Chapter 19
Paleontological Resources

This chapter describes the affected environment for paleontological resources, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. This chapter presents information on the primary study area (area of project features, the Temperance Flat Reservoir Area, and Millerton Lake below RM 274). It also discusses the extended study area (San Joaquin River from Friant Dam to the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas).

Affected Environment

Primary Study Area

Regional Geology

As discussed in detail in Chapter 11, "Geology and Soils," the upper San Joaquin River and the primary study area lie in the central portion of the Sierra Nevada Province at its boundary with the eastern edge of the Central Valley Province. The Sierra Nevada Province encompasses the Sierra Nevada and comprises primarily intrusive rocks, including granite and granodiorite, with some metamorphosed granite and granite gneiss. The central Sierra Nevada has a complex history of uplift that resulted in tilting of the entire Sierra Nevada block to the west. The San Joaquin River and its smaller tributaries cut through the granitic rocks present in the upper San Joaquin River watershed and through intrusive formations and sedimentary and metamorphosed rocks. At the western border of the two provinces, alluvium and sedimentary rocks overtop the granitic Sierra Nevada block. Occasional remnants of lava flows and layered tuff from volcanic episodes in the Sierra Nevada are present in the project vicinity. Metamorphic rocks in the Friant Dam area dip steeply downstream to the west and strike northwesterly. The contact of these metamorphic rocks with the Sierra Nevada batholith lies just east of Friant Dam under Millerton Lake. Friant Dam is founded on metamorphic rocks consisting of quartz biotite schist intruded by aplite and pegmatite dikes and by inclusions of dioritic rocks. Erosion has resulted in thin colluvial cover (Reclamation 2002). Intrusive

Sierra Nevada batholith rocks underlie most of Millerton Lake and areas immediately upstream from Friant Dam.

Local Geology

The proposed facilities would be constructed in a variety of geologic formations (Bateman and Busacca 1982, Matthews and Burnett 1966), which are identified in Table 19-1. Table 19-1 also provides a brief description of each formation, its approximate age, and the paleontological sensitivity determination. Chapter 11, "Geology and Soils," shows the location of the proposed facilities in relation to the rock formations listed in Table 19-1. Table 19-2 presents an abbreviated geologic time scale for reference.

Paleontological Resource Inventory

A stratigraphic inventory was completed to develop a baseline paleontological resource inventory of the primary study area and surrounding area by rock unit and to assess the potential paleontological productivity of each rock unit. Geologic maps and reports covering the geology of the primary study area and the surrounding area were reviewed to determine the exposed rock units and to delineate their respective aerial distributions in the project area.

Published and unpublished geological and paleontological literature was reviewed to document the number and locations of previously recorded fossil sites from rock units exposed in the primary study area and vicinity, as well as the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search conducted at the University of California Museum of Paleontology (UCMP) in Berkeley, California, on April 8, 2013.

Paleontological Resource Assessment Criteria

The potential paleontological importance of a project site can be assessed by identifying the paleontological importance of exposed rock units. Because the areal distribution of a rock unit can be delineated on a topographic map, this method is conducive to delineating parts of a project site that are of higher and lower sensitivity for paleontological resources and to delineating parts of a project site that may require mitigation to ensure that unique paleontological resources are not damaged or destroyed.

Table 19-1. Description of Geologic Formations in the Primary Study Area and Paleontological Sensitivity

Geologic Map of the Millerton Lake Quadrangle				
Map Abbreviation	**Formation Name**	**Description**	**Age**	**Paleontological Sensitivity**
Qal	Alluvium	Stream and gravel alluvium.	Holocene Epoch	Low
Qdf	Debris Flow	Deposits a few meters thick composed of angular trachyandesite blocks, from erosional undercutting of margins of Kennedy Table, and rounded metavolcanic cobbles in a sandy matrix.	Holocene Epoch	Low
Kgd	Biotite Granodiorite	The Millerton Ridge pluton is composed of leucogranodiorite and contains garnets (0.1 to 2 mm across) along the west edge.	Cretaceous Period	Low
Kbl	Tonalite of Blue Canyon–Blocky Hornblende Facies	Plutonic rocks characterized by undeformed blocky hornblende prisms as long as 1 cm and by biotite books as much as 5 mm across.	Cretaceous Period	Low
Kblb	Tonalite of Blue Canyon–Biotite-Rich Facies	Biotite-rich facies of the tonalite of Blue Canyon in the northeastern part of the primary study area may contain 5–12% poikilitic K-feldspar crystals 1–3 cm across. The portion of the biotite-rich facies in the south-central portion of the quadrangle that overlaps with the primary study area may contain subhedral biotite books and quartz crystals as large as 1 cm across.	Cretaceous Period	Low
KJgb	Gabbro	Primarily plagioclase-hornblende that exhibits a range of textures and locally contains minor olivine and/or augite.	Cretaceous or Jurassic Period	Low
Pzv	Metamorphosed Volcanic and Volcanogenic Rocks	Metamorphosed volcanic and volcanogenic rocks characterized as generally strongly foliated and lineated with amphibolite that is often massive.	Paleozoic Era	Low
Pzs	Metasedimentary Rocks–Quartz-Biotite Schist	Metasedimentary rocks are strongly foliated and lineated with minor folds that are isoclinal and with axes that plunge steeply. These rocks include thin layers of quartzite.	Paleozoic Era	Low
Pzvh	Metamorphosed Volcanic and Volcanogenic Rocks	Metamorphosed volcanic and volcanogenic rocks characterized as generally strongly foliated and lineated with amphibolite that is often massive. Composed primarily of quartz, hornblende, and plagioclase schist.	Paleozoic Era	Low
Pzva	Metamorphosed Volcanic and Volcanogenic Rocks	Metamorphosed volcanic and volcanogenic rocks characterized as generally strongly foliated and lineated with amphibolite that is often massive. Composed primarily of plagioclase, diopside, and hornblende amphibolite.	Paleozoic Era	Low
Pzu	Metasedimentary and Metavolcanic Rocks, Undifferentiated	Metasedimentary and metavolcanic rocks, undifferentiated.	Paleozoic Era	Low

Table 19-1. Description of Geologic Formations in the Primary Study Area and Paleontological Sensitivity (contd.)

Geologic Map of California, Fresno Sheet				
Map Abbreviation	**Formation Name**	**Description**	**Age**	**Paleontological Sensitivity**
Tc	Tertiary Nonmarine Sedimentary Rocks	Janda (1966, cited in Marchand and Allwardt 1981) recognized a series of tuffaceous silt, sand, and gravel beneath the trachyandesite of Kennedy Table just east of Friant Dam. Age estimates indicate that these deposits correlate with the older (Miocene-age) portion of the Mehrten Formation. The Mehrten Formation typically consists of sandstone, siltstone, and conglomerate that are interbedded with andesitic breccia from volcanic lava flows that occurred in the Sierra Nevada.	Miocene Epoch	High
Tv[b]	Tertiary Volcanic Pyroclastic Rocks	Olivine basalt and some hornblende andesite flows.	Tertiary Undivided	Low
gr[g]	Mesozoic Granitic Rocks	Granodiorite, including hornblende biotite granodiorite.	Mesozoic Era	Low
ms	Pre-Cretaceous Metasedimentary Rocks	Unnamed metamorphic rocks composed predominantly of schist, metachert, phyllite, quartzite, hornfels, tactite, slate, and marble.	Mesozoic Era	Low

Sources: Bateman and Busacca 1982, Matthews and Burnett 1966, Marchand and Allwardt 1981

Key:
cm = centimeter
mm = millimeter

Table 19-2. Abbreviated Geologic Time Scale

Era	Period	Epoch	Age (million years before present)
Cenozoic	Quaternary	Holocene	0.117 (=11,700)
		Pleistocene	2.6 to 0.11
	Tertiary	Pliocene	5.3 to 2.6
		Miocene	23 to 5.3
		Oligocene	33.9 to 23
		Eocene	55.8 to 33.9
		Paleocene	65.5 to 55.8
Mesozoic	Cretaceous	Upper	99.6 to 65.5
		Lower	145.5 to 99.6
	Jurassic	Upper	161.2 to 145.5
		Middle	175.6 to 161.2
		Lower	199.6 to 175.6
	Triassic	Upper	228.7 to 199.6
		Middle	245.9 to 228.7
		Lower	251 to 245.9
Paleozoic			541 to 251
Precambrian			4,000 to 542

Source: UCMP 2011
Note:
Numbers have been rounded.

A paleontologically important rock unit is one that has a high potential paleontological productivity rating and is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed at a project site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the project site. Exposures of a specific rock unit in a project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the project site.

The tasks listed below were completed to establish the paleontological importance of each rock unit exposed in or near the primary study area:

- The potential paleontological productivity of each rock unit was assessed, based on the density of fossil remains previously documented in the rock unit.

- The potential for a rock unit exposed in the primary study area to contain a unique paleontological resource was considered.

Paleontological Resource Inventory Results

Stratigraphic Inventory Regional and local surficial geologic mapping and correlation of the various geologic units in the primary study area and vicinity have been provided at a scale of 1:65,000 by Bateman and Busacca (1982) and 1:250,000 by Matthews and Burnett (1966).

Paleontological Resource Inventory and Assessment by Rock Unit Based on a record search conducted at UCMP (UCMP 2013), there are no previously recorded fossil localities within or adjacent to the primary study area. The rock formations listed in Table 19-1 have been grouped together and are discussed in the assessment below.

Holocene Rock Formations Holocene-age deposits are less than 11,700 years old and contain only the remains of extant, modern taxa, which are not considered "unique" paleontological resources. To be considered a "unique" paleontological resource, a fossil specimen must be more than 11,700 years old. Therefore, the Quaternary Alluvium and Debris Flow deposits are considered to be of low paleontological sensitivity.

Tertiary Nonmarine Sedimentary Rocks (Mehrten Formation) Vertebrate mammal and plant fossils have been reported from the Mehrten Formation throughout the Sierra Nevada foothills and the eastern margin of the Central Valley. Fossils have been recovered from the Mehrten Formation from more than 50 locations in Alpine, Amador, Calaveras, El Dorado, Nevada, Placer, San Joaquin, Sierra, Stanislaus, Tuolumne, and Merced Counties (UCMP 2013, Sierra College Natural History Museum 2011). Because of the large number of vertebrate and plant fossils that have been recovered from the Mehrten Formation, it is considered to be of high paleontological sensitivity.

Tertiary Volcanic Pyroclastic Rocks Pyroclastic rocks are composed of volcanic materials that range in size from small ashes and tuffs to large blocks ejected from a volcano. Therefore, these deposits would not be expected to contain fossils and are considered to be of low paleontological sensitivity.

Mesozoic and Paleozoic Rock Formations Although vertebrate fossils have been recovered from Fresno and Madera counties in rock formations of Mesozoic age, these localities are on the western edge of the San Joaquin Valley, either

within or adjacent to the Coast Ranges. These types of rock formations are not present in the eastern portions of either county, which are located in the Sierra Nevada. The results of a search of the UCMP database indicate that there are no recorded vertebrate fossil localities in the Mesozoic and Paleozoic granitic rocks that make up the Sierra Nevada. These rocks were formed deep beneath the earth's surface under conditions of high temperature and pressure and therefore would not be expected to contain fossils. Thus, these formations are considered to be of low paleontological sensitivity.

Extended Study Area

The portion of the extended study area extending from Friant Dam to the Delta is now subject to changed instream flows associated with implementing the Settlement. Restoration Flows will modify environmental conditions in the river channel and bypasses. However, the flow of water in any streambed is a natural process that has been ongoing for millennia, and its action and interaction with paleontological resources is a natural process. Regardless of whether water flows would increase or decrease from operation of any water-related project, the flow of water in watercourses does not adversely affect paleontological resources other than perhaps resulting in their movement farther downstream. In addition, use of equipment to remove vegetation would not affect unique paleontological resources that may potentially be present because the zone of soil disturbance would be less than 8 inches (Reclamation 2009). Streambed deposits at and near the surface of watercourses are generally of Holocene age (i.e., less than 11,700 years old) and therefore would not contain unique paleontological resources.

The Delta is also a landform that has developed during the more recent Holocene age and therefore would not contain unique paleontological resources.

The potential to encounter paleontological resources in the CVP and SWP water service areas varies according to the age and character of geologic materials present. San Joaquin Valley is composed of recent flood overflow deposits, alluvial fan and older alluvial deposits, and limited marine sediments found along the margins of the valley. As described previously in the Primary Study Area section, these various formations maintain varying potential to contain paleontological resources. Other areas of southern California also exhibit geologic materials with a wide range of potential to contain paleontological

resources, with deposits ranging from low potential to high potential.

Environmental Consequences and Mitigation Measures

This section describes potential environmental consequences on paleontological resources that could result from implementing any of the alternatives. It also describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine the significance of impacts on paleontological resources. It then discusses the potential impacts and proposes mitigation where appropriate. The potential impacts on paleontological resources and associated mitigation measures are summarized in Table 19-3.

Methods and Assumptions

The Society of Vertebrate Paleontology (SVP) has established standard guidelines that outline acceptable professional practices regarding paleontological resources, and most practicing professional paleontologists in the nation follow these guidelines. In its standard guidelines for assessing and mitigating adverse impacts on paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having high or low sensitivity. In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are generally categorized as being of potentially significant scientific value.

Table 19-3. Summary of Impacts and Mitigation Measures for Paleontological Resources

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
PAL-1: Potential for Damage to or Destruction of Unique Paleontological Resources	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	PAL-1: Implement a Recovery Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Key:
NI = no impact
SU = significant and unavoidable
PS = potentially significant
LTS = less than significant

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing the No Action Alternative and other alternatives. Under NEPA, the severity and context of an impact must be characterized. An environmental document prepared to comply with CEQA must identify the potentially significant environmental impacts 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental impacts (State CEQA Guidelines, Section 15126.4[a]). Implementing any of the action alternatives would have a significant impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site. A "unique paleontological resource or site" is one that is considered significant under the professional paleontological standards described below.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved and if it meets one of the following criteria:

- It is a type specimen (i.e., the individual from which a species or subspecies has been described).
- It is a member of a rare species.
- It is a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn.
- It is a skeletal element different from, or a specimen more complete than, those now available for its species.
- It is a complete specimen (i.e., all or substantially all of the entire skeleton is present).

The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which

they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Marine invertebrates are generally common; the fossil record is well developed and well documented, and they would generally not be considered a unique paleontological resource. Identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare.

Topics Eliminated from Further Consideration

No topics related to paleontological resources that are included in the significance criteria listed above were eliminated from further consideration. Each of the topics associated with potential impacts in the primary study area is addressed below in the Direct and Indirect Impacts section.

As discussed previously in the Affected Environment section, both the streambed deposits in the San Joaquin River and the Delta are generally of Holocene age and therefore would not contain unique paleontological resources. Changes to water conveyance to the CVP and SWP water service areas would not exceed historic maximum deliveries and would not result in placing new land into agricultural production, change cropping patterns, or result in other physical changes to the environment. Therefore, none of the action alternatives would have an impact on any unique paleontological resources that may be present in the extended study area. The potential paleontological resources that may be present in the extended study area are therefore not discussed further in this analysis.

Direct and Indirect Effects

This section describes the environmental consequences of implementing any of the alternatives. Where the action alternatives would have identical or nearly identical impacts regardless of which action alternative is implemented, the action alternatives are described together. Where impacts would differ, the action alternatives are described separately.

Impact PAL-1: Potential for Damage to or Destruction of Unique Paleontological Resources

Primary Study Area

No Action Alternative Because no project-related earthmoving activities would occur under the No Action Alternative, there would be no potential for damage to or destruction of unique paleontological resources.

There would be **no impact** under the No Action Alternative.

Action Alternatives Most of the rock formations located where project-related earthmoving activities would occur are not considered to be paleontologically sensitive, as described previously in the Affected Environment section. However, a portion of the construction activities that would be associated with the new transmission line south of Millerton Lake would occur in Tertiary nonmarine sedimentary rocks, which have been correlated with the Mehrten Formation (see Chapter 11, "Geology and Soils"). Because of the large number of vertebrate and plant fossils that have been recovered from the Mehrten Formation, it is considered to be of high paleontological sensitivity. Therefore, earthmoving activities in the Mehrten Formation have the potential to result in damage to or destruction of unique paleontological resources.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Mitigation Measures

This section discusses the mitigation measure for the potentially significant impact described in the Direct and Indirect Impacts section, as presented in Table 19-3.

Mitigation is required for Impact PAL-1 in the primary study area for all action alternatives. This impact does not apply to the extended study area.

Mitigation Measure PAL-1: Implement a Recovery Plan
To minimize potential adverse impacts on previously unknown potentially unique, scientifically important paleontological resources in the Mehrten Formation as shown in Chapter 11, "Geology and Soils," Reclamation will implement the following measures:

- Before the start of any earthmoving activities associated with the transmission line south of Millerton Lake, Reclamation will retain a qualified paleontologist to train all construction personnel involved with earthmoving activities, including the site superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures if fossils are encountered.

- If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work in the vicinity of the find and notify Reclamation. Reclamation will retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with SVP guidelines (1995, 1996). The recovery plan may include, but would not be limited to, a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by Reclamation to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

Implementing Mitigation Measure PAL-1 would reduce the potentially significant impact of damage to or destruction of paleontological resources to a **less-than-significant** level.

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Chapter 20
Power and Energy

This chapter describes the environmental setting for power and energy, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the project alternatives. This chapter presents information on the primary study area (area of project features, the Temperance Flat Reservoir Area, and Millerton Lake below RM 274) and extended study area.

Affected Environment

Hydropower long has been an important element of power supply in California, both from in-state and out-of-state sources. Hydropower currently supplies between 14 and 19 percent of California's annual electrical energy generation, depending on hydrologic conditions (CEC 2014). About 7.5 percent of electrical generation supplying the United States on a capacity basis comes from hydropower (U.S. Energy Information Administration 2014). Because of its ability to rapidly increase and decrease power generation rates, hydropower is often used to provide load-following generation both during on- peak and off-peak periods. Hydropower is also able to smooth and firm renewable generation such as wind and solar generation.

The upper San Joaquin River watershed is extensively developed for hydroelectric generation. In this area, PG&E and SCE own and operate several hydropower generation facilities. Both the PG&E and SCE systems consist of a series of reservoirs that provide water through tunnels to downstream powerhouses. Hydropower is also generated by the Friant Power Authority (FPA) at the Friant Power Project through releases from Friant Dam to the Friant-Kern Canal, Madera Canal, and San Joaquin River. In total, the upper San Joaquin River Basin has 19 powerhouses with an installed capacity of almost 1,300 MWs, which represents approximately 9 percent of the hydropower generation capacity in California.

The section describes the affected environment for power and energy resources that may be impacted by the alternatives. These include hydropower facilities in the primary study area

between Kerckhoff Dam and Millerton Lake, the FPA and other hydropower facilities at Friant Dam, pumping facilities along the San Joaquin River from Friant Dam to the Delta, and major hydropower and pumping facilities in the CVP and SWP water service areas.

Primary Study Area

This section describes power and energy resources within the primary study area.

Temperance Flat Reservoir Area

The PG&E Kerckhoff Hydroelectric Project accounts for approximately 5 percent of PG&E´s hydroelectric generation capacity, and 15 percent of the generation capacity in the upper San Joaquin River Basin. The existing Kerckhoff Hydroelectric Project (FERC Project No. 96, originally licensed in 1922) with an installed capacity of 174 MW, is today rated at 162.7 MW and includes the following major facilities:

- Kerckhoff Dam and Lake
- Kerckhoff Powerhouse
- Kerckhoff No. 2 Powerhouse

Kerckhoff Dam and Lake Kerckhoff Dam impounds Kerckhoff Lake, which serves as the forebay for both the Kerckhoff and Kerckhoff No. 2 powerhouses. The dam is a concrete arch type, approximately 114 feet in height. The top of the dam is at elevation 997.33, the spillway crest is at elevation 974.172, and the normal maximum water surface is at elevation 987.83. The reservoir has a usable capacity of 4,252 acre-feet. Typically, the reservoir is only drawn 5 feet below the normal maximum water surface. The top 5 feet of the reservoir correspond to an operating capacity of about 750 acre-feet to allow for generation peaking during periods of high electrical demand.

Separate intakes and water conveyance systems are provided for the Kerckhoff and Kerckhoff No. 2 powerhouses. The Kerckhoff Powerhouse intake structure is constructed of concrete and is equipped with two steel slide gates. The intake for the Kerckhoff No. 2 Powerhouse is a concrete-lined box structure located upstream from the Kerckhoff Powerhouse intake.

Kerckhoff Powerhouse The Kerckhoff Powerhouse, sometimes referred to as the Kerckhoff No. 1 Powerhouse, was commissioned in 1920 and is located on the San Joaquin River about 1 mile upstream from Millerton Lake. The powerhouse discharges to the San Joaquin River above Millerton Lake, and generated an average of about 40 GWh/year from 1994 through 2010.

