Chapter 21
Utilities and Service Systems

21.1 Affected Environment

This chapter describes the affected environment related to utilities and service systems for the dam and reservoir modifications proposed under SLWRI.

Because of the potential influence of the proposed modification of Shasta Dam, and subsequent water deliveries over a large geographic area, the SLWRI includes both a primary and an extended study area. The primary area has been further divided into Shasta Lake and vicinity and upper Sacramento River (Shasta Dam to Red Bluff). The extended study area has been further divided into the lower Sacramento River and Sacramento–San Joaquin River Delta Delta and the CVP/SWP service areas.

The utilities and service systems addressed are water supply in the Shasta Lake and vicinity portion of the primary study area, wastewater infrastructure, stormwater drainage and infrastructure, solid waste management, electrical service and infrastructure, natural gas service and infrastructure, and telecommunications infrastructure. Hydropower generation, public services (e.g., fire protection law enforcement, emergency services), roadways and bridges, and recreation are addressed in separate chapters.

The utilities and service systems setting for the Shasta Lake and vicinity portion of the primary study area consists of the portion of Shasta County above Shasta Dam and includes the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA). Utilities and service systems are influenced by rugged, mountainous terrain, lakeside communities, and Shasta Lake. The utilities and service systems setting for the upper Sacramento River portion of the primary study area consists of Shasta County below Shasta Dam and Tehama County. Two incorporated cities, Redding and Red Bluff, necessitate urban utilities and service systems needs in the otherwise rural upper Sacramento Valley, which is characterized by rolling hills with mountains to the north, east, and west.

The utilities and service systems setting for the extended study area consists of 21 counties downstream from the Red Bluff Diversion Dam and encompasses all areas served by the CVP and the SWP. A discussion of project impacts on CVP/SWP water supply and overall CVP and SWP management and operations is provided in the PDEIS Chapter 6, “Hydrology, Hydraulics, and Water Management” and in the *Hydrology, Hydraulics, and Water Management Technical Report*.

21.1.1 Water Supply

Shasta Lake and Vicinity

Water supplies for the Shasta Lake and vicinity portion of the primary study area are provided in one of three ways: by a community service area (CSA) run by Shasta County, by a mutual water company, or by an individual or group well. CSA #2 provides water for the Sugarloaf community, and CSA #6 provides water for the Silverthorn community. Fifteen mutual water companies serve the Shasta Lake and vicinity portion of the primary study area. Mutual water companies are cooperative or mutual associations that furnish water to resorts and other developments (Reclamation 2007) (Figure 21-1).

Upper Sacramento River (Shasta Dam to Red Bluff)

Provided below are descriptions of each entity in Shasta County that currently relies on Reclamation to provide a portion of its water supply and the associated Shasta and Trinity River diversions and facilities. This information was taken from the Final Environmental Assessment for the Long-Term Contract Renewal Shasta and Trinity River Divisions (Reclamation 2005).

City of Redding (Sacramento River, Spring Creek, Toyon) Before 1941, water service for the City of Redding was provided by the California Water Service Company, which had water rights to the Sacramento River dating from 1886. The City of Redding acquired the local facilities and water rights of the company in 1941 and filed for an additional appropriative water right of 5 cubic feet per second in 1944. Subsequent annexations to the City of Redding's service area include the Buckeye County Water District, the Cascade Community Services District, and the Enterprise Public Utility District in 1967, 1976, and 1977, respectively.

The Buckeye zone service area includes two City of Redding pressure zones: Buckeye and Summit City. Approximately half of the Buckeye zone is located within the Redding city limits, and the other half is in an unincorporated area of Shasta County. Approximately one-quarter of the Summit City zone is in an unincorporated area of Shasta County, and three-quarters is in the City of Shasta Lake. The City of Redding currently receives water to its Buckeye zone under a long-term CVP contract with Reclamation (the water comes from Whiskeytown Lake via the Spring Creek tunnel). There are no known groundwater resources within the Buckeye zone service area. During peak demand periods, supplemental water is pumped from the Sacramento River, then treated and delivered into the Buckeye zone service area. The municipal and industrial (M&I) connections in the Summit City zone are supplied exclusively by water diverted from Shasta Lake via the Toyon pipeline. The water is treated by the City of Shasta Lake and delivered to the Summit City zone.

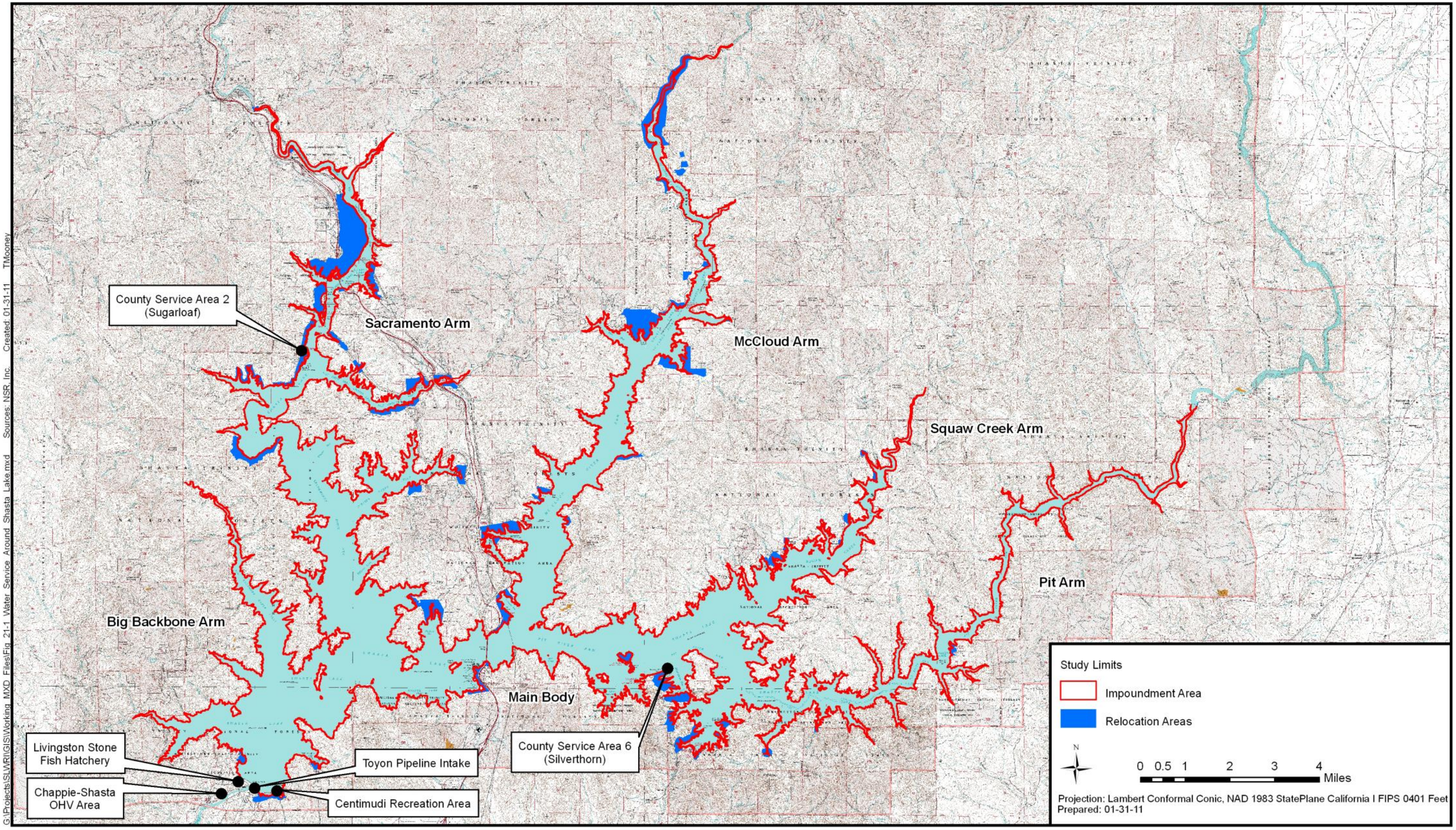

Figure 21-1. Water Service Around Shasta Lake

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The City of Redding has one additional water contract with Reclamation. Redding's 1966 Settlement Contract with Reclamation specifies a base supply and a project water supply. In 2003, the maximum base supply was set at 17,850 acre-feet per year, and the project water supply was set at 3,150 acre-feet per year; since 1995, project water supply entitlements have been increased by 45 acre-feet annually.

Redding's surface-water supply comes from the Sacramento River and Whiskeytown Lake. Sacramento River water is treated at the 24 million gallons per day (mgd) Foothill Water Treatment Plant, and Whiskeytown Lake water is treated at the 7 mgd Buckeye Water Treatment Plant. Redding supplements its surface-water supply with well production capacity from the Redding groundwater basin primarily during peak demand periods. Currently, 14 wells are operational, providing a total capacity of up to 12 mgd.

Redding provides CVP and non-CVP water service to about 24,709 connections. Connections provide water primarily for M&I uses and a small number of agricultural uses. The city administers 4,179 connections in the Buckeye zone and 58 M&I connections in the Summit City zone.

City of Shasta Lake Water for the City of Shasta Lake comes from Shasta Lake via a pump station at Shasta Dam that has a maximum diversion of 5.0 mgd. Water is pumped from an intake in the face of Shasta Dam to a storage/treatment facility immediately east of the Shasta Dam compound. From there it is delivered to the City of Shasta Lake. An interim contract with Reclamation (Contract No. 4-7-20-W1134-IR10) provides an allocation of 4,400 acre-feet per year from this source. Reclaimed water is also available for industrial and landscaping use. Groundwater use is limited because of low aquifer yields.

Prior to incorporation, the community water supply and utility services were provided by the Shasta Dam Area Public Utilities District (PUD), which was formed in 1945 to provide a reliable water supply for an area of 3.5 square miles. Originally, the PUD service area was a residential area established to house workers who were constructing Shasta Dam. Reclamation constructed a water transmission pipeline from Shasta Lake to the PUD in 1948, and the PUD concurrently constructed water storage and distribution systems. The Summit City PUD was annexed in 1978. Before annexation, water was supplied by a series of wells with low and unreliable yields.

The City of Shasta Lake provides water service to 3,800 connections for primarily urban and residential uses, although industrial use has increased over the past decade. The City of Shasta Lake also provides water service to Reclamation's Northern California Area Office.

Bella Vista Water District The Bella Vista Water District (BVWD) is a publicly owned water agency formed in 1957 to serve agricultural irrigation

demands (California Water Code Division 13, Sections 34000 through 38501). The BVWD service area is located generally east of Redding and south of Shasta Lake. The service area includes the rural communities of Bella Vista and Palo Cedro.

