

15. Wetlands and Other Waters

15.1 Introduction

This chapter provides a description of the wetlands and other waters for the Extended, Secondary, and Primary study areas. Descriptions and maps of these three study areas are provided in Chapter 1 Introduction. The U.S. Army Corps of Engineers (USACE) defines *Wetlands* as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. *Other waters*, as defined by the USACE, include all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide.¹ Waters of the state include any surface water or groundwater, including saline waters, within the boundaries of the state.² Certain water features such as lakes and streams are also regulated by the State under Section 1600 of the California Fish and Game Code.

Permits and authorizations for wetlands and other waters are presented in Chapter 4 Environmental Compliance and Permit Summary. The regulatory setting for wetlands and other waters 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. Project-related impacts to the water quality in wetlands or waters are described in Chapter 7 Surface Water Quality.

15.2 Environmental Setting/Affected Environment

15.2.1 Extended Study Area

15.2.1.1 Methodology

This section describes the Extended Study Area with respect to jurisdictional waters pursuant to the Clean Water Act Section 404, including wetlands and other waters of the U.S. as well as waters of the state pursuant to the Porter-Cologne Water Quality Control Act and Section 1600 of the Fish and Game Code. In the Extended Study Area, Central Valley Project (CVP) and State Water Project (SWP) water deliveries are made to urban users, agricultural users, to refuges and to San Luis Reservoir. Only San Luis Reservoir and refuges are described for the Extended Study Area, because no wetlands or other waters would be involved in water deliveries to urban or agricultural lands.

Information describing existing wetland or waters resources for San Luis Reservoir is based on research conducted for the Bay Delta Conservation Plan.

¹ For more detail regarding the definition of waters, the reader is referred to the program definitions document at http://water.epa.gov/lawsregs/lawsguidance/cwa/wetlands/regs_index.cfm.

² Waters of the state are defined in Chapter 2 § 13050 of the Porter-Cologne Water Quality Act.

To describe the extent of wetlands and other waters potentially affected in wildlife refuges, GIS was used to examine the 11 selected Wildlife Refuges and Wildlife Areas for the National Wetland Inventory (NWI) (U.S. Fish and Wildlife Service [USFWS], 1999) perennial wetlands they contain. Using the ArcView 9.3 GIS program (ESRI, 2010), polygons were obtained for perennial wetland areas within outlines of wildlife refuges receiving SWP water deliveries (Figure 1-4 in Chapter 1 Introduction). Acreages of the resulting areas were calculated using GIS to provide an estimate of wetlands and other waters that could potentially receive alternate sources of water supply if one of the alternatives is implemented. Categories of NWI wetland types selected were all freshwater non-tidally influenced wet areas: Palustrine – all categories; Riverine – Lower Perennial/Emergent, Intermittent-Streambed/Vegetated, and Unconsolidated Shore/Vegetated categories.

15.2.1.2 Wetlands and Waters

San Luis Reservoir

The existing acreage, capacity, water levels, and extent of fluctuation of San Luis Reservoir are described in Chapter 6 Surface Water Resources. San Luis Reservoir’s drawdown zone fluctuates between 45 and 90 vertical feet. Within this drawdown zone, temporary narrow strips of herbaceous, often weedy, wetland vegetation or riparian wetland vegetation, such as willow scrub, become established for part of the year in temporary narrow bands and fragmented patches. Where rivers or streams enter the reservoir, more established riparian wetland patches can be found adjacent to the stream.

Wildlife Refuges

The approximate extents of various types of wetlands that exist in the 11 selected National Wildlife Refuges (NWR) and Wildlife Areas (WA) are listed in Table 15-1. Acres of other waters (ponds, lakes, and streams as identified in the NWI) that receive water deliveries within the 12 selected NWRs and WAs are listed in Table 15-1. The “Riverine” portions may or may not receive additional water. The “Other” category represents wetland types that are undefined by the NWI.

Table 15-1
Potentially Affected Wetlands and Other Waters in the Extended Study Area
(National Wetlands Inventory Types)

Wildlife Refuge/Area	Freshwater Emergent Wetland (acres)	Freshwater Forested/ Shrub Wetland (acres)	Fresh-water Pond (acres)	Lake (acres)	Other (acres)	Riverine (acres)	Totals for All Wetland Types (acres)
Sacramento NWR	7,318.4	26.8	153.9	303.0	0	0	7,802.1
Delevan NWR	2,631.5	6.0	70.0	44.8	0	0	2,752.3
China Island Unit/Salt Slough Unit of the North Grasslands WA	589.5	130.4	73.0		31.2	127.5	951.7
West Bear Creek Unit of the San Luis NWR Complex	810.1	126.3	6.8	0	39.4	36.0	1,018.7
Grasslands Water District	39,221.6	293.2	1,889.6	693.8	88.0	82.6	42,268.9

Wildlife Refuge/Area	Freshwater Emergent Wetland (acres)	Freshwater Forested/ Shrub Wetland (acres)	Fresh-water Pond (acres)	Lake (acres)	Other (acres)	Riverine (acres)	Totals for All Wetland Types (acres)
Volta WA	2,549.7	0	13.3	100.5	0	47.8	2,711.4
Merced Unit of the Merced NWR	2,265.3	11.2	5.2			98.1	2,379.7
Los Banos WA	3,064.7	26.2	94.8	179.8	0	49.3	3,415.0
Mendota WA	7,662.1	127.0	0	0	12.1	181.5	7,982.7
Pixley NWR	53.5	0	0	616.0	45.1	0	714.6
Kern NWR	8,514.4	242.9	0	1,323.1	125.0	0.5	1,0205.9
Totals for All Refuges	74,680.9	990.2	2,306.6	3,261.1	340.8	623.4	82,203.0

Source of wetland types: USFWS, 1999.

15.2.2 Secondary Study Area

15.2.2.1 Methodology

For this discussion, jurisdictional waters whose flows, quantity, seasonality, or quality may be affected by Project operations include only the main stems of the Sacramento, Trinity, American, and Feather rivers, plus Clear Creek near Shasta Lake. The following facilities would also be potentially affected: Trinity Lake, Lewiston Lake, Klamath River downstream of the Trinity River, Whiskeytown Lake, Shasta Lake, Spring Creek, Keswick Reservoir, Lake Oroville, Thermalito Complex, Folsom Lake, Lake Natoma, Suisun Bay, Sacramento-San Joaquin Delta (and its wetlands), San Pablo Bay and San Francisco Bay.

The Yolo and Sutter bypasses are also considered as “other waters,” even though they are farmed part of the year, due to their hydrological connection with the Sacramento River system. Waters in the Secondary Study Area were quantified by measuring the length (in miles) of the centerline of each river’s main channel, or areas (in acres) of lakes or reservoirs, using GIS software (ESRI, 2006). Acreages for the Suisun Bay and Marsh were obtained from the Delta Atlas (California Department of Water Resources [DWR], 1995) and from the DWR geodetic branch for the Legal Delta. Acreages for San Pablo and San Francisco bays were estimated using the measuring tool in the ArcView 9.3 GIS program (ESRI, 2010) on the map of the Secondary Study Area.

15.2.2.2 Wetlands and Waters

The above-listed potentially affected waters in the Secondary Study Area include both rivers that drain mountain and foothill areas, and the lakes or reservoirs that feed or regulate the creeks and rivers. The Sacramento River conveys water from these areas down the center of the Sacramento Valley and into the Delta at its confluence with the San Joaquin River. The Colusa Basin Drain, a natural drainage feature that parallels the Sacramento River on the west side, intercepts west-side tributaries and agricultural runoff between Stony Creek and Colusa. All west-side tributary streams to the Sacramento River between Red Bluff and Colusa, with the exception of Stony Creek, are intermittent.

Although the area drained by the Sacramento River contains ponds and several kinds of wetlands (including seasonal wetlands, alkaline wetlands, vernal pools, and emergent wetlands), these wetlands are

located in upland landscapes and are not hydrologically connected to the main channel of the Sacramento River. The exceptions are small areas of emergent wetland in some of the Sacramento River's off-channel habitats, such as oxbows or cutoffs, in the Red Bluff-to-Colusa reach.

Emergent wetlands usually remain wet throughout the year. They contain vegetation that is rooted under water and stems that emerge above the surface. Typical species include cattails and bulrush. Emergent wetlands are not common along the smaller drainages, but do occur occasionally along drainage canals, larger streams, and pond edges. Extensive wetlands, mostly within tidal influence, occur in the Delta and Suisun Marsh around the north edge of Suisun Bay.

For potentially affected waterways, the flow, hydrograph, diversions, impoundments, main tributaries, pattern of riparian vegetation, and any adjacent wetland areas are described in Chapter 6 Surface Water Resources, Chapter 7 Surface Water Quality, and Chapter 8 Fluvial Geomorphology and Riparian Habitat.

The extent of potentially affected streams and waterways are represented by length in miles of the main channel in Table 15-2; the extent of lakes and reservoirs are represented by acres in Table 15-3; and the extent of wetlands in acres in Table 15-4.

Table 15-2
Potentially Affected Waters in the Secondary Study Area: Rivers and Streams

River or Creek	Miles	Notes
Sacramento River	278.7	Downstream of Shasta Lake
Trinity River	121.3	Between Spring Creek Tunnel and Klamath River confluence
Clear Creek	16.1	Reach between Sacramento River and Whiskeytown Lake
Spring Creek	0.7	Downstream of tunnel (measured from Google Earth)
American River	23.3	Downstream of Folsom Lake
Feather River	66.7	Downstream of Lake Oroville
Sutter Bypass	37.4	
Yolo Bypass	42.0	
Colusa Basin Drain	51.2	Includes Colusa Basin Trough
Total	636.7	

Source: ESRI, 2006, unless otherwise noted.

Table 15-3
Potentially Affected Waters in the Secondary Study Area: Lakes and Reservoirs

Lake or Reservoir	Acres	Notes
Trinity Lake	15,972.7	Upper part of Claire Engle Lake
Lewiston Lake	715.3	Lower part of Claire Engle Lake
Whiskeytown Lake	3,106.7	
Shasta Lake and Keswick Reservoir	27,847.3	
Lake Oroville	15,394.6	Above dam only
Thermalito Complex	4,399.6	Forebay + afterbay
Folsom Lake	11,062.3	Above dam only
Lake Natoma	484.9	
Suisun Bay	30,000.0	Open waters only; source: DWR, 1995
Sacramento-San Joaquin Legal Delta	737,500.0	Source: Castro, 2010, pers. comm.
San Pablo Bay	57,600	
San Francisco Bay	256,000	
Total	1,051,130	

Source: ESRI, 2006 unless otherwise noted.

Table 15-4
Potentially Affected Waters in the Secondary Study Area: Wetlands

Wetland area	Acres	Notes
Suisun Marsh	52,000	Managed wetlands
Suisun Marsh	6,300	Unmanaged tidal wetlands
Total	58,300	

Note:

Acres for Legal Delta, Table 15-3, also include some wetlands

Source: DWR, 1995.

15.2.3 Primary Study Area

15.2.3.1 Methodology

Wetlands and other waters were evaluated within the Sites Reservoir Inundation Area during 1998 and 1999 (DWR, 2000). Wetlands and other waters within Project facility locations such as the Recreation Areas, Road Relocations, Funks Reservoir, and the Delevan Pipeline were evaluated during 2001 and 2002 (DWR, 2005). Project facilities proposed after 2005 were evaluated during 2010 (Eastside Road Extension) and 2011 (Delevan Pipeline Intake/Discharge Facilities and Holthouse Reservoir Complex). Potential wetland features were initially mapped using GIS, based in part on interpretation of aerial photography flown in 1997 for this Project (scale: 1:12,000). Preliminary wetland assessments were then made by a field review of hydrologic conditions, plant species composition, and soil characteristics, pursuant to U.S. Army Corps of Engineers (USACE) 1987 guidance (Environmental Laboratory, 1987). All potential wetlands were field-mapped using GPS and assigned to a wetland feature type; wetland acreages were then calculated using ArcView 3.2 and ArcGIS 9.3 software (ESRI, 2001; 2010). For all Project facilities locations, the jurisdictional status of the wetlands has not been determined or verified by the USACE. One exception is the Glenn-Colusa Irrigation District (GCID) Canal facilities, which are not

evaluated in this chapter because Project-related modifications would occur within the confines of existing canal facility structures.

Other waters include ponds, small reservoirs, and tributaries. Other waters were first identified and measured using aerial photography, then field-verified where feasible. Acreages were calculated using GIS and Excel. Tributaries were classified by two general width categories (less than 15 feet wide, greater than 15 feet wide) in the Sites Reservoir footprint (DWR, 2000). Due to changes in measurement guidelines, four width categories (0 to 5, 5 to 10, 10 to 15, and greater than 15 feet wide) were evaluated at all other Project facility locations (DWR, 2005). Agricultural canals and ditches visible on aerial imagery were included in the inventory of existing tributary features, but were not field-verified as to extent of wetland vegetation occurring within the ditch or canal, whether flows were seasonal or perennial, or whether the canal had a direct hydrological connection with a natural stream. Total potential impacts, particularly with respect to feature length are conservative and would need to be delineated and evaluated as part of Project implementation.

Although the extent of the wetland/other waters surveys conducted within the Sites Reservoir Inundation Area overlaps with portions of the Project Buffer, most of the area within the buffer has not yet been inventoried for waters or wetlands. Wetlands and other waters lying outside of Project facility footprints, but within the Project Buffer, were evaluated at a general level only, using 2009 National Agriculture Imagery Program aerial imagery and GIS. Results of field surveys or GIS inventories, which had already been conducted on much of the land within this buffer as part of Project surveys, were used to describe and evaluate wetlands and other waters within the buffer. A survey of this Project component for wetlands and other waters would be conducted prior to Project construction.

15.2.3.2 Wetlands and Waters

Table 15-5 shows presence or absence of wetland features and other waters in the parts of the Primary Study Area that would be occupied by the footprints of the Project facilities, as well as the Delevan Pipeline construction disturbance area. The affected areas are described below. Acres of wetlands and other waters in the Primary Study Area are shown in Table 15-6.

Sites Reservoir Inundation Area, Dams, Recreation Areas, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Tunnel from Sites Pumping/Generating Plant to Site Reservoir Inlet/Outlet Structure, Sites Electrical Switchyard, and Field Office Maintenance Yard

The Sites Reservoir Inundation Area (approximately 14,000 acres) includes most of the Antelope Valley and the drainages of Antelope Creek, Stone Corral Creek, and Funks Creek. All streams within the reservoir footprint and within the proposed roads and recreation areas are ephemeral with little or no flow from June through October. These streams, and especially their smaller tributaries, may rise rapidly with significant rainfall events; however, they may also dry out between events and remain dry for long periods during the winter months.

**Table 15-5
Presence of Wetlands and Other Waters at Each Proposed Project Facility^a**

Project Facility	Wetland Type					Other Waters. Type						Notes
	Alkaline	Emergent	Riparian	Seasonal	Vernal Pool	Pond	Streams 0-5 Feet Wide	Streams 5-10 Feet Wide	Streams 10-15 Feet Wide	Streams < 15 Feet Wide	Streams > 15 Feet Wide	
Sites Reservoir and Dams	X	X	X	X	X	X	X	X	X	X	X	
Recreation Areas and Distribution Lines				X		X	X	X				
Road Relocations and South Bridge	X	X		X	X	X	X	X	X		X	
Sites Electrical Switchyard							X					
Tunnel from Sites Pumping/Generating Plant to Sites Inlet/Outlet Structure							X	X				
Sites Reservoir Inlet/Outlet Structure and Sites Pumping/Generating Plant						X	X	X	X		X	
Field Office Maintenance Yard								X				
Holthouse Reservoir Complex	X		X					X	X		X	
GCID Main Canal Facilities Modifications												Modifications to occur within existing canal only
GCID Main Canal Connection to the TRR												
TRR							X	X	X		X	Canals
TRR Pumping/Generating Plant												
TRR Electrical Switchyard												
TRR Pipeline and TRR Pipeline Road												Canals
Delevan Overhead Power Line ^b	X				X	X	X	X	X		X	Canals
Delevan Pipeline	X				X	X	X	X	X		X	Canals
Delevan Pipeline Electrical Switchyard												
Delevan Pipeline Intake/Discharge Facilities							X				X	Sacramento River plus Canal
Project Buffer ^c	X		X	X	X	X	X	X	X		X	

^aProposed Project Facility includes the facility footprints of the Project facilities, as well as the Delevan Pipeline construction disturbance area.