Kerckhoff powerhouse is a reinforced-concrete, tri-level building approximately 46 feet by 99 feet inside. It houses three vertical, Francis-type turbine units directly coupled to generators with a total capacity of 38 MW. The normal maximum gross head is 350 feet and the turbine speed is 360 revolutions per minute (rpm); each turbine has a butterfly-type shutoff valve. Generation voltage is 6,600 volts (v). Of the three units in Kerckhoff Powerhouse, Unit 2 is currently inoperable. In November 2012, PG&E submitted a non-capacity license amendment to FERC to retire-in-place Unit #2 in the Kerckhoff Powerhouse (PG&E 2012). This would reduce generation capacity to approximately 25 MW. The license was amended accordingly in an April 2013 FERC order (FERC 2013).

Water supply to the Kerckhoff Powerhouse is conveyed from Kerckhoff Lake through an unlined tunnel, approximately 16,943 feet long, to three penstocks, which range from 913 feet to 945 feet in length and allow for a normal maximum gross head of 350 feet. A surge chamber is located at the end of the tunnel, upstream from the penstock gate valve. Table 20-1 shows historical generation at Kerckhoff Powerhouse.

Table 20-1. Recent Hydroelectric Generation at Kerckhoff and Kerckhoff No. 2 Powerhouses

Item	Kerckhoff	Kerckhoff No. 2
Number & Type of Units	3 – Francis	1 – Francis
Maximum Capacity (MW)	38	155
Year Constructed	1920	1983
Reported Annual Generation (MWh)		
1994	10,348	275,752
1995	115,930	803,490
1996	52,273	696,653
1997	72,350	695,775
1998	75,657	735,830
1999	31,959	410,567
2000	37,632	482,279
2001	10,768	316,602
2002	19,639	368,396
2003	18,850	423,974
2004	15,833	362,974
2005	51,662	670,639
2006	55,192	640,116
2007	3,701	212,585
2008	12,270	312,023
2009	31,045	395,527
2010	39,111	551,886
Minimum Annual Generation[1]	3,701	212,585
Maximum Annual Generation[1]	115,930	803,490
Average Annual Generation[1]	38,484	491,475

Source: Annual FERC licensee reports; FERC 2014
Note:
[1] Years 1994-2010
Key:
MW = megawatt
MWh = megawatt-hour

Kerckhoff Powerhouse No. 2 The Kerckhoff No. 2 Powerhouse is a relatively modern facility, commissioned in 1983. It discharges directly to Millerton Lake and generated about 500 GWh/year, on average, from 1994 through 2010.

The Kerckhoff No. 2 Powerhouse is approximately 200 feet underground in a circular, rock chamber measuring 85 feet in diameter and 124 feet high. It houses a single, vertical Francis-type turbine/generator assembly. The powerhouse operates at a normal maximum gross head of 421 feet and has a normal operating capacity of 155 MW. Turbine speed is 180 rpm; the turbine has a butterfly-type shutoff valve.

Water is conveyed from the intake in Kerckhoff Lake to the Kerckhoff No. 2 Powerhouse through a tunnel and penstock. The tunnel is approximately 21,632 feet long and has both lined and unlined sections. A surge chamber is located at the end of the tunnel, near the intake for the penstock, and consists

of an unlined, tapered vertical shaft. A concrete- and steel-lined penstock, approximately 1,013 feet long, conveys water from the tunnel to the powerhouse. The penstock has a concrete-lined section that is 20 feet in diameter and 481 feet long, a concrete-lined section that is 18 feet in diameter and 338 feet long, and a steel-lined section that is 15 feet in diameter and 194 feet long. This steel-lined section enters the powerhouse chamber. The penstock has a flow capacity of 5,100 cfs. Table 20-1 shows historical generation at Kerckhoff No. 2 Powerhouse.

Millerton Lake Below RM 274

The Friant Power Project (FPP) is owned and operated by the FPA, which includes eight member districts of the Friant Division of the CVP: Southern San Joaquin Municipal Utility District, Delano-Earlimart ID, Lindsay-Strathmore ID, Lindmore ID, Terra Bella ID, Orange Cove ID, Madera ID, and Chowchilla WD. Three powerhouses, owned and operated by FPA, are located on the downstream side of Friant Dam.

A powerhouse on each canal outlet generates hydroelectricity as water is released for delivery. The Friant-Kern Powerhouse generates hydroelectricity as water is released through outlets in the left abutment to the Friant-Kern Canal; it has a normal maximum head of 105 feet. The Madera Powerhouse generates hydroelectricity as water is released through outlets in the right abutment to the Madera Canal; it has a normal maximum head of 126 feet. The River Outlet Powerhouse, located at the base of the dam adjacent to the spillway, generates hydroelectricity as water is released to the San Joaquin River through river outlets; it has a normal maximum head of 273 feet. The first full year of generation for the FPP powerhouses was 1986. The combined installed capacity of the three powerhouses is about 30 MW. This represents less than 3 percent of the generation capacity in the upper San Joaquin River Basin. Table 20-2 summarizes Friant Dam hydroelectric project features. Historical power generation and capacity of the FPP is summarized in Table 20-3. Electricity from the FPP is transmitted to the PG&E power grid over a 70-kV transmission line.

Table 20-2. Summary of Hydroelectric Project Features at Friant Dam

Item	Friant Power Project
No. of Storage Reservoirs	1[1]
Additional Regulating Reservoirs[2]	N/A
Total Volume of Storage (TAF)	520.5
No. of Powerhouses	3
Total Installed Capacity (MW)	30.6
Miles of Conveyance (tunnel, penstock, flume, etc.) [3]	N/A

Source: Reclamation and DWR 2005

Notes:

[1] Millerton Lake (Friant Dam) is the storage reservoir that provides head and flow to the Friant Power Project, but the reservoir is not owned by the Friant Power Authority.

[2] Diversion dam reservoirs not included in count of additional regulating reservoirs.

[3] Conveyance length is approximate, as measured in GIS.

Key:
GIS = geographic information system
MW = megawatt
N/A = not applicable
TAF = thousand acre-feet

Table 20-3. Historical Hydroelectric Generation at Friant Power Project

Item	Friant Power Authority		
	Friant-Kern Canal	Madera Canal	River Outlet
Number & Type of Units	1 – Kaplan	1 – Kaplan	1 – Francis
Maximum Capacity (MW)	16	8.3	2
Year Constructed	1986	1985	1985
Reported Annual Generation (MWh)[1]			
1986	57,379	30,853	11,191
1987	13,394	6,288	7,554
1988	19,202	5,934	9,340
1989	22,238	7,382	10,940
1990	15,442	6,354	12,492
1991	28,805	9,990	13,313
1992	23,032	8,160	13,010
1993	74,090	29,008	12,832
1994	25,145	8,916	14,632
1995	89,244	35,843	14,901
1996	80,371	30,464	14,331
1997	63,653	29,570	10,945
1998	59,539	34,679	17,577
1999	70,128	23,723	14,565
2000	71,520	23,526	13,249
2001	35,541	13,627	11,261
2002	43,262	13,686	13,250
2003	58,694	18,203	14,257
Minimum Annual Generation[2]	13,394	5,934	7,554
Maximum Annual Generation[2]	89,244	35,843	17,577
Average Annual Generation[2]	47,260	18,678	12,758

Notes:
[1] First full year of generation for the Friant Power Project was 1986.
[2] Years 1986-2003
Key:
MW = megawatt
MWh = megawatt-hour

A fourth powerhouse, owned and operated by the Orange Cove ID, generates hydroelectricity on releases to the San Joaquin Fish Hatchery. The installed capacity of this facility, known as Fishwater Release Hydroelectric Project, is 0.51 MW.

Extended Study Area

The discussion of power and energy existing conditions and the potential impacts of the action alternatives on power and energy encompasses the primary study area, as well as CVP/SWP water service areas and associated facilities. Implementation of the action alternatives is not anticipated to cause impacts to power and energy outside of these areas; therefore, the San Joaquin River downstream from Friant Dam

and the Delta were eliminated from detailed environmental analysis.

Facilities Within Friant Division of the Central Valley Project Water Service Area

Within the Friant Division of the CVP, the Madera-Chowchilla Water and Power Authority owns and operates four powerhouses along the Madera Canal. These powerhouses have a combined capacity of almost 4 MW.

The Friant Division of the CVP was designed and is operated to support conjunctive water management in an area that was subject to groundwater overdraft. Chapter 13, "Hydrology – Groundwater," discusses the current state of groundwater use and overdraft in the region. Under conditions with reduced surface water deliveries, groundwater pumping increases. Additionally, pumping energy required for groundwater pumping increases with increased overdraft of the groundwater basin.

Central Valley Project Facilities Outside of Friant Division

This section describes power generation and pumping facilities owned and operated by Reclamation as part of the CVP outside of the Friant Division of the CVP.

Central Valley Project Power Generation Facilities Table 20-4 shows the 11 CVP hydroelectric power plants, which have a maximum operation capability of 2,079 MW when all reservoirs are at their fullest. Table 20-4 also shows historical annual power generation for calendar year 2007.

Table 20-4. Central Valley Project Powerplants, Capacities, and Historical Annual Generation

CVP Powerplants	Capacities (megawatt)	Net Annual Generation Calendar Year 2007 (megawatt-hour)
Shasta Powerplant	710	1,914,175
Trinity Powerplant	140	364,532
Judge Francis Carr Powerplant	171	291,940
Spring Creek Powerplant	180	271,582
Keswick Powerplant	117	419,597
Lewiston Powerplant	0.35	N/A
Folsom Powerplant	215	371,369
Nimbus Powerplant	17	41,262
New Melones Powerplant	383	469,679
O'Neill Pumping-Generating Plant	14.4	5,404
William R. Gianelli Pumping-Generating Plant (Federal share)	202	126,409

Source: Reclamation 2007
Key:
CVP = Central Valley Project
N/A = Records not available

Shasta Lake and Vicinity The Shasta Division of the CVP contains Shasta Dam, Lake, and Powerplant, and Keswick Dam, Reservoir, and Powerplant; it captures water of the Sacramento River Basin. Shasta Powerplant is located just below Shasta Dam as part of the Shasta Division. Water from the dam is released through five 15-foot penstocks leading to the five main generating units and two station service units. Shasta Powerplant is a peaking plant and generally runs when demand for electricity is high. Its power is dedicated first to meeting the requirements of CVP facilities. The remaining energy is marketed to various preference power customers in Northern California. The 2006 net annual generation of Shasta Powerplant was 2,648,325 megawatt-hours (MWh).

Upper Sacramento River CVP powerplants located downstream from Shasta Reservoir but upstream from Red Bluff Diversion Dam (RBDD) are the Trinity, Lewiston, Judge Francis Carr, and Spring Creek powerplants of the Trinity River Division and Keswick Powerplant of the Shasta Division. The Trinity River Division of the CVP consists of Trinity Dam and Clair Engle Lake, Trinity Powerplant, Lewiston Dam and Lake, Lewiston Powerplant, Clear Creek Tunnel, Judge Francis Carr Powerplant, Whiskeytown Dam

and Lake, Spring Creek Tunnel and Powerplant, Spring Creek Debris Dam and Reservoir, and related pumping and distribution facilities. The Trinity River Division captures water from the Trinity River Basin for diversion to the Sacramento River.

Trinity Dam stores water from the Trinity River in Clair Engle Lake. Water is released through Trinity Powerplant. Downstream, Lewiston Dam diverts water from the Trinity River, through the Lewiston Powerplant, into Clear Creek Tunnel for the 11-mile trip through the Trinity Mountains. Water enters Whiskeytown Lake through Judge Francis Carr Powerplant. Some of the water flows through the Spring Creek Power Conduit and Powerplant into Keswick Reservoir in the Shasta Division. From there, the water passes through Keswick Powerplant, then flows south in the Sacramento River. The following are hydropower facilities of the Trinity Division of the CVP:

- Trinity Powerplant is a peaking plant that operates mostly during times of peak electricity demand. Trinity County has first preference for the CVP power benefit from Trinity Powerplant.

- Lewiston Powerplant is operated in conjunction with the spillway gates to maintain minimum flow in the Trinity River downstream from the dam. The turbine is normally set at maximum output, with the spillway gates adjusted to regulate river flow. The Lewiston Powerplant provides power to an adjacent fish hatchery.

- Judge Francis Carr Powerplant is a peaking plant with two generators with a total capacity of 171,000 kilowatts (kW). Trinity County has first preference for the CVP power benefit from the Judge Francis Carr Powerplant.

- Spring Creek Powerplant is at the foot of the Spring Creek Debris Dam. Water for power is received through Spring Creek Tunnel, which diverts water from Whiskeytown Lake on Clear Creek. Water from the plant is discharged to Keswick Reservoir. Spring Creek Powerplant is a peaking plant. Its operation is tied to flow regimes aimed at minimizing metal concentrations in the Spring Creek arm of Keswick Reservoir. Trinity County has first preference for the CVP power benefit from Spring Creek Powerplant.

- The Shasta Division of the CVP's Keswick Powerplant, located at Keswick Dam, has three generating units with a total capacity of 117 MW. Keswick Dam acts as Shasta Dam's afterbay, stabilizing the water flow released through Shasta Powerplant to meet on-peak demands and provide ancillary services. Keswick Powerplant is a run-of-the-river plant. This means that the plant runs throughout the day at a constant rate, providing a uniform release to the Sacramento River. Keswick Reservoir also captures water diverted from the Trinity River through the Trinity River Division of the CVP.

Lower Sacramento River and Delta The two CVP powerplants located between RBDD and the Delta are the Folsom and Nimbus powerplants. Both powerplants belong to the Folsom Unit on the American River. The Folsom Unit of the CVP consists of Folsom Dam, Folsom Reservoir, Folsom Powerplant, Nimbus Dam, Lake Natoma, Nimbus Powerplant, and Nimbus Fish Hatchery.

Folsom Powerplant is a peaking powerplant located at the foot of Folsom Dam on the north side of the American River. Water from the dam is released through three 15-foot-diameter penstocks to three generating units. Folsom Dam was constructed by the USACE and, on completion, was transferred to Reclamation for coordinated operation as an integral part of the CVP. Folsom Powerplant provides a large degree of local voltage control and is increasingly relied on to support local loads during system disturbances.

Nimbus Dam forms Lake Natoma to regulate releases for power made through Folsom Powerplant. It allows dam operators to coordinate power generation and flows in the lower American River channel during normal reservoir operations. Lake Natoma has a surface area of 500 acres and its elevation fluctuates between 4 and 7 feet daily. Nimbus Powerplant is a run-of-the-river plant and provides station service backup for Folsom Powerplant.

Central Valley Project South-of-Delta Facilities The CVP powerplants located in the CVP SOD water service area include New Melones Powerplant of the New Melones Unit of the East Side Division of the CVP, and the William R. Gianelli and O'Neill Pumping-Generating plants of the San Luis Unit of the West San Joaquin Division of the CVP. The latter two

plants, with dual functions of generating electricity and pumping water, are jointly owned by Reclamation and DWR.

New Melones Dam was completed in 1979, and inundated the original Melones Dam and created New Melones Reservoir on the Stanislaus River. New Melones Powerplant, located on the north bank immediately downstream from the dam, is a peaking plant. The powerplant contains two generators. New Melones Reservoir on the Stanislaus River currently operates under the New Melones Reservoir Interim Operating Agreement.

The San Luis Unit, part of both the CVP and SWP, was authorized in 1960. Reclamation and the State constructed and operate this unit jointly; 45 percent of the total cost was contributed by the Federal government and the remaining 55 percent by the State. The joint-use facilities are the O'Neill Dam and Forebay, B.F. Sisk (San Luis) Dam, San Luis Reservoir, William R. Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, Los Banos and Little Panoche reservoirs, and San Luis Canal from O'Neill Forebay to Kettleman City, together with the necessary switchyard facilities. The Federal-only portion of the San Luis Unit includes the O'Neill Pumping-Generating Plant and Intake Canal, Coalinga Canal, Pleasant Valley Pumping Plant, and San Luis Drain (the drain was never completed).

San Luis Reservoir serves as the major storage reservoir, and O'Neill Forebay acts as an equalizing basin for the upper stage dual-purpose pumping-generating plant. O’Neill Pumping-Generating Plant takes water from the DMC and discharges it into the O'Neill Forebay, where the California Aqueduct (SWP feature) flows directly. The William R. Gianelli Pumping-Generating Plant lifts water from the O'Neill Forebay and discharges it into San Luis Reservoir. During releases from the reservoir, these plants generate electric power by reversing flow through the turbines. Water for irrigation is released into the San Luis Canal and flows by gravity to Dos Amigos Pumping Plant where it is lifted more than 100 feet to permit gravity flow to its terminus at Kettleman City. The SWP canal system continues to southern coastal areas.

The O'Neill Pumping-Generating Plant consists of an intake channel, leading off the DMC, and six pumping-generating units. Normally, these units operate as pumps to lift water from 45 to 53 feet into the O'Neill Forebay; each unit can discharge 700 cfs and has a rating of 6,000 horsepower (hp). Water is

occasionally released from the forebay to the DMC, and these units then operate as generators; each unit has a generating capacity of about 4,200 kW.

William R. Gianelli Pumping-Generating Plant, the joint Federal-State facility located at San Luis Dam, lifts water by pump turbines from the O'Neill Forebay into San Luis Reservoir. During the irrigation season, water is released from San Luis Reservoir back through the pump-turbines to the forebay and energy is reclaimed. Each of the eight pumping-generating units has a capacity of 63,000 hp as a motor and 53,000 kW as a generator. As a pumping plant to fill San Luis Reservoir, each unit lifts 1,375 cfs at a design dynamic head of 290 feet. As a generating plant, each unit passes 2,120 cfs at a design dynamic head of 197 feet.

Central Valley Project Pumping Plants CVP pumping plants to move water from the Delta to CVP water service areas in the Central Valley include the Jones Pumping Plant, O'Neill and William R. Gianelli pumping-generating plants (previously described), Dos Amigos Pumping Plant, and SWP's Banks Pumping Plant. Table 20-5 shows the calendar year 2007 energy consumption of each of the plants. Reclamation constructed and operated the Jones Pumping Plant. The Banks Pumping Plant is an SWP facility (constructed and operated by DWR, as discussed later in this chapter); however, Reclamation has access to its pumping capacity through a JPOD. The remaining plants, described previously, are joint-use facilities between the two agencies under the San Luis Unit.

Table 20-5. Central Valley Project Pumping Plants and Historical Consumption

CVP Pumping Plants	Energy Used in Calendar Year 2007 (megawatt-hour)
C.W. "Bill" Jones Pumping Plant	593,490
O'Neill Pumping-Generating Plant	75,377
William R. Gianelli Pumping-Generating Plant	210,019
Dos Amigos Pumping Plant	145,502
Harvey O. Banks Pumping Plant – Federal Share	39,647
Total	1,064,035

Source: Reclamation 2007
Key:
CVP = Central Valley Project

The Jones Pumping Plant, formerly Tracy Pumping Plant, is a component of the Delta Division of the CVP. Construction of the plant started in 1947 and was completed in 1951 with an inlet channel, pumping plant, and discharge pipes. Delta water is lifted 197 feet up and carried about 1 mile into the DMC. Each of the six pumps at the Jones Pumping Plant is powered by a 22,500 hp motor and is capable of pumping 767 cfs. Power to run the pumps is supplied by the CVP powerplants. The intake canal includes the Jones Pumping Plant fish screen, which was built to intercept downstream migrant fish to be returned to the main channel to resume their journey to the ocean.

The DMC/California Aqueduct Intertie, a shared federal-state water system improvement, connects the DMC and the California Aqueduct via two 108-inch-diameter pipes and pumping capacity of 467 cubic feet per second (900 cfs gravity flow from California Aqueduct to DMC). The DMC/California Aqueduct Intertie addresses DMC conveyance conditions that had restricted use of the Jones Pumping Plant to less than its design capacity, potentially restoring as much as 35 TAF of average annual deliveries to the CVP.

Dos Amigos Pumping Plant is a joint CVP/SWP facility, located 17 miles south of the O'Neill Forebay on the San Luis Canal. It lifts water 113 feet to permit gravity flow to the terminus of the San Luis Canal at Kettleman City. The plant contains six pumping units, each capable of delivering 2,200 cfs at 125 feet of head.

State Water Project Facilities

The SWP has 8 hydroelectric powerplants and 17 pumping plants. Table 20-6 summarizes powerplant capacity and historical annual generation in calendar year 2009 for each plant. Table 20-7 shows the historical annual power consumption in calendar year 2009 for each pumping plant.

Table 20-6. State Water Project Powerplants, Capacities, and Historical Power Generation

State Water Project Powerplants	Capacity (megawatt)	Energy Generated in Calendar Year 2009 (megawatt-hour)
Hyatt-Thermalito Powerplant Complex	762	1,449,966
William R. Gianelli Pumping-Generating Plant (SWP share)	222	55,835
Alamo Powerplant	17	55,356
Mojave Siphon Powerplant	33	30,518
Devil Canyon Powerplant	276	553,706
Warne Powerplant	74	279,900

Source: DWR 2013

Table 20-7. State Water Project Historical Power Consumption

State Water Project Pumping Plants and Powerplants	Energy Used in Calendar Year 2009 (megawatt-hour)
Hyatt-Thermalito Pumping-Generating Plant (pumpback and station service)	1,488
North Bay Interim Pumping Plant	-
Cordelia Pumping Plant	10,365
Barker Slough Pumping Plant	8,543
South Bay Pumping Plant	100,947
Del Valle Pumping Plant	559
Banks Pumping Plant	476,985
Gianelli Pumping-Generating Plant (SWP share)	174,028
Dos Amigos Pumping Plant (SWP share)	191,980
Buena Vista Pumping Plant	297,423
Teerink Pumping Plant	321,958
Chrisman Pumping Plant	703,386
Edmonston Pumping Plant	2,577,557
Alamo Power Plant (station service)	306
Pearblossom Pumping Plant	320,676
Pine Flat Power Plant	1,389
Mojave Siphon Powerplant (station service)	468
Devil Canyon Powerplant (station service)	919
Oso Pumping Plant	157,762
Warne Power Plant (station service)	880
Las Perillas Pumping Plant	8,349
Badger Hill Pumping Plant	20,628
Devil's Den Pumping Plant	13,689
Bluestone Pumping Plant	12,695

Table 20-7. State Water Project Historical Power Consumption (contd.)