BVWD's primary water source is the Sacramento River. The BVWD supply system consists of the Wintu Pump Station on the Sacramento River and five wells. Water pumped from the river is treated at the district's treatment plant, which provides inline filtration. Distribution facilities include a network of transmission and distribution pipelines, three storage tanks, nine booster pump stations, and pressure-reducing facilities. The major distribution piping was initially constructed by Reclamation but has been expanded over time. The main supply system is still Federally owned, but it was constructed solely for use by BVWD. Both domestic and agricultural users are served through the same distribution system, so all water is treated to meet the higher water quality standards for domestic use. The CVP water that BVWD purchases from the Shasta County Water Agency (SCWA) is described below.

BVWD's original contract allows for up to 24,000 acre-feet per year, which is supplemented with 578 acre-feet per year of CVP water purchased through SCWA. Both of these allotments are subject to reduction during dry years. In the severe drought years of 1991 and 1992, water supplies for M&I were reduced by 25 percent and water for agricultural uses was reduced by 75 percent. Available surface water was supplemented with groundwater from wells located near the southern boundary of the district. These reductions in supply caused severe drought restrictions to be imposed, which have had a continuing impact on district water sales. The supplementary water provided by the wells constitutes about 10 percent of the supply normally available from the Sacramento River and about 15 percent to 20 percent of the reduced supply during a severe drought year. The aquifers in the district have limited yield, so it is not practical to greatly increase the production of wells in the district.

Agricultural and irrigation still represent 70 percent to 80 percent of the district's water demand. However, most of the service connections are now either domestic or rural residential. BVWD currently has 4,538 residential connections and 615 agricultural connections. Urban uses predominate in the southeast portion of the district where sewage disposal facilities are available. Residential uses, with lot sizes between 1 and 5 acres, are dispersed across the rest of the district. Agricultural uses are almost exclusively confined to the fertile soil along Stillwater Creek and Cow Creek. Pasture represents the bulk of agricultural use, although there is a broad range of other crops.

Centerville Community Services District The Centerville Community Services District (CCSD) was originally formed in September 1959 to supply water for domestic use, irrigation, sanitation, industrial use, fire protection, and recreation (California Government Code, Division 3, Community Services Districts, Section 61000, et seq.). The CCSD service boundary encompasses

11,278 acres in the unincorporated area of Shasta County immediately west of Redding.

The source of the district's water supply is Whiskeytown Lake, a key feature of the Trinity River Division of the CVP. This reservoir covers about 3,250 acres at maximum capacity and provides water storage of about 241 thousand acre-feet. The reservoir regulates the flows of the Clear Creek watershed and the imported flows from the Trinity River, which discharge through the Carr Powerhouse into the reservoir.

Designed and constructed by Reclamation, the district's water system dates back to 1967. Water is diverted to the district through two intakes in Whiskeytown Dam, one at an elevation of 1,110 feet and the other at an elevation of 965 feet. The ability to select the depth of the diverted water gives CCSD the capacity to draw less turbid water. The water is treated at a 30 mgd capacity plant located at the base of Whiskeytown Dam. CCSD shares the inline treatment facility with the Clear Creek Community Services District (CCCSD).

Treated water is distributed to the district through an aqueduct that begins at Whiskeytown Dam and terminates at a 250,000-gallon control tank about 8.5 miles south of the dam. This aqueduct, commonly called the Muletown Aqueduct (also Muletown Conduit), consists of about 27,500 feet of 45-inch pipe and 17,400 feet of 42-inch pipe buried along Muletown Road, paralleling Clear Creek. The steel pipe, lined and coated in coal tar, was installed in 1965.

CCSD has a contract with CCCSD that allocates CCSD a 25 percent share of the capacity. CCSD holds two contracts with Reclamation for a total allocation of 3,800 acre-feet per year. The first contract, entered into on April 11, 2001, is an assignment contract. This contract permanently assigned 2,900 acre-feet per year of CVP water from SCWA's 5,000 acre-feet per year contract with Reclamation. This contract carries with it those terms and conditions defined in SCWA's contract, which also includes a binding agreement for early renewal. The second contract, entered into on August 11, 2000, is an exchange contract. This contract with Reclamation for 900 acre-feet per year was intended to provide CCSD with substitute project water for its pre-1914 water rights on Clear Creek. The district does not have access to a groundwater supply source.

CCSD currently provides M&I water to 1,125 metered connections that serve a population of approximately 2,850.

Clear Creek Community Services District CCCSD was formed in 1961 and encompasses about 14,314 acres. The facilities were designed and constructed by Reclamation, and CCCSD began operating in 1967. CCCSD is located approximately 10 miles southwest of Redding and 6 miles west of Anderson in southern Shasta County. The district's service area includes the rural areas known as Olinda and Cloverdale. The general area served by the district is commonly known as Happy Valley.

The source and treatment of CCCSD water is the same as CCSD water; water from Whiskeytown Lake is treated and diverted to service connections via the Muletown Aqueduct. The distribution system within the district's boundaries consists of approximately 75 miles of pipe ranging in size from 2 inches to 45 inches. Title to the distribution line system was transferred to CCCSD on May 29, 2001.

CCCSD has one storage tank along the aqueduct with a capacity of 1 million gallons. A control tank with a 250,000-gallon capacity regulates pressure at the upper elevation of the district. A 32,000-gallon storage tank is located outside of the district boundary at the booster station facility.

The district has developed the first of three planned wells, and it has installed 13,800 feet of 18-inch pipeline to connect a groundwater supply to the distribution system. The first well attached to the distribution system (Well #1) became operational in October 1992. Well #1 and the two proposed wells are intended for use only when surface supplies are inadequate to meet emergency demands.

CCCSD currently provides service for approximately 5,817 acres of irrigated agricultural land and approximately 4,000 acres of rural residences receiving M&I water. Approximately 4,497 acres in the district are undeveloped. The majority of the developed agricultural property in the district is ditch or flood irrigated. The balance of irrigation is done by overhead and drip systems.

Shasta Community Services District The Shasta Community Services District (SCSD), located west of Redding, was formed in 1959 to supply water for domestic use and fire protection for the City of Shasta Lake and adjacent developed areas of the district (Community Services District Laws: California Governmental Code, Sections 61000 through 61934). Congress authorized a water system for the area as part of the Trinity River Division of the CVP. Bonds that were issued by SCSD to finance construction of the transmission and distribution systems have been repaid.

A long-term CVP water service contract provides up to 1,000 acre-feet annually. Water is supplied by gravity from Whiskeytown Lake via a turnout on the Spring Creek conduit. The Spring Creek conduit is the only source of supply, and there are only 0.30 million gallons of storage located near the source. Downstream from the turnout, a single transmission main serves as the backbone of the distribution system and most mains are not looped. Historically, SCSD has been vulnerable to disruptions in supply from its Reclamation contract. During the 1991 drought, Reclamation reduced SCSD's allotment by 25 percent to 750 acre-feet per year.

The district currently serves 630 connections. Virtually all of the active land use is residential or municipal, consisting primarily of ranchettes. Wells are not feasible because the district does not lie over an aquifer.

Shasta County Water Agency SCWA was formed in 1957 to develop water resources for Shasta County (Shasta County Water Agency Act (Legislative Act 7580)). SCWA evolved from the Shasta County Department of Water Resources, which organized Shasta County efforts in conjunction with the Trinity River Division of the CVP.

SCWA has assisted with the creation of BVWD, CCSD, CCCSD, and SCSD and helped create CSAs for water and sewer services in Shasta County. The agency also acts as staff to the Redding Area Water Council, a group that works to preserve the quality and quantity of water in the Redding groundwater basin. Funding for SCWA comes from Shasta County property taxes.

Other Shasta and Trinity River Divisions CVP Contractors Three smaller water districts (see below) are served by either the Shasta or Trinity River division of the CVP. The three districts constitute about 1 percent of the CVP long-term contract water supply to the divisions.

Keswick County Service Area The Keswick County Service Area (KCSA), located west of Redding, was formed in 1990 (California Government Code Sections 25210.1 through 25250). Previously, KCSA operated as the Keswick Community Services District, which was formed in the early 1960s to supply water for domestic use and fire protection for the town of Keswick and adjacent developed areas (California Government Code Sections, 61000 et seq.). The district boundary encompasses Keswick Dam and the Spring Creek Diversion Dam; however, these facilities are not served by the district.

Congress authorized a water system for the Keswick area as part of the Trinity Project Act (69 Stat. 719), and the facilities were constructed in 1965. A repayment schedule was established whereby the Federal government would be reimbursed by KCSA for delivery system construction costs. On completion of repayment, ownership of all project facilities were to remain with the Federal government.

The water source for KCSA is Whiskeytown Lake. Water is transported by gravity flow to a turnout on the Spring Creek conduit that is located upstream from the Spring Creek powerhouse. Two storage tanks provide 0.2 million gallons of storage.

A CVP water service contract provides for up to 500 acre-feet annually. KCSA serves about 195 connections, which are concentrated in the town of Keswick. Land served by KCSA is exclusively rural residential properties.

Mountain Gate Community Services District The Mountain Gate Community Services District (MGCSD) was initially formed in 1956 to provide water service for a 2-square-mile area north of the City of Shasta Lake (California Government Code, Sections 61000 et seq.). The water source for MGCSD is Shasta Lake. The distribution system consists of 29 miles of pipelines that serve

3,750 acres in MGCSD and Bridge Bay Resort (located between the Sacramento and McCloud arms of Shasta Lake on U.S. Forest Service land).

A CVP water service contract provides 350 acre-feet annually. District water supplies are supplemented by a contract with SCWA that provides 1,000 acre-feet annually. MGCSD also operates three wells that take water from a local aquifer. The wells supply nearly half of MGCSD's total needs. There is no water storage in the district.

MGCSD provides water service to 593 connections and fire protection services for its service area. Although the MGCSD primarily provides water for residential uses, it also serves municipal and industrial customers.

U.S. Forest Service The Toyon Pipeline, a Reclamation facility constructed by the USFS, originates from the left abutment of Shasta Dam and diverts water to a point near Government Camp at Toyon (west of the City of Shasta Lake). USFS operates and maintains the water diversion system, which includes pipelines, pumps, and meters (Figure 21-1).

USFS diverts water for the Centimudi Recreation Area located east/southeast of Shasta Dam. A memorandum of agreement between USFS and Reclamation provided USFS with up to 10 acre-feet of municipal, industrial, and domestic water diverted from the Toyon Pipeline before it reaches the City of Shasta Lake to supply the Centimudi Recreation Area. The Centimudi facilities continue to receive water under this memorandum of agreement.

Livingston Stone National Fish Hatchery The Livingston Stone National Fish Hatchery is located near the foot of Shasta Dam and is managed by the USFWS. The hatchery receives its water from the penstocks of Shasta Dam. Water flows through pipes fitted with pressure-reducing valves that pierce manhole covers near the bases of the penstocks. Then the water is routed via a buried pipeline to the hatchery, where it passes through a degassing device, flows through the hatchery, and then returns to the Sacramento River.

