefore, the potential invasion or spread of noxious weed species within the Project Buffer resulting from implementation of Alternative A would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance

Although signs would be posted to prevent recreationists from using the Project Buffer lands, it is possible that unauthorized hiking, biking, or other recreational activity would occur within the buffer during Project operation. In addition, the construction crews required to demolish existing structures or build fences would cause a temporary disturbance to vegetation within that area. Therefore, human disturbance associated with Project Buffer activities would have a **potentially significant impact** on native plant species and vegetation communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-5: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local or Regional Habitat Conservation Plan, or Conflict with Any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance

Refer to the **Impact Bot-5** discussion for Sites Reservoir Inundation Area and Sites Reservoir Dams. There would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Summary of Alternative A Impacts on Vegetation Types

Construction, operation, and maintenance of Alternative A would result in the permanent loss of 13,572.6 acres, and the temporary disturbance of an additional 5,357.9 acres, of vegetation (Table 13-23).

Table 13-23
Acres of Vegetation Types Subject to Alternative A Construction Impacts^a

Vegetation Type	Acreage	
	Permanent Loss ^b	Temporary Disturbance ^c
Annual grassland	12,151.8	2,091.4
Alkaline wetland	0.5	14.0
Blue oak woodland	262.0	353.5
Blue oak savanna	225.4	269.8
Blue oak/mixed chaparral	14.0	21.2
Canal	9.1	14.1
Chamise	0.6	1.9
Crops/agriculture	700.0	2,307.7
Fremont cottonwood riparian	1.1	0.0
Fresh emergent wetland	0.0	4.5
Mixed chaparral	0.8	1.8
Pond	20.8	226.4
Open water	1.6	0.0
Urban/disturbed	88.1	46.9
Valley foothill riparian	75.9	4.6
Valley oak riparian	17.5	0.1
Valley oak woodland	3.4	0.0
TOTAL	13,572.6	5,357.9

^aCalculated acreage does not include acres associated with the Project Buffer because the location and extent of disturbance is not yet specified.

^bTotal permanent vegetation loss acreage includes the footprint of Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, GCID Main Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, TRR Pipeline Road, Delevan Pipeline Electrical Switchyard, and the Delevan Pipeline Intake/Discharge Facilities. Total permanent loss acreage also includes the estimated permanent loss from construction of facilities within the footprint of the Recreation Areas, within the construction disturbance area for the Road Relocations, and from construction of the overhead power line tower/pole footings associated with the Sites/Delevan Overhead Power Line.

^cTotal temporary disturbance acreage includes the footprint of the Recreation Areas (minus the acreage of estimated permanent loss) and the footprint of the existing Funks Reservoir, as well as the defined construction disturbance areas for the Road Relocations (minus the acreage of estimated permanent loss), Delevan and TRR pipelines, Holthouse to Tehama-Colusa Canal Pipeline, TRR to Funks Creek Pipeline, Sites/Delevan Overhead Power Line, and GCID Main Canal Facilities Modifications. Total temporary disturbance acreage also includes the estimated construction disturbance areas (outside of the facility footprints) for Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, GCID Main Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, and Delevan Pipeline Intake/Discharge Facilities.

13.3.5 Impacts Associated with Alternative B

13.3.5.1 Extended Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative B, as they relate to native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**), would be the same as described for Alternative A for the Extended Study Area.

13.3.5.2 Secondary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative B operations on native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**) would be the same as described for Alternative A for Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, Thermalito Complex, Trinity River, Klamath River, Spring Creek, Clear Creek, Feather River, American River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, San Francisco Bay, and for the Sacramento River as it pertains to the construction, operation, and maintenance impacts associated with installing two pumps at the Red Bluff Pumping Plant.

For the remaining facilities, the potential effects to native plants from human disturbance (**Impact Bot-4**) and conflicts with conservation plans (**Impact Bot-5**) would also be the same as described for Alternative A.

Operational differences for Alternative B, when compared to Alternative A for Trinity Lake, Shasta Lake, Lake Oroville, Folsom Lake, the Sacramento River, Sutter Bypass, and Yolo Bypass, are discussed below.

Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake

Operational modeling results for Alternative B, when compared to the Existing Conditions/No Project/No Action Condition, are similar to those described for Alternative A because Alternative B would also result in improved storage conditions. However, Alternative B operations would result in more variable reservoir surface water elevation fluctuations than Alternative A.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Surface water elevation fluctuations associated with implementation of Alternative B would be less severe than those associated with the Existing Conditions/No Project/No Action Condition. Although changes in operations at Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake would result in improved storage and reduced water level fluctuations, these effects would have **no impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Refer to the **Impact Bot-1** discussion. Changes in operations at Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake that would result in improved storage and reduced water level fluctuations would have **no impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

The reduced fluctuations associated with implementation of Alternative B, when compared to the Existing Conditions/No Project/No Action Condition, would also have **no impact** on reduced potential for spread of noxious weeds, when compared to the Existing Conditions/No Project/No Action Condition.

Sacramento River

Operational modeling indicates that Alternative B Sacramento River flows would experience changes similar to those described for Alternative A. However, operation of Alternative B would result in the diversion of up to 3,900 cfs during winter flows, whereas Alternative A would divert up to 5,900 cfs during winter flows. The reduced rate of diversion associated with Alternative B would require a longer duration of diversion, lasting from February through May.