State Water Project Pumping Plants and Powerplants	Energy Used in Calendar Year 2009 (megawatt-hour)
Polonio Pass Pumping Plant	13,758
Greenspot Pumping Plant	13,075
Crafton Hills Pumping Plant	13,747
Cherry Valley Pumping Plant	363

Source: DWR 2013

State Water Project Power Generation Facilities Among the eight hydroelectric powerplants, three powerplants are located in the Lake Oroville vicinity and the remaining in the SOD area.

Lake Oroville, the SWP's largest reservoir, stores winter and spring runoff from the Feather River watershed, and releases water for SWP needs. These releases generate power at three powerplants: Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Thermalito Pumping-Generating Plants (Hyatt-Thermalito Powerplant Complex). DWR schedules hourly releases through the Hyatt-Thermalito Powerplant Complex to maximize the amount of energy produced when power values are highest. Because the downstream water supply does not depend on hourly releases, water released for power in excess of local and downstream requirements is conserved by pumpback operation during off-peak times into Lake Oroville. Energy prices primarily dictate hourly operations for the power generation facilities.

The remaining five SWP powerplants are the jointly owned William R. Gianelli Pumping-Generating Plant (previously described), Alamo Powerplant, Devil Canyon Powerplant, Warne Powerplant, and Mojave Siphon Powerplant. They generate about one-sixth of the total energy used by the SWP. Alamo Powerplant uses the 133-foot head between Tehachapi Afterbay and Pool 43 of the California Aqueduct to generate electricity. Mojave Siphon Powerplant generates electricity from water flowing downhill after its 540-foot lift by Pearblossom Pumping Plant. Devil Canyon Powerplant generates electricity with water from Silverwood Lake with more than 1,300 feet of head, the largest head in the SWP system. Warne Powerplant uses the 725-foot drop from the

Peace Valley Pipeline to generate electricity with its Pelton wheel turbines.

State Water Project Pumping Facilities Among the 17 SWP pumping plants, plants that have historically consumed most of the energy are William R. Gianelli Pumping-Generating Plant (SWP share), Banks Pumping Plant, Dos Amigos Pumping Plant (SWP share), Chrisman Pumping Plant, and Edmonston Pumping Plant.

The Banks Pumping Plant is located 2.5 miles southwest of the Clifton Court Forebay on the California Aqueduct. The plant is the first pumping plant for the California Aqueduct and the South Bay Aqueduct. It provides the necessary head for water in the California Aqueduct to flow for approximately 80 miles south past the O'Neill Forebay and San Luis Reservoir to the Dos Amigos Pumping Plant (another jointly owned facility, as previously described). The Banks Pumping Plant initially flows into Bethany Reservoir, where the South Bay Aqueduct truly begins. The design head is 236 to 252 feet and installed capacity is 10,670 cfs with 333,000 hp.

Along the California Aqueduct, Pearblossom, Chrisman, and Edmonston pumping plants have historically consumed the highest amounts of energy. Pearblossom Pumping Plant lifts water about 540 feet and discharges the water at elevation 3,479, the highest point along the entire California Aqueduct. Chrisman and Edmonston pumping plants provide 524 and 1,970 feet of lift, respectively, to convey California Aqueduct water across the Tehachapi Mountains.

Environmental Consequences and Mitigation Measures

This section discusses environmental consequences on hydropower generation, energy use, and existing hydropower facilities associated with implementing the alternatives. It also describes potential mitigation measures associated with impacts that are significant or potentially significant. Potential direct and indirect impacts to hydropower generation, energy use, and existing hydropower facilities and associated mitigation measures are summarized in Table 20-8.

Table 20-8. Summary of Impacts and Mitigation Measures for Power and Energy

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
PWR-1: Decrease in Kerckhoff Hydroelectric Project Energy Generation and Ancillary Services	Primary Study Area	No Action Alternative	PS	None Available	PSU
		Alternative Plan 1	S		SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
PWR-2: Change in Energy Generation at Friant Dam Powerhouses	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	Beneficial		Beneficial
		Alternative Plan 2	Beneficial		Beneficial
		Alternative Plan 3	Beneficial		Beneficial
		Alternative Plan 4	Beneficial		Beneficial
		Alternative Plan 5	Beneficial		Beneficial
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
PWR-3: Change in Energy Generation and Use Within the Friant Division of the CVP Water Service Area	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	PS	None Required	PSU
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial

Table 20-8. Summary of Impacts and Mitigation Measures for Power and Energy (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
PWR-4: Decrease in CVP System Energy Generation	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
PWR-5: Decrease in SWP System Energy Generation	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
PWR-6: Increase in CVP System Pumping Energy Use	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS

Table 20-8. Summary of Impacts and Mitigation Measures for Power and Energy (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
PWR-7: Increase in SWP System Pumping Energy Use	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS

Key:
LTS = less than significant
NI = no impact
PS = potentially significant
PSU = potentially significant and unavoidable
S = significant
SU = significant and unavoidable

Methods and Assumptions

This impact assessment is based on quantitative data regarding changes to hydropower resources that could occur under the Investigation alternatives in geographic locales within the study area. All action alternatives are compared to a baseline to allow evaluation of potential impacts. For existing conditions, a 2005 level of development CalSim II simulation without Temperance Flat RM 274 Reservoir is used. Similarly, for future conditions, a 2030 level of development CalSim II simulation, the No Action Alternative, is used as a baseline. Each action alternative was simulated using the same levels of development so that any changes from the baseline hydropower generation or consumption can be attributed to the alternative. Detailed tables of monthly energy generation and energy consumption associated with each action alternative are included in the Modeling Appendix.

Four different hydropower models were used for the hydropower accomplishments evaluation in this analysis, including the following:

1. **Local Hydropower Generation** – Simulates existing local hydropower energy generation from the Kerckhoff Power Project and FPP and proposed local hydropower generation at Temperance Flat RM 274 Reservoir based on daily operation simulation.

2. **PLEXOS®** – Simulates hourly hydropower generation and capacity at Temperance Flat RM 274 Reservoir powerhouse and Kerckhoff Hydroelectric Project dispatch in an optimized manner to maximize the value of energy and ancillary services on an hourly basis. Ancillary services are provided by generating resources with specific attributes to quickly ramp up or down generation production. Ancillary services respond to fluctuations in variable energy resources generation to meet load in a reliable manner.

3. **LongTermGen** – Simulates CVP system power generation and power consumption at pumping facilities based on monthly mean operation information from CalSim II.

4. **SWP_Power** – Simulates SWP system power generation and power consumption at pumping

facilities based on monthly mean operation information from CalSim II.

The four hydropower models are described in the following sections.

Local Hydropower Generation Model

Developing any action alternative could affect operations of existing hydropower facilities and provide opportunities for new hydroelectric power production. Existing hydropower facilities estimates were made using modeling approaches that applied output from CalSim II. CalSim II output is post-processed to derive daily water operations, as described in the Modeling Appendix. Daily water operations were used to calculate daily generation in the Local Hydropower Generation Model for existing and proposed hydroelectric powerhouses.

The water-power equation is defined by the following formula:

$$kW = \frac{Q \times H \times e}{11.81} \qquad (1)$$

Where:

kW	=	power (kilowatt)
H	=	net head (feet)
Q	=	flow rate through turbine (cubic feet per second)
e	=	efficiency of the turbine (%)
11.81	=	unit conversion factor

To convert the power output kW to energy kilowatt-hour (kWh), the water power generation equation must be integrated over time.

The approach for estimating hydropower energy generation was as follows:

1. Water-level elevations of the forebay and tailwater or afterbay for each powerhouse are estimated based on reservoir storage output from the water operations model and bathymetric data.

2. Water elevations are then used to compute gross head and net head. Net head takes into account head loss in tunnels, penstocks, etc. Head loss in long conveyance tunnels is calculated based on a design flow.

3. Generation release is then calculated using net head and unit capacity. If the net head is outside the head range of the unit(s), the generation release is zero.

4. The number of hours that generation release can be sustained is then calculated, based on the daily flow from the water operations model.

5. Using the net head, the available water release for generation, and assumed efficiencies, the total power capacity (MW) is calculated.

6. Generation (MWh) is then calculated using the total number of hours the generation releases can be sustained and the total power capacity.

The water operations and models are further described in the Modeling Appendix.

PLEXOS® Model

Using the Local Hydropower Generation Model as input, the PLEXOS® model was used for those projects with dispatchable capacity to optimize the value of the hydropower attributes, as described in the Modeling Appendix. PLEXOS®, a transmission-constrained power market simulation model, distributes that portion of dispatchable energy for which the energy market represents the highest value over the most valuable hours within a day or week using an hourly time step. If ancillary services represent a higher value product, then PLEXOS® allocates a portion of dispatchable energy to the regulation-up market within a day or week using an hourly time step by optimizing among all market opportunities. This optimization assumes that ancillary services bid into the market are only called upon 50 percent of the time.

LongTermGen and SWP_Power Models

Regional energy estimates were made using the Benchmark Study Team (BST) power modeling tools LTGen, Version 1.18, and SWP_Power, BST April 2010 Version, for CVP and SWP facilities, respectively. LongTermGen (LTGen) and SWP_Power use operations data from CalSim II simulations to predict energy generation and consumption throughout the CVP and SWP. Methods applied to evaluate power generation are discussed below.

For each alternative, outputs from CalSim II simulation were input to LTGen and SWP_Power, to simulate power generation

and consumption throughout the CVP and SWP systems, respectively. These CalSim II outputs included reservoir releases, conveyance flow rates, and end-of-month reservoir storage data. Both LTGen and SWP_Power are monthly models. Their simulation periods are from October 31, 1921, to September 30, 2003.

In LTGen and SWP_Power, energy generation is a function of turbine configuration, reservoir release, net head, and duration of generation. Net head is the actual head available for power generation; it is reservoir water surface elevation (a function of storage) minus tailrace elevation (a function of release).

Similarly, the calculation of energy required for pumping in both models is a function of pump configuration, pumping rate, pumping head (i.e., net head with hydraulic losses), and duration of pumping. Detailed descriptions of LTGen and SWP_Power are included in the Modeling Appendix.

Criteria for Determining Significance of Effects

Thresholds of significance for impacts to power and energy are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. An alternative would be considered to have a potentially significant impact on regional hydropower production if the change in the average annual energy generation or consumption (over the 82-year period of simulation) by the CVP/SWP is greater than 5 percent, as shown in Table 20-9.

A threshold of 5 percent was selected as the threshold of significance for hydroelectric generation for several reasons, including seasonal and annual hydrologic variability, short-term operations decisions that may affect the water level in storage, and regional power market demands and prices that may dictate hydropower facilities operations. These factors could contribute to potentially substantial variations in hydropower generation on a monthly or annual basis. As a result, generation variations of less than 5 percent would not be considered significant. Significance statements are relative to both existing conditions (2005) and future conditions (2030), unless stated otherwise.

Table 20-9. Impact Indicators and Significance Criteria for Energy Generation and Usage

Impact Indicator	Significance Criterion
Friant Powerplants Energy Generation	Decrease in average annual Friant Powerplants hydropower generation of more than 5 percent.
Combined Kerckhoff Project and Temperance Flat RM 274 Reservoir Energy Generation	Decrease in average annual hydropower generation or value for the Kerckhoff Project and Temperance Flat RM 274 Reservoir powerhouses of more than 5 percent.
CVP System Energy Generation	Decrease in average annual CVP system hydropower generation of more than 5 percent.
SWP System Energy Generation	Decrease in average annual SWP system hydropower generation of more than 5 percent.
CVP System Pumping Energy Use	Increase in average annual CVP system pumping energy use of more than 5 percent.
SWP System Pumping Energy Use	Increase in average annual SWP system pumping energy use of more than 5 percent.

Key:
CVP = Central Valley Project
RM = river mile
SWP = State Water Project

Energy Generation at Friant Dam Powerhouses

Changes in operations at Friant Dam powerhouses due to the action alternatives could directly affect hydropower generation caused by changes in head and flow available for hydropower generation. A significant increase in energy generation would be beneficial to FPA and Orange Cove ID customers. A significant reduction in energy generation at Friant Dam powerhouses could require the purchase of energy to meet affected FPA and Orange Cove ID customer energy demands, or a reduction in power revenue.

Kerckhoff Hydroelectric Project Energy Generation

The action alternatives could directly affect hydropower generation at Kerckhoff Hydroelectric Project facilities by inundating the Kerckhoff Hydroelectric Project powerhouses. A total loss in energy generation at Kerckhoff Hydroelectric Project powerhouses could require the purchase of energy and/or development of new hydropower power facilities to mitigate for the loss in energy or a reduction in power revenue.

CVP System Energy Generation

Changes in CVP operations due to the action alternatives could result in reoperation of other CVP hydropower generation

facilities, and could result in a systemwide decrease in CVP hydropower generation. A significant reduction in CVP energy generation might result in less generation available to preference power customers.

SWP System Energy Generation

Changes in SWP operations due to the action alternatives could result in reoperation of SWP generation facilities, and could result in a systemwide decrease in SWP hydropower generation. A significant reduction in SWP energy generation could require the purchase of energy to meet SWP pumping energy demands, or a reduction in power revenue.

CVP Pumping Energy Use

Changes in CVP operations due to the action alternatives could result in changes in operations of the CVP pumping plants. A significant increase in CVP system pumping energy use could require the purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

SWP Pumping Energy Use

Changes in SWP operations due to the action alternatives could result in changes in operations of the SWP pumping plants. A significant increase in SWP system pumping energy use could require the purchase of energy to meet SWP pumping energy demands, or a reduction in power revenue.

Topics Eliminated from Further Discussion

No topics were dismissed from further discussion. Impacts to energy generation and consumption are presented according to the facilities that would be affected; therefore, the impacts presented in the following section are specific to either the primary study area (Impact PWR-1 and Impact PWR-2) or the extended study area (Impact PWR-3 through Impact PWR-6).

Direct and Indirect Effects

The following section describes the potential environmental consequences of the alternatives. Where the action alternatives would have identical or nearly identical impacts regardless of which action alternative is implemented, the action alternatives are described together. Where impacts would differ, the action alternatives are described separately.

Impact PWR-1 – Decrease in Kerckhoff Hydroelectric Project Energy Generation and Ancillary Services

Primary Study Area

No Action Alternative Changes in demands between existing and future levels of development would cause changes in magnitude and timing of Kerckhoff Hydroelectric Project tailwater (Millerton Lake) elevations. These changes would affect the magnitude and timing of energy generation and ancillary services under the No Action Alternative compared to Existing Conditions (Table 20-10 and Table 20-11).

This impact would be **potentially significant** under the No Action Alternative.

Table 20-10. Simulated Average Annual Energy Generation and Ancillary Services at Kerckhoff Hydroelectric Project – Existing Conditions and No Action Alternative

Alternative	Kerckhoff Project (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Energy Generation			
Existing Conditions	613.7	0.0	0%
No Action Alternative	616.2	2.5	0%
Ancillary Services			
Existing Conditions	302.2	0.0	0%
No Action Alternative	261.7	-40.5	-13%

Key:
GWh = gigawatt-hour
RM = river mile

Table 20-11. Simulated Average Annual Energy Generation and Ancillary Services Value at Kerckhoff Hydroelectric Project – Existing Conditions and No Action Alternative

Alternative	Kerckhoff Project ($M)	Change from Existing Condition ($M)	Change from Existing Condition (%)
Energy Generation			
Existing Conditions	41.3	0.0	0%
No Action Alternative	41.2	-0.1	0%
Ancillary Services			
Existing Conditions	6.0	0.0	0%
No Action Alternative	5.3	-0.7	-13%

Key:
GWh = gigawatt-hour
M = million
RM = river mile

Alternative Plans 1 – 3 Alternative Plans 1, 2, and 3 would inundate the Kerckhoff Hydroelectric Project powerhouses, and eliminate energy generation at these facilities. The ability of all action alternatives to replace the value of the Kerckhoff Hydroelectric Project powerhouses would vary depending on how carryover storage in Temperance Flat RM 274 Reservoir would be managed. Simulated annual average energy generation and ancillary services at the Kerckhoff Hydroelectric Project and Temperance Flat RM 274 Reservoir is shown in Table 20-12 through Table 20-19 for all action alternatives.

Under Alternative Plans 1, 2, and 3, onsite hydropower energy generation at Temperance Flat RM 274 Reservoir would replace 88 percent and 84 percent of Kerckhoff Hydroelectric Project generation compared to Existing Conditions and the No Action Alternative, respectively. Energy generation is lost because Temperance Flat RM 274 Reservoir has on average less head than the Kerckhoff Hydroelectric Project. Ancillary services would increase 18 percent and 4 percent compared to Existing Conditions and the No Action Alternative, respectively. Ancillary services would increase because the proposed reservoir has more storage capacity and operational flexibility than Kerckhoff Hydroelectric Project. Ancillary services value, however, would decrease because the Temperance Flat RM 274 Reservoir would only increase these services in wet years when value tends to be less.

Energy generation impacts would be **significant** under Alternative Plans 1, 2, and 3. No feasible avoidance or minimization measures are available to reduce this impact below the level of significance. Mitigation for this impact is not proposed because no feasible mitigation is available to reduce the impact to a less-than-significant level. Although not considered mitigation for this impact, PG&E's net lost power generation value after development of new on-site hydropower facilities would be compensated, as described in Chapter 2, "Alternatives."

Alternative Plan 4 Alternative Plan 4 would inundate the Kerckhoff Hydroelectric Project powerhouses and eliminate energy generation at these facilities. Under Alternative Plan 4, onsite hydropower energy generation at Temperance Flat RM 274 Reservoir would replace 91 percent of Kerckhoff Hydroelectric Project generation compared to Existing Conditions and the No Action Alternative. Ancillary services would increase 31 percent and 43 percent compared to Existing Conditions and the No Action Alternative, respectively. Alternative Plan 4 has higher carryover storage in Temperance Flat RM 274 Reservoir than other action alternative and can replace more lost energy and ancillary services value, although not to the level of the Kerckhoff Hydroelectric Project.

Energy generation impacts would be **significant** under Alternative Plan 4. No feasible avoidance or minimization measures are available to reduce this impact below the level of significance. Mitigation for this impact is not proposed because no feasible mitigation is available to reduce the impact to a less-than-significant level. Although not considered mitigation for this impact, PG&E's net lost power generation value after development of new on-site hydropower facilities would be compensated, as described in Chapter 2, "Alternatives."

Alternative Plan 5 Alternative Plan 5 would inundate the Kerckhoff Hydroelectric Project powerhouses and eliminate energy generation at these facilities. Alternative Plan 5 would replace the least amount of energy and ancillary services, relative to the other action alternatives, because of the wider range of head caused by varying reservoir levels in both Millerton Lake and Temperance Flat RM 274 Reservoir.

Energy generation impacts would be **significant** under Alternative Plan 5. No feasible avoidance or minimization measures are available to reduce this impact below the level of significance. Mitigation for this impact is not proposed because

no feasible mitigation is available to reduce the impact to a less-than-significant level. Although not considered mitigation for this impact, PG&E's net lost power generation value after development of new on-site hydropower facilities would be compensated, as described in Chapter 2, "Alternatives."