Other Users of Lake Water No other entities draw water directly from Shasta Lake for domestic or industrial uses. However, some marinas draw raw water from the lake for washing out boats. Return water drains back into the lake.

Shasta County Water supplies in Shasta County are provided by CVP, surface water diversions, and groundwater wells. The City of Redding uses groundwater wells for 40 percent of its water supply to supplement CVP water sources described in the preceding section. Maximum available groundwater production is approximately 19,000 acre-feet per year. Most city groundwater comes from 10 wells located near Redding Municipal Airport, within the Redding groundwater basin. These wells supply a maximum of 16.5 mgd. Four additional wells in the county supply a maximum of 0.7 mgd.

Tehama County Water supplies in Tehama County are provided by CVP, local surface water diversions, and groundwater wells. The recent trend in the county is a shift from reliance on CVP water supplies to groundwater supplies. There are more than 10,000 wells designated for domestic, irrigation, municipal, monitoring, and other uses in the county. CVP deliveries provide 21,300 acre-feet per year; local stream diversions provide 106,300 acre-feet in a normal water year; and groundwater provides approximately 382,000 acre-feet per year, which represents two-thirds of the county's irrigated water supply.

Red Bluff The City of Red Bluff obtains all of its water from 14 wells. It maintains a 3-million-gallon storage tank used for equalizing storage, fire flow, and emergency storage. The City of Red Bluff is in the process of seeking funding for an additional storage tank similar to the first. The wells produce between 500 and 2,500 gallons per minute, with the majority producing between 800 and 1,000 gallons per minute. Well depths range from 150 to 250 feet.

Other Nearby Uses The Chappie-Shasta Off-Highway Vehicle Area and residential and commercial uses in the community of Coram draw water from local groundwater wells.

Lower Sacramento River and Delta and CVP/SWP Service Areas The overall CVP/SWP water supply discussion describes the environmental setting for water supply for the extended study area. Other water supplies come from local surface water diversions and wells, which serve domestic, irrigation, municipal, and commercial uses. A detailed discussion of the overall CVP and SWP management and operations is provided in the PDEIS Chapter 6, "Hydrology, Hydraulics, and Water Management" and in the *Hydrology, Hydraulics, and Water Management Technical Report*.

21.1.2 Wastewater Infrastructure

Shasta Lake and Vicinity

Wastewater is treated and returned to the natural environment using one of several technical methods with either community or individual onsite disposal systems. Most residential, commercial, and recreational developments located in the Shasta Lake and vicinity portion of the primary study area use on-site septic tank/leachfield systems for wastewater treatment. Typically, individual homes, cabins, or businesses are routed to individual septic systems. Large resorts route septic from several buildings to a single tank/leachfield system. Campgrounds and public restrooms use either septic tank/leachfield systems or vault/pit toilets (Reclamation 2007). Marinas also use booster pumps to lift gray water to upslope leachfield areas. No large wastewater collection or treatment systems are located near Shasta Lake.

The highest concentrations of wastewater facilities near Shasta Lake are located in the Lakeshore and Sugarloaf areas, with a substantial number of facilities in

the Bridge Bay, Holiday Harbor, Salt Creek, Campbell Creek, Silverthorn, Jones Valley, Tsadi Resort, and Digger Bay Marina areas (Figure 21-2). The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the wastewater facilities in the ancillary areas near Shasta Lake (Reclamation 2007).

Upper Sacramento River (Shasta Dam to Red Bluff)

Many areas scattered throughout Shasta and Tehama counties are serviced by individual septic systems. The remaining wastewater treatment systems are a form of community collection, treatment, and disposal. The most common form of community system is the treatment plant, which discharges treated effluent to a storage and irrigation system (land disposal) or, diluted, to a surface watercourse.

Below Shasta Dam, a number of community wastewater systems are operated by the cities of Anderson, Redding, Red Bluff, and the City of Shasta Lake. Several unincorporated communities have community wastewater systems that are operated by CSAs.

Redding operates both the Clear Creek Wastewater Treatment Plant (WWTP) and Stillwater WWTP, both of which discharge treated effluent year around to the Sacramento River. The Clear Creek WWTP is currently permitted by the Central Valley Regional Water Quality Control Board to discharge up to 8.8 mgd of average dry-weather flow into the Sacramento River. The wastewater receives advanced secondary treatment. The Stillwater WWTP receives an average of 2.0 mgd of wastewater, approximately one-third of its design capacity of 6 mgd for average dry-weather flow. The Anderson WWTP discharges year around into the Sacramento River at a location approximately 0.25 mile from the Stillwater WWTP.

The City of Shasta Lake operates a large community wastewater system that is permitted to seasonally discharge treated effluent to surface water, namely Churn Creek; a major goal of the city's capital improvement plan has been to significantly reduce these discharges. Churn Creek eventually discharges to the Sacramento River about 0.5 mile upstream from the Stillwater WWTP.

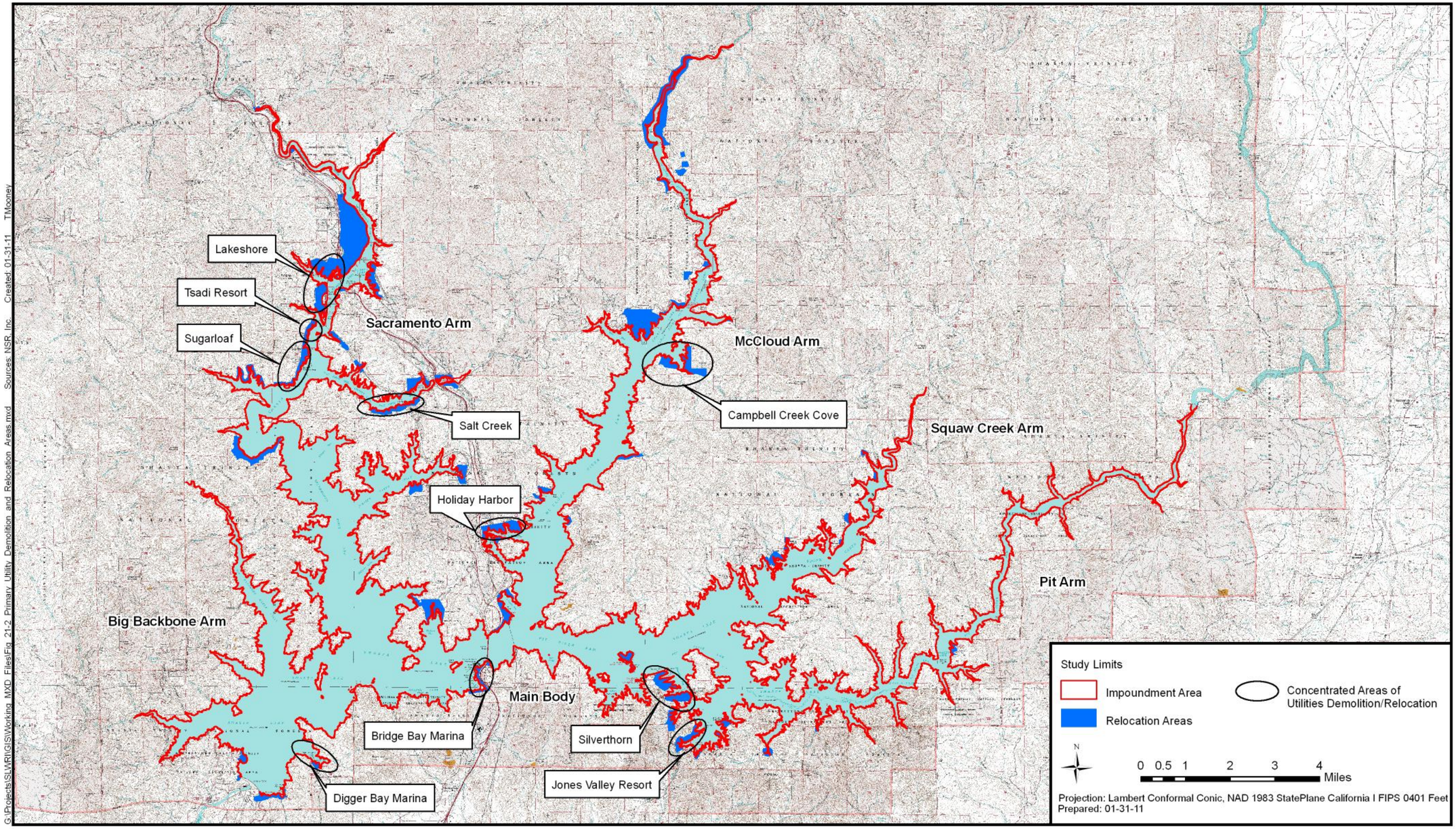

Figure 21-2. Primary Utility Demolition and Relocation Areas

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The Red Bluff WWTP has a treatment capacity of 4.8 mgd and discharges tertiary treated wastewater by gravity into the Sacramento River at approximately 1.4 mgd. The City of Red Bluff operates a wastewater treatment system at the south end of the city. The Rio Alto Water District provides wastewater treatment services for some portions of the community of Cottonwood. Septic/leachfield systems or seepage pits are used in areas not served by these systems.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Wastewater systems in the extended study area are similar to those discussed for the primary study area. Community wastewater service systems are provided through a collection network of gravity and force main sewer lines operated primarily by local utility agencies. Pump stations and lift stations augment sewer line networks. These conveyance systems terminate at wastewater treatment plants that discharge treated effluent to storage and irrigation systems (land disposal) or to surface watercourses where the treated effluent is diluted. Individual on-site wastewater treatment methods are also used where the land is able to accommodate a leachfield/septic tank system.

21.1.3 Stormwater Drainage and Infrastructure

Shasta Lake and Vicinity

Stormwater drainage is primarily a function of the precipitation and runoff characteristics of a watershed. About 6.5 percent (5.8 million acre-feet) of all surface runoff in the state of California originates in Shasta County, representing a substantial portion of the total surface runoff in the Sacramento River system. Runoff in the Shasta Lake and vicinity portion of the primary study area is discharged to the McCloud River, the Sacramento River, and the Pit River, which drain into Shasta Lake. Numerous creeks and small local tributaries also drain into Shasta Lake.

The California Department of Transportation maintains a stormwater drainage system along the Interstate 5 (I-5) corridor. Drainage facilities in developed communities include gutters, swales, ditches, culverts, storm drain inlets, catch basins, storm drainage pipes, and detention basins. Roads also channel stormwater drainage from residences, commercial, and industrial land uses to adjacent lands and stormwater drains.

Upper Sacramento River (Shasta Dam to Red Bluff)

Runoff in the upper Sacramento River portion of the primary study area is discharged to the Sacramento River directly and indirectly via numerous major creeks and small local tributaries in rural and urban areas. Stormwater drainage in undeveloped portions of Shasta and Tehama counties generally consists of natural swales and topographic features.