^bOverhead power line corridors and impacts vary between Alternative D and all other alternatives; Alternative D would not impact wetlands or waters.

^cThe Project Buffer does not include facility footprints, but may overlap with portions of construction disturbance areas.

Note:

TRR = terminal regulating reservoir

**Table 15-6
Acre Summary of Wetlands and Other Waters in the Primary Study Area**

	Acres												
	Wetland Type						Other Waters Type						
	Alkaline ^a	Emergent	Riparian	Seasonal	Vernal Pool	TOTAL WETLAND ACRES	Pond ^b	Streams 0-5 Feet Wide	Streams 5-10 Feet Wide	Streams 10-15 Feet Wide	Streams <15 Feet Wide (Reservoir only)	Streams >15 Feet Wide (all Project facilities)	TOTAL OTHER WATERS
TOTAL ACRES for Primary Study Area (Project facility footprints) and subject to potential impacts^c	36.54	2.41	25	182.41	5.81	252.17	29.66	5.87	15.09	13.28	77	116.32	227.56

^a20 acres of Alkaline wetlands include at least 19.5 acres that are adjacent to the footprint rather than within, but would be subject to indirect impacts; 0.5 acre is within footprint.

^bIncludes 6.1 acres for Salt Lake; all remaining ponds are stock ponds.

^cTotal acreage does not include acreage associated with the Project Buffer, which has not been surveyed or mapped.

Note:

Primary Study Area is defined as the non-overlapping set of largest Project facility footprints, except for the Delevan Pipeline, which also includes a wider construction disturbance area, and the Holthouse Reservoir Complex, where alkaline wetlands include the area adjacent to as well as within the footprint.

The majority of the Sites Reservoir Inundation Area is used for livestock production. The vegetation consists mostly of non-native annual grasslands with sporadic riparian species along the banks of the creeks and drainages. Several large valley oaks and cottonwoods occur along Antelope Creek, with willows scattered along the smaller drainages. Most of the banks of the creeks are heavily degraded by cattle trampling and trails. Smaller drainages have little to no wetland species associated with them and contain annual weedy species up to the ordinary high water mark. Approximately 148 miles of drainages (including Antelope, Grapevine, Stone Corral, Lurline and Funks creeks) occur within the Sites Reservoir Inundation Area. Sixteen acres of small stock ponds occur on drainages throughout the area.

Approximately 153 acres of seasonal wetlands occur throughout the reservoir inundation area. Most are dry by early summer and are associated with low-lying areas of clay or clay loam soils. A small amount of alkaline wetlands, vernal pools, and emergent wetlands also occur within the proposed reservoir inundation area, including Salt Lake.

Golden Gate Dam would be located on Funks Creek and Sites Dam on Stone Corral Creek. Both are active creek channels cutting through steep hillslopes with no other streams or wetlands. The Sites Inlet/Outlet Structure, Pumping/Generating Plant, Tunnel, Electrical Switchyard, Asphalt Batch Plant, and Field Office Maintenance Yard, as well as a 1,000-acre construction disturbance area for all of these Project facilities, would be located in the rolling annual grassland east of the reservoir footprint. In this heavily grazed area, a few intermittent streams drain into Funks Creek as it winds through the area just west of existing Funks Reservoir. No other streams, vernal pools or other wetlands occur in this grassland except for scattered disturbed agricultural ponds.

Proposed recreation areas are mostly sited along hilltops and hillsides above the proposed reservoir inundation area. These areas are mostly dominated by various upland vegetation types, such as grasslands and oak savannas. However, all have several drainages that traverse the areas with sporadic riparian and wetland features. Lurline Creek and its associated small wetlands are located along the Lurline Headwaters Recreation Area access road. Some of the proposed distribution line routes serving the recreation areas cross intermittent streams and, in the case of the Saddle Dam Recreation Area, traverse through areas with vernal pools and other seasonal wetlands.

Wetlands and other waters coinciding with proposed road relocations vary by route segment. Several road segments are located mostly in annual grasslands, but similar to the proposed recreation area distribution lines, cross numerous ephemeral drainages and occasional small seasonal wetlands.

Holthouse Reservoir Complex

The 228-acre existing Funks Reservoir is bounded primarily by annual grasslands composed of mostly weedy non-native species. Very few trees or wetlands occur along the water's edge. Approximately 5 acres of seasonal wetlands occur along drainages above the reservoir water's edge. One vernal pool occurs in the grasslands near the upstream end of the reservoir, although it supports very few native vernal pool plant species. The portion of Funks Creek immediately upstream of the reservoir supports a thin line of riparian and other associated trees, and very small patches of wetland vegetation within its bed. In addition, Funks Creek supports an approximately 0.7-acre area of riparian habitat downstream of the existing dam.

The approximately 365-acre area proposed for the Holthouse Reservoir Complex is composed mostly of annual grassland and agricultural fields. A 13-acre Alkaline Seasonal Wetland complex is located adjacent to and southeast of the Holthouse facilities. The source of water for the wetland complex appears

to be seeps located at its southern edge, as well as runoff from both the nearby orchard to the east and the adjacent agricultural land to the north. Underlying soils are predominantly Hillgate and Capay clays and clay loams, with lesser amounts of Corval, Altamont, and other clay soils (Natural Resources Conservation Service, 1999), which have a very slow infiltration rate, and high water retention capacity typical of clays. Funks Creek flows through the northern third of this area and supports a thin swath of riparian vegetation, including large trees, along its 0.9-mile length, as well as a 1.7-acre area of riparian wetland in its bed near the outlet downstream of the Funks Reservoir Dam.

GCID Main Canal Facilities Modifications

This Project facility consists of modifications to the GCID Main Canal facilities that are contained completely within the existing canal structures. Because this Project component would not generate any ground disturbance or effects on any wetlands or other waters, it will not be discussed further in this chapter.

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

The 218-acre footprint for this reservoir and associated facilities is located east of the GCID Main Canal in an area occupied entirely by agricultural fields, mostly rice. The footprints of these facilities cross no streams and contain no wetlands; the only waterways located in this area are agricultural canals.

Delevan Pipeline, Sites/Delevan Overhead Power Line, Terminal Regulating Reservoir Pipeline, and Delevan Pipeline Electrical Switchyard

The proposed Delevan Pipeline and associated Sites/Delevan Overhead Power Line routes are located primarily within the valley floor and bordered by agricultural fields for most of their length. Approximately 2.7 miles west of the Sacramento River, the pipeline/overhead power line route would cross the Colusa Basin Drain, a large canal that collects agricultural field irrigation water and water intercepted from small streams west of the Sacramento River, conveying it southward to its terminus at the Sacramento River in northeastern Yolo County. The pipeline/overhead power line route would also cross a 14-acre site of disturbed alkaline wetlands approximately 3 miles west of the Sacramento River. The Delevan NWR is located immediately south of the proposed pipeline/overhead power line route. The wildlife refuge contains several wetlands and ponds. Numerous canals occur adjacent to or intersect the proposed pipeline/overhead power line route. Associated with these canals are adjacent wet areas, wetland vegetation, and some riparian vegetation. Several of these drainages follow historic natural stream channels.

Toward its west end, the pipeline and overhead power line routes would diverge. The Delevan Pipeline would cross the GCID Main Canal at the southwest corner of the proposed TRR, and would terminate at the Tehama-Colusa Canal (within the proposed Holthouse Reservoir). The TRR Pipeline would parallel the Delevan Pipeline between these two canals, and the Delevan Pipeline Electrical Switchyard would be located within this section of the pipeline route. Lands between these two canals contain agricultural fields and previously tilled annual grassland. The Delevan Sites/Overhead Power Line route would continue west across both of the canals and would terminate at the proposed Sites Electrical Switchyard and Sites Pumping/Generating Plant. Lands along this portion of the route contain agricultural fields and previously tilled annual grassland, with a small area of alkaline/saline soils.

The Delevan Overhead Power Line associated with Alternative D would run north from a new substation near the town of Colusa, adjacent to and in parallel with the existing PG&E 65-kV lines along SR 45 to the proposed intake/discharge facility on the Sacramento River. Lands within the proposed overhead power line alignment contain agricultural land (orchards and row crops) and urban/residential uses. Small agricultural drainages lie adjacent to SR 45, with a limited number of drainages crossing the highway through culverts.

Delevan Pipeline Intake/Discharge Facilities

The proposed intake/discharge facility site is located east of SR 45, along the bank of the Sacramento River at approximately RM 158.5. The proposed intake/discharge facilities would encompass an approximately 19-acre area, mostly on the land side of the river levee, with a small strip on the water side. The proposed discharge facility would occupy a small fraction of the same area, when compared to the proposed intake facility. A few riparian trees, such as valley oaks, Fremont cottonwoods, and black walnuts, occur at the site between the levee and the river's edge. Emergent wetland vegetation occurs in one shallow area along the riverbank. Large tracts of mature mixed riparian growth occur upstream and downstream; however, the area where the new intake and discharge facilities would be located consists mostly of agricultural land (orchards) in the area west of the levee. The intake facility would extend out into the Sacramento River 40 feet and would occupy a small portion of the river's 400- to 500-foot width at this location. The discharge facility would not extend into the river.

Project Buffer

The Project Buffer surrounds all Project facilities, with the exception of the Delevan Pipeline, Delevan Sites/Overhead Power Line, and portions of the roads. Numerous ephemeral streams draining into the Sites Reservoir footprint are located within the Project Buffer, especially in the hills above the western side and south end of the reservoir. Within the Project Buffer are also scattered stock ponds and, off the reservoir's northeast edges, portions of the seasonal wetland complexes typical of that part of the Primary Study Area. The Project Buffer also includes smaller segments surrounding the TRR and associated facilities, and the Delevan Pipeline Intake/Discharge Facilities at the Sacramento River. Waters within the Project Buffer at both of the latter sites consist only of agricultural canals, except for a short stretch of river edge at the Delevan Pipeline Intake/Discharge Facilities.

Sacramento River

Between Red Bluff and Hamilton City, the Sacramento River meanders within a broad floodplain; whereas, from Hamilton City to Colusa, the river meanders between setback levees on both sides. Upstream of Hamilton City, the river is fed by numerous tributary streams; Stony Creek is the only major tributary downstream.

Historically, this reach supported a wide corridor of riparian forest, with valley oaks on the higher terraces. Today, it is estimated that only 5 to 10 percent of California's original riparian forest remains (Riparian Habitat Joint Venture, 2011). Along the Sacramento River, approximately 11 percent of the original riparian forest and valley oak woodland remain (Sacramento River Conservation Area Forum, 2003). Vegetation consists of large to small patches of willow scrub, cottonwood riparian forest, mixed riparian forest, valley oak riparian forest, and woodland. Marsh and emergent wetlands occur sporadically along sloughs and backwaters. Much of the adjacent lands that historically supported large areas of permanent or seasonal wetlands have been converted to agriculture. Small tributaries are mostly channelized and drain into larger canals, such as the Colusa Basin Drain.

Other Local Creeks and Water Bodies

Funks Creek

Funks Creek originates at approximately 850 feet elevation in blue oak savanna in the foothills west of Antelope Valley. It flows southeast as an intermittent natural stream, where it is joined by Grapevine Creek. As it flows through the foothills and Antelope Valley, its banks are generally eroded to near-vertical slopes, the gravel bed is highly disturbed and compacted by cattle, and it is bordered by annual grassland vegetation. Little to no riparian vegetation occurs throughout much of this reach, although occasional cottonwoods, willows, or non-native species occur along the banks.

Along the north end of Antelope Valley, Funks Creek receives underground drainage from Salt Lake. Salt Lake is a 28-acre area of impounded water and seasonal alkaline wetlands formed by warm salt springs that occur upslope.

As Funks Creek cuts through the Golden Gate gap and enters the west side of the Sacramento Valley, the stream channel becomes wider, although flows are still intermittent. The banks and channel have occasional groupings of riparian trees and shrubs. Occasional wetlands occur, mainly small patches of emergent wetland or stock ponds. Approximately one mile downstream of the Golden Gate gap, Funks Creek is impounded by Funks Reservoir. This reservoir is fed mainly from waters of the Tehama-Colusa Canal. Downstream of the reservoir, Funks Creek is bordered by agricultural lands, and much of this reach is channelized before emptying into Stone Corral Creek. The banks are bordered by levee roads and sparsely vegetated with non-native weedy species. Occasional native or non-native riparian trees and shrubs occur along the bank, as well as small patches of emergent wetland vegetation. This portion of Funks Creek likely has some flow year round due to leakage from the dam at Funks Reservoir. A large wetland area, fed by waters from agricultural canals and Funks Creek, occurs upstream of the confluence of Funks Creek and Stone Corral Creek.

Stone Corral Creek

Stone Corral Creek originates at approximately 700 feet elevation in the foothills west of Antelope Valley. As the intermittent stream flows into the grasslands of Antelope Valley, the channel is narrow and the banks are eroded to near-vertical slopes. Willows and small wetlands occur sporadically along this section of the creek. The much larger Antelope Creek flows into Stone Corral Creek from the south near the town of Sites. As Stone Corral Creek flows through the gap in the foothills and into the western Sacramento Valley, riparian vegetation increases for a few miles downstream of the community of Sites. Native species as well as non-native species, occur along the banks.

Other Local Streams

Grapevine Creek runs along a valley west of the proposed Sites Reservoir and is a tributary to Funks Creek. It has fairly well-developed, but sporadic, riparian vegetation along its entire length. Valley elderberries are common in some areas. It is fed by numerous small ephemeral drainages.

Antelope Creek flows from the south through Antelope Valley and merges with Stone Corral Creek near the town of Sites. It is fed by numerous intermittent drainages and supports sporadic short stretches of riparian vegetation consisting of large valley oaks, Fremont cottonwoods, willows, and valley elderberries. The largest concentration of riparian habitat in the proposed reservoir occurs along Antelope Creek in the southern portion of the reservoir footprint.

Lurline Creek originates in the hills east of Antelope Valley. A small amount of seasonal wetlands and ponds occur within the basin where it originates. Narrow strips of mature willow riparian occur along stretches of the creek as it flows through the low grassy foothills.

15.3 Environmental Impacts/Environmental Consequences

15.3.1 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 biological resources:

Would the Project:

- Have a substantial adverse effect on federal and/or state protected wetlands as defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

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. For the purposes of this analysis, an alternative would result in a potentially significant impact to wetlands and other waters if it would result in any of the following:

- A substantial change in the use or quality (extent in acres or miles) of “other waters” (including but not limited to lakes, rivers or streams tributary to navigable rivers, natural ponds) through direct removal, filling, obstruction, hydrological interruption, or other means. A substantial effect (potentially significant impact) would be permanent impacts to any streams, including canals or ditches that are determined by USACE to be jurisdictional waters or jurisdictional waters of the state.
- A substantial adverse effect on federally protected wetlands, as defined by Section 404 of the Clean Water Act and/or waters of the state as defined by the Porter-Cologne Water Quality Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, discharge of pollutants, or other means. A substantial effect (potentially significant impact) would be any permanent adverse impact to any wetland.