Table 20-12. Simulated Average Annual Energy Generation at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Existing Conditions

Alternative	Kerckhoff Project Simulated Average Annual Generation (GWh)	Temperance Flat Simulated Average Annual Generation (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Conditions	613.7	0	0.0	0
Alternative Plan 1	0	539.6	-74.1	-12
Alternative Plan 2	0	539.6	-74.1	-12
Alternative Plan 3	0	539.6	-74.1	-12
Alternative Plan 4	0	559.4	-54.3	-9
Alternative Plan 5	0	496.1	-117.7	-19

Key:
GWh = gigawatt-hour
RM = river mile

Table 20-13. Simulated Average Annual Energy Generation Value at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Existing Conditions

Alternative	Kerckhoff Project Simulated Average Annual Generation Value ($M)	Temperance Flat Simulated Average Annual Generation Value ($M)	Change from Existing Condition ($M)	Change from Existing Condition (%)
Existing Conditions	41.3	0	0.0	0
Alternative Plan 1	0	36.2	-5.1	-12
Alternative Plan 2	0	36.2	-5.1	-12
Alternative Plan 3	0	36.2	-5.1	-12
Alternative Plan 4	0	37.7	-3.7	-9
Alternative Plan 5	0	32.6	-8.7	-21

Key:
GWh = gigawatt-hour
M = million
RM = river mile

Table 20-14. Simulated Average Annual Ancillary Services at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Existing Conditions

Alternative	Kerckhoff Project Simulated Average Annual Ancillary Services (GWh)	Temperance Flat Simulated Average Annual Ancillary Services (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Conditions	302.2	0	0.0	0
Alternative Plan 1	0	356.0	53.8	18
Alternative Plan 2	0	356.0	53.8	18
Alternative Plan 3	0	356.0	53.8	18
Alternative Plan 4	0	396.0	93.8	31
Alternative Plan 5	0	332.9	30.7	10

Key:
GWh = gigawatt-hour
RM = river mile

Table 20-15. Simulated Average Annual Ancillary Services Value at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Existing Conditions

Alternative	Kerckhoff Project Simulated Average Annual Ancillary Services Value ($M)	Temperance Flat Simulated Average Annual Ancillary Services Value ($M)	Change from Existing Condition ($M)	Change from Existing Condition (%)
Existing Conditions	6.0	0	0.0	0
Alternative Plan 1	0	6.0	-0.1	-1
Alternative Plan 2	0	6.0	-0.1	-1
Alternative Plan 3	0	6.0	-0.1	-1
Alternative Plan 4	0	6.6	0.6	10
Alternative Plan 5	0	5.4	-0.6	-10

Key:
GWh = gigawatt-hour
M = million
RM = river mile

Table 20-16. Simulated Average Annual Energy Generation at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Future Conditions

Alternative	Kerckhoff Project Simulated Average Annual Generation (GWh)	Temperance Flat Simulated Average Annual Generation (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	616.2	0	0.0	0
Alternative Plan 1	0	516.1	-100.1	-16
Alternative Plan 2	0	516.1	-100.1	-16
Alternative Plan 3	0	516.1	-100.1	-16
Alternative Plan 4	0	561.9	-54.3	-9
Alternative Plan 5	0	452.4	-163.8	-27

Key:
GWh = gigawatt-hour
RM = river mile

Table 20-17. Simulated Average Annual Energy Generation Value at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Future Conditions

Alternative	Kerckhoff Project Simulated Average Annual Generation Value ($M)	Temperance Flat Simulated Average Annual Generation Value ($M)	Change from No Action Alternative ($M)	Change from No Action Alternative (%)
No Action Alternative	41.2	0	0.0	0
Alternative Plan 1	0	34.4	-6.8	-16
Alternative Plan 2	0	34.4	-6.8	-16
Alternative Plan 3	0	34.4	-6.8	-16
Alternative Plan 4	0	37.7	-3.5	-8
Alternative Plan 5	0	29.5	-11.8	-29

Key:
GWh = gigawatt-hour
M = million
RM = river mile

Table 20-18. Simulated Average Annual Ancillary Services at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Future Conditions

Alternative	Kerckhoff Project Simulated Average Annual Ancillary Services (GWh)	Temperance Flat Simulated Average Annual Ancillary Services (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	261.7	0	0.0	0
Alternative Plan 1	0	273.1	11.4	4
Alternative Plan 2	0	273.1	11.4	4
Alternative Plan 3	0	273.1	11.4	4
Alternative Plan 4	0	373.2	111.5	43
Alternative Plan 5	0	253.1	-8.6	-3

Key:
GWh = gigawatt-hour
RM = river mile

Table 20-19. Simulated Average Annual Ancillary Services Value at Temperance Flat RM 274 Reservoir Powerhouse and Kerckhoff Hydroelectric Project – Future Conditions

Alternative	Kerckhoff Project Simulated Average Annual Ancillary Services Value ($M)	Temperance Flat Simulated Average Annual Ancillary Services Value ($M)	Change from No Action Alternative ($M)	Change from No Action Alternative (%)
No Action Alternative	5.3	0	0.0	0
Alternative Plan 1	0	4.7	-0.6	-12
Alternative Plan 2	0	4.7	-0.6	-12
Alternative Plan 3	0	4.7	-0.6	-12
Alternative Plan 4	0	6.3	1.1	20
Alternative Plan 5	0	4.2	-1.1	-20

Key:
GWh = gigawatt-hour
M = million
RM = river mile

Impact PWR-2 – Change in Energy Generation at Friant Dam Powerhouses

Primary Study Area

No Action Alternative Changes in demands between existing and future levels of development would cause changes in magnitude and timing of Millerton Lake elevations and Friant Dam diversions and releases. These changes would impact the magnitude and timing of energy generation under the No Action Alternative compared to Existing Conditions (Table 20-20).

This impact would be **less than significant** under the No Action Alternative.

Table 20-20. Simulated Average Annual Energy Generation at Friant Dam Powerhouses – Existing Conditions and No Action Alternative

Alternative	Simulated Average Annual Generation (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Conditions	64.9	0.0	0
No Action Alternative	63.2	-1.7	-3

Key:
GWh = gigawatt-hour
RM = river mile

Action Alternatives All action alternatives would increase Friant Dam powerhouses' average annual generation by up to 16 GWh (25 percent) compared to the No Action Alternative (up to 27 percent compared to Existing Conditions) (Table 20-21 and Table 20-22). Energy generation increases would be caused by higher heads and diversion volumes at Friant Dam.

This impact would be **beneficial** under all action alternatives. Mitigation is not required and thus not proposed.

Table 20-21. Simulated Average Annual Energy Generation at Friant Dam Powerhouses – Existing Conditions

Alternative	Simulated Average Annual Generation (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Conditions	64.9	0	0
Alternative Plan 1	82.3	17.4	27
Alternative Plan 2	82.3	17.4	27
Alternative Plan 3	81.1	16.2	25
Alternative Plan 4	80.1	15.2	23
Alternative Plan 5	80.5	15.6	24

Key:
GWh = gigawatt-hour

Table 20-22. Simulated Average Annual Energy Generation at Friant Dam Powerhouses– Future Conditions

Alternative	Simulated Average Annual Generation (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	63.2	0	0
Alternative Plan 1	78.9	15.7	25
Alternative Plan 2	78.8	15.6	25
Alternative Plan 3	78.8	15.6	25
Alternative Plan 4	78.9	15.7	25
Alternative Plan 5	77.2	14.0	22

Key:
GWh = gigawatt-hour

Impact PWR-3 – Change in Energy Generation and Use Within the Friant Division of the CVP Water Service Area

Extended Study Area

No Action Alternative Changes in energy generation at powerhouses along the Madera Canal would be within typical historical ranges. However, the current state of overdraft and declining groundwater levels in portions of the extended study area would continue. Impacts related to changes in groundwater levels are described in Chapter 13, "Hydrology – Groundwater."

This impact would be **potentially significant** under the No Action Alternative.

Action Alternatives Implementing the action alternatives would likely increase diversions from Millerton Lake to the Madera Canal, and would likely improve energy generation at powerhouses along the Madera Canal. Additionally, increased diversions from Millerton Lake to the Friant-Kern and Madera canals would likely improve groundwater conditions and decrease groundwater pumping energy use.

This impact would be **less than significant and beneficial** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact PWR-4 – Decrease in CVP System Energy Generation

Simulated average annual CVP system generation for the alternatives under the existing and future conditions is shown in Table 20-23 and Table 20-24, respectively.

Table 20-23. Simulated Average Annual Energy Generation in CVP System – Existing Conditions

Alternative	Simulated Average Annual Generation (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Condition	4,925	0	0
Alternative Plan 1	4,922	-3	0
Alternative Plan 2	4,924	-1	0
Alternative Plan 3	4,922	-3	0
Alternative Plan 4	4,923	-2	0
Alternative Plan 5	4,926	1	0

Key:
CVP = Central Valley Project
GWh = gigawatt-hour

Table 20-24. Simulated Average Annual Energy Generation in CVP System – Future Conditions

Alternative	Simulated Average Annual Generation (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	4,912	0	0
Alternative Plan 1	4,914	2	0
Alternative Plan 2	4,914	2	0
Alternative Plan 3	4,914	2	0
Alternative Plan 4	4,914	2	0
Alternative Plan 5	4,914	2	0

Key:
CVP = Central Valley Project
GWh = gigawatt-hour

Extended Study Area

No Action Alternative Simulated average annual CVP system energy generation for the No Action Alternative is shown in Table 20-24. Under the No Action Alternative, simulated average annual energy generation decreased by 13 GWh (0 percent) as compared with existing conditions.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Simulated average annual CVP system generation under the action alternatives is shown in Table 20-23 and Table 20-24 for the existing and future conditions, respectively. Under the action alternatives, changes in simulated average annual energy generation compared with

existing conditions and the No Action Alternative would be less than 1 percent.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact PWR-5 – Decrease in SWP System Energy Generation

Simulated average annual SWP system generation for the alternatives under the existing and future conditions is shown in Table 20-25 and Table 20-26, respectively.

Table 20-25. Simulated Average Annual Energy Generation in SWP System – Existing Conditions

Condition/ Alternative	Simulated Average Annual Generation (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Condition	4,435	0	0
Alternative Plan 1	4,488	53	1
Alternative Plan 2	4,467	32	1
Alternative Plan 3	4,468	33	1
Alternative Plan 4	4,463	29	1
Alternative Plan 5	4,423	-11	0

Key:
GWh = gigawatt-hour
SWP = State Water Project

Table 20-26. Simulated Average Annual Energy Generation in SWP System – Future Conditions

Condition/ Alternative	Simulated Average Annual Generation (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	4,516	0	0
Alternative Plan 1	4,566	50	1
Alternative Plan 2	4,543	28	1
Alternative Plan 3	4,546	31	1
Alternative Plan 4	4,541	26	1
Alternative Plan 5	4,507	-8	0

Key:
GWh = gigawatt-hour
SWP = State Water Project

Extended Study Area

No Action Alternative Under the No Action Alternative, simulated average annual energy generation increased by 81 GWh (2 percent) as compared with existing conditions.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Under the action alternatives, simulated average annual energy generation changes compared with existing conditions and the No Action Alternative would be less than 2 percent.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact PWR-6 – Increase in CVP System Pumping Energy Use

Simulated average annual CVP pumping energy use for the alternatives under the existing and future conditions are shown in Table 20-27 and Table 20-28, respectively.

Table 20-27. Simulated Average Annual Energy Use in CVP System – Existing Conditions

Condition/ Alternative	Simulated Average Annual Energy Use (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Condition	1,179	0	0
Alternative Plan 1	1,186	7	1
Alternative Plan 2	1,186	7	1
Alternative Plan 3	1,183	4	0
Alternative Plan 4	1,183	4	0
Alternative Plan 5	1,179	0	0

Key:
CVP = Central Valley Project
GWh = gigawatt-hour

Table 20-28. Simulated Average Annual Energy Use in CVP System – Future Conditions

Condition/ Alternative	Simulated Average Annual Energy Use (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	1,169	0	0
Alternative Plan 1	1,176	6	1
Alternative Plan 2	1,175	5	0
Alternative Plan 3	1,178	9	1
Alternative Plan 4	1,180	11	1
Alternative Plan 5	1,185	16	0

Key:
CVP = Central Valley Project
GWh = gigawatt-hour

Extended Study Area
No Action Alternative Under the No Action Alternative, simulated average annual pumping energy use decreased by 10 GWh (1 percent) as compared with existing conditions.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Under the action alternatives, changes in simulated average annual pumping energy compared with existing conditions and the No Action Alternative would be less than 2 percent.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed, and thus not proposed.

Impact PWR-7 – Increase in SWP System Pumping Energy Use

Extended Study Area Simulated average annual SWP pumping energy use for the alternatives under the existing and future conditions are shown in Table 20-29 and Table 20-30, respectively.

Table 20-29. Simulated Average Annual Energy Use in SWP System – Existing Conditions

Condition/ Alternative	Simulated Average Annual Energy Use (GWh)	Change from Existing Condition (GWh)	Change from Existing Condition (%)
Existing Condition	7,623	0	0
Alternative Plan 1	7,796	173	2
Alternative Plan 2	7,726	103	1
Alternative Plan 3	7,733	110	1
Alternative Plan 4	7,717	94	1
Alternative Plan 5	7,579	-44	0

Key:
GWh = gigawatt-hour
SWP = State Water Project

Table 20-30. Simulated Average Annual Energy Use in SWP System – Future Conditions

Condition/ Alternative	Simulated Average Annual Energy Use (GWh)	Change from No Action Alternative (GWh)	Change from No Action Alternative (%)
No Action Alternative	7,933	0	0
Alternative Plan 1	8,091	158	2
Alternative Plan 2	8,017	84	1
Alternative Plan 3	8,020	87	1
Alternative Plan 4	8,010	77	1
Alternative Plan 5	7,900	-33	0

Key:
GWh = gigawatt-hour
SWP = State Water Project

No Action Alternative Under the No Action Alternative, there would be an increase in simulated average annual pumping energy use of 310 GWh (4 percent) as compared with existing conditions.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Under the action alternatives, changes in simulated average annual pumping energy compared with existing conditions and the No Action Alternative would be less than 3 percent.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed, and thus not proposed.

Mitigation Measures

This section discusses mitigation measures for each significant impact described in the Direct and Indirect Effects section, as summarized in Table 20-8. No mitigation is required for Impact PWR-2 in the primary study area, and Impacts PWR-3, PWR-4, PWR-5, PWR-6 or PWR-7 in the extended study area, as these impacts would be less than significant, less than significant and beneficial, or beneficial for all action alternatives.

Impact PWR-1 within the primary study area would be significant under all action alternatives. Energy generation and ancillary services at Temperance Flat RM 274 Reservoir powerhouse would offset some, but not all, of the reduction in energy generation caused by taking the Kerckhoff Hydroelectric Project powerhouses offline. No feasible avoidance or minimization measures are available to reduce this impact below the level of significance. Therefore, Impact PWR-1 (within the primary study area) would be **significant and unavoidable**. Although not considered mitigation for this impact, PG&E's net lost power generation value after development of new on-site hydropower facilities would be compensated, as described in Chapter 2, "Alternatives."

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Chapter 21
Public Health and Hazards

This chapter describes the affected environment for public health and hazards, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. This chapter presents information on the primary study area (area of project features, the Temperance Flat Reservoir Area, and Millerton Lake below RM 274). It also discusses the extended study area (San Joaquin River from Friant Dam to the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas).

Affected Environment

The affected environment for public health focuses on hazards associated with activities from or influenced by humans, West Nile virus (WNV), valley fever, naturally occurring asbestos, school safety, wildland fire, and aircraft safety. In addition, this section addresses the potential sources of electromagnetic fields (EMF) in the primary study area, as well as the science behind EMF exposure and human or animal health hazards.

Primary Study Area

Hazards Associated with Human Activities

The term “hazardous material” is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant existing or potential hazard to human health and safety or a potential hazard to the environment. Hazardous materials and waste may exist in the primary study area as a result of past or ongoing waste generation and management. Contaminated sites generally are the result of unregulated spills of hazardous materials, such as gasoline or pesticides, which result in unacceptable levels of toxic substances in soil or water that may pose risks to human health and safety. Contamination also may result from ongoing land uses that generate substantial amounts of hazardous wastes, such as mines and landfills. In addition, utility poles, transformers, and associated electric power transmission facilities typically contain hazardous materials.

A records search of the applicable hazardous material databases was conducted to identify known hazardous materials sites in the vicinity of the primary study area. The search reviewed over 100 databases such as the National Priorities List, Comprehensive Environmental Response, Compensation, and Liability Information System, Resource Conservation and Recovery Act (RCRA), Geotracker (leaking underground storage tank database maintained by the State Water Board), EnviroStor (hazardous materials database maintained by California Department of Toxic Substances Control), and the interactive database of abandoned mines managed by the California Department of Conservation Abandoned Mines Unit. The database search included those that are part of the Cortese list. Table 21-1 provides a summary of the database results within the primary study area.

Based on their proximity to the proposed inundation area, the first three sites listed in Table 21-1 have a potential to be affected by project-related activities. Inundation of underground storage tanks could result in contamination of water in Millerton Lake and downstream in the San Joaquin River.

Implementing any of the action alternatives would require the demolition of several buildings and structures. Structures constructed before 1981 may contain asbestos, and structures painted before 1978 may contain lead paint. PCBs were used as an additive in cooling oils for electrical components, and typical sources of PCBs can include electrical transformers. Based on the age of the structures subject to removal and presence of existing utility infrastructure, asbestos, lead, mercury, and PCBs could be present in specific locations within the primary study area.

Table 21-1. Hazardous Materials Database Sites in the Primary Study Area

Facility Name and Address	Reported Condition
Topham Ranch 36265 Smalley Road Auberry, California 93602	Six permitted underground storage tanks with leaded, unleaded, and aviation-grade gasoline; no reported violations. Tanks are located approximately 600 feet uphill from proposed inundation area.
Delbert and Carole Pitts 35515 Smalley Road Auberry, California 93602	One permitted underground storage tank with leaded gasoline; no reported violations. Tank is located approximately 300 feet uphill from proposed inundation area.
Millerton Lake State Recreation Area 5290 Millerton Road Friant, California 93625	Two permitted underground storage tanks containing gasoline; no reported violations. Tanks are located within 50 feet of proposed inundation area near Friant Dam.
Southern Pacific Transportation Company 17930 Friant Road Friant, California 93626	Fresno County Health Department observed tank truck disposing unknown materials to septic tank in 1987; cleanup status is inactive. Site is located immediately adjacent to the San Joaquin River 100-year floodplain, approximately ¾ mile downstream from Friant Dam.
San Joaquin Fish Hatchery 17372 Brooktrout Friant, California 93626	One permitted above-ground storage tank; permitted removal and closure of one underground storage tank. Small quantity hazardous waste generator. No reported violations. Site is located immediately adjacent to the San Joaquin River 100-year floodplain, approximately ¾ mile downstream from Friant Dam.
Table Mountain Rancheria 23736 Sky Harbor Road Friant, California 93626	Storage, handling, and recovery of inorganic solid wastes and aqueous solutions. No reported violations. Site is located approximately ¼ mile west of the proposed transmission line.
Capricorn III Automotives 21706 Eastmere Lane Friant, California 93626	Gasoline station; no reported violations. Site is located approximately ¼ mile west of the proposed transmission line.
Eagle Springs Golf & Country Club 21722 Fairway Oaks Friant, California 93626	Auto repair/hazardous waste generator. No reported violations. Site is approximately ½ mile southwest of the proposed transmission line.
Table Mountain Rancheria 8206 Table Mountain Friant, California 93625	Wastewater treatment plant; hazmat disclosures are below reporting quantity, permitted organic materials, NPDES permit, air emissions permit. No reported violations. Site is approximately ¼ mile north of proposed transmission line.
Millerton General Store 20023 Auberry Road Clovis, California 93619	Permitted closure and removal of two underground storage tanks. No reported violations. Site is approximately ½ mile southwest of proposed transmission line.
Charles L. Sheppard 25112 Auberry Road Clovis, California 93612	One permitted underground storage tank with unleaded fuel. No reported violations. Site is approximately ½ mile southwest of proposed transmission line.
Fronk's Well Drilling 24941 Auberry Road Clovis, California 93612	Two permitted underground diesel fuel tanks and one waste oil tank; small quantity hazardous waste generator. No reported violations. Site is approximately ½ mile southwest of proposed transmission line.

Table 21-1. Hazardous Materials Database Sites in the Primary Study Area (contd.)

Facility Name and Address	Reported Condition
Don Fernando's at Marshall Station 25527 Auberry Clovis, California 93619	Permitted closure and removal of three underground storage tanks. No reported violations. Site is approximately ¼ mile south of proposed transmission line.
Hurley Forest Fire Station 25267 Auberry Clovis, California 93612	Permitted closure and removal of one underground storage tank; large quantity hazardous waste generator. No reported violations. Site is approximately ¼ mile south of proposed transmission line.

No abandoned mines recorded by the California Department of Conservation were identified in the primary study area. However, within the Millerton Lake watershed, 57 historical gold mines, one active gold mine, and two historical sand and gravel mines were identified. A survey conducted in 2003 by BLM in support of the Investigation identified three abandoned mine sites within the Temperance Flat RM 274 Reservoir Area, including the Patterson Mine (formerly known as the Diana Mine), San Joaquin Mine, and the Sullivan Mine Group. These mines include multiple adits and millsites. Contaminants associated with mining and related activities may include mercury and gold, which are recovered as byproducts from some gravel mining operations, especially in areas affected by historical gold mining, and naturally-occurring contaminants, such as metallic sulfides and/or sulfosalts typically associated with gold deposits (see Chapter 15, "Hydrology – Surface Water Quality," for further discussion). Other potential hazards associated with abandoned mines include undetonated explosives, decomposed support timbers, unstable ground and rocks, obscure vertical workings, and water-filled excavations (Springer 2005). These hazards pose potential risks to casual entrants.

West Nile Virus

All mosquito species are potential vectors of organisms that can cause disease to pets, domestic animals, wildlife, and humans. WNV has become an endemic disease in California and like other encephalitic viruses, can cause serious illness. People who are infected may have a variety of symptoms that can include fever, head and body aches, nausea, vomiting, swollen lymph glands, and skin rash. Only about 1 in 150 infected people will develop a serious illness that may require hospitalization. Elderly people are at highest risk of developing the severe form of WNV and are at an increased risk of long-lasting physical and mental disorders. The severe form of the disease can be fatal (CDC 2012a, DPH and MVC 2012).