Stormwater collection systems are present in urban areas and developed communities. Drainage facilities in urban areas include gutters, swales, ditches,

culverts, storm drain inlets, catch basins, storm drainage pipes, canals, detention basins, and pump stations. Roads also channel stormwater drainage from residences and commercial and industrial land uses to adjacent lands and stormwater drains. The cities of Redding, Anderson, and Red Bluff and the City of Shasta Lake each operate municipal storm drainage systems in the city limits. The California Department of Transportation I-5 stormwater drainage system continues along I-5 in the upper Sacramento River area.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Stormwater systems in the extended study area are similar to those discussed for the primary study area. Various storm drainage facilities and collection/conveyance systems are located throughout the extended study area. Stormwater facilities and infrastructure are operated primarily by local districts and road departments, and include gutters, swales, ditches, culverts, storm drain inlets, catch basins, storm drainage pipes, canals, detention basins, and pump stations. Treated stormwater is often discharged to rivers, tributaries, and major creeks throughout the extended study area.

21.1.4 Solid Waste Management

Shasta Lake and Vicinity

Contractors, under the auspices of Shasta County, provide solid waste disposal services for the private sector. The Shasta-Trinity National Forest (STNF), Reclamation, and California Department of Transportation use contractors to provide disposal services for facilities on public lands. A number of sites are used to collect solid waste and recyclables, which are later transferred to landfills or recycling centers in the extended study area, primarily in Shasta County.

Upper Sacramento River (Shasta Dam to Red Bluff)

The Shasta County Department of Public Works is responsible for providing solid waste management in unincorporated areas of the county. Three landfills (West Central Landfill, Anderson Landfill, and Twin Bridges Landfill) and 11 collection/transfer stations are currently operating in Shasta County. Shasta County generated 187,909 tons of solid waste in 2006; however, 307,568 tons of solid waste were disposed of in the county during the same period (CIWMB 2008).

In 2006, the 1,200-acre West Central Landfill received approximately 417 tons per day (CIWMB 2008) of nonhazardous waste from residential, commercial, industrial, and agricultural sources. This Class III landfill has a permitted capacity of 7,078,000 cubic yards and a storage area of 107 acres. In 2001, the State of California estimated that the landfill had a remaining capacity of 6,606,000 cubic yards (CalRecyle 2010). Under existing State permits, the landfill has sufficient capacity to accommodate the disposal of solid waste at least until the year 2019. In 2006, the 246-acre Anderson Landfill, a Class III landfill and asbestos-containing waste disposal site, received approximately 426

tons of solid waste per day (CIWMB 2008). This landfill has a permitted capacity of 16,840,000 cubic yards, and in 2008 the State of California estimated that the landfill had a remaining capacity of 11,914,000 cubic yards (CalRecycle 2010). The estimated year of closure is 2055. The Twin Bridges Landfill is a Class II landfill that has ceased accepting solid waste and is undergoing closure (CIWMB 2008).

Tehama County operates the 102-acre Tehama County/Red Bluff Sanitary Landfill, located approximately 2.5 miles northwest of Red Bluff. This landfill, a Class III facility, has a maximum permitted daily capacity of 400 tons (CIWMB 2008). This landfill has a permitted capacity of 5,097,000 cubic yards, and in 2008 the State of California estimated that the landfill had a remaining capacity of 2,149,000 cubic yards (CalRecycle 2010). The estimated year of closure is 2040. The landfill is owned by the Tehama County Sanitary Landfill Association, a joint-powers authority composed of Tehama County and the cities of Red Bluff, Corning, and Tehama. The Tehama County/Red Bluff Landfill Management Agency oversees daily landfill operations at the Tehama County/Red Bluff Landfill and at the Material Recovery Facility. Tehama County/Red Bluff Landfill Management Agency is another joint-powers authority and is composed of Tehama County and the City of Red Bluff. This agency is also responsible for maintaining permits and monitoring environmental compliance at the landfill.

In addition to the landfill and material recovery facilities, Tehama County operates two household hazardous waste facilities, in Corning and Red Bluff, and four transfer stations in the outlying rural areas of Manton, Payne's Creek, Mineral, and Rancho Tehama. There are no facilities authorized to accept commercial hazardous waste within the primary study area.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Solid waste services and infrastructure in the extended study area are similar to those discussed for the primary service area. Urban centers in the extended study area may generate more solid waste than the population centers in the primary study area; however, the mechanisms used for transfer and disposal of the waste are similar. Solid waste facilities, including landfills and transfer stations, provide pickup and disposal services. There are three commercial hazardous waste disposal facilities authorized to accept various types of commercial hazardous waste in the extended study area. These facilities are located in Kings, Kern, and Imperial counties. Only the facility in Kings County is certified to accept materials that contain polychlorinated biphenyls.

21.1.5 Electrical Service and Infrastructure

Shasta Lake and Vicinity

Pacific Gas and Electric Company (PG&E) provides electrical service to Shasta Lake and vicinity. This service area is part of a larger PG&E territory, which encompasses 70,000 square miles in northern and central California, from

Eureka in the north to Bakersfield in the south. Power transmission facilities serving the Shasta Lake and vicinity portion of the primary study area have developed mostly parallel to I-5 and adjacent to developed communities.

Currently, PG&E is capable of providing three-phase power parallel to the I-5 corridor, north to Bridge Bay and south from Lakehead to Turntable Bay. Power lines around Shasta Lake are typically routed overhead on utility poles or towers, although a portion of the lines serving individual businesses, homes, and cabins are routed underground. Power lines serving the Shasta Lake and vicinity portion of the primary study area are frequently attached to bridges when routed over rivers and lake inlets. The voltage of local distribution lines is typically 12 kilovolts (kV), whereas the voltage of high-voltage power transmission lines is typically 60 kV to 230 kV. Service to individual homes and businesses is typically 120 volts to 480 volts.

The highest concentrations of electrical service facilities near Shasta Lake are in the Lakeshore and Sugarloaf areas, with a substantial number of facilities in the Bridge Bay, Holiday Harbor, Salt Creek, Campbell Creek, Silverthorn, Jones Valley, Tsadi Resort, and Digger Bay Marina areas (Figure 21-2). The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the electrical service facilities in the ancillary areas near Shasta Lake (Reclamation 2007).

Upper Sacramento River (Shasta Dam to Red Bluff)

Electrical service and related infrastructure in the upper Sacramento River portion of the primary study area are similar to those discussed for the Shasta Lake and vicinity portion. The City of Shasta Lake, city of Anderson, outlying rural areas of Shasta County, and Tehama County (Red Bluff and Corning) receive electrical service from PG&E.

The City of Redding owns and operates a looped 115 kV system, which delivers energy to 11 115/12 kV distribution substations that step the voltage down to 12 kV for delivery to the city's customers. The system is managed by the Redding Electric Utility. In total, Redding's distribution system has 67.3 miles of 115 kV local transmission lines and approximately 610 miles of overhead and underground 12 kV distribution lines. Delivery of all power from outside the city is made to the Redding Municipal Airport 230/115 kV transmission substation and to the Keswick Dam switch yard. Redding jointly owns the airport substation with the Western Area Power Administration. The Western Area Power Administration owns and operates the Keswick switching substation and an electrical transmission line that runs north and south along the western side of the City of Redding and the City of Shasta Lake.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Electrical services and infrastructure in the extended study area are similar to those discussed for the primary study area. Power generation and transmission facilities have developed parallel to population centers, power, natural gas,

nuclear, oil, hydroelectric, wind, solar, and other technologies used for power production.

Infrastructure in the Sacramento River basin downstream from the Red Bluff Diversion Dam, the American River basin, and the San Joaquin River basin consists primarily of natural gas–fired and hydroelectric generating facilities, transmission lines, substations, and distribution lines. In the Sacramento–San Joaquin River Delta, PG&E and the Western Area Power Administration have developed power transmission lines across Delta islands and waterways. Many of the corridors are within the periphery of the Delta upland areas, including several natural gas–fired plants. There are no power-generating facilities in the central Delta. In other portions of the CVP and SWP service areas, a complex system of electrical generating facilities, substations, and transmission infrastructure exists.

21.1.6 Natural Gas Service and Infrastructure

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

PG&E is responsible for providing natural gas service to the primary study area. Gas is delivered to customers below Shasta Dam, including residents of the cities of Redding, Anderson, and Red Bluff and the City of Shasta Lake. Although the study area is bisected by a large PG&E natural gas pipeline, service varies based on PG&E's distribution system. No natural gas facilities are present in the Shasta Lake and vicinity portion of the primary study area.

A number of rural residences and businesses in the primary study area rely on propane for various purposes. Propane is supplied by various local providers to individual on-site tanks. Propane tanks for homes and businesses are portable and are typically leased (Reclamation 2007).

Lower Sacramento River and Delta and CVP/SWP Service Areas

Natural gas services and infrastructure are located throughout the extended study area and are supplied by various energy providers. Pipelines, storage areas, and compressor stations are located in the Sacramento River and San Joaquin River valleys and in the CVP/SWP service areas. Natural gas discovered in the Delta region has been developed into a significant supply source and depot for underground storage. Gas fields, pipelines, and related infrastructure have been developed throughout the CVP/SWP service areas. Natural gas infrastructure is owned by oil and gas companies, public utilities, and various independent leaseholders.

21.1.7 Telecommunications

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Landline telephone service in the primary study area is provided by various commercial communications companies. The majority of the landline facilities

are located in county- or city-owned rights-of-way and on private easements. Telecommunications lines are either copper wire or fiber optic cable and are routed overhead on utility poles and underground. Telephone lines are frequently attached to bridges when routed over rivers and lake inlets. There are no transcontinental fiber optic lines in the Shasta Lake and vicinity portion of the primary study area.

In addition to landline service, a large number of communications towers have been constructed throughout the primary study area for cellular phone service. Cellular towers have been erected along major travel corridors to meet emergency service objectives. Cellular service is available, to varying degrees, throughout the service area.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Telecommunications systems in the extended study area are similar to those discussed for the primary study area and are supplied by various providers. Associated infrastructure is located throughout the extended study area and consists of underground fiber optic cable, telephone transmission lines (overhead and underground), and cellular towers owned or leased by telecommunications service providers.

21.2 Regulatory Framework

21.2.1 Federal

Reclamation Act

The 1902 Reclamation Act authorized the Federal government to finance and build water supply projects. The act set up the Reclamation Fund to finance single-purpose irrigation projects in the western United States. Since that time, water supply projects and the financing needed to construct and maintain infrastructure have grown substantially. The act has been amended several times, most recently in 1982 with the passage of the Reclamation Reform Act.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was passed to protect public health by regulating the nation's drinking water supply. The law requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. Originally, the SDWA focused on water treatment as the primary means to provide safe drinking water at the tap. In 1996, amendments to the SDWA expanded the act to include source water protections.