Level of significance for flow-related impacts to wetlands and other waters was determined by comparing modeling results for different scenarios of the proposed operation of the alternatives (Appendix 6B Water Resources System Modeling and Chapter 6 Surface Water Resources). Project-related changes that would result in substantial changes to the flow regime outside the range of historical variation were considered potentially significant.

It should also be noted that any “no impact” statements in this chapter are subject to USACE and the Regional Water Quality Control Board (RWQCB) jurisdictional determinations. A conservative approach to the identification of potentially jurisdictional determinations was taken to account for potential impacts to jurisdictional waters and wetlands. Total potential impacts, particularly with respect to feature length are conservative and would need to be delineated and evaluated as part of Project implementation.

Impacts to riparian vegetation are evaluated in Chapter 13 Botanical Resources.

15.3.2 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 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.

15.3.2.1 Assumptions

The following assumptions were made regarding Project-related construction, operation, and maintenance impacts to wetlands and other waters:

- 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 existing bays 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 intake location (i.e., Red Bluff Pumping Plant).
- 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 incremental 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 would be located within the Sites Reservoir footprint or outside the Primary Study Area from offsite sources.
- Frequent Sites Reservoir water level fluctuations would create a barren draw-down zone.

15.3.2.2 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 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.

The methodology used to determine the extents of wetlands and other waters potentially affected in the Extended Study Area, the extent of jurisdictional waters whose flows, quantity, seasonality, or quality may be affected by Project operations in the Secondary Study Area, and the extent of wetlands and other waters within the Primary Study Area is described in Sections 15.2.1.1, 15.2.2.1, and 15.2.3.1, respectively.

The wetland resources impact assessment 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 wetland, water, and 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 2030 (82-year simulation period). Detailed discussion of the CALSIM II model results are provided in Appendix 6B Water Resources System Modeling. Further, in assessing the impacts on the riparian vegetation and jurisdictional waters 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 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 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.

Within the Primary Study Area, the footprints of Project facilities were compared to the existing extents of wetlands and other waters to determine direct impacts, as well as indirect impacts to immediately adjacent wetlands and other waters.

15.3.3 Topics Eliminated from Further Analytical Consideration

Because the effects of population growth associated with the No Project/No Action Alternative would be addressed in the agricultural, municipal, and industrial water use discussions, and those issues are not relevant to jurisdictional waters and wetlands, population growth is not addressed.

The effects of operation and maintenance activities on wetlands and other waters within the Primary Study Area are not discussed for wetlands or other waters that would experience permanent loss as a result of construction activities and/or inundation.

15.3.4 Impacts Associated with Alternative A

15.3.4.1 Extended Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Wildlife Refuge Water Use

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

To meet the established requirement to supply the target of 555,515 acre-feet of water to the wildlife refuges, pursuant to the Central Valley Project Improvement Act, the refuges would be supplying the same amount of water to their wetlands regardless of the Project operations. Therefore, there would be **no impact** on waters, when compared to the Existing Conditions/No Project/No Action Condition within the wildlife refuges from differences in the source of their water supply as a result of Project operations.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

As indicated in the **Impact Wet-1** discussion, the wildlife refuges would be supplying the same amount of water to their wetlands regardless of the Project operations. Therefore, the perennial wetland resources in the 11 potentially affected wildlife refuges and wildlife areas would experience **no impact** on federally

protected wetlands, when compared to the Existing Conditions/No Project/No Action Condition, from differences in the source of their water supply as a result of Project operations.

San Luis Reservoir

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Project operational modeling indicates that Project operations would result in larger and more frequent fluctuations in water levels in San Luis Reservoir, in certain types of water years. This effect would slightly exceed the existing height or extent of the draw-down zone at San Luis Reservoir in some very dry years. Because the fluctuations would remain very close to the historic range of variability, and because operating the Project would not introduce pollutants, fill material, or obstructions to this water body, the impact of Project operations on the San Luis Reservoir is considered **less than significant**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federally or State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Although small wetlands occur at some seeps in drainages feeding San Luis Reservoir, these small wetlands in the drawdown zone have their own water sources and are independent of water levels in the reservoir. Therefore, **no impact** to wetlands would occur as a result of the increased San Luis Reservoir fluctuations associated with the Project, when compared to the Existing Conditions/No Project/No Action Condition.

15.3.4.2 Secondary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Trinity Lake, Lewiston Lake, Trinity River, Klamath River Downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex, Feather River, Sutter Bypass, Yolo Bypass, Folsom Lake, Lake Natoma, and American River

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Project operational modeling in all of the above waters indicates that Project operations would not result in water levels higher or lower than historic levels. For lakes and reservoirs, Project operations would cause no discernible differences in water levels, mostly reducing the extent of fluctuation extremes. For rivers in general, a total of 668 miles of rivers downstream of dams would be potentially affected; however, this impact would be **less than significant**, when compared to the Existing Conditions/No Project/No Action Condition. For the Feather and American rivers in particular, Project operation would have the indirect effect of dampening the extremes of flows to make the rivers’ flows more closely

resemble natural conditions, correlating with local hydrological conditions. Because water levels would remain within historic ranges of variation, and would have a steadying effect on the artificially fluctuating water levels that occur during Existing Conditions, the impact of the Project operation on all of the above waters would be **less than significant**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Refer to the **Impact Wet-1** discussion. Due to the minimal fluctuations in flows expected in the above-listed waters with implementation of Alternative A, there would be a **less-than-significant impact** on jurisdictional wetlands present at those locations, when compared to the Existing Conditions/No Project/No Action Condition.

Sacramento River

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Project operational modeling using the Sacramento River Ecological Flow tool (SacEFT) (Appendix 8B Sacramento River Ecological Flows Tool) indicates that Project operations would indirectly result in changes in river flows downstream of the GCID Main Canal, Red Bluff Pumping Plant, and proposed Delevan Pipeline intakes for Sites Reservoir. However, the changes would be slight when compared to the Existing Conditions. There would be no change in the frequency or severity of flood event flows. These slight changes in flows would represent a **less-than-significant impact** on the Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Pump Installation at the Red Bluff Pumping Plant

The construction activities associated with installing two pumps at the Red Bluff Pumping Plant, and their operation and maintenance, would not affect levels of waters other than the Sacramento River immediately downstream of the pumping plant. Transportation of necessary equipment to install the pump (including a crane) would occur along existing construction or access roads. Dewatering of the afterbay would likely be required, and could occur during regularly scheduled maintenance periods or during the non-irrigation season. Therefore, construction and maintenance is not expected to involve any disturbance that would result in a loss or alteration of the river environment. Operations of the pump would increase the rate of diversion from the river by up to 250 cubic feet per second (cfs). An increase of such a small amount is not expected to affect the aquatic environment downstream of the diversion adversely. Therefore, the modification of the existing flow regime resulting from the operation of two additional pumps at the Red Bluff Pumping Plant would have a **less-than-significant impact** on Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not

Limited to, Marsh, Vernal Pool, Coastal)) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Refer to the **Impact Wet-1** discussion. Minimal fluctuations in flows are expected in the Sacramento River with implementation of Alternative A from the installation, operation, and maintenance of two pumps at the existing Red Bluff Pumping Plant. Because changes in flows would be minimal, there would be a **less-than-significant impact** on jurisdictional wetlands present along the edges of the river (most likely in backwater or slough locations), when compared to the Existing Conditions/No Project/No Action Condition.

Sacramento-San Joaquin Delta and Suisun Bay

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Project operational modeling indicates that Project operations would increase the flow through the Delta in summer and fall, and in very dry years. This change in flow is not contrary to the Biological Opinion for delta smelt. Therefore, there would be a **less-than-significant impact** on the Delta, when compared to the Existing Conditions/No Project/No Action Condition.

In December and January, Project operations would result in a reduction in flows through the Delta, which would result in a 1- to 2-kilometer westward movement of the salinity/freshwater edge line, or “X2,” increasing salinity in Suisun Bay in early spring. This shift would be located substantially to the west of the mandated standard location of X2, and would fall within the historical range of species tolerance. Similarly, modeling indicates that the diversions associated with the Project would substantially increase electrical conductivity (EC) (which is a measure of changes in salinity) in the Suisun Marsh in December. However, this would occur when EC is at its lowest annual level, and this increase would fall within the historical range of species tolerance. Modeling also indicates an improvement in salinity conditions in August through October, and increased inflows into the Delta during critically dry years. Because the salinity changes would be within historic ranges of variation, there would be a **less-than-significant impact** on Delta-Suisun Bay, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Refer to the **Impact Wet-1** discussion. Because alterations in flows and salinities expected in the Delta-Suisun Bay with implementation of Alternative A would be within the historical range of species tolerance in winter, and actually improved during Dry conditions, there would be a **less-than-significant impact** from Alternative A on jurisdictional wetlands present in the Delta and Suisun Marsh, when compared to the Existing Conditions/No Project/No Action Condition.

San Pablo Bay and San Francisco Bay

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds,

Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Project operational modeling indicates that the effect of Project operations would not reach as far as San Pablo or San Francisco Bay, and would, therefore, result in **no impact** on these waters, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Refer to the **Impact Wet-1** discussion.

15.3.4.3 Primary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

An evaluation of the potential construction, operation, and maintenance impacts to wetlands and other waters resulting from implementation of Alternative A is discussed below.

Sites Reservoir Inundation Area and Sites Dams

Ground disturbance associated with dam construction, as well as inundation of the 1.3-million-acre-foot (MAF) Sites Reservoir, would have a permanent adverse impact on existing wetlands and other waters due to removal and replacement by standing water, sterile subsoil, or permanent facilities. The acres of wetlands or other that would be affected by the 1.3-MAF Sites Reservoir and its associated dams are listed in Table 15-7. Ponds are considered separately from wetlands or tributary streams.

**Table 15-7
Direct Loss of Wetlands and Other Waters Due to the Construction of the 1.3-MAF Sites Reservoir
Inundation Area and Dams**

Wetland or Other Waters Type	Number of Acres Affected	Number of Miles Affected^a
Alkaline	19.2	N/A
Emergent	2.4	N/A
Riparian	21.5	N/A
Seasonal	153.1	N/A
Vernal pool	4.3	N/A
Total Wetlands	200.6	N/A
Tributaries 0 to 15 Feet Wide (smaller tributaries)	77.0	123.0
Tributaries > 15 Feet Wide (major tributaries)	82.0	25.0
Stock Ponds	20.2	N/A
Salt Lake Pond	6.1	N/A
Total Other Waters	185.3	148.0

^aOnly streams are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

During construction of the dams, a cofferdam would be installed upstream of the Sites and Golden Gate dam sites around the dams’ construction work areas to retain storm flows entering the reservoir basin from Funks Creek and Stone Corral Creek. Funks Creek flows would not be maintained between the Golden Gate dam site and the existing Funks Reservoir during the construction period. The reach of Funks Creek that would be temporarily dewatered during construction would be approximately 1.4 miles long. However, Funks Creek flows would be maintained downstream of Funks Reservoir during the entire construction period. Therefore, the temporary dewatering of Funks Creek upstream of Funks Reservoir would be a **less-than-significant impact** on waters, when compared to the Existing Conditions/No Project/No Action Condition.

Diverted Funks Creek flows would pass through a pipe at the Sites Dam site and would continue downstream into Stone Corral Creek. Construction of the dams, as well as the filling of Sites Reservoir, would result in the direct permanent loss of a total of 148 miles (159 acres) of streams, consisting of 25 miles (82 acres) of major tributaries, and 123 miles (77 acres) of smaller tributaries (Table 15-7) (DWR, 2000). Major tributaries are considered to be stream reaches more than 15 feet in width; minor tributaries are less than 15 feet wide. Most of the streams are associated with Antelope, Grapevine, Funks, and Stone Corral creeks. The streams are mostly very minor ephemeral drainages, and the more major tributaries are also quite disturbed. However, the loss of these streams, especially the 82 acres of major tributaries, would be considered a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

During operation, releases from Sites and Golden Gate dams would maintain flows of up to 10 cfs from October through May in Stone Corral and Funks creeks, respectively, to mimic the ephemeral nature of these streams. Because these flows would be maintained close to natural levels, the impact to waters would be **less than significant**.

Periodic maintenance activities, and debris and vegetation removal from the dam embankments, could result in temporary increases in sedimentation or organic matter in downstream Stone Corral and Funks creeks. However, best management practices (BMPs) should minimize this effect, resulting in a **less-than-significant impact** on waters.

Stock Ponds

The permanent loss of 28 small stock ponds (20.2 acres) due to construction and filling of Sites Reservoir would result in a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Seasonal Wetlands

Construction and operation of the 1.3-MAF reservoir would result in the permanent loss of 153.1 acres of seasonal wetlands through initial inundation and repeated water level fluctuations (Table 15-7). These 97 wetlands are mostly small areas associated with low-lying swales, valley bottoms, or shallow drainages, especially in clay-dominated soils. More than half of these wetlands are smaller than 1 acre; 29 are between one and 5 acres, and 8 are larger than 5 acres. Seasonal wetlands lost to inundation also include nearly 12 acres associated with Salt Lake; some of these may be at least partially saline. Because the wetlands of the western edge of the Sacramento Valley are already much reduced in number, the loss of these potentially jurisdictional seasonal wetlands (especially because they include some partly alkaline or saline features) would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Alkaline Wetlands and Salt Lake Pond

Construction and inundation of a 1.3-MAF Sites Reservoir would result in the permanent direct loss of 19.2 acres of alkaline wetlands, all associated with the 6-acre saline spring-fed Salt Lake impoundment. These seasonal wetlands are separate from the 12 acres of seasonal (non-alkaline) wetlands discussed above. More than 15 acres are located in the same drainage as Salt Lake (directly upstream or downstream), and four additional acres of alkaline wetland are located in the adjacent drainage to the east. This unique habitat includes muds so high in mineral salts that no vegetation becomes established; salt- and alkali-tolerant species are supported in narrow strips around its edges. The saline/alkaline wetland surrounding Salt Lake represents the single largest wetland within the Sites Reservoir footprint. No alkaline wetlands were mapped in any other portions of the reservoir footprint. Although historically abundant in the western edges of the Sacramento Valley, the alkaline (or saline/alkaline) wetland type is no longer common in the Project region due to extensive conversion of land to large-scale agricultural fields. Loss of the Salt Lake pond (6 acres) and alkaline wetland complex (19 acres), totaling 25 acres, would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Vernal Pools

If Alternative A is implemented, the construction and inundation of Sites Reservoir would also permanently destroy 4.3 acres of vernal pools, many of which are either artificially created impoundments or highly disturbed/degraded by long-term heavy grazing. These 16 vernal pools are distributed throughout the reservoir footprint in Antelope Valley. The largest pool (more than 1.3 acres) is associated with Salt Lake. The remaining features are all smaller than 1 acre. Most of the vernal pools within the reservoir footprint are highly degraded. However, because vernal pools of the western edge of the Sacramento Valley are already much reduced in number, the loss of these vernal pools within the Sites Reservoir Inundation Area (especially because they include some partly alkaline or saline features) would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Emergent Wetlands

Approximately 2.4 acres of emergent wetlands would be permanently lost through construction and inundation of Sites Reservoir if Alternative A is implemented. These wetlands consist of two areas impounded by Peterson Road in the north part of the reservoir footprint; one (1.6 acres) is spring-fed. Although these features are small and disturbed by cattle, such wetlands are sensitive features and part of

a large swale complex draining the coast range foothills, and their loss would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Riparian Wetlands

A total of 21.5 acres of riparian wetlands were mapped and identified within the reservoir footprint for Alternative A. These riparian wetlands would be permanently lost through construction and filling of Sites Reservoir. Most of these 15 mapped areas are 1 acre or smaller, and consist of sparse riparian vegetation within disturbed intermittent stream channels. However, the loss of these riparian wetlands due to construction and inundation could be considered a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Recreation Areas

Because the exact location and area affected by construction of the recreation area are not currently known, total loss of existing ponds and other waters from recreation area footprints has approximated. The maximum acres of wetlands or other waters that may be affected within each recreation area are listed in Table 15-8. This loss represents the maximum acreage; the actual direct loss of waters would likely be less, and most of the impacts would be indirect.