Mosquito species are broadly separated into two groups according to where they lay eggs, floodwater mosquitoes and standing water mosquitoes. Adult female floodwater mosquitoes lay eggs on mud or previously submerged vegetation. The eggs may remain dormant for days, months, or even years until they are flooded, at which time larvae hatch. Standing water mosquitoes lay eggs on the water surface. The eggs float on the surface for a few hours to a few days until the larvae hatch into the water. Floodwater mosquito larval development (breeding) sites include irrigated pastures, rice

fields, seasonally flooded duck clubs and other managed wetlands, tidal wetlands, riparian corridors, and snowmelt pools. These intermittent or seasonally flooded habitats can be among the most productive sources of mosquitoes because they are often free of natural predators. Standing water mosquito breeding sites include artificial containers, treeholes, catch basins, open ditches, retention/detention ponds, natural or constructed ponds and wetlands, stormwater management devices, and along the edges of flowing streams. Sources are found everywhere from highly urban areas to natural wetlands and often produce multiple generations of mosquitoes each season (DPH and MVC 2012).

Severe WNV symptoms consist of West Nile encephalitis (inflammation of the brain), West Nile meningitis (inflammation of the membrane around the brain and spinal cord), and West Nile acute flaccid paralysis (inflammation of the spinal cord). Of the total WNV cases reported to the Centers for Disease Control and Prevention (CDC), 2,734 consisted of the severe West Nile neuroinvasive diseases listed above (CDC 2012b). It is important to note that these statistical data include only those cases reported to the CDC. Because most people infected do not experience symptoms and those who do experience symptoms may not seek medical attention, the epidemiological information discussed above does not include all cases of WNV infection.

Both Madera and Fresno counties have reported cases of WNV (DPH 2012a). Mosquito habitat for all the species' lifecycles is located in this geographic region within several miles of wetted portions of the San Joaquin River, bypasses, and tributaries. These habitats are also occupied by predatory fish and other insects that feed on mosquitos.

Valley Fever

Valley fever (*Coccidioidomycosis*) is an infection, usually targeting the lungs, which results from inhalation of the fungus *Coccidioides immitis*. These spores live in soil and generally are limited to areas of the southwestern United States, Mexico, and parts of Central and South America. It can be only contracted from inhalation of spores; it cannot be passed from person to person. In California, it is primarily found in the southern San Joaquin Valley. Spores can enter the air when ground-moving activities, including natural disasters such as earthquakes or excavation activities, disturb spore-bearing soil. Approximately 60 percent of exposed people experience symptoms. Infection can cause flu-like symptoms, and if it is

disseminated to organs other than the lungs, it can lead to severe pneumonia, meningitis, and death.

Fresno and Madera counties are considered "highly endemic" because they have an incidence rate of more than 20 cases per 100,000 population per year. It is reported that average incidence rates were 475 cases per 100,000 people in Fresno County, and 24 cases per 100,000 people in Madera County (DPH 2012b). Although Fresno and Madera counties are considered highly endemic, the incidence of valley fever in Fresno County varies significantly by location, with the majority of cases concentrated in the southwest and central portions of the county (MacLean 2011). The primary study area includes portions of the eastern extent of Fresno County, near the mountain region, which is considered a less endemic area. Nevertheless, the spores that cause valley fever may be present in the primary study area and could be disturbed and become airborne during earth-moving activities. A site-specific evaluation would be needed to confirm the soil types and presence of spores.

Naturally Occurring Asbestos

Asbestos is a term applied to several types of naturally occurring fibrous materials found in rock formations throughout California (i.e., naturally occurring asbestos, or "NOA"). Exposure and disturbance of rock and soil that contains asbestos can result in the release of fibers to the air and consequent exposure to the public. All types of asbestos are now considered hazardous and pose public health risks. Asbestos is commonly found in ultramafic rock, including serpentinite. Two forms of asbestos are associated with serpentinite: chrysotile asbestos and tremolite/actinolite asbestos. As discussed in detail in Chapter 11, "Geology and Soils," the primary study area is composed of volcanic basalt, the older portion of the Mehrten Formation, and older granitic and rocks of the Sierra Nevada Batholith. These types of rocks do not contain NOA. Furthermore, the California Geological Survey has prepared a publication entitled *General Location Guide for Ultramafic Rocks in California — Areas More Likely to Contain Naturally Occurring Asbestos* (Churchill and Hill 2000). A review of this publication indicates that the primary study area is not located in an area that is likely to contain NOA.

School Safety

School-aged children are considered to be particularly sensitive to adverse impacts resulting from exposure to hazardous

materials, substances, or waste. Public Resources Code Section 21151.4 requires that project proponents evaluate projects that are proposed within one-quarter mile of a school to determine whether release of hazardous air emissions or hazardous substances resulting from project implementation would pose a human health or safety hazard. The following schools are located in the vicinity of the primary study area:

- Foothill Middle School, located at 29147 Auberry Road in Prather, California (approximately 2 miles east of the proposed reservoir)
- Auberry Elementary School, located at 33367 Auberry Road in Auberry, California (approximately 2.5 miles east of the proposed reservoir)
- Friant Elementary School, located at 17220 Burroughs Avenue in Friant, California (approximately 3 miles west of the proposed transmission line)

Wildland Fire

The California Department of Forestry and Fire Protection has developed fire hazard severity zones as a way to predict fire damage. The zones take into account the potential fire intensity and speed, production and spread of embers, fuel loading, topography, and climate (e.g., temperature and the potential for strong winds). Proposed facilities would be constructed in both Federal Responsibility Areas and State Responsibility Areas. With the State Responsibility Areas, facilities would be constructed in areas classified as moderate to high fire hazard severity zones (CAL FIRE 2007a, 2007b).

Aircraft Safety

Collisions between aircraft and wildlife can compromise the safety of passengers and flight crews. Damage to an aircraft resulting from a wildlife collision can range from a small dent in the wing to catastrophic engine failure, destruction of the aircraft, and potential loss of life. Damage or potential damage caused by birds and other wildlife is termed a “strike” or “strike hazard.” Federal Aviation Administration (FAA) regulations recommend a separation of at least 5 statute miles from airport facilities to reduce risk of damage to aircraft resulting from high-speed collisions with birds or the ingestion of birds into aircraft engines (FAA 2007). In addition to bird strike, CEQA requires an evaluation of potential hazards to people residing or working in a project area that is within 2 miles of a public airport or in the vicinity of a private airstrip.

Airports and airstrips in the region and their distance from the primary study area are listed in Table 21-2.

As shown in Table 21-2, there are no airports within 5 miles of the FAA-recommended distance for evaluation of bird strike hazards, and there are no airports or airstrips within 2 miles of the primary study area for evaluation of potential hazards to people working in the project area.

Table 21-2. Airports and Airstrips in the Vicinity of the Primary Study Area

Name	Approximate Distance and Direction from Primary Study Area
Arnold Ranch Airport	6 miles southwest
Fresno Yosemite International Airport	12 miles south
Sierra Skypark Airport	16 miles southwest
Fresno Chandler Executive Airport	18 miles south
Madera Municipal Airport	20 miles west
Sallaberry Ranch Airstrip	23 miles northwest

Electromagnetic Fields

EMFs are areas surrounding a source that are influenced by the flow of electricity. EMF sources could include electrical transmission lines, generators, or other magnetized materials.

There has been continued public concern about long-term exposure to high-voltage transmission lines and other EMF sources. However, available evidence has not established a conclusive link between EMF exposure and human or animal health hazards. In light of these inconclusive results, organizations such as the CPUC, National Institute of Environmental Health Sciences, World Health Organization, and National Academy of Science have found there is no evidence that EMF exposure affects most health outcomes. The studies indicating an association between EMF exposure and increased risk of childhood leukemia have not been reproduced by laboratory evidence and lack a scientific explanation (NIEHS 2002).

In the Temperance Flat Reservoir Area, three 115-kV PG&E transmission lines connect the power generation systems at the Kerckhoff and Kerckhoff No. 2 powerhouses to the regional and statewide electrical grid. East of the Temperance Flat Reservoir Area, a high-voltage PG&E electrical transmission corridor runs from north to south. Aboveground electrical

transmission lines extend from the electrical grid to electrical utility boxes in the recreation areas around Millerton Lake, and aboveground distribution lines provide electricity to water pumps that supply water to the recreation areas around Millerton Lake. Additional aboveground electrical distribution lines are located along the Millerton Lake boat ramp and Winchell Cove boat ramp (Reclamation and State Parks 2010).

The CPUC has not adopted numeric exposure limits. It has developed design guidelines to be incorporated into the design of new facilities to reduce EMF exposure. These design measures include increasing structure height, locating power lines near the right of way (ROW) centerline, reducing conductor spacing, and phasing circuits to reduce EMF strength.

Extended Study Area

The extended study area extending from Friant Dam to the confluence with the Merced River, San Joaquin River from Merced River to the Delta, and the Delta is now subject to changed instream flows associated with implementing the SJRRP. However, these changes in water flow would have no impacts on, nor would they be affected by, anthropogenic factors, valley fever, naturally occurring asbestos, wildland fire, aircraft safety, or EMF. Therefore, these public health and hazards for the extended study area are not discussed further in this section.

The discussion of WNV in the West Nile Virus section above does not pertain to the extended study area because implementing any of the action alternatives would not result in modifying land uses or provide increases in water supply that exceed historic amounts. The delivery of water supplies generated by implementing any of the action alternatives and delivering water supplies to the SOD CVP and SWP water service areas would not result in a modification of physical conditions that would result in an increase in mosquito habitat or associated mosquito populations that could pose an increased risk of West Nile virus. Changes in San Joaquin River flows associated with operations of the action alternatives would remain within the historic flow range and would not be substantially different from no action conditions. Mosquito habitats and populations in the extended study area would not substantially vary from existing conditions and the No Action Alternative.

Environmental Consequences and Mitigation Measures

This section describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine significance of impacts on public health and hazards. It then discusses the impacts of the Investigation and proposes mitigation where appropriate. The potential impacts on public health and hazards and associated mitigation measures are summarized in Table 21-3.

Methods and Assumptions

This analysis considers foreseeable hazardous materials use, risk of wildland fire, potential risk of damage from acts of terrorism, potential for EMF impacts associated with the proposed electrical transmission line, and risk of disease resulting from constructing the project facilities and delivery of water supplies from the new reservoir. This analysis identifies how these hazards could expose individuals or the environment to health and safety risks. This analysis is based on a review of existing information and various site investigation reports prepared for the Study Area, planning documents applicable to the Study Area, fire insurance maps, consultation with appropriate agencies, and field reconnaissance.

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing the No Action Alternative and other alternatives. Under NEPA, the severity and context of an impact must be characterized. An environmental document prepared to comply with CEQA must identify the potentially significant environmental impacts 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental impacts (State CEQA Guidelines, Section 15126.4[a]).

Table 21-3. Summary of Impacts and Mitigation Measures for Public Health and Hazards

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
HAZ-1: Potential for Exposure to Hazardous Materials	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS	None Required	LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-2: Potential Emission of Hazardous Materials within 0.25 Mile of a School	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	HAZ-2: Reduce Exposure of Hazards to Schools	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-3: Increase Hazards from a Known Hazardous Materials Contamination Site	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	HAZ-3: Reduce Hazards from Hazardous Material Sites	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 21-3. Summary of Impacts and Mitigation Measures for Public Health and Hazards (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
HAZ-4: Interfere with Evacuation Routes and Emergency Vehicle Access	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	PS	HAZ-4: Implement Mitigation Measure TRN-2, Implement a Traffic Management Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-5: Locate Electrical Transmission Facilities Near a School	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-6: Increase Hazards of Wildland Fires	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 21-3. Summary of Impacts and Mitigation Measures for Public Health and Hazards (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
HAZ-7: Increase Hazards of West Nile Virus	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	PS	HAZ-7: Reduce Hazards of West Nile Virus	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-8: Increase Hazards of Valley Fever	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	HAZ-8: Reduce Hazards of Valley Fever	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-9: Increase Exposure to Damage from Acts of Terrorism	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 21-3. Summary of Impacts and Mitigation Measures for Public Health and Hazards (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
HAZ-10: Increase Exposure to Hazards Associated with Abandoned Mine Sites	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
HAZ-11: Increase Potential for Blast-Related Injury during Construction	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	HAZ-11: Reduce Hazards from Blasting	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Key:
LTS = less than significant
NI = no impact
PS = potentially significant

The following significance criteria are based on guidance provided by the State CEQA Guidelines and consider the context and intensity of the environmental impacts as required under NEPA. Impacts of an alternative on public health and hazards would be significant if project implementation would do any of the following:

- Expose construction workers, the public and the environment to hazardous materials including routine transport, use, disposal, or accident conditions
- Emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school
- Be located on a site that is included on a list of hazardous materials sites (Cortese List) compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment
- Interfere with emergency evacuation routes and emergency vehicle access
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires
- Locate electrical transmission facilities less than 150 feet from the property line of an existing or approved school site
- Potential impacts related to health hazards from exposure of people to WNV (or vector-borne illnesses)
- Potential impacts related to health hazards from the exposure of people to valley fever spores
- Increase hazards from the potential risk of damage from acts of terrorism
- Expose construction workers or the general public to hazards associated with abandoned mine sites

Topics Eliminated from Further Consideration

There are no airports within 5 miles of the FAA-recommended distance for evaluation of bird strike hazards, and there are no

airports or airstrips within 2 miles of the primary study area for evaluation of potential hazards to people working in the project area. The airport closest to the primary study area is Arnold Ranch airport, located approximately 6 miles to the southwest in Madera, California. Similarly, the project is not in an area covered by an adopted airport land use plan. These issues are not discussed further in this section.

Water safety hazards posed by the alternatives to water-based recreationists are assessed in Chapter 22, "Recreation;" therefore, this topic has been eliminated from further analysis in this chapter. Similarly, the impacts of hazardous materials on water quality, including impacts related to inundation of historic mine sites, are assessed in Chapter 15, "Hydrology – Surface Water Quality."

Implementing any of the action alternatives would increase the amount of water available for delivery from Millerton Lake. Portions of this water would be conveyed directly to Friant Division water contractors or down the San Joaquin River and rediverted or exchanged for delivery to SOD CVP and SWP water contractors. The conveyance of these water supplies would not exceed channel capacity of the San Joaquin River or Delta waterways. No change in existing use of adjacent lands would occur. Because implementing any of the action alternatives would not result in San Joaquin River or Delta instream flows that would exceed channel capacity or result in changes to land or water uses, their implementation would not create a hazard and would not pose a threat to the health of members of the public using the San Joaquin River or Delta. Therefore, none of the five action alternatives would have an impact on public health or hazards in the San Joaquin River or Delta.

As described in Chapter 14, "Hydrology – Surface Water Supplies and Facilities Operations," of this Draft EIS, implementing any of the action alternatives would increase water reliability for the Friant Division and SOD CVP and SWP water contractors during most water-year types. The delivery of this additional water would not exceed historic maximum deliveries or existing contracted water volumes, result in placing new land into agricultural production, change cropping patterns, or result in other physical changes to the environment. Because implementing any of the action alternatives would not result in land use changes or other physical consequences in the CVP and SWP service areas, their implementation would not create a hazard and would not pose

threat to public health. Therefore, none of the five action alternatives would have an impact on public health or create hazards in the CVP or SWP service areas. This issue is not discussed further in this analysis.

Direct and Indirect Impacts

This section describes the environmental consequences of implementing any of the alternatives. Where the action alternatives would have identical or nearly identical impacts regardless of which action alternative is implemented, the action alternatives are described together. Where impacts would differ, the action alternatives are described separately.

Impact HAZ-1: Potential for Exposure to Hazardous Materials

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable future projects or continuation of existing plans would occur that would result in any increase in exposure of the public or the environment to hazards, hazardous materials, or hazardous waste in the project area.

There would be **no impact** under the No Action Alternative.

Action Alternatives Project construction and operation, including the inspection, maintenance, and repair of project features, may involve the transportation, use, or storage of hazardous materials, including the potential use of explosives and drilling during construction of the diversion tunnel. Local, State, and Federal safety codes and procedures related to hazardous material transport, handling, use, and disposal would be followed for project construction and operation to minimize the risk of a hazardous materials release or exposure to construction workers. However, an accidental release resulting from project activities could create a health risk for construction workers and the public and could degrade the environment.

Project facilities proposed for construction would be located within the primary study area. All construction activities along the San Joaquin River would be conducted during months when instream flows are managed outside the flood season (e.g., June to September) in areas not protected by flow management facilities such as the cofferdams, diversion

channels, or other similar structures. Hazardous materials to be used during the construction of the project would include gasoline, diesel fuel, oil, solvents, and lubricants associated with vehicles and construction activities. Construction workers and the general public could be exposed to hazards and hazardous materials as a result of improper storage, handling, or use during construction activities; transportation accidents; or fires, explosions, or other emergencies. Construction workers could also be exposed to hazards associated with accidental releases of hazardous materials, which could result in adverse health impacts.

Implementing any of the action alternatives would involve both demolition of existing facilities and construction of new structures. Structures constructed before 1981 may contain asbestos, and structures painted before 1978 may have lead-based or lead-containing paint. These buildings may also contain electrical components that contain PCBs and mercury. Improper handling could expose construction workers, the public, and the environment to these hazardous materials.

Possible contaminants would be stored at the aggregate quarry, batch plant, staging area, and waste disposal area. Because of uncertainties in adequacy of rock for aggregate, three quarry and associated batch plant options with varying locations are being considered within each action alterative, as described in Chapter 2, “Alternatives.” Construction staging would occur in one dedicated area directly above the dam’s left abutment. This staging area would be approximately 21 acres in size and outside the proposed inundation area. Aggregate extraction and transport could require operation of heavy equipment next to and in Millerton Lake. Excavation and extraction of aggregate from these sources, and transport of aggregate to construction areas would require the use of construction equipment, which would involve the use of various hazardous materials such as fuel, oils, grease, and other petroleum products. These contaminants could be accidentally introduced into surface and groundwater, either directly or through surface runoff. Chapter 2, “Alternatives,” of this Draft EIS identified environmental commitments to be implemented as part of project development, including the implementation of a Water Quality Control Plan designed to minimize or avoid discharge of materials to surface waters.

The Kerckhoff Project powerhouses and Kerckhoff-Le Grand and Kerckhoff-Sanger transmission lines would be subject to inundation as a result of implementing this project. The

majority of mechanical and electrical equipment for both powerhouses would be removed and salvaged. Inundated sections of the Kerckhoff–Le Grand and Kerckhoff–Sanger transmission lines (approximately 4 miles) would be reconstructed as the Le Grand–Sanger transmission line. Other utilities that could be affected by inundation include potable water, power distribution, telecommunications, and septic facilities. If such utilities are affected by inundation, they would be demolished and relocated (if the associated facility is relocated or required to maintain distribution). Utility demolition or modification, as well as the demolition of other structures and facilities that would be inundated as a result of implementing this project, could potentially require handling of hazardous waste including asbestos, lead paint, and wood preservatives. This hazardous waste, along with any additional forms of hazardous waste materials generated by project construction, would be removed to an approved landfill for disposal according to regulatory requirements.

After the dam modifications are complete, hazardous materials, such as oils, grease, or solvents, could be used in small amounts during project operation. In addition, workers would be required to inspect new facilities, such as the diversion tunnel, as part of routine maintenance activities. As stated above, local, State, and Federal safety codes and procedures would be followed for project operation to minimize the risk of a hazardous materials release or exposure to other safety hazards.

As described in Chapter 2, “Alternatives,” Reclamation has incorporated environmental commitments into the action alternatives to reduce impacts on water quality. Many of these water quality measures apply to public health and hazards because they further limit the potential for accidental releases and/or exposure to hazardous materials. These environmental commitments include the development and implementation of a SWPPP, spill prevention and water quality control plan, and compliance with all applicable permits and requirements relating to water quality protection. Additional water quality BMPs would be implemented to avoid spills from construction equipment and include storage of hazardous materials in double containment, proper disposal of hazardous and nonhazardous products, monitoring of on-site vehicles for fluid leaks and regular maintenance, and containment of bulk storage tanks. BMPs that would be implemented to avoid and/or minimize potential impacts associated with dam construction include minimizing potential impacts associated

with equipment contaminants, minimizing potential impacts associated with access and staging, removing temporary fills as appropriate, and removing equipment from the river overnight and during high flows. These BMPs are further described in Chapter 2, "Alternatives."

As described in Chapter 2, "Alternatives," environmental commitments included in all action alternatives include the preparation and implementation of a Hazardous Materials Business Plan, spill prevention and control plan, and worker health and safety requirements. The actions called for by these plans and requirements would enable the construction crews to safely manage hazardous materials and respond to events where hazardous materials may be accidently released. With implementation of these plans and requirements, the potential environmental threat associated with accidental release of hazardous materials would be substantially lessened, and exposure to the environmental and personnel would be minimized.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact HAZ-2: Potential Emission of Hazardous Materials Within 0.25 Mile of a School

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or continuation of existing plans would occur that would result in any increase in hazards from potential emission or handling of hazardous materials within 0.25 mile of a school.

There would be **no impact** under the No Action Alternative.

Action Alternatives As described in the Affected Environment section, there are no schools located within 0.25 mile of the primary study area. However project implementation could expose schools along designated truck routes to hazardous materials and waste during the routine transport of materials to the project site.