The U.S. Environmental Protection Agency (EPA) is responsible for administering the act. EPA establishes National Primary Drinking Water Regulations for contaminants that may cause adverse public health effects. These regulations set maximum contaminant levels and nonenforceable health

goals (called Maximum Contaminant Level Goals) for recognized contaminants.

The SDWA does not regulate private wells that serve fewer than 25 people. However, the act does apply to all public water systems. A public water system is one that provides water for public consumption that regularly serves at least 25 people or has at least 15 service connections. This includes facilities such as resorts and marinas.

Clean Water Act

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. The act regulates discharges of pollutants into the waters of the United States. EPA is responsible for administering waste discharge permits under the National Pollutant Discharge Elimination System. M&I wastewater facilities that discharge effluent into surface waters are required to obtain National Pollutant Discharge Elimination System permits. Large and medium storm sewer systems also require a National Pollutant Discharge Elimination System permit. The stormwater permits often require implementation of a pollution prevention plan to prevent contaminants from reaching surface waters.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) is designed to provide "cradle to grave" control of hazardous waste by imposing management requirements on generators and transporters of hazardous wastes and on owners and operators of treatment, storage, and disposal facilities. The RCRA also applies to the management of nonhazardous solid waste through the municipal solid waste landfill. EPA is responsible for administering the RCRA.

Shasta-Trinity National Forest Land and Resource Management Plan

The STNF Land and Resource Management Plan (LRMP) identifies goals, standards, and guidelines related to utilities and service systems in the Shasta-Trinity National Forest. The following public services goals, standards, and guidelines related to the project area were excerpted from the LRMP (USFS 1995).

Facilities Goals:

- Provide and maintain those administrative facilities that effectively and safely serve the public and Forest Service workforce.

Facilities Standards and Guidelines:

- Manage, construct, and maintain buildings and administrative sites to meet applicable codes and to provide the necessary facilities to support resource management.

Lands Goals:

- Provide for continued use and new development of hydroelectric facilities.

Lands, Special Uses Standards and Guidelines:

- Do not approve special use applications if such use can reasonably be accommodated on private land.
- Bury new telephone lines and new or reconstructed power distribution lines less than 35 kV, unless:
- Visual quality objectives (VQO) can be met without burying,
- Geologic conditions make burying infeasible, and
- Burying will produce greater long-term site disturbance.

Whiskeytown-Shasta-Trinity National Recreation Area Management Plan

- Road construction will be restricted to that which is compatible with the purpose of the NRA and to provide essential private land access.
- Road closures will be implemented as opportunities arise in order to decrease road density and associated wildlife disturbance.
- No additional roads will be constructed for timber harvest.
- Any timber harvest must be consistent with NRA goals and objectives.
- All developments and long-term activities in the NRA will be designed with the intent of meeting VQOs. Those objectives include areas designated as retention, partial retention, and modification.
- Management activities that can be seen from within developed recreation sites will meet a VQO of retention in the foreground and partial retention in the middle ground.
- Best management practices and soil quality standards apply to all management activities.
- Riparian reserve standards and guidelines apply to all management activities within riparian reserves.

21.2.2 State

California Water Plan

The California Water Plan provides a framework for water supply planning for the state. It identifies and evaluates existing and proposed statewide demand, water supply programs, and projects to address the state's water supply needs.

DWR is responsible for the preparation of the California Water Plan and the management of the state's surface water and groundwater resources. DWR also oversees California's SWP and the regulation and protection of dams, assists local agencies in preparing urban water management plans, and reviews the plans to ensure compliance with the Urban Water Management Act.

The State Water Resources Control Board (SWRCB) has broad authority over water rights and regulations for the state. SWRCB and its nine regional water quality control boards administer water rights and enforce pollution control standards throughout the state. SWRCB is responsible for granting water rights through an appropriation process following public hearings and requisite environmental review by applicants and responsible agencies. In granting water rights permits, SWRCB must consider all beneficial uses, including water for downstream human and environmental needs.

Water suppliers must obtain a permit from the Department of Public Health, Office of Drinking Water, for a community water system, defined as a "public water system that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents of the area served by the system" (42 Code of Federal Regulations Section 300f).

Water Quality Control Plan for the Sacramento and San Joaquin River Basins

The Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) provides guidance for wastewater and stormwater facilities and development that could affect water quality in the basins. Basin Plan objectives are incorporated into county and city general plans, zoning ordinances, building codes, and subdivision ordinances. Central Valley Regional Water Quality Control Board is responsible for issuing and enforcing waste discharge requirements, including discharge prohibitions and user reuse requirements for wastewater reclamation projects.

Nonhazardous Solid Waste Disposal Standards

Title 14, Chapter 3, of the California Code of Regulations provides minimum standards for solid waste handling and disposal in California and pertains to nonhazardous solid waste management. The California Department of Resources Recycling and Recovery is a new department in the California Natural Resources Agency that administers the programs formerly managed by the California Integrated Waste Management Board, including the regulation of nonhazardous solid waste facilities in the state.

Hazardous Waste Control Act

The California Hazardous Waste Control Act governs hazardous waste management and cleanup in California (Health and Safety Code, Ch. 6.5–6.98). The act mirrors the RCRA and imposes a "cradle to grave" regulatory system for handling hazardous waste in a manner that protects human health and the environment. County Environmental Health Departments and California

Environmental Protection Agency Certified Unified Program Agencies assume responsibility for enforcing local hazardous waste reporting requirements. Sites that store, handle, or transport specified quantities of hazardous materials are inspected annually. California Environmental Protection Agency, Department of Toxic Substances Control, regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the RCRA and the State Hazardous Waste Control Act.

California Public Utilities Code

The California Public Utilities Code has broad regulatory authority over public utilities in California, which include electrical utilities, mutual water companies, private energy producers, telephone corporations, and railroad corporations. The California Public Utilities Commission is the government body that administers the California Public Utilities Code. The California Public Utilities Commission issued Order-95 to provide safety standards for construction of power transmission facilities.

21.2.3 Regional and Local

City and County General Plans

The general plans for the counties and cities in the primary and extended study areas contain policies regarding utilities and services systems. Water supply, wastewater treatment, solid waste disposal, and utilities are subjects covered in the general plans and are considered essential public services required by all types and densities of development.

21.3 Environmental Consequences and Mitigation Measures

21.3.1 Methods and Assumptions

Evaluation of potential utility and services system impacts was based on a review of planning documents pertaining to the primary and extended study areas, including the STNF LRMP, Department of Toxic Substances Control databases, and the general plans for the cities of Redding and Red Bluff, the City of Shasta Lake, and Shasta and Tehama counties. The analysis also uses an inventory of utilities and service system infrastructure in the primary study area as it relates to the SLWRI.

Effects on water supply in the Shasta Lake and vicinity portion of the primary study area were evaluated based on construction and operational activities that would result from project implementation. It was generally assumed that construction activities associated with modifying Shasta Dam could result in short-term effects on the delivery of local water supplies if the surface elevation of the reservoir were lowered to accommodate construction. A long-term effect would result if project operation would create a substantial disruption or reduction in the distribution or quantity of water supply.

Impacts on utilities and service systems were evaluated based on the duration and extent to which such services would be affected, as well as the ability of the service provider to continue to provide a level of service that could meet the needs of the public. The evaluation compares the duration of the effect with the service provided, taking into account the ability of the provider to maintain necessary services through alternative means.

21.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an Environmental Impact Statement must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project (CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (CEQA Guidelines, Section 15126.4(a)).

The following significance criteria were developed based on guidance provided by State CEQA Guidelines and consider the context and intensity of the environmental effects as required under NEPA. An alternative was determined to result in a significant effect related to utilities and service systems if it would result in any of the following:

- Not comply with published local, State, or Federal statutes, regulations, or standards relating to solid waste
- Exceed permitted landfill capacity with waste generated by the project
- Degrade the level of service of a public utility or services system
- Require relocating utility infrastructure
- Exceed wastewater treatment requirements of the applicable SWRCB
- Exceed water supplies available to service the project from existing entitlements and resources, such that new or expanded entitlements would be needed
- Disrupt utilities service to create a public health hazard or extended service disruption

- Require substantial improvements to the infrastructure or level of staffing of a utility or services system to maintain its existing level of service

- Require or result in the construction of new water treatment, wastewater treatment, or stormwater drainage facilities, or the expansion of such existing facilities, the construction of which could cause significant environmental effects

21.3.3 Topics Eliminated from Further Consideration

The action alternatives would increase availability of water supply for water users on the Sacramento River and Delta. Increased water supplies might increase demand for new or expanded wastewater plants that discharge to the Sacramento River or Delta. SWRCB has review, approval, and permitting authority over operation of new or expanded wastewater treatment plants, and the environmental effects of approving wastewater treatment plants must be evaluated under CEQA. If approved, wastewater treatment plants must operate within the limits established in the waste discharge requirements issued by SWRCB. Although increased water supplies might increase demand for new or expanded wastewater plants that discharge to the Sacramento River or Delta, it is speculative to assume that SWRCB would approve new or expanded wastewater treatment plants. Therefore, increased discharge of treated wastewater into the Sacramento River or Delta that is not currently authorized as a result of this project (and that has not already been evaluated under CEQA) is not reasonably foreseeable and is eliminated from further consideration.

21.3.4 Direct and Indirect Effects

Utilities and service system impacts in the Shasta Lake and vicinity and upper Sacramento River (Shasta Dam to Red Bluff) of the primary study area caused by project construction and operation are described below. Only minimal, if any, project-related impacts to utilities and service systems are expected to occur downstream from Red Bluff Diversion Dam or in the remainder of the extended study area.

No-Action Alternative

Shasta Lake and Vicinity, Upper Sacramento River (Shasta Dam to Red Bluff), Lower Sacramento and Delta, and CVP/SWP Service Areas The impact discussion for the No-Action Alternative addresses all three study areas together, because this alternative would not impact utilities in either of the three study areas.

Impact Util-1 (No-Action): Damage or Disruption of Public Utility and Service Systems Infrastructure Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no damage to public utilities infrastructure or temporary disruption of services in the vicinity of Shasta Lake would occur from

implementing the No-Action Alternative. There would be no impact. Mitigation is not required for the No-Action Alternative.

Impact Util-2 (No-Action): Utility Infrastructure Relocation or Modification Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, relocation or modification of existing utilities infrastructure in the vicinity of Shasta Lake would not occur from implementing the No-Action Alternative. There would be no impact. Mitigation is not required for the No-Action Alternative.

Impact Util-3 (No-Action): Short-Term Increase in Solid Waste Generation Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no solid waste would be generated as a result of implementing the No-Action Alternative. There would be no impact. Mitigation is not required for the No-Action Alternative.

Impact Util-4 (No-Action): Increases in Solid Waste Generation from Increased Recreational Opportunities Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no solid waste associated with increased recreational opportunities would be generated as a result of implementing the No-Action Alternative. There would be no impact. Mitigation is not required for the No-Action Alternative.