Table 15-8
Direct Loss of Wetlands and Other Waters
Due to the Construction of the Recreation Areas

Wetland or Other Waters of the U.S. Type	Number of Acres/Miles Lost by Recreation Area					All Recreation Areas
	Saddle Dam	Peninsula Hills	Stone Corral	Antelope Island	Lurline Headwaters	
Seasonal Wetlands	13.30 acres	0	0	0	0	13.30 acres
Total Wetlands	13.30 acres	0	0	0	0	13.30 acres
Tributaries 0 to 5 Feet Wide	0.72 acre/ 2.91 miles	0.99 acre/ 3.82 miles	0.78 acre/ 2.25 miles	0.03 acre/ 0.15 mile	0.22 acre/ 0.97 mile	2.74 acres/ 10.1 miles
Tributaries 5 to 10 Feet Wide	0.22 acre/ 0.34 mile	0.02 acre/ 0.03 mile	0	0	0	0.24 acre/ 0.37 mile
Tributaries > 15 Feet Wide	0	0	0	0	0	0
Total Other Waters	0.94 acre/ 3.25 miles	1.01 acres/ 3.85 miles	0.78 acre/ 2.25 miles	0.03 acre/ 0.15 mile	0.22 acre/ 0.97 mile	2.98 acres/ 10.47 miles
Total Ponds	1.24 acres	0	0	0	0.04 acre	1.28 acres

Indirect impacts to wetlands or other waters could include siltation, erosion, and habitat degradation due to mechanical disturbance from incidental or accidental off-road driving, foot traffic, and other disturbance by visitors and their pets that could occur during Project operation and maintenance.

Impacts to waters from the distribution lines that would serve the recreation areas would all be temporary impacts of disturbance during the construction period only, with very small areas permanently occupied by the poles during Project operation.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of "Other Waters," (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds,

Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

Approximately 3 acres (10.5 miles) of streams could be permanently lost or permanently degraded by construction and operation of the five recreation areas. These waters consist mostly of numerous short sections of intermittent small natural tributaries (mostly less than 5 feet in width) in all five areas. No streams greater than 10 feet wide would be lost or affected. In some recreation areas, the majority of these small stream segments are located at upper ends of very steep drainage channels that are very unlikely to be included in facility development. However, in the Stone Corral Recreation Area, some tributaries to Stone Corral Creek are on gentler slopes and could be directly affected. This is also true of the several tributaries to Funks Creek in the Peninsula Hills Recreation Area and some of the tributaries to Hunters Creek in the Saddle Dam Recreation Area. The streams in the Saddle Dam Recreation Area connect the many seasonal wetlands in that vicinity. In addition, because headwaters are involved in almost every case, all of the streams are vulnerable to impacts of erosion and siltation due to construction and other upslope human activities that would occur in the recreation areas during Project operation and maintenance. Despite the ephemeral nature of most of these streams, loss or adverse effects to streams within the recreation areas would be considered a substantial effect on waters. The combined length of more than ten miles, and the connection of several streams with wetland features, mostly in the Saddle Dam Recreation Area, would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

The corridor for the distribution lines that would serve the recreation areas would cross 0.06 acre (0.11 mile) of streams, which could result in minor temporary impacts during construction and potential direct impacts from placement of electrical poles. However, poles could be placed to avoid these stream crossings. Operation of these distribution lines would be an unmanned activity and have no associated on-the-ground disturbance. Maintenance activities, including equipment inspections and vegetation maintenance, could also be performed to avoid any effects to these stream crossings. Due to the minor extent of streams that could be affected and the ease of avoiding the streams, this would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Ponds

Approximately 1.2 acres of ponds (a total of five ponds) could be destroyed or substantially disturbed by construction of three of the recreation areas. Indirect disturbance from recreational use during Project operation, as well as from maintenance activities, including road grading and vegetation control, could also occur. All are stock ponds that are smaller than 1 acre and vary in the amount of emergent or other wetland vegetation they support. Most have little to no vegetation because they are very disturbed by cattle trampling. No ponds would be affected by construction within the corridors of the distribution lines that would serve any of the recreation areas. Direct loss, disturbance during construction, or indirect disturbance from operation and maintenance activities, of 1.2 acres of stock ponds would constitute **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not

Limited to, Marsh, Vernal Pool, Coastal)) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Seasonal Wetlands

Approximately 13 acres of seasonal wetlands could be permanently lost or otherwise affected by construction, operation, and maintenance of the recreation facilities within the Saddle Dam Recreation Area. This acreage includes approximately 0.2 acre of seasonal wetlands within the north end of the construction disturbance area for the electrical distribution line that would serve this recreation area. Although not mapped as alkaline wetlands, these seasonally wet areas are at or near the headwaters of some of the watersheds feeding off-site alkaline wetlands. It is possible that some of the wetlands in the Saddle Dam Recreation Area could support alkaline wetland species, and these habitats could be lost or affected by construction, operation, or maintenance activities in this area. Although a portion of these 13 acres would probably not be affected or may be subjected to only temporary or short-term impacts during construction, it is expected that they would be lost or adversely affected by use of recreational facilities during operation or during maintenance activities, including road grading and vegetation control. Because seasonal wetlands are potentially jurisdictional wetlands, their loss or disturbance would be a **potentially significant impact** to wetlands, when compared to the Existing Conditions/No Project/No Action Condition.

Road Relocations and South Bridge

The Road Relocations and South Bridge would include portions of the existing Huffmaster, 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 (Figure 3-1 in Chapter 3 Description of the Sites Reservoir Project Alternatives).

The 200-foot-wide construction buffer includes the surface areas of paved roads, gravel roads, the associated shoulders and cut-and-fill slopes, and some additional area. Both sides of the roads are proposed to be fenced. Because exact locations of construction-related activities are not known, construction of the roads is expected to result in direct permanent loss of existing waters within the entire construction disturbance area. An unknown portion of these impacts would actually be temporary if the waters were avoided or restored after construction. However, once a stream is severely disturbed or impacted, its hydrology may be permanently altered, resulting in a permanent impact even if the feature still exists after construction. The maximum extent (in acres and miles) of wetlands or other waters that would be affected by construction of the Road Relocations and South Bridge is shown in Table 15-9.

Table 15-9
Direct Loss of Wetlands and Other Waters Due to the Construction of
the Road Relocations and South Bridge

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost^a
Alkaline Wetlands	1.14	N/A
Emergent Wetlands	0.04	N/A
Seasonal Wetlands	4.21	N/A
Vernal Pools	0.03	N/A
Total Wetlands	5.42	N/A
Tributaries 0 to 5 Feet Wide	2.05	6.0
Tributaries 5 to 10 Feet Wide	4.02	4.44
Tributaries 10 to 15 Feet Wide	1.15	0.80
Tributaries > 15 Feet Wide	2.22	0.58
Ponds	0.48	N/A
Total Other Waters	9.92	11.8

^aOnly streams are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

A total of more than 9.4 acres (11.8 miles) of streams could suffer permanent adverse impacts from road construction. These streams consist mostly of numerous short sections of intermittent small tributaries (many smaller than 5 feet in width) in all road segments, with substantial additions from some larger stream crossings in a few segments. The largest potential impacts to other waters are the crossings by Eastside Road, where it would cross Funks Creek (>15 feet wide) and its tributaries. One Funks Creek tributary crossing in this segment, and another in the Stone Corral Road segment, support riparian trees. The next largest losses of streams are the crossings of creeks that are 5 to 10 feet wide by Saddle Dam Road and Lurline Road. Streams crossed by Saddle Dam Road (the North Road segment) are tributaries to Hunters Creek, and streams crossed by Lurline Road (the Huffmaster Road to Lurline Road segment) are tributaries to Antelope or Lurline creeks off the southeast end of the reservoir. Although most stream crossings would be very small, the collective loss of these streams would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Vehicle use associated with operation of the roads would be confined to the defined road and shoulder areas due to continuous roadside fencing and/or guardrails. Therefore, operation of the roads would be expected to result in a **less-than-significant impact** on waters.

Disturbance from maintenance activities, such as road repair, embankment erosion repair, and vegetation control, could result in increased sedimentation and organic matter entering adjacent streams. However, BMPs should minimize this effect, resulting in a **less-than-significant impact** on waters.

Ponds

Construction of the Road Relocations and South Bridge could also result in the direct loss of nearly 0.5 acre of ponds, in locations between Golden Gate Dam and Funks Reservoir, and along the Lurline Road to the Communication Tower segment of Com Road, off the southeast edge of the Sites Reservoir footprint. One small pond would also be intersected by the construction disturbance area of the Road 69 segment, east of Eastside Road. Indirect disturbance could also occur during operation or maintenance of the roads. No other ponds would be crossed by any other segment of the roads. These ponds are all very small stock ponds, artificially created (dammed) and disturbed, with minimal associated vegetation, except for some vegetation associated with the pond at the head of Lurline Road. Their loss or disturbance would constitute a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Seasonal Wetlands

If Alternative A is implemented, approximately 4.2 acres of seasonal wetlands could be permanently lost or otherwise impacted by construction of the Road Relocations and South Bridge and the associated cut and fill areas. More than 1 acre would be lost within the Saddle Dam Road, and approximately 2 acres along Road 69 approaching its intersection with Saddle Dam Road. Composed of four separate crossings, these wetlands are located approximately 1 to 2 miles directly north of the Salt Lake complex of alkaline wetland features. Although not mapped as alkaline wetlands, the wetlands intersected by these road segments are at or near headwaters of some of the watersheds feeding alkaline wetlands off the northeast edge of the Sites Reservoir footprint. It is possible that some of the seasonal wetlands crossed by the Saddle Dam Road and intersected by the Road 69 widening could support alkaline wetland species, and portions of these habitats could be lost or affected by construction in this area. Approximately 0.8 acre of seasonal wetlands would also be permanently lost due to construction of the Sulphur Gap Road (Maxwell Sites Road to Lurline Road segment) portion of the route. Indirect disturbance could also occur during operation or maintenance of the roads. No mapped seasonal wetlands would be lost or directly affected in any of the other parts of the road relocations. Although seasonal wetlands can be considered jurisdictional features, these small wetlands can be easily avoided by relocation of the route, so their loss is unlikely and would be a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Alkaline Wetlands

If Alternative A is implemented, construction of the Road Relocations and South Bridge could result in the direct loss of approximately 1.14 acres of alkaline wetlands along Road 69 at the Tehama-Colusa Canal to Saddle Dam Road segment of the North Road, located northeast of the Sites Reservoir footprint. At this location, the construction disturbance area overlaps with closely adjacent seasonal and alkaline wetlands and has high potential for impacts to these wetlands. Indirect disturbance could also occur during operation or maintenance of the roads. No other alkaline wetlands are crossed by other segments of the Road Relocations and South Bridge. In this part of the Sacramento Valley, remnant alkaline wetlands have mostly disappeared due to agriculture, so loss of any remaining alkaline wetlands would be

a potentially substantial adverse effect; however, because these features are relatively easily avoided by rerouting the road corridor, their loss is unlikely and would be a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Vernal Pools

If Alternative A is implemented, construction of the Road Relocations and South Bridge could also result in the direct loss of 0.03 acre of vernal pools along the North Road (Road 69 at the Tehama-Colusa Canal to Saddle Dam Road segment), located northeast of the Sites Reservoir footprint. This small acreage would result from an overlap of the construction disturbance area with a series of ten small vernal pools ranging from 12 to 20 feet in diameter. Indirect disturbance could also occur during operation or maintenance of the roads. No other vernal pools would be crossed by other segments of the Road Relocations and South Bridge. Because these five small vernal pools represent half of all the vernal pool features mapped in this part of the Primary Study Area, and vernal pools are a sensitive resource, loss of or impact to these vernal pools near Road 69 would be a potentially substantial adverse effect; however, because these features are relatively easily avoided by rerouting the road corridor, their loss is unlikely and would be a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Emergent Wetlands

Alternative A construction of the Road Relocations and South Bridge could result in the direct loss of 0.04 acre of emergent wetlands along the North Road (Road 69 at the Tehama-Colusa Canal to Saddle Dam Road segment), located northeast of the Sites Reservoir footprint. This small acreage would result from an overlap of the construction disturbance area with a stream channel aligned south of Road 69, approximately 0.5 mile west of the Tehama-Colusa Canal. This 390-foot-long emergent wetland is in a stream channel and is therefore also a riparian wetland. It is associated with other waters. Indirect disturbance could also occur during operation or maintenance of the roads. Its loss or disturbance resulting from road construction would be a potentially substantial adverse effect; however, because these features are relatively easily avoided by rerouting the road corridor, their loss is unlikely and would be a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

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

The Sites Reservoir Inlet/Outlet Structure and four adjacent facilities would be located between Logan Ridge (location of the dams) and Funks Reservoir. The footprints of these facilities represent the area of permanent disturbance; temporary disturbance would also occur within the construction disturbance area. Because exact locations of construction-related activities are not known, construction of the Inlet/Outlet facility group is expected to result in the direct permanent loss of existing waters within the entire combined footprint. A portion of these impacts would be temporary if the wetland or waters were avoided or restored after construction. However, once a wetland or stream is severely disturbed or impacted, its hydrology may be permanently altered, resulting in permanent impact even if the feature still exists after construction. The acres of each type of waters that would be lost or adversely affected within the Sites Inlet/Outlet facility group footprint are summarized in Table 15-10. No wetlands exist at the Sites Inlet/Outlet facility group location. The construction disturbance area for this facilities group lies within

the approximately 1,000-acre construction disturbance area for the Sites Reservoir/dam facilities. Construction-related ground disturbance for the Inlet/Outlet structure facilities occurring in this construction disturbance area would be temporary, and disturbed areas would be returned to their original condition following completion of construction.