Modeling performed using SRH-1DV and SacEFT indicates that the coverage of the valley foothill riparian vegetation alliance along the Sacramento River would increase or remain similar if Alternative B is implemented, relative to the Existing Conditions/No Project/No Action Condition. The only exception is that the SacEFT indicates a slight increase in the number of years with post-initiation scour risk for Fremont cottonwood seedlings if Alternative B is implemented, relative to the Existing Conditions/No Project/No Action Condition.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Despite the change in the rate and duration of diversion, operational modeling for Alternative B, including modeling that is specific to riparian vegetation, indicates only minimal effects to riparian vegetation resulting from the described changes in the flow regime. Riparian vegetation downstream of the intakes would not be expected to be adversely affected. Therefore, the modifications of the Sacramento River's existing flow regime resulting from operation of Alternative B would have a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Because changes in the Sacramento River flow regime would not be expected to adversely affect riparian vegetation, they would also not be expected to affect riparian-associated special-status plant species. Therefore, the modifications of the Sacramento River's existing flow regime resulting from operation of

Alternative B would have a **less-than-significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

The minimal effects of operation of Alternative B on vegetation, when compared to the Existing Conditions/No Project/No Action Condition, would result in a **less-than-significant impact** on the spread of noxious weeds.

Sutter Bypass and Yolo Bypass

Alternative B's reduced rate of diversion (3,900 cfs) of flow from the Sacramento River, when compared to Alternative A (5,900 cfs), would require a longer duration of diversion. Alternative B would reduce the velocity and volume of floodwaters entering the Sutter and Yolo bypasses from the Sacramento River by 2,100 cfs, when compared to Alternative A.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to BA Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

The reduction in the velocity and volume of water entering the bypasses could provide the same benefits of reduced scouring to native plant communities as was described for Alternative A. Although the modification of the existing flow regime in both the Sutter and Yolo bypasses would result in reduced magnitude and velocity of incoming floodwaters, these effects would have **no impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

Because modification of the existing flow regime in the Sutter and Yolo bypasses would potentially benefit native plant communities, they would also be expected to benefit associated special-status plant species that may occur in the bypasses. Although the modification of the existing flow regime in both the Sutter and Yolo bypasses would result in reduced magnitude and velocity of incoming floodwaters, these effects would have **no impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-3: An Increase in Potential for the Invasion or Spread of Noxious Weed Species

The reduced flow rates and water volume compared to the Existing Conditions/No Project/No Action Condition would also include **no impact** of reduced potential for spread of noxious weeds.

13.3.5.3 Primary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

Unless explicitly discussed below, impacts at all Project facilities within the proposed facility complexes are anticipated to be the same as those described for Alternative A.

Although the footprint of the Recreation Areas would be the same for Alternatives A and B, the associated electrical distribution line alignment would differ as a result of the change in location of Golden Gate Dam. With implementation of Alternative B, 2.9 fewer acres of annual grassland would be

affected by the Recreation Area Electrical Distribution Line construction disturbance area. However, this difference in the size of the facility footprint, alignment, or construction disturbance area would not change the type of construction, operation, and maintenance activities that were described for Alternative A. They would, therefore, have the same impact on native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**) as described for Alternative A.

In addition, the road relocations associated with Alternative B differ from those for Alternative A, mostly due to changes to the saddle dam access roads. An additional 2.5 acres of vegetation would be affected by Alternative B roads. However, these differences in the size of the facility footprint, alignment, or construction disturbance area would not change the type of construction, operation, and maintenance activities that were described for Alternative A. They would, therefore, have the same impact on native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**) as described for Alternative A.

The boundary of the Project Buffer would be the same for Alternatives A and B, but because the footprints of some of the Project facilities that are included in the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, these differences in the size of the area included within the buffer would not change the type of construction, operation, and maintenance activities that were described for Alternative A. They would, therefore, have the same impact on native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**) as described for Alternative A.

For the remaining facilities, the impact of noxious weed species (**Impact Bot-3**), potential effects to native plants from human disturbance (**Impact Bot-4**), and conflicts with conservation plans (**Impact Bot-5**) would also be the same as described for Alternative A. However, for Alternative B, the footprint and/or construction disturbance area of Sites Reservoir and Dams, the Sites/Delevan Overhead Power Line, and the Delevan Pipeline Discharge Facilities differ from Alternative A. These changes would affect different acreages of vegetation. The differences between these facilities and their impacts on botanical resources are described below.

Sites Reservoir Inundation Area and Sites Reservoir Dams

Alternative B includes the construction of a 1.8-MAF Sites Reservoir, which would require the construction of Sites Dam, Golden Gate Dam, and nine saddle dams. Sites and Golden Gate dams would have a larger footprint, and the Golden Gate Dam location would be shifted for Alternative B, when compared to Alternative A. Construction-related ground-disturbing activities and vegetation removal, and the consequent filling of the reservoir, would result in the direct and permanent loss of the same vegetation communities as described in Alternative A, but more acreage of some communities would be lost with the construction and filling of the larger reservoir (Table 13-24).