Impact Util-5 (No-Action): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, increased demand for water treatment and distribution facilities related to increases in water supply would not occur from implementing the No-Action Alternative. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Utilities and service systems impacts would occur primarily in the Shasta Lake and vicinity portion of the primary study area. The majority of impacts identified would be short-term impacts resulting from the abandonment and relocation of utilities and service systems. Individual utilities or service systems are discussed where project detail is available. However, stormwater, wastewater, solid waste management, and water supply systems are also referred to as service systems when a general reference to all of the systems would be appropriate; and electrical service and infrastructure, natural gas service and infrastructure, and telecommunications service and infrastructure are referred to as utilities when a general reference to all of the utilities would be appropriate.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP1 addresses the Shasta Lake and Vicinity and Upper Sacramento River study areas together, because impacts from construction activities would affect both study areas.

Impact Util-1 (CP1): Damage or Disruption of Public Utility and Service Systems Infrastructure Project construction activities could damage public utility and service systems infrastructure, which could result in short-term disruptions of service. Construction activities would occur in areas proposed for utilities or service systems abandonment and relocation. Project implementation could require disruption of public utilities or service systems to accommodate construction activity. This impact would be potentially significant.

The quantity of utility and service systems infrastructure relocation varies for the developed areas in the general vicinity of Shasta Lake. The bulk of the work would be done along the shores of the Sacramento Arm, the most developed portion of Shasta Lake. Utility abandonment and relocation would take approximately 36 months. Some service systems construction would occur in the upper Sacramento River portion of the primary study area, primarily at the Shasta Dam compound. Disruptions of utilities service in the upper Sacramento River area could result from project implementation and are discussed below.

Project construction activities associated with abandonment and relocation of utilities and service systems infrastructure could damage existing public utility lines. Excavation activities, vegetation clearing, and heavy equipment operations could accidentally damage utility lines or service system pipes/ditches, which could result in a disruption of public utilities or service systems.

Reclamation inventoried utilities and service systems on lands surrounding Shasta Lake that could be inundated by an increased reservoir elevation. Based on Reclamation's inventory, a 6.5-foot raise in the level of Shasta Lake would require abandonment and relocation of approximately 31,000 feet (5.8 miles) of power lines and 35,000 feet (6 miles) of telecommunications lines. Power and telecommunications facilities that could be inundated and that would require relocation include transmission towers, power poles, underground power and telecommunications lines, above-ground power and telecommunications lines, and cable lines. Approximately 20 percent of the power transmission facilities that could be inundated would consist of high voltage power lines; the remaining 80 percent would consist of low voltage power lines. Numerous individual onsite wastewater systems and stormwater systems (primarily adjacent to roads) would be relocated to areas that would not be affected under CP1 (Figure 21-2). The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the utilities in the ancillary areas that would need to be demolished or relocated (Reclamation 2007).

Disruptions in services resulting from damage to utility lines would likely be localized because the majority of power and telecommunication lines that would require relocation serve the local population around Shasta Lake. Reclamation or project contractors would likely repair potential infrastructure damage immediately after discovery of the damage. Therefore, disruptions of public utilities in the Shasta Lake and vicinity portion of the primary study area would not continue for extended periods of time. However, periodic service disruptions could occur throughout the 36-month construction period, which could inconvenience the local population.

Project construction activities associated with raising Shasta Dam could damage existing public utilities infrastructure and result in disruptions of public utilities service in the primary study area. Activities that could damage public utilities at the dam and result in disruptions of service include drilling activities, heavy equipment operations, and other worksite accidents. As explained above, infrastructure damage would be repaired immediately. If hydropower generation is interrupted at Shasta Dam, repair time could be extended and there would be prolonged impacts to the upper Sacramento River portion of the primary study area.

Public utilities or service systems could be disrupted during construction activities that require a temporary shut-off for safety or mechanical purposes. This effect would be most likely to occur in the Shasta Lake and vicinity portion of the primary study area because of the amount of project construction in that area relating to local utilities and service systems relocation activities. Occasional disruptions of public utilities could also occur in the upper Sacramento River area because of construction activities at Shasta Dam that require temporary power outages. Construction activities in the immediate vicinity of the Shasta Dam compound could occasionally impact the treatment and delivery of water to the City of Shasta Lake. This impact would be short term and would continue intermittently until project construction activities were completed. Construction would take approximately 36 months.

To minimize potential disruption of service and damage to the utilities and service systems infrastructure, project contractors would follow local, State, and Federal regulations pertaining to utilities and service systems location and construction. However, the magnitude of the project and number of utilities and service systems requiring relocation make it likely that utilities or service systems could be damaged or services disrupted. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP1): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, air quality, water quality, and utilities service. This impact would be potentially significant.

In general, short-term impacts that could result from relocation of utilities infrastructure would be localized (Shasta Lake and vicinity) and could include disruptions caused by noise, traffic, and dust associated with construction activities. Relocation of utilities infrastructure could result in localized long-term impacts related to visual quality, land use, vegetation, transportation, water quality, air quality, noise, and wildlife in the Shasta Lake and vicinity portion of the primary study area; these impacts are discussed in separate Environmental Impact Statement/Environmental Impact Report chapters. Some utilities infrastructure would also be modified in the upper Sacramento River portion of the primary study area, particularly in the general vicinity of the Shasta Dam compound.

As discussed in Impact Util-1 (CP1), project construction and operation would result in relocation and/or modification of utilities infrastructure at Shasta Dam and in communities in the Shasta Lake and vicinity portion of the primary study area (Figures 21-1 and 21-2). The infrastructure components include water and wastewater service and electrical infrastructure, telephone lines, and cable lines. Proposed infrastructure relocation was based on (1) whether utilities components would be inundated by an increased lake elevation and (2) whether the inundation would warrant relocation or permanent abandonment.

The largest potentially impacted residential developments near Shasta Lake are in the Lakeshore and Sugarloaf areas. Recreational facilities (e.g., campgrounds and marinas) would also change substantially. The quantity of services and utilities infrastructure reconstruction varies around Shasta Lake with an emphasis on the Sacramento, McCloud, and Pit arms as well as the Main Body. Abandonment and relocation of utilities infrastructure would take 36 months. The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the utilities in the ancillary areas that would need to be demolished or relocated (Reclamation 2007).

Consistent with Shasta County Development Standards, septic systems within 200 feet of the new full pool waterline or 100 feet downslope of the new full pool waterline would be demolished. Wastewater pipes, septic tanks, vaults/pits, and leachfields would be abandoned in place, and restroom buildings and contents would be removed and taken to an approved landfill. Relocation of septic systems in the project area would be done in one of two ways: (1) construct new septic systems on the property of the impacted home or facility, where feasible, or (2) define a possible localized wastewater treatment plant alternative for homes that do not meet Shasta County requirements for septic system separation from the lake. The general wastewater treatment plant would include a pressurized sewer collection system to transport wastewater flows to several centralized package wastewater treatment plants. Localized wastewater treatment plants would likely be constructed to serve the areas of Salt Creek, Sugarloaf/Tsadi Resort, Lakeshore (possibly several plants), Antlers Campground, Campbell Creek Cove, Bridge Bay Marina, Silverthorn Resort, and Jones Valley.

Wastewater treatment plant operation can result in undesirable environmental effects. For example, discharge of treated wastewater could impact the water quality of Shasta Lake, pump stations could generate unwanted noise, and the treatment process could generate undesirable odors. The environmental impacts of constructing and operating wastewater treatment facilities are evaluated in the pertinent technical chapters of the Environmental Impact Statement/Environmental Impact Report.

Power lines and telecommunications lines usually follow parallel alignment and typically use the same power pole. Some of the utility lines serving individual houses, businesses, government facilities, and cabins are routed underground. All transmission towers, power poles, underground power lines, and telecommunications lines that would be inundated under CP1 would need to be removed and relocated.

Low-voltage power lines, telecommunications lines, or power poles located within 50 feet of the CP1 maximum lake elevation would be considered threatened by inundation, and high voltage power lines and towers located within 100 feet would be considered inundated. Relocation of utilities infrastructure would be consistent with applicable local, State, and Federal requirements.

CP1 would inundate 31,060 feet (approximately 5.8 miles) of power lines and 35,000 feet (about 6 miles) of telecommunications lines near Shasta Lake. All associated transmission towers, power poles, underground power lines, telecommunications lines, and cable lines that would be inundated under CP1 would need to be removed and relocated.

Relocation of infrastructure would include vegetation removal, which would result in project impacts. Clearing of vegetation would be required to provide space for utilities structures and to create a safety buffer. Reclamation would clear the appropriate space for utilities infrastructure as provided by local, State, and Federal regulations. Additional space could be cleared to provide the highest level of safety for project operation and maintenance. In addition, Reclamation would apply the National Electric Safety Code, a voluntary safety code followed by the utilities industry, to ensure that relocated infrastructure would operate as safely or safer than existing utilities. Widths of vegetation clearance would range from 40 to 75 feet. Cleared areas could be wider, depending on site-specific conditions, such as on steep slopes or when tall trees are nearby.

Impacts resulting from vegetation clearing associated with relocation of utilities infrastructure would be minimized where possible. When possible, Reclamation would locate utilities corridors in sites that are not heavily forested to minimize vegetation clearing. Where heavily forested areas cannot be avoided for relocation of utilities infrastructure, Reclamation would coordinate vegetation removal with USFS and other landowners/managers to minimize impacts.

Relocation of utilities infrastructure would require additional roads for construction and maintenance of the new facilities. Roads would be constructed in the rights-of-way of the cleared utility lines and would be constructed according to the appropriate jurisdiction's standards (i.e., USFS or Shasta County). New roads serving relocated utilities infrastructure would be located and designed to prevent erosion and avoid geologic hazards.

As discussed in Chapter 20, "Transportation and Traffic," some work in the road relocation areas could require a road closure with detours, lane closures, or a combination of both. Road closures would temporarily impede access to local connector roads and recreational land uses, affecting residents, local recreational and nonrecreational businesses, and visitors to Shasta Lake.

To minimize potential impacts resulting from relocation of utilities infrastructure, Reclamation and project contractors would follow local, State, and Federal regulations pertaining to installation of utilities infrastructure, the STNF LRMP standards and guidelines, and the Shasta County General Plan and zoning guidance. Before vacating a street or public service easement, the Shasta County Board of Supervisors must consider applicable consistency with the general plan. Shasta County Streets and Highways Code Section 8313 and Public Utilities Code Section 12808.5 require cities and counties approving electrical transmission and distribution lines of municipal utilities districts to make a finding concerning the consistency of the lines with the general plan.

Reclamation is committed to funding the demolition and relocation of existing infrastructure and construction of replacement infrastructure, including localized wastewater treatment plants that might replace some individual septic systems. Reclamation is also committed to facilitating establishment of community services districts and transferring plant ownership to the districts, which would be responsible for long-term operation and management.