Table 15-10
Direct Loss of Wetlands and Other Waters Due to the Construction of the Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Tunnel from Sites Pumping/Generating Plant to Sites Reservoir Inlet/Outlet Structure, and Field Office Maintenance Yard

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost ^a
Seasonal Wetlands	0	N/A
Total Wetlands	0	N/A
Tributaries 0 to 5 Feet Wide	0.31	0.61
Tributaries 5 to 10 Feet Wide	0.58	0.49
Tributaries 10 to 15 Feet Wide	0	0
Tributaries > 15 Feet Wide	0.53	0.08
Ponds	0.20	N/A
Total Other Waters	1.62	1.19

^aOnly streams are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

If Alternative A is implemented, approximately 1.4 acres (1.2 miles) of streams could experience permanent adverse impacts from the construction of these facilities. Some of these streams consist of sections of intermittent small tributaries that are smaller than 5 feet in width within the Field Office Maintenance Yard footprint. However, crossings of Funks Creek and its tributaries by the Sites Reservoir Inlet/Outlet Structure account for larger areas of impact to waters, because these streams are 15 feet or larger in width. The largest potential impacts to other waters would be the crossings at the center of the Inlet/Outlet Structure, where the facility would cross Funks Creek (greater than 50 feet wide). One Funks Creek tributary crossing in this segment supports riparian trees. The Inlet/Outlet Structure would also cross the northwest end of Funks Reservoir, which is from 60 to 130 feet wide and accounts for approximately 1.3 acres of waters. Although the acreage of disturbed streams is small, the permanent disturbance to Funks Creek during construction of the Sites Reservoir Inlet/Outlet Structure would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Ponds

Construction of the Outlet concrete and excavation components of the Sites Reservoir Inlet/Outlet Structure facility group would result in the direct loss of approximately 0.2 acre of one pond, located west of Funks Reservoir. This pond is a stock pond, artificially created (dammed) as part of the nearby

ranching operation, very disturbed, and devoid of associated vegetation. Its loss or disturbance would have a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

No wetlands occur within the footprint of these facilities. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Holthouse Reservoir Complex

The Holthouse Reservoir Complex includes the existing Funks Reservoir, the proposed Holthouse Reservoir, and these connected facilities: the dam, spillway and stilling basin, pumping plant, Tehama-Colusa Canal discharge dissipater, Funks bypass pipeline, and discharge pipeline to the Tehama-Colusa Canal. The footprints of these facilities represent the ground area they would occupy once built plus the temporary disturbance area within the construction disturbance area of the Holthouse to Tehama-Colusa Canal discharge pipeline. The construction disturbance area for the remainder of the Holthouse Reservoir facilities is expected to be located within adjacent agricultural land. Construction of the proposed facilities within the Holthouse Reservoir Complex would result in the direct permanent loss of wetlands or other waters within the entire combined footprint. The number of acres of each type of other waters that would be lost or adversely affected within the Holthouse Reservoir Complex proposed footprint is summarized in Table 15-11.

**Table 15-11
Direct Loss of Wetlands and Other Waters Due to the Construction of
the Holthouse Reservoir Complex^a**

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost^b
Alkaline Wetlands	Direct: 0.5 Possible Indirect: 13.0 to 40.0	N/A
Total Wetlands	Direct: 0.5 Possible Indirect: 13.0 to 40.0	N/A
Tributaries 0 to 5 Feet Wide	0	0
Tributaries 5 to 10 Feet Wide	0.30	0.29
Tributaries 10 to 15 Feet Wide	0.46	0.26
Tributaries > 15 Feet Wide	5.04	0.87
Total Other Waters	5.8	1.4

^aAcres of existing Funks Reservoir not included.

^bOnly streams are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

A total of 5.6 acres (1.4 miles) of tributaries would be permanently lost through construction of these facilities and inundation of Holthouse Reservoir. Some of these streams (1 acre, 0.6 mile) consist of agricultural ditches (between 8 and 32 feet wide) that traverse the agricultural areas between the Tehama-Colusa Canal and north of Funks Creek within the Holthouse Reservoir and Dam footprints. Loss of these ditches, which were dug through upland areas to irrigate nearby fields, would constitute **no impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition. However, inundation of Funks Creek by the Holthouse Reservoir and Dam accounts for more substantial areas of impact to waters, because Funks Creek downstream of the existing dam outlet ranges from 40 to 120 feet, or more, in width. One of the largest potential impacts to other waters is the inundation of the 2-acre riparian area supported by Funks Creek downstream of the existing dam outlet, where Funks Creek averages more than 80 feet wide. The remaining length (approximately 0.8 mile or 5 acres) of the Funks Creek channel supports a narrow strip of mature riparian trees that would be lost to construction of these facilities. The permanent loss to this stretch of Funks Creek waters resulting from construction and inundation would be a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Funks Reservoir

The proposed dredging of the existing Funks Reservoir would involve draining the reservoir for 2 years. This dredging would represent special maintenance to return the facility to original design capacity, which is beyond the annual maintenance that is already conducted. The 2-year drainage and dredging would be temporary, but may be considered a hydrological interruption, which would be a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

After dredging activities are complete, Funks Reservoir would continue to impound Funks Creek and would become hydrologically connected to the proposed Holthouse Reservoir. Current periodic maintenance required for the existing Funks Reservoir is expected to continue after the Funks Reservoir dredging and its connection to Holthouse Reservoir.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Alkaline Wetlands

Approximately 0.5 acre of alkaline wetlands would be directly impacted by construction of the Holthouse Reservoir Complex. The footprint of the Holthouse to Tehama-Colusa Canal Pipeline would overlap with the northwest end, or headwaters, of one of the shallow alkaline wetland swales that contribute to a 13-acre alkaline wetland. Loss of this portion of the alkaline wetland swale would be a **potentially significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

A 13-acre alkaline and saline wetland complex lies immediately southeast of the Holthouse Reservoir Complex, located within a 40-acre area that supports an upland (grassland) matrix. This wetland type is rare and sensitive, being potential habitat for several rare plant and invertebrate species (Silveira, 2011, pers. comm.). Although it would not be directly impacted by the construction and operation of the

Holthouse Reservoir Complex, there is potential during operation for the pressure from the weight of the water behind the dam, and possibly the belowground portion of the dam and discharge pipeline, to affect the underground hydrologic regime supporting this wetland. No groundwater studies have been conducted to evaluate this potential. From inspection of field data on the location of seeps, comparison of current (2009) and historical (1958) aerial photos, and consultation of geology fault-trace maps, it appears that the wetland's water source is likely ancient marine groundwater rising up from the south or southeast. The direction of the bedding dips, and the direction of the faults, would direct underground water up from the south and east. If this is the case, the presence of a dam and reservoir to the west and north would not interfere with the wetland's water source (Gordon et al., 2011, pers. comm.). Because it is not known if the presence and operation of the Holthouse facilities would intercept and cut off the wetland area's underground water supply and dry up the wetland, or might redirect or pressure more water into the area and increase inundation, converting the area into a perennial marsh, these possible effects would be considered a **potentially significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

In addition to the underground water supply being possibly increased or decreased, overland flow from the uplands along the wetland's western border, particularly to the vernal swale at the wetland area's northwestern corner, would be cut off. This could occur from construction of the Holthouse to Tehama-Colusa Canal Pipeline, which would be located less than 200 feet from the swale and would directly impact the swale's headwater area. The pipeline and dam would be located approximately 300 and 700 feet, respectively, from the hillslope along the wetland's western edge. It is not known to what extent the wetland depends on waters entering from within or from the surface of this upland strip. Thus, this rare and sensitive habitat could be subject to drying or inundation effects from the presence of the proposed Holthouse Reservoir Complex. This indirect hydrological interruption effect would represent a **potentially significant impact** to wetlands, when compared to the Existing Conditions/No Project/No Action Condition.

Seasonal Wetlands

The proposed dredging of the existing Funks Reservoir would involve deepening the bottom and making the sides steeper, which would eliminate the shallow-water areas around its edges. This could result in the desiccation or alteration of the hydrology of the 3.8-acre seasonal wetland area at Funks Reservoir's south end. If this wetland's water supply is not interrupted, it may not be affected; however, the down-cutting of the reservoir edge along the wetland's northern edge may result in desiccation when the lake is not full because its water could abruptly fall into the steeper-sided reservoir basin. The alteration of this wetland could represent a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition. No other wetlands have been mapped around the immediate edges of Funks Reservoir. Other seasonal wetlands and a vernal pool in the general area are located more than 500 feet away from the reservoir edge and would be unlikely to be affected by the dredging of Funks Reservoir.

Terminal Regulating Reservoir, Terminal Regulating Reservoir Pumping/Generating Plant, Terminal Regulating Reservoir Electrical Switchyard, and GCID Main Canal Connection to the Terminal Regulating Reservoir

The TRR and its associated facilities would be located near the intersection of the existing GCID Main Canal and the proposed Delevan Pipeline. The only waters that could be impacted by these facilities are all agricultural ditches and canals. Their acreage and lengths are shown in Table 15-12. No wetlands or ponds would be affected by TRR construction.

Table 15-12
**Direct Loss of Wetlands and Other Waters Due to the Construction of the TRR,
 TRR Pumping/Generating Plant, TRR Electrical Switchyard, and the GCID Main Canal Connection
 to the TRR**

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost ^a
Total Wetlands	0	N/A
Ditches 0 to 5 Feet Wide	0.37	0.74
Ditches 5 to 10 Feet Wide	0.78	0.77
Canals 10 to 15 Feet Wide	0.63	0.43
Canals > 15 Feet Wide	0.61	0.26
Total Other Waters	2.39	2.19

^aOnly streams are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Ditches and Canals

All 2.4 acres (or approximately 2.2 miles) of waters that would be permanently lost to construction of the TRR and its associated facilities consist of agricultural ditches and canals and their loss would likely constitute a **less-than-significant impact** to waters when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

No wetlands occur within the footprint of these facilities. Therefore, 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 analysis for Alternative A includes only the 150-foot-wide construction disturbance area extending between the Sacramento River and the Sites Reservoir Inlet/Outlet Structure to the west of Funks Reservoir.³ The Sites/Delevan Overhead Power Line construction disturbance area includes all areas needed for overhead power line construction activities. This 150-foot-wide corridor would experience mostly temporary disturbance during construction. Once construction is complete, the only Project facility that would generate a permanent impact would be the overhead power line tower/pole footings. The total permanent habitat loss associated with the tower/pole footings, with a worst-case scenario of 144 overhead power line towers/poles with a concrete pad for a base over the entire length of the overhead power line, would equal approximately 5.0 acres of

³ The impacts on wetlands and other waters of the 50-foot-wide easements for the electrical distribution lines that would serve the Recreation Areas are discussed in that analysis.

agricultural fields and some open grassland, with intermittent streams scattered within the grasslands. Because no additional access or maintenance roads or other infrastructure is proposed, the land between the towers/poles would revert to its original use. Thus, the impact on much of the acreage within the easement would be temporary for this Project facility. Because there is flexibility in siting the individual tower/pole footings, the likelihood of a tower/pole footing being constructed within or adjacent to any waters is low.

The acres of each type of wetlands and other waters that would be lost or adversely affected within the Sites/Delevan Overhead Power Line easement are summarized in Table 15-13.

Table 15-13
Direct Loss of Wetlands and Other Waters Due to the Construction of the Sites/Delevan Overhead Power Line East of the Sites Electrical Switchyard

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost ^a
Alkaline Wetlands	Direct/Permanent: 0.04 Temporary: 2.2	N/A
Vernal Pools	Indirect/Temporary: 0.4	N/A
Total Wetlands	Permanent: < 0.1 Temporary: 2.6	N/A
Tributaries 0 to 5 feet wide	0.09	0.22
Tributaries 5 to 10 feet wide	0.41	0.41
Tributaries 10 to 15 feet wide	0.44	0.30
Tributaries > 15 Feet wide	1.77	0.32
Ponds	1.90	N/A
Total Other Waters	4.62	1.26

^aOnly streams are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Stream

A total of 2.7 acres (1.26 miles) of streams could be adversely affected through construction of the tower/pole footings and other construction activities. Because no towers/poles are likely to be placed in or adjacent to waterways, the impact would be temporary. If the water was redirected back into the farmer’s irrigation system so that the water would still be available for surrounding fields, temporary disruption of these waters by construction of the overhead power line would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

East of the GCID Main Canal, all of these waters (approximately 1.5 acres or 0.8 mile) consist of agricultural ditches and canals, mostly between 5 and 20 feet in width. Because no towers/poles are likely to be placed in or adjacent to waterways, the impact would be temporary and effects to these ditches and canals would constitute **no impact** when compared to the Existing Conditions/No Project/No Action Condition. West of the GCID Main Canal, the streams are natural drainages through open grassland or dryland grain fields. In this area, 1.2 acres (0.47 mile) of streams would be at least temporarily impacted

by the Sites/Delevan Overhead Power Line construction. Except for where the line would cross Funks Creek, these ephemeral drainages average 6 feet wide. Because the overhead power line tower/pole spans can be from 1,200 to 1,300 feet, flexibility in tower/pole footing placement would decrease the likelihood of any tower/pole footing being constructed on or immediately adjacent to any waters. Because these drainage features are relatively easily avoided by rerouting the overhead power line corridor, their loss or disturbance is unlikely and would be a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Ponds

A 5-acre pond located approximately 3.5 miles west of the Sacramento River could be impacted by the Sites/Delevan Overhead Power Line. This pond is part of an agricultural operation and has no associated natural vegetation. It is likely that tower/pole footings could be constructed to one side of this pond rather than impact it. Because this pond is relatively easily avoided by rerouting the overhead power line corridor, its loss or disturbance is unlikely and would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act. [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Alkaline Wetlands

Construction of the Sites/Delevan Overhead Power Line could result in direct loss or long-term disturbance of 0.04 acre and temporary disturbance to a maximum of 2.2 acres of disturbed alkaline wetlands in one parcel located approximately 3 miles west of the Sacramento River. This land is located north of the Delevan NWR, north of the existing road. It is highly disturbed, having been disked in the past, and is being managed as a private duck hunting club, with tules and other freshwater emergent wetland vegetation. The extent of permanent loss would equal the area of one tower/pole footing (worst case, approximately 1,600 square feet, or 0.04 acre). Because this area is relatively easily avoided by repositioning the towers/poles, this loss would be unlikely, and would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Vernal Pools

Although the Sites/Delevan Overhead Power Line construction disturbance area would not be aligned through any vernal pools, it is aligned adjacent to a mapped 0.4-acre vernal pool located west of the GCID Main Canal. Because the construction disturbance area would be located less than 25 feet south of this vernal pool, the potential exists for direct or indirect impacts to this vernal pool if construction activities are not confined within the defined area. The construction disturbance area would also pass between two small vernal pools in the median strip of I-5, passing approximately 200 feet south of one and 330 feet north of another; each is approximately 0.1 acre. Keeping all construction activities within the construction disturbance area would avoid disruption or disturbance to any of these adjacent or nearby pools, so loss or disturbance of the pools would be unlikely, and a **less-than-significant 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 pipeline analysis for Alternative A includes the 1,500-foot-wide construction disturbance area that would extend between the Sacramento River and the Holthouse Dam. This includes the portion of the Delevan Pipeline route that would extend from the river to the TRR, the TRR Pipeline route, and the portion of the Delevan Pipeline route that would parallel the TRR Pipeline from the TRR to Holthouse Reservoir and Dam. The latter portion of the pipeline route also includes a permanent gravel maintenance road and electrical switchyard above the pipelines. Once construction is complete, there would be no major pipeline facilities that would generate a permanent ground impact; most of the land over the buried pipeline would revert to its original use. The exceptions would be regularly spaced aboveground facilities, such as blow-off structures, air valve structures, and an outlet and energy dissipater structure. The 20-foot-wide gravel inspection road from the TRR to Holthouse Reservoir and Dam, as well as the electrical switchyard, would generate permanent ground disturbance. The pipeline construction disturbance area would traverse many agricultural ditches/canals and some agricultural ponds; some of these might be avoidable. The acres of each type of wetlands and other waters that would be lost or adversely affected within the pipeline, maintenance road, and electrical switchyard construction disturbance area are summarized in Table 15-14.