Table 13-24
Permanent Vegetation Loss Due to the Construction and Filling of the 1.8-MAF Sites Reservoir
and Associated Dams: Alternative B Compared to Alternative A

Vegetation Type	Permanent Loss (Acres) Alternative A	Permanent Loss (Acres) Alternative B	Additional Loss Associated with Alternative B when Compared to Alternative A
Annual grassland	11,654.6	13,196.9	1542.3
Blue oak woodland	182.3	399.0	216.7
Blue oak savanna	163.1	313.2	150.1
Blue oak/mixed chaparral	8.1	27.5	19.4
Cropland	267.9	267.9	0.0
Ponds	20.2	21.8	1.6
Urban/disturbed	76.1	78.8	2.7
Valley foothill riparian	64.1	71.1	7.1
Valley oak riparian	17.4	26.4	9.0
Valley oak woodland	3.4	3.5	0.1
TOTAL	12,457.2	14,406.1	1,948.9

The construction disturbance area for the 1.8-MAF Sites Reservoir would be the same as described for the 1.3-MAF reservoir. The construction disturbance area could disturb as much as 1,000 acres of land, with the majority of disturbed habitat consisting of annual grassland vegetation.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

Substantially larger areas of the most botanically diverse vegetation communities would be lost with implementation of Alternative B, when compared to Alternative A, because the additional acreage lost would be within the blue oak associations and at the blue oak woodland-annual grassland edges around the perimeter of Antelope Valley. This permanent vegetation loss, as well as the temporary disturbance of the construction disturbance area, resulting from the construction and filling of Sites Reservoir and Dams would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

The additional acreage lost with implementation of Alternative B, when compared to Alternative A, is likely to support several different special-status plant species, including the federally endangered *Sidalcea keckii*. Construction of the larger reservoir with implementation of Alternative B would also result in the loss of one known occurrence of the rare *Lotus rubriflorus*, which lies outside of the inundation area for the 1.3-MAF reservoir footprint of Alternative A. Direct impacts on special-status plant species, as well as the temporary impacts within the construction disturbance area, resulting from the construction and filling of Sites Reservoir and Dams would be a **potentially significant impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Sites/Delevan Overhead Power Line

The Alternative B design of the Sites/Delevan Overhead Power Line differs from that of Alternative A. Because there would be no pumping/generating plant associated with Delevan Pipeline Discharge Facilities, there would be no overhead power line alignment from the Sacramento River westward to the existing Western Area Power Administration (WAPA) or PG&E transmission line. There would, however, still be an overhead power line alignment from approximately 3 miles east of the Sites Electrical Switchyard to the existing WAPA or PG&E transmission line. The construction disturbance area of the Alternative B Sites/Delevan Overhead Power Line would result in the temporary disturbance and small amounts of permanent loss of vegetation, but at a much smaller scale than with Alternative A (Table 13-25).

Table 13-25
Temporary Disturbance of Vegetation Due to the Construction of the Sites/Delevan Overhead Power Line: Alternative B Compared to Alternative A

Vegetation Type	Temporary Disturbance (acres) for the Entire Length of the Sites/Delevan Overhead Power Line: Alternative A	Temporary Disturbance (acres) for the 4-mile Section of the Sites/Delevan Overhead Power Line Outside of the Construction Disturbance Area of the Delevan Pipeline: Alternative A	Temporary Disturbance (acres) for the Entire Length of the Sites/Delevan Overhead Power Line*: Alternative B
Annual grassland	69.5	69.5	54.6
Alkaline wetland	2.1	0.0	0.0
Canal	1.5	1.2	0.6
Cropland	203.7	2.0	0.0
Pond	1.04	0.0	0.0
Urban/disturbed	1.1	0.0	0.0
Valley foothill riparian	1.1	1.1	1.1
TOTAL	280.0	73.8	56.3

*Length of the Alternative B Sites/Delevan Overhead Power Line calculated from the start of the line (approximately 3 miles east of the Sites Electrical Switchyard) to the existing PG&E transmission line. Number of affected acres would be slightly reduced if the Project connects to the existing WAPA transmission line.

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

The footings of the overhead power line towers/poles would result in the permanent loss of vegetation. Based on a worst-case scenario, the total permanent vegetation loss associated with the overhead power line tower/pole footings would be approximately 1.0 acre of annual grassland vegetation, which is less than the 5.0-acre loss associated with the implementation of Alternative A. Despite the reduced amount of permanent vegetation loss associated with implementation of Alternative B, the permanent loss and temporary disturbance of vegetation communities resulting from construction of the overhead power line would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

The temporary construction disturbance to as-yet unsurveyed occurrences of *Hesperovax caulescens* (HECA) is possible along the central 1.25 miles of this route; this disturbance would represent a **less-than-significant impact** on special-status plant species due to HECA's widespread distribution and tolerance for disturbance, when compared to the Existing Conditions/No Project/No Action Condition.

Delevan Pipeline Discharge Facilities

If Alternative B is implemented, the Delevan Pipeline would be operated as a release-only pipeline. The associated Delevan Pipeline Discharge Facilities would, therefore, not include a fish screen or any of the facilities needed for pumping and generating operations that are associated with Alternative A. The construction of the Delevan Pipeline Discharge Facilities would require ground-disturbing activities that would result in the direct and permanent loss of native vegetation communities (Table 13-26), but at a smaller scale than described for the intake facilities associated with Alternative A.