Project implementation would result in relocation or modification of utilities infrastructure. The extent of relocation of utilities infrastructure and/or modification that would be necessary could result in short-term impacts on noise, traffic, and utilities services; and project implementation could result in long-term impacts on land use, wildlife, water quality, and soils. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP1): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

Demolition and construction activities would generate waste materials, including concrete, metal, and other materials from the dam renovation;

structural metal, concrete, and wood from demolished bridges and buildings; concrete and asphalt from relocated boat launch facilities; unusable recreation equipment from relocated campgrounds and picnic areas; cables, pumps, wiring, and power towers from utility relocations; and scrap material generated as a byproduct of construction. Demolition and construction waste for CP1 would total about 176,627 cubic yards. Reclamation's contractors will take measures to recycle or reuse demolished materials, such as steel or copper wire, where practical. Therefore, some of the demolition and construction waste would be brought to nearby recycling facilities. Hazardous materials (e.g., asbestos, if found) would be brought to an approved hazardous waste landfill for disposal. Much of the underground utilities and service systems proposed for abandonment would be abandoned in place and would not be removed to a landfill or recycling facility.

Table 21-1 provides a summary of project-generated solid waste for the five action alternatives.

Table 21-1. Waste Generated by Project Construction

Feature	Estimated Volume (cubic yards)		
	CP1	CP2	CP3, CP4, CP5
Vehicle bridge replacements	10,700	10,700	10,700
Doney Creek UPRR bridge replacement	4,718	4,718	7,334
Sacramento River UPRR second crossing	15,558	15,558	15,558
Pit River Bridge piers 3 and 4 protection	0	0	0
Railroad realignment	2,420	2,420	2,420
Major road relocations	10,980	20,659	23,516
Reservoir area utilities (removals/relocations)	1,364	3,251	4,070
Reservoir area recreation (removals/relocations)	99,240	102,076	105,220
Main dam	2,263	1,553	1,553
Outlet works	388	388	388
Spillway	18,305	16,590	12,765
Temperature control device modification	20	20	20
Powerplant and penstocks	0	0	0
Right wing dam	531	511	511
Left wing dam	8,630	8,630	8,630
Visitor Center Replacement	1,510	1,510	1,510
Reservoir area dikes	0	0	0
Pit 7 modifications	0	0	0
Total	176,627	188,584	194,195

Key:
CP = Comprehensive Plan
UPRR = Union Pacific Railroad

Two landfills are currently operational in Shasta County: the West Central Landfill and the Anderson Landfill. The West Central Landfill, in the City of Redding, is the closest facility to Shasta Dam and would likely receive the majority of solid waste generated during construction. This landfill has sufficient permitted capacity to accommodate solid waste disposal needs during construction of the project. CP1 would generate roughly 176,627 cubic yards of solid waste; however, the West Central Landfill has a remaining capacity of approximately 5,000,000 cubic yards, and the Anderson Landfill has a remaining capacity of approximately 11,000,000 cubic yards. Recycling of demolition and construction waste materials would further reduce the volume of waste disposed at landfills.

Three commercial hazardous waste landfills operate in Southern California. Utilities poles, materials containing asbestos or lead-based paints, and transformers containing polychlorinated biphenyls would be sent to one of these landfills or to another EPA-permitted hazardous waste facility.

Solid waste generated by the project would be a short-term impact. Furthermore, accepting the project waste would not impair solid waste facilities that would serve the project. Therefore, the impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP1): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant.

Implementation of the project could increase and enhance recreational opportunities in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River. Additional recreationists could incrementally increase the amount of solid waste generated. Multiple landfills, including the West Central Landfill, the Anderson Landfill, and the Tehama County/Red Bluff Landfill, are located in the project region and have a substantial amount of available capacity. Private transfer stations are located throughout the region as well. These multiple facilities have adequate capacity for disposal of solid waste generated by implementation of the project (CIWMB 2008). Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP1): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply It is reasonable to assume that the increased water supply expected under this alternative would increase demand for construction and operation of water treatment and distribution

facilities within the CVP service area. No information is currently available about future water facilities that might be built in response to the expected increase in water supply. Therefore, it is not possible to evaluate the environmental effects of building and operating such facilities. Such an evaluation would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Util-6 (CP1): Damage or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no impact related to temporary disruption of utilities during construction in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP1): Utility Infrastructure Relocation or Modification Construction would not occur outside of the primary study area; therefore, there would be no impact related to relocation or modification of utilities infrastructure in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP1): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no impact related to increases in solid waste generation from construction activities in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP1): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would not occur outside of the primary study area; therefore, no impacts related to increases in solid waste generation from increased recreational opportunities would occur in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP1): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply It is reasonable to assume that the increased water supply expected under this alternative would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. No information is currently available about future water facilities that might be built in response to the expected increase in water supply. Therefore, it is not possible to evaluate the environmental effects of building and operating such facilities. Such an evaluation would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP2 addresses the Shasta Lake and Vicinity and Upper Sacramento River study areas together, because impacts from construction activities would affect both study areas.

Impact Util-1 (CP2): Damage or Disruption of Public Utility and Service Systems Infrastructure Project implementation could damage public utilities and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure and, thus, service, during construction operations. Construction activities would occur in areas proposed for abandonment of utilities or service systems, and implementation of relocation projects could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1). An increase in the height of the dam could result in a larger area of inundation and additional infrastructure and service systems construction activities. Construction activities for CP2 would take longer than for CP1 and would extend the duration of impacts resulting from CP2. CP2 would require the relocation of approximately 5,000 more feet of power lines, about 2,000 more feet of telecommunications lines, and take approximately 12 more months than CP1. Additional service systems would need to be demolished and/or relocated for CP2.

Project implementation could damage public utilities and service systems infrastructure, or result in short-term disruption of utilities and service systems service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP2): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1). An increase in the height of the dam could result in a larger area of inundation, which would result in additional relocation or modification of utilities infrastructure compared to Util-1 (CP1). Construction activities for CP2 would take longer than for CP1 and would extend the duration of impacts resulting from CP2. CP2 would require the relocation of approximately 5,000 more feet of powers lines and associated transmission facilities, relocation of about 2,000 more feet of telecommunications lines and associated facilities, and take approximately 8

more months than CP1. Additional vegetation clearing would also be required to accommodate relocation of infrastructure.

Project implementation could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utilities service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP2): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP1). An increase in the height of the dam would result in a larger area of inundation, which could result in a greater potential for generation of construction waste materials compared to Impact Util-1 (CP1). CP2 would generate roughly 188,584 cubic yards of solid waste (see Table 21-1). Similar to CP1, the anticipated increase in the amount of solid waste generated during construction of this alternative would still be sufficiently handled by the three local landfills and permitted hazardous waste landfills. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP2): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, in which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant.

This impact would be similar to Impact Util-4 (CP1). An increase in the height of the dam could result in a larger area of inundation, which could result in more recreationists and greater potential for generation of solid waste materials than with Impact Util-1 (CP1). The anticipated increase in the amount of construction waste generated during long-term operation of this alternative is expected to be sufficiently handled by the three local landfills, which have a substantial amount of available capacity. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP2): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP2 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of

building and operating such facilities would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact Util-6 (CP2): Damage or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no impact related to temporary disruption of utilities service during construction in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP2): Utility Infrastructure Relocation or Modification Construction would not occur outside of the primary study area; therefore, there would be no impact related to relocation or modification of utilities infrastructure in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP2): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no impact related to increases in solid waste generation from construction activities in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP2): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would occur only in the primary study area; therefore, no impacts related to increases in solid waste generation from increased recreational opportunities would occur in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP2): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP2 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and, therefore, is not provided in this document.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply
Shasta Lake and Vicinity/Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP3 addresses the Shasta Lake and Vicinity and Upper Sacramento River study areas together, because impacts from construction activities would affect both study areas.

Impact Util-1 (CP3): Damage or Disruption of Public Utility and Service Systems Infrastructure Project implementation could damage public utilities and service systems infrastructure, which could result in short-term disruptions

of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure and, thus, service during construction operations. Construction activities would occur in areas proposed for abandonment and relocation of utilities or service systems. Project implementation could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1). An increase in the height of the dam could result in a larger area of inundation and additional infrastructure and service systems construction activities. Construction activities for CP3 would take longer than for CP1 and would extend the duration of impacts resulting from CP3. CP3 would require the relocation of approximately 7,500 more feet of power lines and about 5,000 more feet of telecommunications lines and take approximately 24 more months than CP1. Additional service systems would need to be demolished and/or relocated for CP3 to prevent inundation.

Project implementation could damage public utility and service systems infrastructure, or result in short-term utility and service systems service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP3): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utility infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1). An increase in the height of the dam could result in a larger area of inundation, which would result in additional relocation or modification of utility infrastructure compared to Impact Util-1 (CP1). Construction activities for CP3 would take longer than for CP1 and would extend the duration of impacts resulting from CP3. CP3 would require the relocation of approximately 7,500 more feet of power lines and associated transmission facilities and about 5,000 more feet of telecommunications lines and associated facilities; CP3 would take approximately 24 more months than CP1 to implement. Additional vegetation clearing would also be required to accommodate infrastructure relocation.

Project implementation could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP3): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation

during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP1). An increase in the height of the dam would result in a larger area of inundation, which could result in a greater potential for generation of construction waste materials compared to Impact Util-1 (CP1). CP3 would generate roughly 194,195 cubic yards of solid waste (see Table 21-1). Similar to CP1, the anticipated increase in the amount of solid waste generated during construction of this alternative would still be sufficiently handled by the three local landfills and permitted hazardous waste landfills. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP3): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, creating incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to Impact Util-4 (CP1). An increase in the height of the dam could result in a larger area of inundation, which could result in more recreationists and greater potential for generation of solid waste materials compared to Impact Util-1 (CP1). The anticipated increase in the amount of solid waste generated during long-term operation of this alternative would be handled by the three local landfills and permitted hazardous waste landfills. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP3): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP3 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta/CVP/SWP Service Areas

Impact Util-6 (CP3): Damage or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no impact related to temporary disruption of utilities service during construction in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP3): Utility Infrastructure Relocation or Modification Construction would not occur outside of the primary study area; therefore, there would be no impact related to relocation or modification of utilities infrastructure in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP3): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no impact related to increases in solid waste generation from construction activities in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP3): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would occur only in the primary study area; therefore, no impacts related to increases in solid waste generation from increased recreational opportunities would occur in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP3): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP3 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP2 addresses the Shasta Lake and Vicinity and Upper Sacramento River study areas together, because impacts from construction activities would affect both study areas.