Table 15-14
Loss of Wetlands and Other Waters Due to the Construction of the Delevan Pipeline, Terminal Regulating Reservoir Pipeline, Terminal Regulating Reservoir Pipeline Road, and Delevan Pipeline Electrical Switchyard

Wetland or Other Waters Type	Number of Acres Lost or Disturbed	Number of Miles Lost or Disturbed ^a
Alkaline Wetlands	Indirect: 14.0	N/A
Vernal Pools	Indirect: 0.4	N/A
Total Wetlands	Direct/Permanent: 0 Indirect: 14.4	
Ditches 0 to 5 Feet Wide	0.26	0.46
Ditches 5 to 10 Feet Wide	8.77	9.16
Canals 10 to 15 Feet Wide	10.6	6.77
Canals > 15 Feet Wide	22.3	7.48
Ponds	5.0	N/A
Total Other Waters	46.9	23.9

^aOnly ditches and canals are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

A total of approximately 42 acres (24 miles) of waters could be permanently lost or adversely affected through construction of the buried pipelines and other activities associated with construction of the Delevan and TRR pipelines, TRR Pipeline Road, and Delevan Pipeline Electrical Switchyard. All

affected waters consist of agricultural ditches and canals between 3 and 30 feet in width. If the water was not redirected back into the farmers' irrigation systems so that the water would still be available for surrounding fields, temporary or permanent disruption of most of these canal waters by the pipelines would represent a hydrological interruption and would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition. In addition, because the pipelines' small and regularly spaced above-ground structures (i.e., blow-off structures, air valve structures, and an outlet and energy dissipater structure) could be sited to avoid waters, they would result in a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Ponds

No ponds would be affected by construction of the TRR Pipeline, TRR Pipeline Road, or Delevan Pipeline Electrical Switchyard. The 5-acre pond located approximately 3.5 miles west of the Sacramento River would be affected by construction of the Delevan Pipeline (refer to the Sites/Delevan Overhead Power Line discussion for additional description of the pond). The pipeline would pass directly through this pond, resulting in the loss of the entire pond. Because this is an agricultural (human-made) pond, it is possible that it could be restored to its original condition after construction is completed, in which case the effects to this pond would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition. If the pond's hydrological integrity cannot be restored post construction, then its loss would represent a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition. In addition, because the pipelines' small and regularly spaced above-ground structures (i.e., blow-off structures, air valve structures, and an outlet and energy dissipater structure) could be sited to avoid ponds, they would result in a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act. [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Construction of the Delevan Pipeline could have a long-term direct adverse impact on alkaline wetlands and vernal pools due to the direct removal of the soil and the replacement of soil over the buried pipeline, and/or by construction access roads, spoils piles, or other mechanical disturbance or displacement within the 1,500-foot-wide construction disturbance area. For wetlands, mechanical disruption of the hydrological regime would result in the permanent destruction of the feature; once disturbed or disrupted, wetland features rarely return to their former ecological integrity.

Alkaline Wetlands

No alkaline wetlands would be affected by construction of the TRR Pipeline, TRR Pipeline Road, or Delevan Pipeline Electrical Switchyard. Construction of the Delevan Pipeline could result in the direct loss or long-term disturbance of a maximum of 14 acres of disturbed alkaline wetlands in one parcel located approximately 3 miles west of the Sacramento River. This land is located north of the Delevan NWR, north of the existing road along the south end of the Gunnersfield duck club. (Refer to the Sites/Delevan Overhead Power Line discussion for further description of the managed wetland.) Direct disturbance of the duck club managed freshwater wetland would be unavoidable during pipeline construction, which in this case might be temporary. If the managed freshwater wetland could be restored

to its full water-containment capacity and use after construction, the pipeline construction would represent a **less-than-significant impact** to these waters, when compared to the Existing Conditions/No Project/No Action Condition. If it is not possible to restore the impermeable clay bottom of the managed freshwater wetland, then the wetland properties of the parcel would be lost and the pipeline construction would have a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

The pipeline construction disturbance area is located near the Delevan NWR wetland complex. The Delevan NWR wetlands are separated from the disturbance area by two roads and a canal located along the south edge of the pipeline's construction disturbance area. Because construction activities would occur north of these three barriers, the NWR wetland complex would not be adversely affected by sedimentation, mechanical disturbance or other effects of construction activities including traffic, equipment operation, and other aspects of pipeline installation. Because construction would occur north of three effective barriers, there should be **no impacts** to the refuge wetlands, when compared to the Existing Conditions/No Project/No Action Condition.

Vernal Pools

No vernal pools would be affected by construction of the TRR Pipeline, TRR Pipeline Road, or Delevan Pipeline Electrical Switchyard. The Delevan Pipeline construction disturbance area would pass through three small vernal pools located within the median strip of I-5; each is approximately 0.1 acre. The northern two pools are discussed in the Sites/Delevan Overhead Power Line analysis. Although these pools could easily be avoided during overhead power line construction, they and the third southernmost pool would be more difficult to avoid during pipeline construction, which would affect a wider swath of land. Because most of the vernal pools formerly present in this part of Colusa County have been converted to agricultural fields, the loss of these few remaining pools would be **potentially significant**, when compared to the Existing Conditions/No Project/No Action Condition. However, if the pipeline construction occurs completely underground, as proposed, impacts to these pools would be indirect.

The Delevan Pipeline construction disturbance area is located adjacent to a mapped 0.1-acre vernal pool that is located south of the road in the Delevan NWR. Because all construction activities would occur north of the Gunnersfield southern boundary road, there would be **no impact** on this NWR vernal pool, when compared to the Existing Conditions/No Project/No Action Condition.

Delevan Pipeline Intake/Discharge Facilities

The Delevan Pipeline Intake/Discharge Facilities are associated with the Delevan Pipeline for Alternatives A and C. Construction of these facilities could result in a combination of temporary disruption, long-term disturbance, and permanent loss of existing agricultural canals and the Sacramento River. The acres of each water type that would be lost as a result of construction of the Delevan Pipeline Intake/Discharge Facilities are listed in Table 15-15. No ponds exist where the Delevan Pipeline Intake/Discharge Facilities would be constructed.

Table 15-15
Direct Loss of Wetlands and Other Waters Due to the Construction of the
Delevan Pipeline Intake/Discharge Facilities

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost ^a
Total Wetlands	0	N/A
Ditches 0 to 5 Feet Wide	0.05	0.13
Ditches 5 to 10 Feet Wide	0	0
Canals 10 to 15 Feet Wide	0	0
Canals > 15 Feet Wide	0.25	0.10
Sacramento River	1.6	0.12
Total Waters	1.9	0.35

^aOnly ditches and canals are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

Construction of the Delevan Pipeline Intake/Discharge Facilities would impact approximately 2 acres (0.35 mile) of potential waters. These acres include agricultural ditches and canals, but also include 1.6 acres (0.12 mile) of the Sacramento River. Agricultural ditches and canals are generally not considered jurisdictional and disturbance from intake facility construction would most likely result in **less-than-significant impacts** to these types of waters, when compared to the Existing Conditions/No Project/No Action Condition.

For the Sacramento River, construction activities would create temporary disturbance of this portion of the river, where a cofferdam would extend approximately 40 feet into the river channel. Due to its temporary nature, construction disturbance to this part of the river would represent a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

The completed intake facility would permanently extend into the river channel. However, the existing Maxwell ID Pumping Plant is located in a narrow section of the river and consequently acts as a local flow control point (Bureau of Reclamation [Reclamation], 2012). Therefore, the portion of the Delevan Pipeline Intake/Discharge Facilities that would extend into the river would not obstruct the Sacramento River and would have a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

During operation, there is potential for ongoing erosional, biotic, and other effects of intake and release. Therefore, the operation of this facility represents a **potentially significant impact** on the Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Maintenance activities, including periodic sediment removal from the forebay, would be conducted when the forebay is dewatered and would not be expected to contribute to increased sedimentation of the Sacramento River. Therefore, there would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Emergent Wetlands

No loss of mapped wetlands of any type would result from construction of the Delevan Pipeline Intake/Discharge Facilities on the Sacramento River. However, small amounts of emergent wetland vegetation in shallow areas along the river's edge could be disturbed or lost to construction activities. The affected area is approximately 0.06 mile long (350 feet) and includes sparse herbaceous growth along the water's edge. This vegetation is variable, influenced by fluctuations in the river; its loss would therefore be temporary and would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Project Buffer

The area within the Project Buffer for Alternative A includes many small streams and a few ponds around the Sites Reservoir footprint, canals around the TRR facilities, and canals and a short river stretch around the Delevan Pipeline Intake/Discharge Facilities. The outer perimeter of the Project Buffer would be fenced.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of "Other Waters," (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Ground-disturbing activities that would occur within the Project Buffer outside of existing developed land include fence construction, the creation of a fuelbreak, and the demolition of existing structures. Fence posts could be strategically placed to avoid waters. Their construction would therefore have a **less-than-significant impact** on waters. The fuelbreak would consist of permanently disturbed unvegetated land around the perimeter of the Buffer. The exposed soil within the fuelbreak has the potential to contribute sediments to downslope streams. Although any single stream crossing within the fuelbreak would not contribute a significant amount of sediment to waters, the total number of stream crossings within the entire Project Buffer could contribute an amount of sediment that could result in a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition. Ground disturbance associated with the demolition of existing structures could result in temporary increases in sediment transport to adjacent waters; however, this disturbance would be temporary, and lands would be revegetated following demolition. Therefore, structure demolition would have a **less-than-significant impact**.

Project and outer perimeter fencing would prevent any ground disturbance and human activity within the Project Buffer during operation. In addition, grazing would also no longer occur within the Project Buffer. Project operation would, therefore, have **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Maintenance activities associated with fence repair would not be expected to affect waters, and would, therefore, have a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition. Fuelbreak maintenance would result in the removal of any vegetation growth, and

therefore, could contribute sediment to downslope streams. The total number of stream crossings that would occur within the entire Project Buffer during maintenance of the fuelbreak could contribute an amount of sediment that could result in a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal- or State-protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Refer to the **Impact Wet-1** discussion. Demolition of existing structures, as well as activities associated with the construction, operation, and maintenance of fences and a fuelbreak, would have a **less-than-significant impact** on wetlands as described for other waters.

One probable indirect effect that could occur within the Project Buffer during operation would be conversion of some of the more disturbed shallow seasonal wetlands or vernal pools in the area around the Sites Reservoir footprint to non-native weedy grasslands once cattle-grazing is removed, because this is a common outcome in many wetland or vernal pool landscapes in California (Marty, 2007). The net effect of lack of any direct impacts, but with the indirect effects of cessation of grazing, would most likely be a **less-than-significant impact** to some of the wetlands within the reservoir facilities' Project Buffer.

Summary of Alternative A Impacts to Wetlands and Waters

A summary of the acreages of wetlands and other waters that would be affected by construction, operation, and maintenance of Project facilities as a result of Alternative A implementation are presented in Table 15-16.

15.3.5 Impacts Associated with Alternative B

15.3.5.1 Extended Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative B, as they relate to jurisdictional waters (**Impact Wet-1**) and federally protected wetlands (**Impact Wet-2**), would be the same as described for Alternative A for the Extended Study Area.

15.3.5.2 Secondary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative B operations to jurisdictional waters. (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**) would be the same as described for Alternative A for Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex, Feather River, Sutter Bypass, Yolo Bypass, Folsom Lake, Lake Natoma, the 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.

Table 15-16

Affected Acres of Wetlands and Other Waters for All Project Facilities: Alternative A

Project Facility	Wetland Type						Waters Type						Notes	
	Alkaline	Emergent	Riparian	Seasonal	Vernal Pool	TOTAL WETLAND ACRES	TOTAL PONDS ^b ACRES	Streams / Ditches 0-5 Feet Wide	Streams / Ditches 5-10 Feet Wide	Streams / Canals 10-15 Feet Wide	Streams / Canals < 15 Feet Wide	Streams / Canals > 15 Feet Wide		TOTAL OTHER WATERS ACRES
Sites Reservoir Inundation Area (1.3 MAF) and Dams	19.2	2.4	21.5	153.1	4.3	200.6	26.3 ^c				77	82	159.0	Stream acres are same as for 1.8-MAF reservoir because data cannot be separated out
Recreation Areas and Distribution Lines				13.3		13.3	1.3	2.7	0.2				3.0	
Road Relocations and South Bridge	1.1	< 0.1		4.2	<0.1	5.3	0.5	2.1	4.0	1.2		2.2	9.5	
Sites Reservoir Inlet/Outlet Structure, Tunnel, Sites Pumping Generating Plant, Field Office Maintenance Yard, and Electrical Switchyard						0	0.2	0.3	0.6			0.5	1.4	
Holthouse Reservoir Complex	0.5 ^a		2.0			2.5			0.3	0.5		5.0	5.8	
TRR, GCID Connection to the TRR, TRR Pumping/Generating Plant, and TRR Electrical Switchyard						0		0.4	0.8	0.6		0.6	2.4	All agricultural canals
Sites/Delevan Overhead Power Line (entire length)	2.2				0.4	2.6	1.9	0.1	0.4	0.4		1.8	2.7	Some natural streams, some canals
Delevan Pipeline (entire length), TRR Pipeline, TRR Pipeline Road, and Delevan Pipeline Electrical Switchyard	14.0				0.4	14.4	5.1	0.3	8.8	10.6		22.3	42.0	All agricultural canals
Delevan Pipeline Intake/Discharge Facilities						0		0.1				1.9	2.0	Includes Sacramento River
Project Buffer ^d														Area includes some wetlands and streams
TOTAL ACRES for Primary Study Area (Project facility footprints) and Subject to Potential Impacts^e	37.0	2.4	23.5	170.6	5.1	238.7	35.3	6.0	15.1	13.3	77	116.3	227.8	

^aThe northwest 0.5 acre of swale feeding the marsh is within the proposed footprint but hydrologically connected to a 20-acre (estimated minimum area) marsh/swale/vernal pool complex. Wetlands themselves equal 13 acres; entire complex with connecting upland watersheds equal 20 to 40 acres.

^bPonds counted separately from streams.

^cIncludes 6.1 acres for Salt Lake. All other pond acreages are stock ponds.

^dAcres of wetlands and other waters types are unknown because the Project Buffer was added after surveys were conducted; consequently, wetland/WUS features were not mapped.

^eTotal acreage does not include acreage associated with the Project Buffer, which has not been surveyed or mapped.

Note:

Primary Study Area is defined as the Project facility footprints except for the Delevan Pipeline, which also includes a wider construction disturbance area, and for Holthouse Reservoir Complex, where alkaline wetlands potentially affected include acres adjacent to dam footprint as well as overlapping with the footprint.

Operational differences for Alternative B, when compared to Alternative A, for the Sacramento River are discussed below.

Sacramento River

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Operational modeling using SacEFT (Appendix 8B Sacramento River Ecological Flows Tool) indicates that Project operations would indirectly result in changes in river flows downstream of the diversions for Sites Reservoir. For Alternative B, there would not be any diversion from the Sacramento River at the east end of the Delevan Pipeline (as there would be for Alternatives A and C). Operational modeling indicates that Sacramento River flows associated with implementation of Alternative B would experience changes similar to those described for Alternative A. However, Alternative B would divert up to 3,900 cfs during winter flows (rather than the 5,900 cfs diversion that would occur with Alternative A during winter flows). The reduced rate of diversion would consequently require a longer duration of diversion, lasting from February through May. Despite the increased duration of diversion, minor changes in flows are expected. These minor changes would represent a **less-than-significant impact** on the waters of the Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Refer to the **Impact Wet-1** discussion. Due to the minimal fluctuations in flows expected in the Sacramento River with implementation of Alternative B, there would be a **less-than-significant impact** on jurisdictional wetlands present along the edges of the river (most likely in backwater or slough locations), when compared to the Existing Conditions/No Project/No Action Condition.

15.3.5.3 Primary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

Many of the same Project facilities are included in Alternatives A and B (see Table 3-1 in Chapter 3 Description of the Sites Reservoir Project Alternatives). These facilities would require the same construction methods and operations and maintenance activities, and would therefore result in the same construction, operation, and maintenance impacts to wetlands and other waters. Therefore, unless explicitly discussed below, impacts for all Project facilities are anticipated to be the same as discussed for Alternative A.