Foothill Middle School and Auberry Elementary are located 2.5 miles east of the proposed Temperance Flat RM 274 Reservoir site along Auberry Road, which is a designated truck route for this project. As described for Impact HAZ-1 above,

the project would involve transportation of hazardous materials such as fuels (gasoline and diesel fuel), oils, hydraulic fluids, lubricants, and cleaners. Although storage and handling of hazardous materials would not occur within 0.25 mile of a school, the transportation of hazardous materials along Auberry Road could place Foothill Middle School and Auberry Elementary School at risk of exposure to hazardous materials as a result of this project.

Accidental releases during the transport of hazardous materials or attributable to other equipment or maintenance failure could result in an inadvertent spill or release. Depending on the amount released, this accidental release could pose a potential hazard to nearby school occupants.

This impact would be **potentially significant** under the action alternatives. Mitigation for this potentially significant impact is proposed below in the Mitigation Measures section.

Impact HAZ-3: Increase Hazards from a Known Hazardous Materials Contamination Site

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or continuation of existing plans would occur that would result in any increase in hazards from a known hazardous materials contamination site in the project area.

There would be **no impact** under the No Action Alternative.

Action Alternatives To determine the potential for hazardous materials within the primary project area, a records search of the applicable hazardous materials databases was conducted to identify known hazardous materials sites in the vicinity of the primary study area. The search reviewed more than 100 records for information on sites of "environmental concern" at least three-quarters of a mile from the project component sites. These sites include underground and aboveground storage tanks, underground diesel fuel tanks, a gasoline service station, a wastewater treatment plant, hazardous materials and waste handling sites, and other facilities.

One spill was recorded at one of the 14 known hazardous materials sites identified in the primary study area: the fourth site listed in Table 21-1, which is located 0.75 miles

downstream from Friant Dam. The other 13 sites had no reported violations.

As noted earlier, the first three sites listed in Table 21-1 are underground storage tanks that are located between 50 feet and 600 feet from the proposed inundation area. Inundation of existing underground storage tanks could result in contamination of water in Millerton Lake and downstream in the San Joaquin River.

This impact would be **potentially significant** under the action alternatives. Mitigation for this potentially significant impact is proposed below in the Mitigation Measures section.

Impact HAZ-4: Interfere with Evacuation Routes and Emergency Vehicle Access

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Even without the project, traffic volumes are expected to increase under the No Action Alternative and potentially decrease the level of service on area roadways, which could interfere with emergency evacuation routes and emergency vehicle access. These impacts would be minor and would not result in any substantial interference with emergency evacuation routes or emergency vehicle access in the project area.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives As described in Chapter 24, "Transportation, Circulation, and Infrastructure," regional and local roadways, including SR 99, SR 41, SR 145, Friant Road, Lake Road, Millerton Road, Sky Harbour Road, Auberry Road, North Fork Road, Road 206, Road 208, Road 210, Wellbarn Road, and Powerhouse Road, would be affected by personal vehicles, equipment, and trucks carrying construction materials to and from the project site. In addition, other roads located on land owned by BLM could be affected by the alternatives. Some of these roads are designated as motorized routes, such as Smalley Road, and others are designated as non-motorized routes.

Emergency access to the primary study area could be affected by construction of the project features, and construction-related traffic could delay or obstruct the movement of emergency vehicles due to lane or road closures or roadway detours. Thus,

construction activities could impair the ability of local agencies to respond to an emergency.

This impact would be **potentially significant** under the action alternatives. Mitigation for this potentially significant impact is proposed below in the Mitigation Measures section.

Impact HAZ-5: Locate Electrical Transmission Facilities Near a School

Primary Study Area
No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or continuation of existing plans would occur that would result in any increase in the risk of EMF exposure in the project area.

There would be **no impact** under the No Action Alternative.

Action Alternatives New transmission lines and other power facilities would be constructed as part of the action alternatives; therefore, EMF levels would increase and there would be some potential for increased exposure by people and the environment to EMF. The California Department of Education regulations require minimum distances between a new school and the edge of a transmission line ROW. The setback distances are 100 feet from the edge of the transmission line ROW for 115- kV lines. Because none of the project components would be within one-quarter mile of an existing or proposed school, this distance criterion would be met.

There would be **no impact** under the action alternatives.

Impact HAZ-6: Increase Hazards of Wildland Fires

Primary Study Area
No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or continuation of existing plans would occur that would result in any increase in the risk of wildland fire in the project area.

There would be **no impact** under the No Action Alternative.

Action Alternatives Temperance Flat RM 274 Dam site and surrounding areas are located in moderate to high fire hazard severity zones. The area consists mostly of agricultural and

undeveloped lands, and nearby residences could be exposed to wildland fire if one were sparked during construction of the project.

The use of construction equipment, increased human activity, storage and use of potentially flammable materials and presence of charged utility lines increase the potential for fire ignition in the primary study area. Road construction and vegetation clearing would require operation of construction equipment in vegetated areas which would contribute to wildfire potential.

Relevant safety standards/procedures related to fire prevention would be incorporated into the project design, and would be used during construction activities and project operation and maintenance. Applicable safety standards and procedures include the California Building Code; the Fresno and Madera County Fire Plans; U.S. Forest Service safety requirements regarding fire hazards; CPUC General Order 95, which provides procedures for proper removal, disposal, and placement of poles, wires, and associated infrastructure.

Project materials and workers traveling to the construction sites via the designated access roads and haul roads could also increase the risk of fire hazard over their route. Operation of motor vehicles throughout the region, particularly when vegetation adjacent to roadways is dry, imparts a certain level of fire potential from accidental combustion (e.g., sparks), hot metal (e.g., tail pipes, motors), or traffic accidents which could result in fire. Project activities, including those intended to mitigate impacts on vegetation, are expected to reduce the overall fuel loading around Millerton Lake and vicinity portion of the primary study area, thereby reducing the long-term fire hazard.

As described in Chapter 2, “Alternatives,” Reclamation would prepare and implement a fire protection and prevention plan to minimize the risk of wildfire and the potential threat to workers, property, and the public. With implementation of these practices and measures for fire protection, prevention, and control, the potential impact of wildfire would be reduced to a minimum.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact HAZ-7: Increase Hazards of West Nile Virus

Primary Study Area
No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or continuation of existing plans would occur that would result in substantially increased hazards associated with WNV. Continuation of increased instream flows from the SJRRP would result in increased hazards associated with WNV related to an increase in the extent of wetted areas.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives The proposed Temperance Flat RM 274 Reservoir would be formed by a rolled compact concrete arch gravity dam located in the upstream portion of Millerton Lake at RM 274. Structures, ground depressions, excavation pits, and other features associated with construction and/or implementation of action alternatives that hold permanent sources of standing water provide aquatic habitats for mosquitos and other vector species as an unintended consequence. All counties in the primary study area have reported cases of WNV, and habitat for all mosquito species' life cycles is located in this geographic region within several miles of wetted portions of the San Joaquin River. With the long history of mosquitos in these areas, implementing any of the action alternatives would not introduce a new potential health hazard but could contribute to the spread of and/or increase existing mosquito populations. The creation of standing water during facility construction and the establishment of a new reservoir would constitute a potential additional opportunity where mosquitoes could breed, resulting in an additional source of vector-borne illness from WNV.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact HAZ-8: Increase Hazards of Valley Fever

Primary Study Area
No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or continuation of existing plans or plans would occur that would

result in increased hazards associated with valley fever. Invariably, new construction activities would occur under the No Action Alternative, but such activities would be similar to those under existing conditions.

There would be **no impact** under the No Action Alternative.

Action Alternatives Ground-disturbing activities associated with the proposed Temperance Flat RM 274 Dam and Reservoir, new and relocated transmission line corridors, and construction of other reservoir-related project features would increase fugitive dust emissions that could lead to valley fever exposure if spores are present. The CDC considers valley fever to be endemic in California, and has identified Fresno and Madera counties as "highly endemic" (more than 20 cases per 100,000 population per year). However the incidence of valley fever in Fresno County varies significantly by location. The primary study area is considered to have a lesser potential for incidences of valley fever when compared to western portions of the county. However, because this disease is considered to be particularly prevalent in these counties, the potential exists for valley fever to be present in the primary study area and could be disturbed and become airborne during earthmoving activities.

According to the CDC, workers engaged in soil-disturbing activities in endemic areas should be considered at risk for the disease. Furthermore, severe dust storms can carry fungal spores outside the endemic areas into neighboring counties, where outbreak follow. Since soil conditions within the primary study area could potentially support valley fever spores, it is anticipated that implementing any of the action alternatives could result in health hazards from the exposure of workers and nearby residents to valley fever spores.

As described in Chapter 2, "Alternatives," Reclamation has identified a number of environmental commitments which are incorporated into the project to reduce impacts to air quality. Many of these air quality measures are aimed at fugitive dust emissions which would also reduce the potential risk of valley fever exposure. These measures include compliance with Regulation VIII, and the following SJVAPCD-recommended enhanced and additional control measures to further reduce fugitive dust emissions:

- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from adjacent project areas with a slope greater than 1percent.

- Suspend excavation and grading activity when winds exceed 20 miles per hour.

- Limit area subject to excavation, grading, and other construction activity at any one time.

However, even with these dust abatement measures, fugitive dust generated during construction could expose workers to valley fever spores if present in local soils.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact HAZ-9: Increase Exposure to Damage from Acts of Terrorism

Primary Study Area
No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or plans would occur that would result in any increase in exposure of the public or environment to damage from acts of terrorism in the project area.

There would be **no impact** under the No Action Alternative.

Action Alternatives The number and high profile of international and domestic terrorist attacks during the last decade presents a new and realistic threat to the safety and security of the United States population, infrastructure, and resources. There is a potential for intentional destructive acts, such as sabotage or terrorism events, to cause impacts on human health and the environment. Current analysis of terrorist goals and motivations points to domestic and international critical infrastructure and key resources (CI/KR) as potentially prime targets for terrorist attacks (DHS 2013). The U.S. Department of Homeland Security (DHS) has developed the National Infrastructure Protection Plan (NIPP) to provide an approach for integrating the country's many CI/KR protection initiatives into a single national effort.

The NIPP delineates domestic infrastructure and resources into 14 specific sectors, including Agriculture, Defense, Dams, and

Energy. For purposes of this analysis, the Dam Sector Specific Plan and Energy Sector Specific Plan would be most relevant to this project. The Energy Sector includes the "production, refining, storage, and distribution of oil, gas, and electric power, except for hydroelectric and commercial nuclear power facilities" (DHS and U.S. Department of Energy 2007). Although electrical transmission lines are not specifically referred to in the NIPP, they would generally fall into the category of distribution of electric power and are therefore considered a potential target of terrorist attack. Both plans were developed to complement the NIPP in achieving a safer, more secure, and more resilient Dams and Energy Sectors by lessening vulnerabilities, deterring threats, and minimizing the consequences of terrorist attacks, natural disasters, and other incidents.

As indicated in the Energy and Dam Sectors Specific Plans, potential consequences of a terrorist attack on the project site could include:

- Disruption of electrical service
- Physical damage to system features and surrounding facilities
- Flooding and Inundation
- Personal injury or loss of human life

The specific consequences of disruption at the proposed Temperance Flat RM 274 Dam and Reservoir could include loss of electrical generating capacity or transmission equipment, which could affect local or regional electrical power grids. It also could lead to loss of control of water supply, which could affect agriculture, river navigation, and municipal water supply. Failure of the flood control mission of a dam can result from disruption or manipulation of the facility's control mechanisms, as well as from physical destruction of the dam. In the unlikely event of a dam failure or uncontrolled water release, downstream flooding could result in extensive casualties and widespread property damage. Failure of Temperance Flat RM 274 Dam could also compromise the operation at other dams downstream such as Friant Dam, thereby increasing the overall consequences.

Temperance Flat RM 274 Dam would not likely be a high-priority target for acts of terrorism because of its location in a

rural area. The Dam Sector Specific Plan indicates that "because most of the dams and levees in the United States are located in rural areas, they have not been a "high crime" target; in fact, most criminal activities associated with sector assets have been relatively minor, such as vandalism and theft." Despite this fact, the Dams Sector recognizes that assets must be considered possible terrorist targets because such attacks at select sites have the potential to cause significant downstream casualties and economic losses (DHS 2010).

As stated in the Dam Sector Specific Plan, Federal critical infrastructure and key resources owners and operators – in this case, Reclamation – are self-regulating and therefore establish their own protective programs that involve identifying their critical assets, conducting vulnerability assessments, and implementing any required recommendations. Collaborative efforts of members from the private sector, government agencies, and professional organizations, are also leading a significant voluntary effort to increase planning and preparedness, including infrastructure protection and cyber security. These efforts also include building redundancy and implementing backup systems to minimize disruptions or alleviate undesirable consequences, and incorporating hazard resistance into facility design (DHS 2010).

While the potential for a terrorist attack exists for any critical infrastructure system, Temperance Flat RM 274 Dam is not considered an optimal target, and the potential threat would be no greater than for other dams of similar scale located in the country.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact HAZ-10: Increase Exposure to Hazards Associated with Abandoned Mine Sites

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or plans would occur that would result in any increase in hazards to construction workers or the general public associated with abandoned mine sites.

There would be **no impact** under the No Action Alternative.

Action Alternatives As discussed above, three abandoned mine sites are located within the Temperance Flat Reservoir Area, the Patterson Mine (formerly known as the Diana Mine), San Joaquin Mine, and the Sullivan Mine Group. These mines include multiple adits and millsites. Potential hazards associated with abandoned mines include undetonated explosives, decomposed support timbers, unstable ground and rocks, obscure vertical workings, and water-filled excavations (Springer 2005). These hazards pose potential risks to casual entrants. Because none of the project features or recreational facilities would be located in the vicinity of these mine sites, the action alternatives would not expose construction workers or the general public to hazards associated with abandoned mine sites.

There would be **no impact** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact HAZ-11: Increase Potential for Blast-Related Injury during Construction

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built. Moreover, no known changes from reasonably foreseeable projects or plans would occur that would result in any increase in hazards to construction workers or the general public associated with blasting.

There would be **no impact** under the No Action Alternative.

Action Alternatives Blasting may be required for excavation and removal of rock during construction of the diversion tunnel. Blasting entails the placement of explosive materials into a borehole, which is then ignited. The subsequent explosion generates air blasts and seismic waves that fracture the surrounding rock. Reasonably foreseeable accidents associated with blasting include accidental discharge and expulsion of materials beyond the expected distance (i.e., flyrock).

Explosive materials are ignited from sources of energy. During construction-related blasting activities, materials are ignited from the controlled used of electricity. Depending on the amount of material and method of storage, the size and extent of an accidental discharge could cause extensive destruction. Injuries and fatalities could result from the initial explosion

and/or secondary effects such as fires and flyrock (i.e., mud, water, or fragments of rock that accidently travel outside of the expected blast area). Creation of flyrock can be the result of many factors, including anomalies in the geology and rock structure, poor communication, and incorrect blasthole layout and loading.

Section 12101 through 12103 of the California Health and Safety Code describe permit requirements for manufacturing, possession, transportation, and use of explosives, which would apply to blasting activities on the project site, and these permits must be issued or endorsed by the jurisdiction in which blasting would take place. OSHA's Construction Safety and Health Outreach Program sets standards for blaster qualifications, transportation, storage, and loading, execution, and post-explosion requirements. However, accidental discharge of materials or production of flyrock remains possible and could cause injury or fatalities to construction workers or the general public.

This impact would be **potentially significant** under the action alternatives. Mitigation for this potentially significant impact is proposed below in the Mitigation Measures section.

Mitigation Measures

This section discusses mitigation measures for each potentially significant impact described in the environmental consequences section, as presented in Table 21-3.

No mitigation is required for Impacts HAZ-1, HAZ-5, HAZ-6, HAZ-9, or HAZ-10 within the primary study area because there would be no impact or the impact would be less than significant for all action alternatives. None of the impacts apply to the extended study area.

Impacts HAZ-2, HAZ-3, HAZ-4, HAZ-7, HAZ-8, and HAZ-11 within the primary study area would be potentially significant for all action alternatives. Implementing Mitigation Measures HAZ-2, HAZ-3, HAZ-4, HAZ-7, HAZ-8, and HAZ-11 would reduce these impacts to less than significant for all action alternatives.

Mitigation Measure HAZ-2: Reduce Exposure of Hazards to Schools

Foothill Middle School and Auberry Elementary are schools located within 0.25 mile of a designated truck route (Auberry Road). To minimize the potential for an accidental spill or

release during transport of hazardous materials to the project site, Reclamation shall implement the following:

- Reclamation shall coordinate hazardous materials transportation routes with the Fresno County Fire Protection District, Madera County Fire Department, the County Sheriff's Offices in both Fresno and Madera counties (which are the designated offices of emergency services for the primary study area), U.S. Forest Service, California Department of Transportation, the California Highway Patrol, representatives from Foothill Middle School and Auberry Elementary, and each county office of emergency services that would be affected in the primary study area. Coordination efforts shall include disclosing and planning proposed hazardous material transportation routes and schedules to allow for site-specific modifications that would lessen the potential impact on nearby schools.

- Transportation of hazardous materials, such as diesel fuel, is regulated by the California Highway Patrol and the California Department of Transportation. Reclamation shall comply with these regulations, including display of proper placards on vehicles containing hazardous materials, and appropriate licensing of drivers.

Implementing Mitigation Measure HAZ-2 would reduce the potentially significant impact associated with the transport of hazardous materials within 0.25 mile of a public school (Impact HAZ-2) to a **less-than-significant** level.

Mitigation Measure HAZ-3: Reduce Hazards from Hazardous Material Sites

Three underground storage tanks identified in Table 21-1 are located between 50 feet and 600 feet from the proposed inundation area. To minimize the risk of waterway contamination resulting from inundation of underground storage tanks, Reclamation shall, before construction begins, permanently remove aboveground and underground storage tanks from areas that are subject to inundation and coordinate with Madera County and Fresno County environmental management departments responsible for their identification and closure.

Implementing Mitigation Measure HAZ-3 would reduce the potentially significant impact of waterway contamination resulting from inundation of underground storage tanks (Impact HAZ-3) to a **less-than-significant** level.

Mitigation Measure HAZ-4: Implement Mitigation Measure TRN-2, Implement a Traffic Management Plan

Reclamation will prepare and implement a TMP in coordination with local emergency service providers that will be used to ensure unimpeded emergency vehicular access and passage, develop detours to ensure acceptable traffic flow through and/or around the construction zone, and minimize traffic congestion. The TMP shall include plans to coordinate all construction activities with emergency service providers in the area. Emergency service providers shall be notified of the timing, location, and duration of construction activities.

Implementing Mitigation Measure HAZ-4 would reduce the potentially significant impact associated with interference with emergency evacuation routes and emergency vehicle access (Impact HAZ-4) to a **less-than-significant** level.

Mitigation Measure HAZ-7: Reduce Hazards of West Nile Virus

As part of final design, Reclamation shall prepare and implement a project-specific health and safety plan that specifies measures to be taken to routinely inspect construction areas to identify soil depressions, pools, or other standing water that may provide suitable breeding habitat for mosquitos. If identified, actions shall be taken to dewater, fill, or apply an approved treatment capable of eradicating identified mosquito populations. This would include identifying and grading excavated areas not located within the Temperance Flat Reservoir Area, including quarry sites used for construction purposes, to minimize the potential for formation of standing water both during and after construction activities cease. In addition, exposed side slopes in the proposed Temperance Flat RM 274 Reservoir that are subject to drawdown during future operations shall be graded to minimize the potential presence of standing water that may form during reservoir operations.

The plan shall provide a general description of the levels of personal protection and safe operating guidelines expected of each employee or contractor engaged in construction and/or fieldwork activities to minimize exposure to mosquitos. Measures shall include providing insect repellent for worker use at construction sites with a minimum of 23.8 percent

diethyl-meta-toulamide (DEET). The plan shall also specify steps to notify the appropriate city or county health department of dead birds seen on the construction site.

The plan also shall identify periodic evaluation of standing water that is created during drawdown of the new Temperance Flat RM 274 Reservoir. This evaluation shall occur annually until exposed reservoir side slopes erode to form minimal bodies of standing water capable of supporting mosquito breeding. As part of this evaluation, actions shall be taken to dewater, fill, or apply an approved treatment capable of eradicating identified mosquitos populations to the major bodies of standing water that pose substantial potential to support such populations.

With implementation of Mitigation Measure HAZ-7, potential health-related impacts from exposure to increased numbers of mosquitoes possibly caring disease such as WNV (Impact HAZ-7) would be minimized and reduced to a **less-than-significant** level.