Table 13-26

Permanent Vegetation Loss Due to the Construction of the Delevan Pipeline Discharge Facilities: Alternative B Compared to the Alternative A Delevan Pipeline Intake/Discharge Facilities

Vegetation Type	Permanent Loss (Acres) by Alternative A	Permanent Loss (Acres) by Alternative B
Canal	0.6	0.1
Crops/agriculture	11.1	3.9
Fremont cottonwood riparian	1.1	1.5
Open water (Sacramento River)	1.6	0.1
Urban/disturbed	4.2	2.0
Valley foothill riparian	0.5	0.1
TOTAL	19.1	7.7

Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on Any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or Any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project

The main native plant community lost to construction of the Delevan Pipeline Discharge Facilities would be mature Fremont cottonwood riparian forest. Although the affected length of this plant community bordering the Sacramento River edge would be somewhat less with Alternative B than for the Alternative A intake facilities, the total acreage removed would be greater by more than 36 percent, or 0.4 acre. This permanent loss of vegetation communities resulting from construction of the discharge facility would be a **potentially significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Additional acreage of temporary disturbance would occur as a result of a construction disturbance area for these facilities. The construction disturbance area for the Delevan Pipeline is located immediately adjacent to these facilities and could potentially be used as a staging area. The construction disturbance area acreage for the Delevan Pipeline Discharge Facilities would be approximately 0.8 acre in size. Disturbed areas would be restored to their original land cover following completion of construction. The land cover that would be affected by this construction disturbance area would be agricultural (orchards). Orchards support almost no native flora, and areas of disturbance would be reestablished after construction is complete, resulting in a **less-than-significant impact** on native plant communities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS

No special-status plant species were found during field surveys conducted in the footprint of these facilities. Therefore, construction within the Delevan Pipeline Discharge Facilities footprint would result in **no impact** on special-status plant species, when compared to the Existing Conditions/No Project/No Action Condition.

Summary of Alternative B Impacts on Vegetation Types

Construction, operation, and maintenance of Alternative B would result in the permanent loss of 15,508.3 acres, and the temporary disturbance of an additional 5,341.4 acres, of vegetation (Table 13-27).

**Table 13-27
Acres of Vegetation Subject to Alternative B Construction Impacts**

Vegetation Types	Acreage	
	Permanent Loss ^a	Temporary Disturbance ^b
Annual grassland	13,694.4	2079.4
Alkaline wetland	0.5	14.0
Blue oak woodland	478.6	353.5
Blue oak savanna	375.5	269.7
Blue oak/mixed chaparral	33.4	21.1
Canal	8.6	13.5
Chamise	0.6	1.9
Crops/agriculture	691.1	2,304.6
Fremont cottonwood riparian	1.4	0.0
Fresh emergent wetland	0.0	4.5
Mixed chaparral	0.8	1.8
Pond	22.4	226.4
Open water	0.1	0.0
Urban/disturbed	88.6	46.9
Valley foothill riparian	82.4	4.0
Valley oak riparian	26.4	0.1
Valley oak woodland	3.5	0.0
TOTAL^c	15,508.3	5,341.4

^aTotal permanent vegetation loss acreage includes the footprint of Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, GCID Main Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, TRR Pipeline Road, Delevan Pipeline Electrical Switchyard, and the Delevan Pipeline Discharge Facilities. Total permanent loss acreage also includes the estimated permanent loss from construction within the footprint of the Recreation Areas, within the construction disturbance area for the Road Relocations, and from construction of the overhead power line tower/pole footings associated with the Sites/Delevan Overhead Power Line.

^bTotal temporary disturbance acreage includes the footprint of the Recreation Areas (minus the acreage of estimated permanent loss) and the footprint of the existing Funks Reservoir, as well as the defined construction disturbance areas for the Road Relocations (minus the acreage of estimated permanent loss), Delevan and TRR pipelines, Holthouse to Tehama-Colusa Canal Pipeline, TRR to Funks Creek Pipeline, Sites/Delevan Overhead Power Line, and GCID Main Canal Facilities Modifications. Total temporary disturbance acreage also includes the estimated construction disturbance areas (outside of the footprints) for Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, GCID Main Canal Modifications, GCID Main Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, and Delevan Pipeline Discharge Facilities.

^cTotal acreage does not include acreage associated with the Project Buffer.

13.3.6 Impacts Associated with Alternative C

13.3.6.1 Extended Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative C, as they relate to native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**), would be the same as described for Alternative A for the Extended Study Area.

13.3.6.2 Secondary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative C operations on native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**) would be the same as described for Alternative A for Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, Thermalito Complex, Trinity River, Klamath River, Spring Creek, Clear Creek, Feather River, American River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, San Francisco Bay, and for the Sacramento River as it pertains to the construction, operation, and maintenance impacts associated with installing two pumps at the Red Bluff Pumping Plant.

Because Alternative C includes the three Project intake locations that were described for Alternative A, the operational impacts associated with Alternative C, as they relate to native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**), would be the same as described for Alternative A for Trinity Lake, Shasta Lake, Lake Oroville, Folsom Lake, Sacramento River, Sutter Bypass, and Yolo Bypass.