The footprints of the Recreation Areas for Alternative B are the same as Alternative A, but the electrical distribution lines that would serve the Alternative B Saddle Dam Recreation Area would have a different alignment than was evaluated for Alternative A. However, the two alternatives' distribution lines would cross equivalent extents of very small tributary drainages, distributed the same over the various stream widths, and would, therefore, have the same impacts on jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**), as described for Alternative A.

Due to the larger reservoir size and increased number of dams with implementation of Alternative B, the impacts of Sites Reservoir and Dams to jurisdictional waters (**Impact Wet-1**) would be similar, but slightly larger for Alternative B than those 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 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 jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**), as described for Alternative A.

The remaining facilities, and their impacts associated with implementation of Alternative B, are described below.

Sites Reservoir Inundation Area and Dams

Ground disturbance associated with dam construction and borrow areas, as well as inundation by a 1.8-MAF Sites Reservoir, would have a long-term direct adverse impact on existing wetlands and other waters due to direct removal of wetlands or waters and replacement by standing water, sterile subsoil, or permanent facilities. Construction of the associated dams would result in the complete loss of existing waters and wetlands within their footprints. Alternative B includes nine saddle dams as well as Golden Gate Dam and Sites Dam. The acres of each wetland or waters type that would be affected by the 1.8-MAF Sites Reservoir and its associated dams are listed in Table 15-17. Ponds are considered separately from wetlands or tributary streams.

Table 15-17
Direct Loss of Wetlands and Other Waters Due to the Construction of the 1.8-MAF Sites Reservoir Inundation Area and Dams

Wetland or Other Waters Type	Number of Acres Affected	Number of Miles Affected^a
Alkaline	19.2	N/A
Emergent	2.4	N/A
Riparian	23.0	N/A
Seasonal	164.9	N/A
Vernal pool	4.7	N/A
Total Wetlands	214.2	N/A
Tributaries 0 to 15 Feet Wide (smaller tributaries)	77	123
Tributaries > 15 Feet Wide (major tributaries)	82	25
Salt Lake (Pond)	6.1	N/A
Ponds	20.7	N/A
Total Other Waters	185.8	148

^aOnly streams are indicated.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not

Limited to, Marsh, Vernal Pool, Coastal) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Seasonal Wetlands

Approximately 164 acres (11 acres more than for Alternative A) of seasonal wetlands would be permanently lost through initial inundation and repeated water level fluctuations within Sites Reservoir. These 113 wetlands (16 more than for Alternative A) are mostly small areas associated with low-lying swales, valley bottoms, or shallow drainages especially in clay-dominated soils. More than half are smaller than 1 acre; 30 are between 1 and 5 acres, and 10 (2 more than for Alternative A) are larger than 5 acres. The impacts to seasonal wetlands associated with Salt Lake are the same as described for Alternative A. The loss of all of these seasonal wetlands (especially because they include some partly alkaline or saline features) would be a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Vernal Pools

The construction and inundation of Sites Reservoir and Dams would result in the direct and permanent loss of approximately 4.7 acres of vernal pools (0.7 acre more than for Alternative A), many of which are either artificially created impoundments or highly disturbed/degraded by long-term heavy grazing. These 17 vernal pools (one more than for Alternative A) are distributed throughout the reservoir footprint in Antelope Valley. The largest (larger than 1.3 acres) is associated with Salt Lake. The remaining features are all smaller than 1 acre. Because the vernal pools of the western edge of the Sacramento Valley are already much reduced in number, the loss of these vernal pools (especially because they include some partly alkaline or saline features) would be a **potentially significant impact**, when compared to Existing Conditions/No Project/No Action Condition.

Emergent Wetlands

The impact of Alternative B on emergent wetlands would be the same as described for Alternative A.

Riparian Wetlands

More than 23 acres of riparian wetlands were mapped and identified within the reservoir footprint for Alternative B. Most of these 16 mapped areas are 1 acre or smaller, and consist of sparse wetland vegetation within disturbed intermittent stream channels. The loss of these riparian wetlands would be considered a **potentially significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Road Relocations and South Bridge

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of "Other Waters," (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

The road relocation construction disturbance area would differ slightly to serve different sets of dams, but the two alternatives' routes would cross equivalent extents of very small tributary drainages. They both would impact approximately 12 miles (or 9.5 acres) of waters, distributed the same over the various

stream widths. However, Alternative B would result in a slightly greater impact, affecting 0.3 mile (0.1 acre) more waters than Alternative A. This increase is due largely to some substantial crossings of creeks associated with salt springs in the area south of the Saddle Dam Recreation Area; only Alternative B's road route traverses this sensitive area of wetlands and waters on its way to Saddle Dams 1 and 2. For Alternative B, the combined length of almost 12 miles and the connection of several streams with wetland features near the Saddle Dam Recreation Area would result in a **potentially significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Ponds

The impact of roads on ponds for Alternative B would be the same as described for Alternative A.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

Seasonal Wetlands

For Alternative B, the impacts of the road relocations on wetlands would be similar to Alternative A, exceeding Alternative A only by 0.17 acre more of impacts to seasonal wetlands along the road south of the Saddle Dam Recreation Area, for a total of 5.6 acres of seasonal wetlands lost to construction activities. As described for Alternative A, although seasonal wetlands can be considered jurisdictional features, these small wetlands can be easily avoided by relocation of the route, so their loss is unlikely and would be a **less-than-significant impact** to waters, when compared to the Existing Conditions/No Project/No Action Condition.

Sites/Delevan Overhead Power Line

If Alternative B is implemented, the affected wetlands and waters acreage from construction of the Sites/Delevan Overhead Power Line would be less than half of the total for Alternative A because there would be no overhead power line alignment from the Sacramento River to the PG&E transmission line. Only the portion of the overhead power line that would connect the Sites Pumping/Generating Plant to the PG&E or Western Area Power Administration transmission line would be constructed (a total of up to 3 miles, compared to more than 12 miles for Alternative A) (Figure 3-1 in Chapter 3 Description of the Sites Reservoir Project Alternatives). Construction of this part of the overhead power line would impact small tributary streams, but no wetlands or ponds.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of "Other Waters," (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

West of the GCID Main Canal, 1.2 acres (0.47 mile) of streams through open grassland or dryland grain fields would be at least temporarily impacted by the Sites/Delevan Overhead Power Line construction. Except for where the line would cross Funks Creek, these ephemeral drainages average 6 feet wide. Because the overhead power line tower/pole spans could be from 1,200 to 1,300 feet, flexibility in tower/pole footing placement would decrease the likelihood of any tower/pole footing being constructed

on or immediately adjacent to any waters. Because these drainage features are relatively easily avoided by rerouting the overhead power line corridor, their loss or disturbance is unlikely and would be a less-than-significant impact, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

No wetlands occur within the construction disturbance area of the Alternative B Sites/Delevan Overhead Power Line. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Delevan Pipeline Discharge Facilities

The Delevan Pipeline Discharge Facilities is associated with the Delevan Pipeline for Alternative B. Construction of this facility could result in a combination of temporary disruption, long-term disturbance, and permanent loss of existing agricultural canals and the Sacramento River. Construction of the Discharge Facility would impact fewer acres of agricultural ditches and canals and a smaller area of the Sacramento River than construction of the Delevan Pipeline Intake/Discharge Facilities described for Alternative A. No ponds exist where the Delevan Pipeline Discharge Facilities would be constructed. The acres of each wetland or water type that would be lost from the construction of the Delevan Pipeline Discharge Facilities are listed in Table 15-18.

**Table 15-18
Direct Loss of Wetlands and Other Waters Due to the Construction of the
Delevan Pipeline Discharge Facilities**

Wetland or Other Waters Type	Number of Acres Lost	Number of Miles Lost^a
TOTAL Wetlands	0	N/A
Ditches 0 to 5 Feet Wide	0	N/A
Ditches 5 to 10 Feet Wide	0	N/A
Canals 10 to 15 Feet Wide	0	N/A
Canals > 15 Feet Wide	0.05	0.02
Sacramento River	0.09	0.03
Total Other Waters	0.14	0.05

^aOnly ditches and canals are indicated.

Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of “Other Waters,” (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE or the State to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means

Streams

Construction of the Discharge Facility would directly impact approximately 0.14 acre (0.05 mile) of waters. These acres consist of an agricultural canal, but also include 0.09 acre (0.03 mile) of the Sacramento River. Disturbance to this canal would most likely be temporary and represent **a less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition. For the Sacramento River, construction activities would create temporary disturbance in a

small portion of the river where the cofferdam would extend approximately 5 to 10 feet out into the channel. Due to its temporary nature, discharge facility construction disturbance to this part of the river would represent a **less-than-significant impact**. However, due to the potential for ongoing erosional, biotic, and other effects of release as a result of Project operation, the operation of this facility represents a **potentially significant impact** on the Sacramento River, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Wet-2: A Permanent Adverse Effect to Federal and State Protected Wetlands (as Defined by Section 404 of the Clean Water Act and the Porter-Cologne Water Quality Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means

No loss of mapped wetlands of any type would result from construction of the Delevan Pipeline Discharge Facilities on the Sacramento River. Very small amounts of emergent riparian wetland vegetation along the river's edge could be disturbed or lost to construction activities. The affected area is approximately 0.02 mile long (140 feet) and includes intermittent sparse herbaceous growth at the base of a steep slope below riparian forest. This vegetation is variable, influenced by fluctuations in the river; its loss would therefore be temporary and would be a **less-than-significant impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Summary of Alternative B Impacts to Wetlands and Other Waters

A summary of the acreages of wetlands and other waters that would be affected by construction, operation, and maintenance of Project facilities as a result of implementing Alternative B are presented in Table 15-19.

15.3.6 Impacts Associated with Alternative C

15.3.6.1 Extended Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative C, as it relates to jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**), would be the same as described for Alternative A for the Extended Study Area.

15.3.6.2 Secondary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative C operations, as it relates to jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**), would be the same as described for Alternative A for Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex, Feather River, Sutter Bypass, Yolo Bypass, Folsom Lake, Lake Natoma, the 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.

Table 15-19
Affected Acres of Wetlands and Other Waters for All Project Facilities: Alternative B

Project Facility	Wetland Type							Other Waters Type						Notes
	Alkaline	Emergent	Riparian	Seasonal	Vernal Pool	TOTAL WETLAND ACRES	TOTAL POND ACRES ^b	Streams / Ditches 0-5 Feet Wide	Streams / Ditches 5-10 Feet Wide	Streams / Canals 10-15 Feet Wide	Streams / Canals < 15 Feet Wide	Streams/Canals > 15 Feet Wide	TOTAL OTHER WATERS OF THE U.S. ACRES	
Sites Reservoir Inundation Area (1.8 MAF) and Dams	19.2	2.4	23.0	164.9	4.7	214.2	26.8 ^c				77	82	159.0	
Recreation Areas and Distribution Lines				13.3		13.3	1.3	2.7	0.2				3.0	
Road Relocations and South Bridge	1.1	<0.1		4.2	<0.1	5.3	0.5	2.1	4.0	1.2		2.2	9.5	
Sites Reservoir Inlet/Outlet Structure, Tunnel, Sites Pumping Generating Plant, Field Office Maintenance Yard, and Electrical Switchyard						0	0.2	0.3	0.6			0.5	1.4	
Holthouse Reservoir Complex	0.5 ^a		2.0			2.5			0.3	0.5		5.0	5.8	
TRR, GCID Main Canal Connection to the TRR, TRR Pumping/Generating Plant, and TRR Electrical Switchyard						0		0.4	0.8	0.6		0.6	2.4	All agricultural canals
Sites/Delevan Overhead Power Line (entire length)	2.2				0.7	2.9	1.9	0.1	0.4	0.4		1.8	2.7	Some natural streams, some canals
Delevan Pipeline (entire length), TRR Pipeline, TRR Pipeline Road, and Delevan Pipeline Electrical Switchyard	14.0				0.4	14.4	5.1	0.3	8.8	10.6		22.3	42.0	All agricultural canals
Delevan Pipeline Discharge Facilities						0		0.1				1.9	2.0	Includes Sacramento River
Project Buffer ^d														Area includes some wetlands and streams
TOTAL ACRES for Primary Study Area (Project Facility Footprints) and Subject to Potential Impacts^e	37.0	2.4	25	182.4	5.8	252.6	35.8	6.0	15.1	13.3	77	116.3	227.8	

^aThe northwest 0.5 acre of swale feeding marsh is within the proposed footprint but hydrologically connected to a 20-acre (estimated minimum area) marsh/swale/vernal pool complex. Wetlands themselves equal 13 acres; entire complex with connecting upland watersheds equal 20 to 40 acres.

^bPonds counted separately from streams.

^cIncludes 6.1 acres for Salt Lake. All other pond acreages are stock ponds.

^dAcres of wetlands and other waters types are unknown because the Project Buffer was added after surveys were conducted; consequently, wetland/WUS features were not mapped.

^eTotal acreage does not include acreage associated with the Project Buffer, which has not been surveyed or mapped.

Note:

Primary Study Area is defined as the Project facility footprints except for the Delevan Pipeline, which also includes a wider construction disturbance area corridor, and for Holthouse Reservoir complex, where Alkaline wetlands potentially affected include acres adjacent to dam footprint as well as overlapping with the footprint.

Because Alternative C includes the three Project intake locations that were described for Alternative A, the impacts as they relate to jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**) of the Sacramento River, would be the same as described for Alternative A.

15.3.6.3 Primary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

Many of the same Project facilities are included in Alternatives A 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 operations and maintenance activities, and would therefore result in the same construction, operation, and maintenance impacts to wetlands and other waters. Therefore, unless explicitly discussed below, impacts for all Project facilities are anticipated to be the same as discussed for Alternative A.

Under Alternative C the design of the Sites/Delevan Overhead Power Line and Delevan Pipeline Intake/Discharge Facilities would be 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 to wetlands and other waters as described for Alternative A.

The Alternative C design of the Sites Reservoir Inundation Area and Dams, Recreation Facilities and Associated Distribution Lines, and Road Relocations and South Bridge is 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 to wetlands and other waters as described for Alternative B.

The boundary of the Project Buffer would be the same for all alternatives, 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 associated with jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**), as those described for Alternative A.

Summary of Alternative C Impacts to Wetlands and Other Waters

A summary of the acreages of wetlands and other waters that would be affected by construction, operation, and maintenance of Project facilities as a result of implementing Alternative C are presented in Table 15-20.