Mitigation Measure HAZ-8: Reduce Hazards of Valley Fever

As part of final design, Reclamation will prepare and implement project-specific health and safety plan that is designed to test for presence of valley fever spores in the soil, and provide actions to minimize worker exposure. The plan will provide a general description of the levels of personal protection and safe operating guidelines expected of each employee or contractor engaged in construction and/or fieldwork activities to minimize exposure to blowing dust. Reclamation, its contractors, and/or its construction partners will coordinate development and implementation of this plan with jurisdictional agencies (e.g., Fresno County), as appropriate. The plan shall achieve the following performance criteria:

- Confirm presence or absence of valley fever spores in primary study area
- Provide training on the health hazards of valley fever and how to recognize symptoms of illness
- Control dust at the source and minimize worker exposure by watering exposed ground surfaces, limiting the amount of exposed open/cut ground, and covering

open loads of haul trucks and equipment where feasible

- Provide respiratory protection, such as National Institute for Occupational Safety and Health–approved N95 respirators, to reduce the risk of inhalation, when appropriate

- Establish a California Division of Occupational Safety and Health-compliant respiratory program that addresses respirator wearers and includes medical clearance to wear a respirator, fit testing, training, and procedures for cleaning and maintaining respirators, if applicable

- Minimize the transport of spores through development of BMPs, including proper use, maintenance, and washing of equipment, clothing, and enclosed spaces where concentrated levels of dust may occur

If valley fever spores are found to be present in local soils, implementing Mitigation Measure HAZ-8 would reduce potential health-related impacts from soil-disturbing activities and exposure to valley fever (Impact HAZ-8) to a **less-than-significant** level.

Mitigation Measure HAZ-11: Reduce Hazards from Blasting

To reduce the potential for accidental injury or death related to blasting, construction contractors whose work on the project site will include blasting will prepare and implement a blasting safety plan. This plan will be created in coordination with a qualified blaster, as defined by the Construction Safety and Health Outreach Program, Subpart U, Section 1926.901, and distributed to all appropriate members of construction teams.

Upon completion of a blasting safety plan, the construction contractor shall secure any required permits from the Fresno County Fire Protection District, Madera County Fire Department, and the County Sheriff's Offices in both Fresno and Madera counties (which are the designated offices of emergency services for the primary study area).

The plan will include, but is not limited to, the following performance criteria:

- Designate storage locations that meet ATF standards contained in 27 CFR Part 55

- Provide personal protective equipment for all construction personnel

- Establish an accident management plan that considers misfires (i.e., explosive fails to detonate), unexpected ignition, and flyrock

- Provide measures to protect surrounding property (e.g., netting, announcement of dates of expected blasting, barricades, audible and visual warnings)

Implementing Mitigation Measure HAZ-11 would reduce potentially significant impacts related to blasting activities (Impact HAZ-11) to a **less-than-significant** level.

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Chapter 22
Recreation

This chapter describes the affected environment for recreation, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. The discussion focuses on the primary study area (area of project features, Temperance Flat Reservoir Area, and Millerton Lake below RM 274). It also discusses the extended study area (the San Joaquin River from Friant Dam to the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas).

Affected Environment

The primary and extended study areas contain a number of parks and public lands offering diverse recreation opportunities, particularly associated with the many reservoirs, rivers, and other water bodies found throughout this portion of California. In addition, numerous recreation opportunities exist on private lands, including fishing, hunting, and other activities.

Primary Study Area

Recreation resources within the primary study area include the Millerton Lake SRA and the SJRG SRMA (Figure 22-1). The Millerton Lake SRA is managed by State Parks through agreements with Reclamation and CDFW. The SJRG SRMA is managed by BLM. Each of these areas is discussed in more detail below.

Millerton Lake State Recreation Area

The Millerton Lake SRA contains about 10,500 acres and is one of the most popular recreation areas in the San Joaquin Valley. The north side of the City of Fresno is 10 miles from the Millerton Lake SRA via Friant Road, while the town of Madera and SR 99 are about 22 miles to the west.

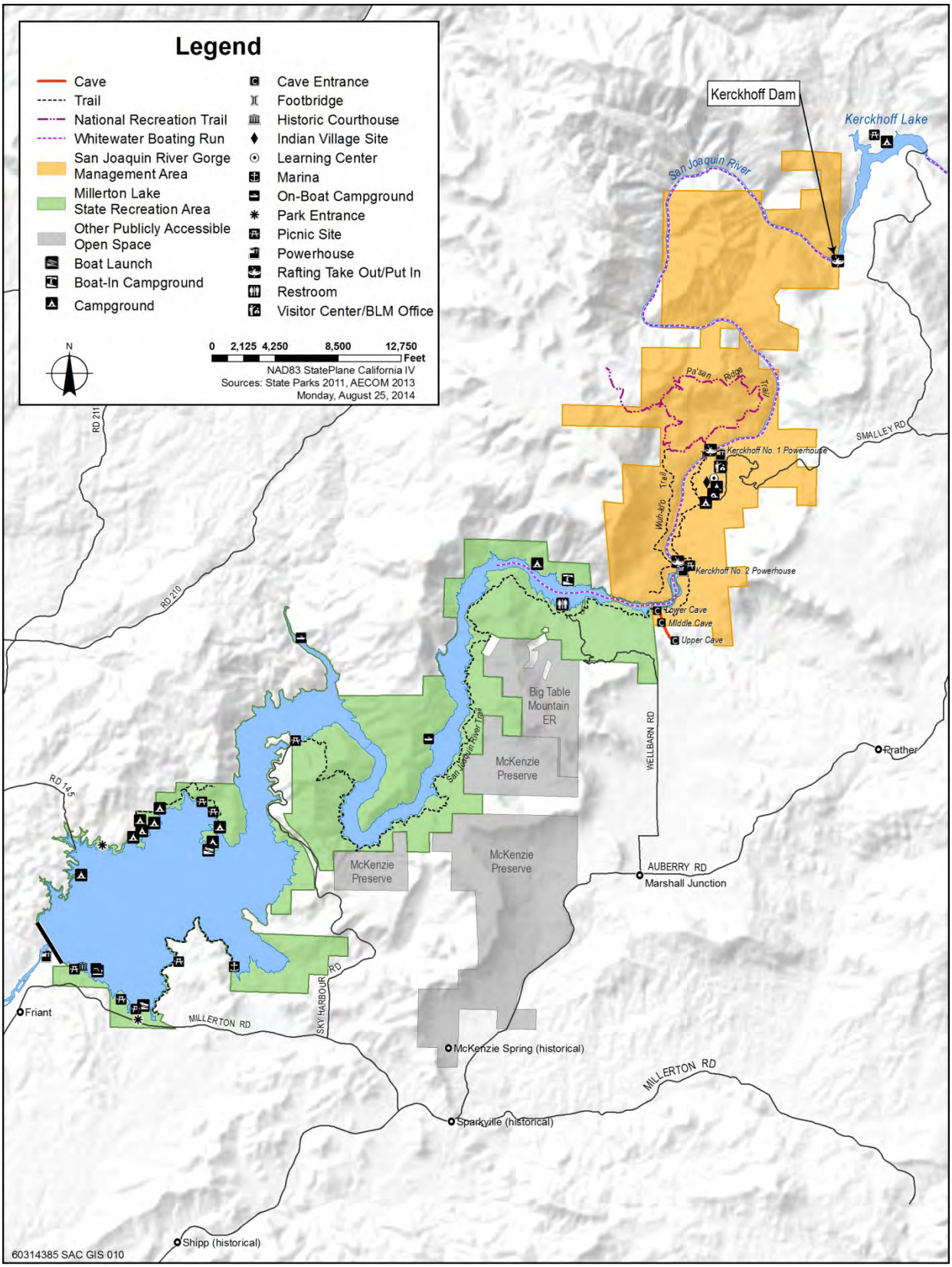

Figure 22-1. Recreation Facilities in the Vicinity of the Primary Study Area

Recreation Opportunities Millerton Lake, the centerpiece of the Millerton Lake SRA, is more than 15 miles long and was formed by the construction of Friant Dam across the San Joaquin River in 1942. The reservoir has a surface area of about 4,900 acres and a shoreline length of about 63 miles at top-of-active storage. The main body of the reservoir is about 3 miles long and 1.5 miles wide. The seasonal fluctuation of its surface elevation is substantial under normal operations.

Annual maximum water levels typically occur in May or June and nearly reach the top-of-active storage elevation of 581 feet msl in most years. The reservoir is typically drawn down 75 to 100 feet, with the minimum annual elevation occurring in October or November, before refilling of the reservoir begins with the onset of winter rains (Reclamation 2006).

Visitors are drawn to the Millerton Lake SRA for water-oriented recreation opportunities. Motor boating, sailing, waterskiing, jet skiing, swimming, and fishing are the primary activities. Shoreline activities include picnicking, hiking, biking, camping, and nature watching. Fall and spring, when temperatures are cooler, are the most popular periods for activities such as hiking and mountain biking and some types of angling. Special recreation events that have been held at the lake include sailing regattas, water-ski competitions, and triathlons. Figure 22-1 shows recreation areas and facilities within the Millerton Lake SRA.

Fishing Fishing is a popular activity from both the shore and boats, with several popular game species available including largemouth, smallmouth, and spotted bass; striped bass; American shad; and catfish, crappie, and bluegill. The season is open year-round and as many as 40 bass fishing tournaments are held year-round on the lake, primarily focusing on black bass. Anglers look for rocky underwater points or bars and similar fish-holding structure in coves and along the shoreline. Striped bass are pursued in deeper water, often by trolling. The number of bass tournaments per year is expected to decrease because of enforcement of a non-formant two-stroke motor ban at the Millerton Lake SRA (beginning May 11, 2013), which affects bass boats that often use nonconforming outboard motors. Bass tournaments are expected to decrease from 40 tournaments per year to 5 to 10 (Gresham 2013).

Boating A range of boating opportunities are possible in the Millerton Lake SRA. Millerton Lake's shoreline offers three

launch ramps and a marina. Local boating groups stage sailboat races and regattas in June and July.

Whitewater Boating The south shore of the upper portion of Millerton Lake below Kerckhoff No. 2 Powerhouse, commonly known as Temperance Flat, serves as a take-out for the 3 mile whitewater boating run on the San Joaquin River below Kerckhoff No. 2 Powerhouse, known as Millerton Bottoms. The Class II-III+ run with up to six rapids becomes available when the reservoir is drawn down to elevations of at least 520 feet msl and PG&E Kerckhoff No. 2 Powerhouse is releasing water. A typical whitewater rafting season extends from August through November when Millerton Lake has been sufficiently drawn down to expose the upstream river channel. The last rapid on the run only appears when the reservoir is drawn down below 480 feet (American Whitewater 2013a).

Interpretation and Education The Millerton Lake SRA interpretive and education programs include school tours of a historical Millerton courthouse, bald eagle tours, and junior ranger and summer campfire programs. Activities such as guided hikes and nature tours are also available during certain times of the year.

Trail Use Trails within the Millerton Lake SRA are used for hiking, horseback riding, and bicycling and several other shorter trails intended for lake access or nature observation. Trails range from level hiking areas to challenging mountain bike trails.

Camping Year-round tent and recreational vehicle (RV) camping is allowed at campsites dispersed along the north shore of the Millerton Lake SRA. Boat-in campsites and boat camping are also available. Some campsites with wheelchair-accessible features are also available.

Picnicking Picnicking is a common activity throughout the Millerton Lake SRA, with most areas providing picnic facilities with barbeque grills.

Swimming Areas within the fluctuation zone of the reservoir are used as informal beaches by both land-based and boating visitors and attract many visitors throughout summer. Several popular swim areas are marked with buoy lines to exclude boats.

Wildlife Viewing and Nature Observation Wildlife viewing and nature observation occur throughout the Millerton Lake SRA, where public access to the lake and adjacent lands exists. Wildlife viewing within the Millerton Lake SRA is enhanced by the biological diversity of the area and the variety of plant and animal species present. The lake has the largest population of wintering bald eagles in the San Joaquin Valley. From December through February, group boat tours to view bald and golden eagles around the lake are offered.

Special Events In addition to bass tournaments, 10 nonboating/fishing events per year are held at the lake (e.g., triathlons, motorcycle rallies). Another special event that occurs in the Millerton Lake SRA is the archery-only spring turkey hunt in the Pincushion Mountain and Temperance Flat areas. Only 14 hunters are allowed (two per week for 7 weeks) at this upland game bird heritage hunt sponsored by CDFW. In addition, a competitive mountain bike race is held on the San Joaquin River Trail in late March/early April. The race starts in the SJRG SRMA and ends at the South Finegold picnic area and draws up to 500 spectators and participants (Gresham 2013).

Recreation Facilities The Millerton Lake SRA includes several day-use and overnight recreation facilities to support these activities, most of which are located on the gently sloping southern and northern shores of the lower portion of the reservoir, closest to population centers (Figure 22-1). Facilities include boat ramps, picnic areas, campgrounds, trails, a marina, and a historic courthouse. Table 22-1 provides a list of boating and day-use facilities within the Millerton Lake SRA and a description of site amenities.

Table 22-2 provides a list of overnight facilities at the Millerton Lake SRA and a description of site amenities.

At Big Bend, about 6 miles upstream from Friant Dam near RM 274, the reservoir extends into a narrow, winding canyon. Most of the upper 8.5 miles of the reservoir, beginning at Big Bend, is less than 1,000 feet in width and is bordered by steep hillsides and table mountains reaching from 800 to 1,400 feet above the reservoir. Although boating is allowed, water skiing and other high speed boating are not permitted in this narrow portion of the reservoir.

Table 22-1. Millerton Lake State Recreation Area Day-Use Recreation Facilities

Facility Type/Name	Primary Site Amenities	Parking Facilities	Sanitary Facilities[1]
Boat Ramps[2]			
Ramp #1 (Crow's Nest Ramp)	2 lanes 1 boarding dock	25 vehicle-with-trailer spaces	4 flush toilets
Ramp #3 (Grange Grove Ramp)	10 lanes 3 boarding docks	560 vehicle-with-trailer spaces	6 flush toilets
Ramp #6 (Meadows Ramp)	2 lanes 1 boarding dock	50 vehicle-with-trailer spaces	4 flush toilets
Picnic Areas			
Grange Grove	74 picnic tables 33 fire rings, 28 BBQs Group shelter	50 vehicle spaces (part of large Grange Grove boat ramp lot)	4 flush toilets and 1 vault toilet
La Playa	95 picnic tables 1 fire ring, 62 BBQs	Several areas with designated and undesignated spaces	4 flush toilets
Crow's Nest	13 picnic tables 2 fire rings, 6 BBQs	50 vehicle spaces	4 flush toilets and 1 vault toilets
Millerton Courthouse	3 picnic tables	16 parking spaces	4 flush toilets
Blue Oak	3 picnic tables 3 fire rings, 3 BBQs	Undesignated spaces	1 chemical toilet
South Bay	9 picnic tables 7 fire rings, 6 BBQs	Undesignated spaces	1 vault toilet
McKenzie Point	Low water ramp	10 vehicle spaces	1 vault toilet
Eagle's Nest	2 picnic tables	Undesignated spaces	None
Buzzard's Roost	2 picnic tables 12 fire rings, 2 BBQs Trailhead	Undesignated spaces	None
Sunset Point	10 picnic tables 9 BBQs	100 vehicle spaces (at Meadows Ramp)	2 vault toilets (at boat ramp)
South Finegold	10 picnic tables 1 fire ring, 3 BBQs Group shelter	Paved lot, 40 spaces	4 flush toilets
Marina			
Winchell Cove	326 boat slips (wet) 55 dry storage spaces Office/store Fuel dock	80 vehicle spaces	1 vault toilet

Table 22-1. Millerton Lake State Recreation Area Day-Use Recreation Facilities (contd.)

Facility Type/Name	Primary Site Amenities	Parking Facilities	Sanitary Facilities[1]
Entrance Stations/Office			
South shore entrance	3 entrance lanes/booths	5 parking spaces	None
North shore entrance	2 entrance lanes, booth	5 parking spaces	1 chemical toilet
Millerton Lake SRA Office	3,000-square-foot building	14 public, 10 staff parking spaces	1 toilet

Sources: Reclamation and State Parks 2010; Reclamation 2006

Notes:

[1] Several day-use facilities are also served by portable chemical toilets, which are not listed here.

[2] Ramps #2, #4, and #5 are low-water ramps used when the lake is drawn down over 40 feet, 60 feet, and 80 feet, respectively.

Key:

BBQ = barbeque

SRA = State Recreation Area

Table 22-2. Millerton Lake State Recreation Area Overnight Facilities

Facility Name	Campsites and Amenities	Toilet Facilities	Shower Facilities
North Shore Area			
Rocky Point	21 sites with table, fire ring	4 flush toilets	2 shower buildings
Mono	16 sites with table, fire ring	2 flush toilets	2 shower buildings
Fort Miller	36 sites with table, fire ring	4 flush toilets	2 shower buildings
Dumna Strand	10 sites with table, fire ring	1 facility with chemical toilet	None
Meadows	59 sites with table, fire ring (27 electric sites) 28 sites have shelters	2 flush toilet buildings	2 shower buildings
Valley Oak	6 sites with table, fire ring	1 chemical toilet	None
Group camps (large and small)	Space for 115 people 30 picnic tables 4 fire rings, large BBQs RV dump station	1 flush toilet building 2 vault toilets	1 shower building
Other Area			
Temperance Flat	25 sites (walk-in/boat-in)	1 pit toilet	None

Sources: Reclamation and State Parks 2010; Reclamation 2006
Key:
BBQ = barbeque
RV = recreational vehicle

The south shore area, located immediately south of the dam, contains the Grange Grove boat ramp (Ramp #3), the primary boat launching facility on the lake. The cement ramp is several hundred feet wide and is served by three boarding docks, allowing several boats to be launched or retrieved at one time. The parking area at the ramp has spaces for 560 vehicles with boat trailers. This ramp is usable down to a pool elevation about 44 feet below top-of-active storage, and three low-water ramps in the cove provide for launching at progressively lower pool levels. An additional two-lane ramp in the south shore area provides launching down to about 95 feet below top-of-active storage, or 486 feet msl.

The south shore area also contains several picnic areas, which in total provide about 150 picnic sites. Picnic areas are furnished with tables, barbecue grills and flush or vault toilet facilities. The largest facility, the Grange Grove picnic area, provides a large irrigated lawn with shade trees and a group picnic shelter that is available by reservation for groups of up to 100 people. Also in this area is the historic 1867 Millerton Courthouse, reconstructed on the site from its original location that is now beneath the lake, and open for guided tours. The park headquarters is near the south shore entrance and a ranger office and maintenance facility is located nearby.

A few miles east of the south shore area is the full-service Winchell Cove Marina with approximately 330 wet berths; dry boat storage; and services that include fishing boat rentals, boat fueling, and bait and tackle sales. A large number of slips at the marina are occupied by sailboats.

The north shore area of the Millerton Lake SRA, about 2 miles northeast of the dam, is primarily occupied by several shoreline campground loops that provide 148 campsites among oak and pine woodlands (Table 22-2). Each site contains a table and fire ring. Several of the camp loops have flush toilets and showers, and one loop provides full hook-up RV sites. Additionally available are one equestrian camping area and two group camps with space for up to 115 people. The area also provides three small picnic areas and a two-lane boat ramp usable at all pool elevations.

There are a few, more isolated facilities on the upstream portion of the lake. About 6 miles upstream from the dam, the North Finegold area offers boat-in camping on a first-come, first-served basis for up to 15 boats. Only fully contained boats (i.e., boats with marine toilets) are permitted to use this area. Across the lake, the South Finegold picnic area provides tables, barbeques, and shade structures that can accommodate 150 people.

The Temperance Flat boat-in campground, located about 13.5 miles upstream from the dam, offers 25 primitive walk-in campsites accessible only by boat. Organized groups have access to primitive sites at the nearby Hewitt Valley Environmental Camp.

In addition to boat access, visitors can reach the south shore of the Temperance Flat area on foot or bicycle via gravel roads that link to Wellbarn Road, where vehicle access ends at a locked gate. A vault restroom has been installed in the area.

Visitors to the Millerton Lake SRA can take advantage of several trails for hiking, biking, and equestrian use year-round (Table 22-3). The 4-mile Blue Oak Trail is a multiple-use trail that follows the shore between the south shore area and Winchell Marina. The North Shore Trail runs through the north shore area and links to the half-mile Buzzard’s Roost hiking trail that leads to a high viewpoint overlooking the lake. Also in the north shore area is a quarter-mile nature trail posted with interpretive information about the natural and cultural resources in the area.

Table 22-3. Millerton Lake State Recreation Area Trails

Trail Name	Approximate Trail Length	Trailhead and Uses
Blue Oak Trail	4 miles	Trailhead at Blue Oak picnic area Multiple-use trail (hiking, biking, equestrian)
San Joaquin River Trail	12 miles	Trailhead at South Finegold picnic area Multiple-use trail (hiking, biking, equestrian)
North Shore Trail	2 miles	Trailheads at large group campsites and Valley Oak Campground Multiple-use trail (hiking, biking, equestrian)
Buzzard's Roost Trail	0.5 mile	Trailhead in north shore area Hiking only
Nature Trail	0.25 mile	Trailhead near Fort Miller Campground Hiking only

Sources: Reclamation and State Parks 2010; Reclamation 2006

The South Finegold picnic area serves as the trailhead for the San Joaquin River Trail, which runs along the east side of the reservoir for more than 12 miles upstream. This is a regional backcountry trail that connects to trails in the upstream SJRG SRMA and is planned to ultimately extend higher into the Sierra Nevada when the trail is completed. The trail is popular, particularly in spring, with both hikers and mountain bikers.