13.3.6.3 Primary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

Unless explicitly discussed below, impacts at all Project facilities within the proposed facility complexes are anticipated to be the same as those described for Alternative A.

The Sites/Delevan Overhead Power Line and Delevan Pipeline Intake/Discharge Facilities included in Alternative C are the same as described for Alternative A. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative, and would, therefore, result in the same construction, operation, and maintenance impacts on botanical resources as described for Alternative A.

The Alternative C design of the Sites Reservoir Inundation Area and Dams, Electrical Distribution Lines associated with the Recreation Areas, and Road Relocations and South Bridge are the same as described for Alternative B. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative, and would, therefore, result in the same construction, operation, and maintenance impacts as those described for Alternative B, as follows: native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**).

The boundary of the Project Buffer is the same for Alternatives A, B, and C, but because the footprints of some of the Project facilities that are included in the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, these differences in the size of the area included within the buffer would not change the type of construction, operation, and maintenance activities that were described for Alternative A.

Summary of Alternative C Impacts on Vegetation Types

Construction, operation, and maintenance of Alternative C would result in the permanent loss of 15,521.7 acres, and the temporary disturbance of an additional 5,257.6 acres, of vegetation (Table 13-28).

Table 13-28
Acres of Vegetation Types Subject to Alternative C Construction Impacts

Vegetation Type	Acreage	
	Permanent Loss ^a	Temporary Disturbance ^b
Annual grassland	13,694.7	2091.5
Alkaline wetland	0.5	14.0
Blue oak woodland	478.6	353.5
Blue oak savanna	375.5	269.7
Blue oak/mixed chaparral	33.4	21.1
Canal	9.1	14.1
Chamise	0.6	2.1
Crops/agriculture	700.0	2,307.7
Fremont cottonwood riparian	1.1	0.0
Fresh emergent wetland	0.0	4.5
Mixed chaparral	0.8	1.8
Pond	22.4	226.6
Open water	1.6	0.0
Urban/disturbed	90.8	46.9
Valley foothill riparian	82.6	4.0
Valley oak riparian	26.5	0.1
Valley oak woodland	3.5	0.0
TOTAL^c	15,521.7	5,357.6

^aTotal permanent vegetation loss acreage includes the footprint of Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, GCID Main Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, TRR Pipeline Road, Delevan Pipeline Electrical Switchyard, and the Delevan Pipeline Intake/Discharge Facilities. Total permanent loss acreage also includes the estimated permanent loss from construction within the footprint of the Recreation Areas, within the construction disturbance area for the Road Relocations, and from construction of the overhead power line tower/pole footings associated with the Sites/Delevan Overhead Power Line.

^bTotal temporary disturbance acreage includes the footprint of the Recreation Areas (minus the acreage of estimated permanent loss) and footprint of the existing Funks Reservoir, as well as the defined construction disturbance areas for the Road Relocations (minus the acreage of estimated permanent loss), Delevan and TRR pipelines, Holthouse to Tehama-Colusa Canal Pipeline, TRR to Funks Creek Pipeline, Sites/Delevan Overhead Power Line, and GCID Main Canal Facilities Modifications. Total temporary disturbance acreage also includes the estimated construction disturbance areas (outside of the footprints) for Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, GCID Main Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, and Delevan Pipeline Intake/Discharge Facilities.

^cTotal acreage does not include acreage associated with the Project Buffer.

13.3.7 Impacts Associated with Alternative D

13.3.7.1 Extended Study Area – Alternative D

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative D, as they relate to native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**), would be the same as described for Alternative A for the Extended Study Area.

13.3.7.2 Secondary Study Area – Alternative D

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative D operations on native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**), would be the same as described for Alternative A for Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, Lake Natoma, Thermalito Complex, Trinity River, Klamath River, Spring Creek, Clear Creek, Feather River, American River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, San Francisco Bay, and for the Sacramento River as it pertains to the construction, operation, and maintenance impacts associated with installing two pumps at the Red Bluff Pumping Plant.

Because Alternative D includes the three Project intake locations that were described for Alternative A, the operational impacts associated with Alternative D, as they relate to native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**), would be the same as described for Alternative A for Trinity Lake, Shasta Lake, Lake Oroville, Folsom Lake, Sacramento River, Sutter Bypass, and Yolo Bypass.

13.3.7.3 Primary Study Area – Alternative D

Construction, Operation, and Maintenance Impacts

- The vast majority of the Project facilities for Alternative D are the same as those that are included in Alternatives A, B, and C (see Table 3-1 in Chapter 3 Description of the Sites Reservoir Project Alternatives). These facilities would require the same construction methods and operation and maintenance activities and would, therefore, result in the same construction, operation, and maintenance impacts on botanical resources. Therefore, unless explicitly discussed below, Alternative D facilities have the same impacts that are described for Alternative A as they relate to native plant communities (**Impact Bot-1**), special-status plant species (**Impact Bot-2**), and noxious weed species (**Impact Bot-3**), as well as the potential effects from human disturbance (**Impact Bot-4**) or conflicts with conservation plans (**Impact Bot-5**). The following are Project facilities and impacts associated with Alternative D: Alternative D would include the development of only two recreation areas (Stone Corral Recreation Area and Peninsula Hills Recreation Area) instead of up to five recreation area that could be developed for each of the other alternatives. Alternative D would include a boat ramp on the western side of the reservoir where the existing Sites Lodoga Road would be inundated. Only two recreation areas under Alternative D is not expected to substantially change the potential impacts to vegetation communities shown in Table 13-28 under Alternative C, and subsequent botanical resources.