**Table 15-20
Affected Acres of Wetlands and Other Waters for All Project Facilities: Alternative C**

Project Facility	Wetland Type						Waters Type							Notes
	Alkaline	Emergent	Riparian	Seasonal	Vernal Pool	TOTAL WETLAND ACRES	TOTAL POND ACRES ^b	Streams / Ditches 0-5 Feet Wide	Streams / Ditches 5-10 Feet Wide	Streams /Canals 10-15 Feet Wide	Streams / Canals <15 Feet Wide	Streams /Canals >15 Feet Wide	TOTAL OTHER WATERS ACRES	
Sites Reservoir Inundation Area (1.8 MAF) and Dams	19.2	2.4	23.0	164.9	4.7	214.2	26.8 ^c				77	82	159.0	
Recreation Areas and Distribution Lines				13.3		13.3	1.3	2.7	0.2				3.0	
Road Relocations and South Bridge	1.1	<0.1		4.2	<0.1	5.3	0.5	2.1	4.0	1.2		2.2	9.5	
Sites Reservoir Inlet/Outlet Structure, Tunnel, Sites Pumping Generating Plant, Field Office Maintenance Yard, and Electrical Switchyard						0	0.2	0.3	0.6			0.5	1.4	
Holthouse Reservoir Complex	0.5 ^a		2.0			2.5			0.3	0.5		5.0	5.8	
TRR, GCID Connection to the TRR, TRR Pumping/Generating Plant, and TRR Electrical Switchyard						0		0.4	0.8	0.6		0.6	2.4	All agricultural canals
Sites/Delevan Overhead Power Line (entire length)	2.2				0.4	2.6	1.9	0.1	0.4	0.4		1.8	2.7	Some natural streams, some canals
Delevan Pipeline (entire length), TRR Pipeline, TRR Pipeline Road, and Delevan Pipeline Electrical Switchyard	14.0				0.4	14.4	5.1	0.3	8.8	10.6		22.3	42.0	All agricultural canals
Delevan Pipeline Intake/Discharge Facilities						0		0.1				1.9	2.0	Includes Sacramento River
Project Buffer ^d														Area includes some wetlands and streams
TOTAL ACRES for Primary Study Area (Project Facility Footprints) and Subject to Potential Impacts^e	37.0	2.4	25	182.4	5.5	252.3	35.8	6.0	15.1	13.3	77	116.3	227.8	

^aThe northwest 0.5 acre of swale feeding marsh is within the proposed footprint but hydrologically connected to a 20-acre (estimated minimum area) marsh/swale/vernal pool complex. Wetlands themselves equal 13 acres; entire complex with connecting upland watersheds equal 20 to 40 acres.

^bPonds counted separately from streams.

^cIncludes 6.1 acres for Salt Lake. All other pond acreages are stock ponds.

^dAcres of wetlands and other waters types are unknown because the Project Buffer was added after surveys were conducted; consequently, wetland/WUS features were not mapped.

^eTotal acreage does not include acreage associated with the Project Buffer, which has not been surveyed or mapped.

Note:

Primary Study Area is defined as the Project facility footprints except for the Delevan Pipeline, which also includes a wider construction disturbance area corridor, and for Holthouse Reservoir complex, where Alkaline wetlands potentially affected include acres adjacent to dam footprint as well as overlapping with the footprint.

15.3.7 Impacts Associated with Alternative D

15.3.7.1 Extended Study Area – Alternative D

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative D, as they relate to jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**), would be the same as for Alternative A for the Extended Study Area.

15.3.7.2 Secondary Study Area – Alternative D

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative D operations, as they relate to jurisdictional waters (**Impact Wet-1**) and federally protected wetlands (**Impact Wet-2**), would be the same as for Alternative A for Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex, Feather River, Sutter Bypass, Yolo Bypass, Folsom Lake, Lake Natoma, the American River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, San Francisco Bay, and 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 Alternatives A and C, the impacts associated with Alternative D, as they relate to the jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**) of the Sacramento River, would be the same as for Alternatives A and C.

15.3.7.3 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). Construction, operation, and maintenance of Alternative D would be expected to result in similar impacts to wetlands and other waters, except for the overhead power lines and substations.

Therefore, unless explicitly discussed below, Alternative D facilities would have the same impacts that are described for Alternative A as they relate to jurisdictional waters (**Impact Wet-1**) and protected wetlands (**Impact Wet-2**). 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 areas 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 wetlands and other water 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 wetlands and other water resources as compared to those under 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 wetlands and other water 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.
- Unlike the 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 Holthouse 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 wetlands and other water resources than those described for the east-west line alignment for the other alternatives. The north-south alignment would be approximately 1 mile longer.
- 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). Tower/pole footings would be placed to minimize impacts, and the overhead power lines would span the majority of the 12-mile length, thus avoiding impacts to potentially jurisdictional waters and wetlands. As such, impacts to wetlands and other waters under Alternative D would be less 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 on wetlands and other water resources.

15.4 Mitigation Measures

It should be noted that all waters and wetlands identified as being potentially adversely affected by the construction of various Project facilities have been identified as jurisdictional wetland types in a preliminary wetland delineation study. All potential jurisdictional features anticipated to be impacted by Project facilities shall be field-delineated, and waters and wetland delineations verified by the USACE. In addition, some drainage ditches mapped within Project facility footprints were considered to be potentially jurisdictional. Accordingly, all potential waters and wetlands were identified regardless of their potential federal or state jurisdictional status to account for the maximum area of potential waters and wetlands impacts.

All jurisdictional determinations shall be made as part of a formal delineation process including information necessary to support a CWA 404(b)(1) analysis. Final determination of jurisdictional status and associated Project impacts to such jurisdictional waters and wetlands would be determined by

USACE, the RWQCB, and the California Department of Fish and Wildlife (CDFW; formerly called California Department of Fish and Game).

Mitigation measures are provided below and summarized in Table 15-21 for the impacts that have been identified as potentially significant.

**Table 15-21
Summary of Mitigation Measures for
Sites Reservoir Project Impacts to Wetlands and Other Waters**

Impact	Associated Project Facility	LOS before Mitigation	Mitigation Measure	LOS after Mitigation
<i>Impact Wet-1: A Permanent Change in the Use, Quality (Extent in Acres or Miles) of "Other Waters," (Including, but Not Limited to, Lakes, Rivers, Streams Tributary to Navigable Rivers, Natural Ponds, Canals, or Ditches) that Are Determined by the USACE to Be Jurisdictional, through Direct Removal, Filling, Obstruction, Hydrological Interruption, or Other Means</i>				
Impact Wet-1a: Streams	Sites Reservoir and Dams, Recreation Areas, Road Relocations, Sites Inlet/Outlet Structure, Field Office Maintenance Yard, Funks Reservoir, Holthouse Reservoir Complex, Delevan Pipeline Intake/Discharge Facilities, Delevan Pipeline Discharge Facility	Potentially Significant	Mitigation Measure Wet-1a: Implement Compensatory Mitigation Measures for Streams Pursuant to USACE and State Determination within the Watershed in which the Impacts Occur.	Less than Significant
	Project Buffer	Potentially Significant		Less than Significant
Impact Wet-1b: Canals	Subject to USACE determination	Potentially Significant	Mitigation Measure Wet-1b: Reroute Drainage Ditches and Canals to Ensure Continued Hydrological Connection, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination.	Less than Significant
Impact Wet-1c: Ponds	Sites Reservoir and Dams, Funks Reservoir, Delevan Pipeline	Potentially Significant	Mitigation Measure Wet-1c: Restore Pond to Original Condition, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Same Hydrologic Unit in which the Pond Occurs.	Less than Significant
<i>Impact Wet-2: A Permanent Adverse Effect to Federally Protected Wetlands (as Defined by Section 404 of the Clean Water Act [Including, but Not Limited to, Marsh, Vernal Pool, Coastal]) through Direct Removal, Filling, Hydrological Interruption, Discharge of Pollutants, or Other Means</i>				
Impact Wet 2a: Seasonal Wetlands	Sites Reservoir and Dams, Recreation Areas, Funks Reservoir, Holthouse Reservoir	Potentially Significant	Mitigation Measure Wet 2a: Conserve, Enhance, Restore, or Create Seasonal Wetlands, or Implement Other Compensatory Mitigation Measures per USACE Determination within the Watershed in which the Impacts Occur.	Less than Significant

Impact	Associated Project Facility	LOS before Mitigation	Mitigation Measure	LOS after Mitigation
Impact Wet-2b: Alkaline Wetlands	Sites Reservoir and Dams, Holthouse Reservoir Complex, Delevan Pipeline	Potentially Significant	Mitigation Wet-2b: Conserve, Enhance, Restore, or Create Alkaline Wetlands, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Watershed in which the Impacts Occur.	Less than Significant
Impact Wet-2c: Vernal Pools	Sites Reservoir and Dams, Delevan Pipeline	Potentially Significant	Mitigation Measure Wet-2c: Conserve, Enhance, Restore, or Create Vernal Pools Equivalent to the Type of Vernal Pools Adversely Impacted, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination.	Less than Significant
Impact Wet-2d: Emergent Wetlands	Sites Reservoir and Dams	Potentially Significant	Mitigation Measure Wet-2d: Conserve, Enhance, Restore, or Create Emergent Wetlands, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Watershed in which the Impacts Occur.	Less than Significant
Impact Wet-2e: Riparian Wetlands	Sites Reservoir and Dams	Potentially Significant	Mitigation Measure Wet-2e: Conserve, Enhance, Restore, or Create Comparable Riparian Wetlands in the Inner Coast Range Foothills, or Implement Other Compensatory Mitigation Measures Pursuant to CDFW Determination.	Less than Significant

Note:

LOS = Level of Significance

Mitigation Measure Wet-1a: Implement Compensatory Mitigation Measures for Streams Pursuant to USACE and State Determination within the Watershed in which the Impacts Occur

Compensatory mitigation for impacts to streams and waters impacted by the construction and operation of Project facilities shall be identified and developed in coordination with the USACE, CDFW, and USFWS. Appropriate restoration, enhancement or creation shall be included in a mitigation and monitoring plan with specific performance standards as appropriate as proposed below. Mitigation ratios for anticipated impacted streams and waters shall be a minimum of 1:1 and shall occur within the watershed in which the impacts occur:

- Sites Reservoir & Dams, Recreation Areas - Funks/Hunter/Antelope/Grapevine/Stone Corral Creek watersheds.
- Delevan Pipeline Intake/Discharge Facilities – Sacramento River adjacent to facility location.
- Road Relocations, Funks Reservoir, Holthouse Reservoir Complex, Sites Inlet/Outlet Structure and associated facilities, Field Office Maintenance Yard, Electrical Switchyard –Funks Creek watershed.

Restoration and compensatory mitigation for portions of the streams identified above to be impacted by the Project would include the following based on coordination and consultation with the USACE, RWQCB, and CDFW:

- A waters and wetland mitigation and monitoring plan shall be developed by a qualified biologist in coordination with USACE, RWQCB, 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 wetland 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 a wetland 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, onsite mitigation shall be implemented including the potential enhancement and restoration of upstream and/or downstream portions of creeks that would not be inundated by the Project. If wetland preservation is included a minimum of up to a 3:1 ratio shall be used, but the ratio may be greater depending of quality, types and functions and values of the wetlands included in the preservation area.

Mitigation Measure Wet-1b: Reroute Drainage Ditches and Canals to Ensure Continued Hydrological Connection, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination

For impacts to jurisdictional drainage ditches and canals involving the inability to avoid such features, mitigation shall include re-routing all jurisdictional drainage ditches or canals to ensure continued hydrological function were possible. For such features that cannot be avoided, **Mitigation Measure Wet-1a** shall be implemented.

Mitigation Measure Wet-1c: Restore Ponds to Original Condition, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Same Hydrologic Unit in which the Ponds Occur

Construction and filling of Sites Reservoir would result in the permanent loss of 28 small stock ponds (20.2 acres). To offset the loss, additional ponds would be created at a minimum ratio of 1:1 for acreage of ponds permanently lost. A pond located 3.5 miles west of the Sacramento River within the Delevan Pipeline construction disturbance area shall be restored (assuming it is in place and functioning prior to Project construction) and returned to its condition as an agricultural pond. If restoration is not possible, compensatory mitigation measures, including a minimum of 1:1 restoration or creation to offset the loss shall be implemented within the Hunters Creek-Logan Creek watershed downstream of their confluence as part of **Mitigation Measure Wet-1a**.

Mitigation Measure Wet-2a: Conserve, Enhance, Restore, or Create Seasonal Wetlands, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Watershed in which the Impacts Occur

In accordance with **Mitigation Measure Bot-1b**, 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 in 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 included 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.

Mitigation for unavoidable impacts to seasonal wetlands 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*. For the seasonal wetlands located along the edge of Funks Reservoir, the potential exists to alter the extent of dredging so that the slope of the reservoir bottom would be more tapered at this point. Mitigation shall be a minimum of 1:1 per **Mitigation Measure Wet-1a** and measures shall include one or more of the following:

- Obtaining credits from a mitigation bank;
- Making a payment to an in-lieu fee program that would conduct wetland, stream, or other aquatic resource restoration, creation, enhancement, or preservation activities; or
- Aquatic resource restoration, establishment, enhancement, and/or preservation activities within the same watershed as the Project impacts (off-site mitigation) where on-site mitigation would not be possible.

Mitigation Measure Wet-2b: Conserve, Enhance, Restore, or Create Alkaline Wetlands, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Watershed in which the Impacts Occur

Mitigation for unavoidable impacts to seasonal wetlands 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 local saline spring areas further upslope in same geological formation as the springs that feed Salt Lake shall be mitigated at up to a 3:1 ratio as part of the implementation of **Mitigation Measure Wet-1a**. These springs are located outside of the Sites Reservoir footprint but in the creases of the foothills due north of Salt Lake. Some could be partially protected from grazing impacts with the installation of protective fencing. Protective measures potentially include a conservation agreement to manage and protect the entire alkaline wetland area southeast of Hothouse Reservoir. Management could include burning and grazing regimes similar to those used effectively on the Sacramento NWR.

A purchase or conservation agreement may be entered into with the utilities or other landowners to protect and manage other saline/alkaline wetland habitats in parcels east of the Tehama-Colusa Canal, north of the Primary Study Area subject to landowner approval and coordination with USACE and

CDFW as determined appropriate. Protected areas could include a potential alkaline wetland area southeast of the Colusa Generating Station located along the Tehama-Colusa Canal.

For the Holthouse Reservoir alkaline wetlands, a hydrogeologic study shall be conducted to determine the direction and sources of water supplying the seeps, swales, and main wetland area, to better inform evaluation of potential effects of placing the dam and reservoir in proximity of the wetland's west edge.

Mitigation Measure Wet-2c: Conserve, Enhance, Restore, or Create Vernal Pools Equivalent to the Type of Vernal Pools Adversely Impacted, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination

For vernal pools, the type of vernal pools created, restored, enhanced and/or conserved elsewhere shall be equivalent to the type impacted within the Primary Study Area including claypan and alkaline vernal pools as appropriate. Mitigation for unavoidable impacts to vernal pools 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*. Creation, restoration, enhancement and preservation of vernal pool habitat shall be at a ratio of at least 1:1 up to 3:1, depending on the quality and functions of the impacted pools relative to the mitigation vernal pools per **Mitigation Measure Wet-1a**.

Mitigation Measure Wet-2d: Conserve, Enhance, Restore, or Create Emergent Wetlands, or Implement Other Compensatory Mitigation Measures Pursuant to USACE Determination within the Watershed in which the Impacts Occur

Mitigation for unavoidable impacts to emergent wetlands 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*. Mitigation shall include creation, restoration, enhancement and preservation of emergent wetlands and is expected to be a minimum of 1:1 and up to 3:1 depending on the quality and functions of the impacted wetland relative to the mitigation wetland per **Mitigation Measure Wet-1a**.

Mitigation Measure Wet-2e: Conserve, Enhance, Restore, or Create Comparable Riparian Wetlands in the Inner Coast Range Foothills, or Implement Other Compensatory Mitigation Measures Pursuant to CDFW Determination

Mitigation for unavoidable impacts to riparian vegetation shall include restoration and enhancement of degraded riparian areas in the inner coast range foothills. Restoration and enhancement may include such things as bank stabilization, planting native riparian trees and shrubs, and removal of invasive species and other beneficial activities as determined on a site-specific basis. Restoration and enhancement of riparian areas shall occur at a minimum ratio of 1:1 and up to 3:1 for unavoidable impacts to riparian areas per **Mitigation Measure Wet-1a**.

15.4.1 Significance of Impacts with Implementation of Mitigation Measures

Implementation of **Mitigation Measures Wet-1a, Wet-1b, Wet-1c, Wet-2a, Wet-2b, Wet-2c, Wet-2d, Wet-2e, and SW Qual-1c(1)** would reduce Project impacts to wetlands and other waters to **less than significant**.