Impact Util-1 (CP4): Damage or Disruption of Public Utility and Service Systems Infrastructure Project implementation could damage public utilities and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure and, thus, service during construction operations. Construction activities would occur in areas proposed for utilities or service systems abandonment and relocation. Project implementation could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1) and identical to Impact Util-1 (CP3). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP4): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1) and identical to Impact Util-2 (CP3). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP4): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP3), with a very slight increase in solid waste generation related to downstream restoration construction activities. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP4): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from project implementation. Therefore, this impact would be less than significant.

This impact would be similar to Impact Util-4 (CP1) and identical to Impact Util-4 (CP3). Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP4): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP4 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact Util-6 (CP4): Damage or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area. Gravel augmentation and the Reading Island habitat restoration along the upper Sacramento River would slightly, but not substantially, increase the potential for temporary disruption of utilities service. This impact is considered less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP4): Utility Infrastructure Relocation or Modification No utility infrastructure relocation or modification would occur outside of the primary study area; therefore, there would be no impact related to relocation or modification of utilities infrastructure in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP4): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area. Gravel augmentation and the Reading Island habitat restoration along the upper Sacramento River would generate a nominal amount of solid waste. However, substantial landfill capacity is available to accommodate solid waste generated by these activities. This impact is considered less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP4): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would occur only in the primary study area; therefore, no impacts related to increases in solid waste generation from increased recreational opportunities would occur in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP4): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP4 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and is, therefore, not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan
Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP2 addresses the Shasta Lake and Vicinity and Upper Sacramento River study areas together, because impacts from construction activities would affect both study areas.

Impact Util-1 (CP5): Damage or Disruption of Public Utility and Service Systems Infrastructure Project implementation could damage public utilities

and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure and, thus, service during construction operations. Construction activities would occur in areas proposed for abandonment and relocation of utilities or service systems. Project implementation could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1) and identical to Impact Util-1 (CP3). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP5): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1) and identical to Impact Util-2 (CP3). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP5): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP4) , with a very slight increase in solid waste generation related to enhancement of tributary and warm-water habitat and recreational trails. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP5): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant.

This impact would be similar to Impact Util-4 (CP1) and identical to Impact Util-4 (CP3). Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP5): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP5 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Util-6 (CP5): Damage or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area. Gravel augmentation and the Reading Island habitat restoration along the upper Sacramento River would slightly, but not substantially, increase the potential for temporary disruption of utilities service. This impact is considered less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP5): Utility Infrastructure Relocation or Modification No utility infrastructure relocation or modification would occur outside of the primary study area; therefore, there would be no impact related to relocation or modification of utilities infrastructure in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP5): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area. Gravel augmentation and the Reading Island habitat restoration along the upper Sacramento River would generate a nominal amount of solid waste. However, substantial landfill capacity is available to accommodate solid waste generated by these activities. This impact is considered less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact Util-9 (CP5): Increases in Solid Waste Generation from Increased Recreational Opportunitie*s Increased recreational opportunities caused by project implementation would occur only in the primary study area; therefore, no impacts related to increases in solid waste generation from increased recreational opportunities would occur in the extended study area. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP5): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP5 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be remote and speculative and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

21.3.5 Mitigation Measures

Table 21-2 presents a summary of mitigation measures for utilities and service systems.

Table 21-2. Summary of Mitigation Measures for Utilities and Service Systems

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Util-1: Damage or Disruption of Public Utility and Service Systems Infrastructure (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Util-1: Implement Procedures to Avoid Damage to or Temporary Disruption of Service.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-2: Utility Infrastructure Relocation or Modification (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Util-2: Adopt Measures to Minimize Infrastructure Relocation Impacts.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-3: Short-Term Increase in Solid Waste Generation (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-4: Increases in Solid Waste Generation from Increased Recreational Opportunities (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-5: Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	NI	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)

Table 21-2. Summary of Mitigation Measures for Utilities and Service Systems (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Util-6: Damage or Disruption of Public Utility and Service Systems Infrastructure (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	LTS	LTS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	LTS	LTS
Impact Util-7: Utility Infrastructure Relocation or Modification (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	NI	NI
Impact Util-8: Short-Term Increase in Solid Waste Generation (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	LTS	LTS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	LTS	LTS
Impact Util-9: Increases in Solid Waste Generation from Increased Recreational Opportunities (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	NI	NI
Impact Util-10: Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)	N/A (RS)

Key:
B = beneficial
LOS = level of significance
LTS = less than significant
N/A = not applicable
RS = remote and speculative
NI = no impact
PS = potentially significant
S = significant

No-Action Alternative

No mitigation is required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Util-3 and Impact Util-4. Mitigation is provided below for other impacts of CP1 on utilities and service systems.

Mitigation Measure Util-1 (CP1): Implement Procedures to Avoid Damage to or Temporary Disruption of Service To avoid temporary disruption of service, the following measures will be implemented during project construction to ensure that existing utilities infrastructure is not damaged:

- **Permits** – Reclamation will obtain utilities excavation or encroachment permits as necessary before initiating any work with potential to affect utility lines and will include all necessary permit terms in construction contract specifications.

- **Locating Line** – Utility locations will be identified through field surveys and the use of the Underground Service Alert services. Any buried utility lines will be clearly marked before initiation of any ground-disturbing construction activity.

- **Clearing Right-of-Way and Road Access** – If necessary, infrastructure will be removed or reinforced in coordination with all potential service providers known to have, or potentially having, utilities infrastructure in the project area.

- **Response Plan** – The construction contractor will prepare a response plan to address potential accidental damage to utility lines prior to the start of construction. The plan will identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the safety of the public and workers. The response plan will be circulated to the potentially affected service system providers for review and approval prior to the start of construction activities. Worker education training in response to such situations will be conducted by the contractor.

Implementation of this mitigation measure would reduce Impact Util-1 (CP1) to a less than significant level.

Mitigation Measure Util-2 (CP1): Adopt Measures to Minimize Infrastructure Relocation Impacts For each segment of a utility line that would need to be relocated or modified as a result of project construction and operations, the following measures will be implemented:

- **Permits** – Reclamation will obtain utilities excavation or encroachment permits as necessary before initiating any work associated with modification or relocation of an existing utility line and will include all necessary permit terms in construction contract specifications.

- **Locating and Staking Line** – Locations for relocated utility lines will be identified in coordination with affected service providers. As part of this effort, field surveys will be conducted and the Underground Service Alert services will be used to ensure that there are no conflicts with other existing utility lines. After the alignment of the line has been finalized, a survey will be made to map the route of the line. The results of the survey will be plan and profile drawings, which will be used to spot the poles. After exact positions have been fixed, a stake will be driven to indicate the center of the structure or pole.

- **Clearing Right-of-Way and Road Access** – The right-of-way must be cleared of all obstructions that will interfere with the operation of the power line. A strip of land must be cleared on each side of the centerline of the transmission line by cutting or trimming the trees and brush. All trees and brush should be cut 3 inches or less from the ground line so that the passage of trucks and tractors will not be hindered. The cut trees and brush must be disposed of by chipping or spreading, burning, or hauling away. Disposal of the debris by burning, or otherwise, must be accomplished in accordance with State and local laws and regulations without creating a hazard or nuisance. The right-of-way should be treated with chemical spray to retard the growth of brush or trees that could endanger the operation of the transmission line.

- **Installing Pole Footings and Foundations** – Pole sites must be properly graded in accordance with the specifications. Usually the slope of the grade must not be more than 3:1. All topsoil should be removed prior to grading the pole location.

- **Utilities Modification Plan** – The construction contractor will prepare a utilities modification and relocation plan prior to the start of construction. The plan will identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the safety of the public and workers and include a description of how utilities infrastructure will be modified or relocated and identification of precise alignment where utility lines will be relocated. The plan will be circulated to the potentially affected service system providers for review and approval prior to the start of construction activities. Worker education training in response to such situations will be conducted by the contractor.

- The contractor will stage utility line modifications and relocations in a manner that minimizes interruption of service.

- In accordance with the STNF LRMP, relocated power lines less than 35 kV and telephone lines on Forest Service land within the STNF will be buried unless the STNF VQO can be met without burying, geologic conditions make burying infeasible, or burying will produce greater long-term site disturbance.

- **Traffic Control and Safety Assurance Plan** – Reclamation will implement Mitigation Measure Trans-1 as described in PDEIS Chapter 20, "Transportation and Traffic" to reduce adverse effects of road closures and detours or partial road closures on access to local streets and adjacent uses.

Implementation of this mitigation measure would reduce Impact Util-2 (CP1) to a less than significant level.

CP2 - 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Util-3 and Impact Util-4. Mitigation is provided below for other impacts of CP2 on utilities and service systems.

Mitigation Measure Util-1 (CP2): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP2) to a less than significant level.

Mitigation Measure Util-2 (CP2): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP2) to a less than significant level.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply

No mitigation is required for Impact Util-3 and Impact Util-4. Mitigation is provided below for other impacts of CP3 on utilities and service systems.

Mitigation Measure Util-1 (CP3): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP3) to a less than significant level.

Mitigation Measure Util-2 (CP3): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP3) to a less than significant level.

CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation is required for Impact Util-3 and Impact Util-4. Mitigation is provided below for other impacts of CP4 on utilities and service systems.

Mitigation Measure Util-1 (CP4): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP4) to a less than significant level.

Mitigation Measure Util-2 (CP4): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP4) to a less than significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is required for Impact Util-3 and Impact Util-4. Mitigation is provided below for other impacts of CP5 on utilities and service systems.

Mitigation Measure Util-1 (CP5): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP5) to a less than significant level.

Mitigation Measure Util-2 (CP5): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP5) to a less than significant level.

21.3.6 Cumulative Effects

Cumulative Effects

Past, present, and reasonably foreseeable future projects would generate construction-related solid waste. As discussed in Impacts Util-3, affected landfills have sufficient capacity to accommodate project-generated solid waste, and are also expected to have sufficient capacity to accommodate reasonably foreseeable development in addition to project waste. Therefore, none of the action alternatives would contribute to cumulative effects related to solid waste disposal.

Implementing the proposed SLWRI alternatives would have a significant cumulative effect on utilities and service systems in the primary study area. As discussed above, construction activities associated with CP1 through CP5 could inadvertently damage utilities and public service systems infrastructure. In addition, utilities and service systems could be temporarily disrupted to accommodate construction activities. These effects would be of greater and longer in duration with the larger dam raises. Thus, effects of CP2 would be similar to but greater than those of CP1, and similar to but less than those of

CP3 through CP5. Although Mitigation Measure Util-1 would reduce these effects, the effects would not be eliminated. Given the reasonably foreseeable development actions described previously, utilities and service systems provided by local, State, and Federal agencies within the primary study area could be subject to cumulatively considerable incremental effects resulting from CP1 through CP5. However, these effects would diminish with distance from the project construction sites, and CP1 through CP5 would not have cumulatively considerable effects on utilities and public service systems downstream from Red Bluff (i.e., in the extended study area).