- Under Alternative D, the TRR would be slightly smaller (approximately 80 acres smaller for Alternative D); however, the smaller TRR is not expected to change the potential impacts related to botanical resources compared to Alternative C.
- For Alternative D, the Delevan Pipeline alignment would be approximately 50 to 150 feet south of the alignment presented for Alternatives A, B, and C. The Alternative D alignment takes advantage of existing easements to reduce impacts on local landowners. The shift in alignment is not expected to change the potential impacts to botanical resources.
- The boundary of the Project Buffer would be the same for all alternatives, but because the footprints of some of the Project facilities included in the Project Buffer would differ among the alternatives, the acreage of land within the Project Buffer would also differ. However, these differences in the size of the area included within the buffer would not change the type of construction, operation, and maintenance activities; therefore, Alternative D would have impacts similar to those described for all other alternatives.
- Alternative D includes a north-south alignment of the Delevan Overhead Power Line, rather than the east-west alignment between the TRR and the Delevan Intake/Discharge facility. Alternative D includes a proposed electrical substation west of Colusa in addition to the substation near the Holhouse Reservoir. The Alternative D north-south alignment of the Delevan Overhead Power Line and related substation are not anticipated to result in different impacts on botanical resources than those described for the east-west line alignment for the other alternatives. The north-south alignment would be approximately 1 mile longer. Potential impacts associated with the proposed Delevan Overhead Power Line to vegetation types are shown in Table 13-29. The primary areas of disturbance associated with the overhead power line would be limited to the placement of the tower/pole footings (estimated to be a total of approximately 5.0 acres). The overhead power line would span the majority of the 12-mile length, thus avoiding impacts to most botanical resources, including potential botanical resources associated with jurisdictional waters and wetlands. As such, there would be fewer impacts to botanical resources under Alternative D than impacts described for Alternatives A, B, and C.
- Under Alternative D, the Lurline Headwaters Recreation Area would not be constructed; therefore, the road segment providing access to that recreation area would not be required. Alternative D includes an additional 5.2 miles of roadway from Huffmaster Road to Leesville Road; otherwise, the design of the Sites Reservoir Inundation Area and Dams, and South Bridge would be the same as that under Alternative A and is not expected to change the potential impacts to vegetation communities shown in Table 13-28 under Alternative C.

Table 13-29

Acres of Vegetation Types Subject to Alternative D Construction Impacts from Delevan Overhead Power Line and Substation

Vegetation Type	Acreage*	
	Permanent Loss	Temporary Disturbance
Crops/agriculture	2.4	174
Urban/disturbed	0.4	29

*Estimated acreage based on Farmland Mapping and Monitoring Program (2014) and 2017 aerial/field review.

13.4 Mitigation Measures

It should be noted that all botanical resources (including those within potentially jurisdictional waters and wetlands) anticipated to be impacted by Project facilities shall be surveyed following USFWS, CDFW, and CNPS botanical survey protocols prior to construction.

Mitigation measures are provided in this section and summarized in Table 13-30 for the impacts that have been identified as potentially significant.

Table 13-30
Summary of Mitigation Measures for North-of-the-Delta Offstream Storage Project Impacts on Botanical Resources

Impact	Associated Project Facility	LOS before Mitigation	Mitigation Measure	LOS after Mitigation
Impact Bot-1: A Substantial Adverse Effect, Including Conversion to Non-native Vegetation, on any Riparian Habitat or Other Sensitive Natural Community Identified in Local or Regional Plans, Policies, Regulations, or by CDFW or USFWS, or any Native Plant Community Known to Be Rare, Unusual, or Becoming Uncommon in the Biogeographic Region of the Project				
Impact Bot-1a: Loss of Vegetation Community	Sites Reservoir and Dams, Salt Lake wetlands, construction disturbance area outside of the Sites Reservoir footprint; Recreation Areas; Road Relocations; Holthouse Reservoir Complex; Sites/Delevan Overhead Power Line; Delevan Pipeline; Delevan Pipeline Intake/Discharge Facilities; Project Buffer	Potentially Significant	Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE	Less than Significant
Impact Bot-1b: Annual Grassland (of higher botanical value)	Valley edges of Sites Reservoir and Dams, Salt Lake wetlands, staging area outside of Sites Reservoir footprint; Recreation Areas; Road Relocations; Holthouse Reservoir Complex swale area; Project Buffer	Potentially Significant	Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE	Less than Significant
	Holthouse Reservoir Complex	Potentially Significant	Mitigation Measure Bot-1b: Conduct Watershed Hydrological Studies	Less than Significant
Impact Bot-1c: Blue Oak Woodland (includes savanna and woodland with chaparral understory)	Valley edges of Sites Reservoir and Dams, Recreation Areas, Road Relocations; Project Buffer	Potentially Significant	Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE	Less than Significant

Impact	Associated Project Facility	LOS before Mitigation	Mitigation Measure	LOS after Mitigation
Impact Bot-1d: Riparian Vegetation	Sites Reservoir and Dams, Road Relocations, Holthouse Reservoir Complex, Sites/Delevan Overhead Power Line, Delevan Pipeline Intake/Discharge Facilities; Project Buffer	Potentially Significant	Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE	Less than Significant
Impact Bot-1e: Valley Oak Woodland	Sites Reservoir and Dams	Potentially Significant	Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE	Less than Significant
Impact Bot-1f: Alkaline Wetland	Holthouse Reservoir Complex	Potentially Significant	Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE Mitigation Measure Bot-1b: Conduct Groundwater Hydrological Studies	Less than Significant Less than Significant
Impact Bot-2: A Substantial Adverse Effect, Either Directly or Through Habitat Modifications, on Any Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS				
Impact Bot -2a Fed/1B-A: Special-status Plant Species: CNPS 1B and State- or Federally Listed Species	Sites Reservoir and Dams; Recreation Areas, Road Relocations; Project Buffer; Delevan Pipeline (managed alkaline wetland parcel); Sites/Delevan Overhead Power Line (unsurveyed grassland portion)	Potentially Significant	Mitigation Measure Bot 2: Conduct Pre-construction Surveys for special-status plants; if Found, Compensate According to USFWS, CDFW, and CNPS Guidelines	Less than Significant
Impact Bot-2b: Special-status Plant Species	Holthouse Reservoir Complex	Potentially Significant	Mitigation Measure Bot-1b: Conduct Groundwater Hydrological Studies	Less than Significant

Impact	Associated Project Facility	LOS before Mitigation	Mitigation Measure	LOS after Mitigation
Impact Bot-3: An Increase in the Potential for Invasion and Spread of Noxious Weeds				
Impact Bot-3: An Increase in the Potential for Invasion and Spread of Noxious Weeds	Sites Reservoir and Dams, Recreation Areas, Road Relocations, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard, Holthouse Reservoir Complex, Delevan Pipeline, TRR Pipeline, Sites/Delevan Overhead Power Line, Delevan Pipeline Intake/Discharge Facilities; Project Buffer	Potentially Significant	Mitigation Measure Bot-3a: Implement Preventive Actions by Following Weed Control BMPs; Minimize Exposed Ground; Reduce Weed Seed by Removal of Onsite and Offsite Weeds	Less than Significant
	Delevan Pipeline, Sites/Delevan Overhead Power Line	Potentially Significant	Mitigation Measure Bot-3b: Implement Avoidance Measures in Areas Adjacent to the Delevan National Wildlife Refuge	Less than Significant
Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance				
Impact Bot-4: Indirect Impacts on Native Plants from Human Disturbance	Recreation Areas, Road Relocations, Holthouse Reservoir Complex, Delevan Pipeline (near Delevan NWR), Project Buffer	Potentially Significant	Mitigation Measure Bot 2: Conduct Pre-construction Surveys for Special-Status Plants; if Found, Compensate According to USFWS, CDFW, and CNPS Guidelines	Less than Significant

Notes:

LOS = Level of Significance

USACE = U.S. Army Corps of Engineers

Mitigation Measure Bot-1a: Implement Compensatory Mitigation Measures for Vegetation Community Impacts in Coordination with USFWS, CDFW, CNPS, and USACE

Impacts to habitat types, and by extension, the corresponding vegetation types that would be adversely affected by the construction and operation/maintenance of the Project shall include mitigation for impacts on grassland that contains wetlands, is suitable habitat for special-status plant species, and/or contains native grass stands; impacts on blue oak woodlands, including savanna and woodlands with chaparral understory; impacts on riparian vegetation, including distinction between degraded/disturbed areas (e.g., Sites Reservoir) versus mature forest (e.g., Funks Creek at Holthouse Reservoir Complex and Delevan Pipeline Intake/Discharge Facilities); impacts on valley oak woodlands, taking into consideration the small and fragmented sites; and impacts on alkaline wetlands.

Restoration and compensatory mitigation for special status botanical resources impacted by the Project would include the following based on coordination and consultation with the USFWS, CDFW, CNPS, and USACE:

- A waters and wetland mitigation and monitoring plan (**Mitigation Measure Wet-1a**) shall be developed by a qualified biologist in coordination with USACE, Regional Water Quality Control Board, and USFWS that details mitigation and monitoring obligations for temporary and permanent impacts to waters and wetlands as a result of construction and operation activities. Appropriate mitigation ratios from 1:1 to 3:1 replacement shall be determined following USACE's 12501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios as well as USACE's Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines. The plan shall quantify the total acreage lost, describe mitigation ratios for lost habitat, annual success criteria, mitigation sites, monitoring and reporting requirements, and site specific plans to compensate for waters and wetland losses resulting from the Project.
- Purchase or dedication of land to provide botanical resources (including wetlands) preservation, restoration or creation as necessary depending on availability and suitability of on-site options. If restoration is available and feasible, then a ratio of at least 1:1 shall be used. If habitat needs to be created, at least a 1:1 ratio and up to 3:1 shall be implemented to offset losses. Where practical and feasible, on-site mitigation shall be implemented within adjacent areas that would not be inundated or impacted by the Project. Compensation ratios may be greater depending of quality, types and functions and values of the wetlands included in the preservation area.

In addition, a botanical natural community mitigation and monitoring plan shall be developed that outlines the specific mitigation and monitoring obligations including restoration, enhancement and preservation activities for those special status botanical resources not associated with jurisdictional waters or wetlands. The plan will include measures for transplanting, seed collection, enhancement and/or protection of known occurrences in nearby habitat. The plan will include specific success criteria and performance standards, monitoring and reporting requirements long term maintenance plans and a process for adaptive management. Unavoidable impacts to sensitive natural communities such as oak woodlands and riparian areas, would be mitigated at a 1:1 ratio for restoration and a minimum of 2:1 for enhancement or preservation. Final vegetation community compensatory mitigation ratios will be determined on the conditions of the mitigation sites and ecological value added as a result of restoration or enhancement of replacement vegetation communities and will be at a 1:1 ratio or greater depending on species and coordination with USFWS and CDFW and consistent with CNPS policy guidelines. The nature and amount of mitigation will adequately compensate for impacts to natural vegetation communities. Specific mitigation measures would include:

- On-site and off-site restoration, enhancement and preservation of oak woodland habitat.
- Reseeding of temporarily disturbed areas with appropriate native grass and wildflower seed mixes.

Mitigation Measure Bot-1b: Conduct Watershed Hydrological Studies

Hydrological studies to determine how much of the grassy upland acts as a watershed for the alkaline wetland swale that feeds the downstream alkaline marsh shall be conducted. The studies shall provide guidance regarding how to avoid impacts on the grasslands that direct water to the marsh. In the event the studies indicate that the Project would result on unavoidable impacts to the alkaline marsh hydrology, the Authority shall initiate a monitoring program to determine the effect of the altered hydrology on the

marsh vegetation community. The monitoring plan will include collection of pre-project (baseline conditions) on plant species diversity and abundance (cover). Post project, the alkaline marsh vegetation will be monitored for a minimum of 5 years to assess whether or not the Project has resulted in an impact. In the event the monitoring indicated that the altered hydrology is resulting in adverse impacts to the alkaline marsh, compensatory mitigation including restoration, enhancement and/or preservation of alkaline marsh habitat will be implemented in accordance with **Mitigation Measure Wet-2b** which includes the conservation, enhancement, restoration and/or creation of alkaline wetlands.

Mitigation Measure Bot-2: Conduct Pre-construction Surveys for Special-status Plants; if Found, Compensate According to USFWS, CDFW, and CNPS Guidelines

Prior to construction surveys will be completed following USFWS, CDFW, and CNPS special-status plant survey guidelines and protocols and the location, extent, and size of the occurrences provided to CDFW and USFWS. To the extent possible, occurrences of special-status plant species will be avoided. Exclusion fencing and signage will be installed around all special-status plant occurrences near work areas to prevent accidental intrusion into sensitive areas. If impacts to special status botanical resources are unavoidable, compensatory mitigation proposed as part of **Mitigation Measure Bot-1a** will be implemented.

Mitigation Measure Bot-3a: Implement Preventive Actions by Following Weed Control BMPs; Minimize Exposed Ground; Reduce Weed Seed by Removal of On-site and Off-site Weeds

The potential for introduction of new weed seeds into the construction disturbance area or transport of weed seeds between construction disturbance areas shall be preparing a weed control plan to mitigate for potential Project construction and operation/maintenance impacts. The weed control plan shall include the following:

- During Project preconstruction and construction, all erosion control materials shall be weed-free rice straw
- During Project preconstruction and construction, vehicles and all equipment shall be washed (including wheels and undercarriages) before entering project sites to avoid the potential for weed seed transport across habitat types and agricultural areas.
- All plant materials used during restoration shall be native (to the extent possible) and certified weed-free
- On-site weeds within or adjacent to areas to be disturbed shall be removed as practicable prior to construction
- Weed control treatments shall incorporate all legally permitted herbicide, manual, and mechanical methods in compliance with all State and federal laws and regulations and in coordination with Glenn and Colusa counties

The potential spread of noxious weeds shall also be minimized by limiting the exposed ground within the construction disturbance area that is available for weed colonization or spread by mulching with weed-free materials or planting the exposed ground with native cover crops local to the Project area.

Mitigation Measure Bot-3b: Implement Avoidance Measures in Areas Adjacent to the Delevan National Wildlife Refuge

During construction of the Delevan Pipeline and associated facilities, potential impacts to the Delevan National Wildlife refuge shall be minimized by avoiding the placement of large staging areas within the portion of the construction disturbance area that borders the Delevan NWR. A minimum of a 100-foot buffer will be established between large staging areas and the NWR to the extent practicable.

13.4.1 Significance of Impacts with Implementation of Mitigation Measures

Implementation of **Mitigation Measures Bot-1a, Bot-1b, Bot-1c, Bot-2, Bot-3a, and Bot-3b** would reduce the level of significance of Project impacts on botanical resources to **less than significant**.

This page intentionally left blank.