Recreational Use

Estimated Annual Recreation Use Total annual visitor use from 2006 to 2012 averages 357,792 visitors (Table 22-4). Many factors influence visitor use, including time of year, weather, economic conditions, fee increases, and gas prices. Between 2000 and 2002, before the period shown in Table 22-4, annual use estimates exceeded 600,000 visitors. Typically, the highest use at the Millerton Lake SRA occurs between May and July, with use beginning to decline in August. Two-thirds of annual visitation to the Millerton Lake SRA occurs between May and August.

Table 22-4. Millerton Lake State Recreation Area Annual Visitation Estimates

Year	Paid Day Use	Free Day Use	Camping	Total
2006–2007	261,618	1,850	48,406	311,874
2007–2008	237,880	3,616	51,311	292,807
2008–2009	266,047	26,505	47,266	339,818
2009–2010	270,079	53,505	49,217	372,801
2010–2011	236,547	69,816	49,512	355,875
2011–2012	330,571	89,555	53,452	473,578
6-year average	267,124	40,808	49,861	357,792

Sources: State Parks 2007, 2008, 2009, 2010, 2011, 2012

Composition of Recreation Use by Season The composition of recreation uses in the Millerton Lake SRA varies between the recreation season (April 1 through September 30) and the off-season (October 1 through March 31). Throughout the year (both seasons), day use is generally evenly divided between boating activities (50 percent) and land-based activities (50 percent) (Table 22-5). Boating activity use in the recreation season is composed of personal watercraft (PWC) use (20 percent), waterskiing/wakeboarding (30 percent), general recreational boating (20 percent), and boat fishing (30 percent).

Table 22-5. Estimate of Millerton Lake State Recreation Area Day Use by Activity and Season

	Percent of Day Use Occurring During the Recreation Season[1]	Percent of Day Use Occurring During the Off-Season[2]
Boating Activities – 50% of Total Day Use		
Personal watercraft	20	0
Waterskiing/wakeboarding	30	0
General	20	10
Boat fishing	30	90
Land-Based Activities – 50% of Total Day Use		
Picnicking/swimming	80	5
Shoreline fishing	5	50
Trail use	8	15
Birdwatching	2	15
Sightseeing	5	15

Source: Gresham, personal communication, 2013

Notes:

[1] Recreation season is from April 1 through September 30.

[2] Off-season is from October 1 through March 31.

During the off-season, PWC and waterskiing/wakeboarding use declines, and the composition of boating activities shifts mainly to boat fishing (90 percent) with some general recreational boating (10 percent). Sailboating, although possible, receives limited use at Millerton Lake. It occurs in the off-season, and minimal use occurs in the recreation season (2 percent of boating use, or 10 percent of the 20 percent of general recreational boating use).

As for land-based activities at the Millerton Lake SRA, picnicking is the primary activity, making up 80 percent of land-based day use. The remaining 20 percent of land-based day use is composed of trail use (8 percent), sightseeing (5 percent), shoreline fishing (5 percent), and birdwatching (2 percent).

During the off-season, land-based day use shifts to primarily shoreline fishing (50 percent), along with trail use (15 percent), birdwatching (15 percent), and sightseeing (15 percent). Picnicking accounts for only 5 percent of land-based day use during the off-season (Gresham 2013).

Recreation Use Upstream and Downstream from RM 274
Recreation use also varies by location, particularly upstream and downstream from RM 274 where the project would be located. Based on the breakdowns of use by activity and use above and below RM 274, in the recreation season, 82 percent of total day use occurs below RM 274, and 18 percent occurs above RM 274. In the off-season, about 68 percent of total day use occurs below RM 274, and 32 percent occurs above RM 274.

Because of the restriction on waterskiing above Fine Gold Creek, all waterskiing use occurs downstream from RM 274 (Table 22-6). Most of the PWC use also occurs below RM 274 (80 percent). Boat fishing use is split evenly upstream and downstream from RM 274 (50 percent each), whereas slightly more general recreational boating use occurs downstream from RM 274 (60 percent).

As for land-based activities, almost all picnicking and shoreline fishing use (99 percent of each) occurs below RM 274 because of the lack of day-use facilities and shoreline access above RM 274. In addition, the vast majority of sightseeing and birdwatching use (99 percent of each) occurs below RM 274, in part because of the lack of access above RM 274 and bald

eagle tours primarily occurring on the main portion of Millerton Lake (below RM 274).

Table 22-6. Estimate of Millerton Lake State Recreation Area Day Use Above and Below RM 274 by Activity

	Percent of Total Activity Use Occurring Above RM 274	Percent of Total Activity Use Occurring Below RM 274
Boating Activities		
Personal watercraft	20	80
Waterskiing/wakeboarding	0	100
General	40	60
Boat fishing	50	50
Land-Based Activities		
Picnicking/Swimming	1	99
Shoreline fishing	1	99
Trail use	90	10
Birdwatching	5	95
Sightseeing	5	95

Source: Gresham 2013
Key:
RM = River Mile

The San Joaquin River Trail is located above RM 274 and is the most likely trail to be used by visitors whose primary activity is trail use (hiking/biking/horseback riding). Therefore, most trail use (as a primary day-use activity) occurs above RM 274.

Mountain biking is the primary use of the San Joaquin River Trail in the Millerton Lake SRA. Although there are no counters along the trail in the Millerton Lake SRA, an estimated 40 bikes per day (Friday or Saturday) use the trail on weekends in the recreation season, along with 10 hikers and some equestrians, all of which enter the trail from South Finegold day-use area (Table 22-7). In the off-season, use of the trail decreases to about 20 bikes per day on the weekends, along with five hikers and a few equestrians. Trail use during the week (Sunday through Thursday) is intermittent, with likely 10 bikers and a couple of hikers during the week in the recreation season and less use in the off-season.

Table 22-7. Estimate of San Joaquin River Trail Use in the Millerton Lake State Recreation Area (per Weekend Day and per Week)

	Average Number of Bikers	Average Number of Hikers	Average Number of Equestrians
Recreation Season[1]			
Friday or Saturday	40	10	5
Sunday through Thursday	10	3	0
Off-Season[2]			
Friday or Saturday	20	5	2
Sunday through Thursday	5	1	0

Source: Gresham 2013

Notes:

[1] Recreation season is from April 1 through September 30.

[2] Off-season is from October 1 through March 31.

All drive-in camping occurs downstream from RM 274; however, most boat-in camping (75 percent) occurs upstream from RM 274 at the Temperance Flat Campground. During the recreation season, an average of four boat-in campsites are used on Friday and Saturday nights; of those four sites, three would be located at the Temperance Flat Campground. There is very limited weekend boat-in camping use in the off-season (no sites to one site used on average) and limited weekday use in either season (no sites to less than one site used on average). In addition, Temperance Flat Campground is not accessible for camping at lake elevations below 520 feet (Gresham 2013).

Facility Capacity Estimates On-water boating use is not currently at capacity, but future capacity exceedance is anticipated upstream from Fine Gold Creek after the Boating Management Plan is completed and new boating densities (based on the new Water Recreation Opportunity Spectrum [WROS] classes) are enforced. Capacity exceedance is not anticipated in the remainder of Millerton Lake in the near future.

Day-use facilities currently reach capacity on holiday weekends when there are high pool levels because less space is available for parking; therefore, State Parks institutes closures at boat ramps and day-use areas. On holiday weekends with lower pool levels (20–30 feet below top-of-active storage), more space is available for parking on dirt roads and facility closures are not necessary. If closures occur, they are typically on the Memorial Day and July 4 holiday weekends; pool levels

are substantially below top-of-active storage by Labor Day weekend, so adequate parking is usually available.

The Millerton Lake SRA has six campgrounds, large and small group camps, and one boat-in campground (Temperance Flat). According to the Millerton Lake SRA general plan, overnight use is highest in spring and summer, when individual days can have campground occupancy over 90 percent and an average seasonal occupancy rate of 40 percent. Occupancy is much lower in fall and winter, below 5 percent on average. Campgrounds can reach capacity on holiday weekends and may meet capacity on other summer weekend days (Gresham 2013).

San Joaquin River Gorge Special Recreation Management Area

The SJRG SRMA is located 5 miles northwest of Auberry and covers approximately 6,700 acres of land on both the north and south sides of the San Joaquin River. The area ranges from 640 feet to 2,200 feet msl in elevation, and is characterized by the rugged and steep-walled river canyon surrounded by chaparral and oak woodland covered hills.

Recreation Opportunities The SJRG SRMA provides year-round recreation opportunities and access between Millerton Lake SRA, Kerckhoff Lake, and the Sierra National Forest (Figure 22-1). The area was designated a Special Recreation Management Area by BLM in the late 1960s. The SJRG SRMA is a popular destination for hunters, anglers, hikers, mountain bikers, horseback riders, kayakers, wildlife watchers, sightseers, gold prospectors, and people participating in nature study. Other recreation opportunities within the SJRG SRMA include caving; backpacking; picnicking; and family, group, and equestrian camping. The SJRG SRMA also provides opportunities for cultural heritage and interactive learning, including through two signature national programs, the Project Archaeology and Hands on the Land programs, which received national recognition in 2006 with the receipt of BLM's Silver Award for Excellence in Interpretation and Environmental Education (BLM 2010a).

Fishing Angling at the SJRG SRMA typically occurs in spring and early summer on the shoreline of Millerton Lake, when the water surface elevation is high enough to reach into the SJRG SRMA, and on the accessible portions of the river. Catfish, trout, and striped bass are among the available gamefish species. In the northern portion of the management

area, there is no public vehicle access and the river is accessible only on foot, horse, or via boat. The main river access point is the Ya Gub Weh Tuh trailhead/campground, with other river access provided from the San Joaquin River Trail and its feeder trails. There is also river access via a short trail at the west end of Smalley Road.

Boating Most boating use in the SJRG SRMA consists of kayaking, rafting, and PWC use. Motorized boating access is not available within the SJRG SRMA; however, access from Millerton Lake provides some motorized boating use on the river at the southern end of the management area during periods of high flows.

Whitewater Boating Two whitewater boating runs are located in the SJRG SRMA. With the put-in at the base of Kerckhoff Dam, at the eastern boundary of the area, the Patterson Bend Run (the San Joaquin River between Kerckhoff Dam and Kerckhoff Powerhouse) is a 9.8-mile Class III–V run that is available during peak runoff in wet years (American Whitewater 2013b); however, the river is reported to be navigable over a wide range of flows, although portaging may be required (Rowland 2013). At the conclusion of the run, boaters can either take-out at Kerckhoff Powerhouse or continue past the powerhouse on the Squaw Leap Run (American Whitewater 2013b). This run is a 1.9-mile Class IV+ run that is available yearly and ends at Kerckhoff No. 2 Powerhouse. The typical season lasts 4 weeks from late October to November, when Kerckhoff No. 2 Powerhouse is not operational and instream releases from Kerckhoff Lake into the Patterson Bend run are low (American Whitewater 2013c). Flows can often be erratic in both runs (Rowland 2013). The Kerckhoff No. 2 Powerhouse is also the put-in location for the Millerton Bottoms run within the Millerton Lake SRA, which was discussed previously.

BLM found that the portion of the San Joaquin River from Kerckhoff Dam downstream to the Kerckhoff Powerhouse was suitable and eligible for designation as a Wild and Scenic River with outstandingly remarkable scenic, cultural, and wildlife values. The study also found that the portion of the river from Kerckhoff Powerhouse to the start of Millerton Reservoir was eligible for designation as a Wild and Scenic River because of its recreational and scenic values (BLM 2010b). For additional information, refer to Chapter 17, “Land Use Planning and Agricultural Resources.”

Trail Use All trails in the SJRG SRMA are shared by hikers, backpackers, horseback riders, and mountain bike users with heaviest use occurring on weekends. Trails provide SJRG SRMA users with access to both sides of the San Joaquin River. Trails also provide access to the Madera County portion of the SJRG SRMA, which is managed as a primitive, nonmotorized area. The SJRG SRMA offers a National Recreation Trail (the Pa'san Ridge and Wuh-ki'o Trails, including the bridge trail from the Ya Gub Weh Tuh trailhead to the San Joaquin River bridge), which covers prehistoric trade routes of the Mono and Dumna-Kechayi Yokut Indians, and there are plans to connect the San Joaquin River Trail through the gorge and Sierra National Forest to the Devils Postpile National Monument. The San Joaquin River Trail is used mostly by hikers (60 percent of users) and mountain bikers (30 percent of users), with some equestrian use (10 percent of users) occurring in winter and early spring (Rowland 2013). Equestrians, mountain bikers, and hikers often use the San Joaquin River Trail as an out-and-back trail, although some hikers travel only one way on the trail (and shuttle using two cars). There is also a competitive mountain bike race that has been held for the last 5 years on the San Joaquin River Trail in late March/early April. The race begins within the developed area in the SJRG SRMA and ends at the South Finegold picnic area in the Millerton Lake SRA and draws up to 500 spectators and participants each year.

Camping Year-round walk-in tent campsites with group sites are available for use at the SJRG SRMA. Wheelchair-accessible campsites are available at the group and walk-in campgrounds (one accessible site at each campground). Backpacking camping is available on the Madera County side of the river only, and campsites are to be located at least 200 feet from water, trails, cultural sites, and wildlife watering holes.

Interpretation and Education The SJRG SRMA participates in the Hands on the Land program, "a national network of field classrooms linking students, teachers, and parents to their public lands" (Hands on the Land Network 2014). The program explores natural resources, geology, and hydrology, and over 2,800 elementary and high school students participate yearly. The Hands on the Land program cooperates with such educational partners as the Sierra Mono Museum, Sierra Unified School District, Three-Forests Interpretive Association, Reclamation, and the U.S. Forest Service to

support the programs and facilities associated with Hands on the Land.

Wildlife Viewing and Nature Observation The wide variety of flora and fauna in the SJRG SRMA provides many opportunities for nature study and appreciation. In addition to the extensive wildflower displays, vegetation includes oak woodlands, riparian forest, foothill pine woodlands, and chaparral. The SJRG SRMA is also used as an outdoor laboratory by local colleges and universities.

Hunting Deer, bear, and quail hunting are allowed in fall and winter for 4–5 months. Turkey hunting occurs in spring, and dove hunting occurs in early September and throughout November and December. Hunters must adhere to the rules and regulations of CDFW. A shooting closure exists around all occupied areas, such as the campgrounds, trails, visitor center, and power facilities. No target shooting, paintball, or airsoft is permitted on these lands; only shooting for legal taking of game species is allowed.

Caving The SJRG SRMA offers entrance to the Millerton Lake Cave System for exploration. The system of three caves (upper, middle, and lower), separated only by short impassable segments, is near the lake surface and extends about one-half mile upslope from the south shore of Millerton Lake to the boundary of the Millerton Lake SRA and onto privately owned land spanning an elevation of approximately 760–900 feet msl. The lower cave and a portion of the middle cave of the Millerton Lake Cave System are located on land administered by BLM; however, the upper cave and a portion of the middle cave are located on privately owned land. Multiple entrances are found along each section of the cave system (Richards 1986).

The caves have been eroded from granitic rock by flows of nearby Big Sandy Creek. The upper cave is the longest and most complex of the three cave segments. It is listed as the sixth deepest granite cave in the United States and the ninth longest cave known in this category. Additionally, the middle cave is the twentieth longest granite cave known in the country. The Millerton Cave System has been proposed for designation by BLM as a significant cave resource under the Federal Cave Resource Protection Act (BLM 2012). This designation would only apply to the portion of the cave system on Federal lands.

Gold Panning Gold panning frequently occurs on sections of the river. Rockhounding and gold panning are permitted activities on public land administered by BLM. BLM also sponsors programs on the history of the gold rush for schools, groups, and the public.

Picnicking Picnicking occurs at the fishing access day-use area at the Kerckhoff No. 2 Powerhouse, the only developed picnic area within the SJRG SRMA. Informal picnicking also occurs at the learning and visitor centers.

Rock Climbing Rock climbing (bouldering) and canyoneering are possible within the canyon. Downstream from the San Joaquin River Trail bridge, there are several identified bouldering routes on the south side of the river and many (more than 30) on the north side of the river. There are also many (more than 30) identified bouldering routes on the north side of the river upstream from the trail bridge. Bouldering routes within the river gorge range in difficulty from V0 to V6. Most of the rock climbing opportunities are located on large boulders right along the river channel. Although rock climbing during summer can be hot because of sun exposure, the area provides good winter climbing because of the lower elevation and sun exposure (Rockclimbing.com 2014).

Recreation Facilities The SJRG SRMA offers several educational and recreation facilities, concentrated in the developed zone on the Fresno County (south) side of the river, accessible via Smalley Road from Auberry (Figure 22-1; 22-8). The developed zone extends from the visitor center on the eastern end of the zone to the fishing access at the locked gate above Kerckhoff No. 2 Powerhouse (across the road from the switchyard) on the western end of the zone. There are three developed campgrounds; an equestrian camp; a group camp (Aholul) with a large, open, flat area available for tents; and a walk-in campground with five walk-in tent sites (Ya Gub Weh Tuh trailhead/campground). Camping fees are required and reservations are required for the group camp. At the equestrian camp, corrals are available, along with three campsites. Area parking lots can accommodate large trailers and recreational vehicles. SJRG SRMA visitor center/park headquarters are located east of the equestrian camp. A visitor center featuring unique, multimedia displays on the natural environment and cultural history of the area is open daily from 10 a.m. to 2 p.m. In addition, a bookstore operated by Three-Forests Interpretive Association is located inside the visitor center. Outdoor

classrooms are located outside the visitor center and throughout the developed zone.

Table 22-8. San Joaquin River Gorge Special Recreation Management Area Recreation Facilities

Facility Name/Type	Primary Site Amenities	Parking	Sanitary Facilities
Learning center	1,200-square-foot building with full kitchen, shop, storage Open-sided pole barn with tables adjacent	Gravel parking area	2 wheelchair-accessible flush toilets and 2 portable toilets (1 is wheelchair accessible)
Visitor center	1,300-square-foot building, exhibits on natural and cultural resources, bookstore, multi-media exhibits, outdoor classrooms	10–12 spaces	1 public restroom
Ya Gub Weh Tuh Trailhead Campground	5 sites (walk-in)	Paved parking area	Double vault toilet
Group camp	Large, open flat area for tents	Paved parking area	Double vault toilet
Equestrian camp	3 campsites, corrals, water	Gravel parking area	Two portable toilets
Fishing access day-use area	Picnic area, provides trail access to San Joaquin River for fishing, gold panning, sightseeing	Large gravel parking area	Single vault toilet

Source: Reclamation 2006; Rowland 2013

Note:

The San Joaquin River Gorge Special Recreation Management Area also includes a recreated Native American village, which does not contain any permanent structures.

The Hands on the Land and Project Archaeology programs make use of a learning center and a replica Native American village, which are located near the visitor center. The learning center is housed in a new building with a full kitchen, restrooms, and storage/shop space and in an adjacent outdoor space sheltered by an open-sided pole barn, with several picnic tables beneath. The replica Native American village is an integral part of the learning center and incorporates outdoor classrooms such as a bedrock mortar, pond study area, nature trail, and other sites. The bedrock mortar provides for hands-on acorn processing. A nature trail is adjacent to the equestrian camp, near the learning center, which is focused on ethnobotany or Native American cultural uses of native plants. The trail features a diversity of plants and habitats and crisscrosses a small stream several times (BLM 2010a).

Various trails are available for hiking, mountain biking, and horseback riding (Table 22-9). The San Joaquin River Trail continues about 1.5 miles from the boundary of the Millerton Lake SRA into the SJRG SRMA (on the Fresno County side of the River) and terminates at the Ya Gub Weh Tuh trailhead/campground. The San Joaquin River Trail bridge at Big Sandy Creek, within the Millerton Lake SRA, has been installed and is open for use. This bridge links the SJRG SRMA trail system to the State Parks' trail system at Millerton Lake (BLM 2010a). BLM is working to acquire the final one-quarter mile necessary to continue the trail eastward to connect to the more recently acquired BLM lands in the Patterson Bend area, then on to the Sierra National Forest boundary. After the trail is completed, estimated San Joaquin River Trail mileage within the SJRG SRMA would be approximately 8–10 miles.

Table 22-9. San Joaquin River Gorge Special Recreation Management Area Trails

Trail Name	Trail Length	Trailhead and Uses
San Joaquin River Trail	1.5 miles (from Millerton Lake SRA boundary)	Ya Gub Weh Tuh trailhead at campground Multiple-use (hiking, biking, equestrian)
Bridge Trail	1.2 miles	Ya Gub Weh Tuh trailhead at campground Multiple-use (hiking, biking, equestrian), part of the National Recreation Trail within the SJRG SRMA
Pa'san Ridge Trail	6 miles (loop trail)	Begins at San Joaquin River Trail bridge Multiple-use (hiking, biking, equestrian)), part of the National Recreation Trail within the SJRG SRMA
Wuh-ki'o Trail	4 miles	Begins western side of Pa'san Ridge Trail Multiple-use (hiking, biking, equestrian)), part of the National Recreation Trail within the SJRG SRMA

Source: Reclamation 2006

Note:

Additional short unnamed trails lead to the river. A quarter-mile nature trail is located near the learning center.

Key:

SJRG SRMA = San Joaquin River Gorge Special Recreation Management Area
SRA = State Recreation Area

In addition to the San Joaquin River Trail, hikers, mountain bikers, and horseback riders in the SJRG SRMA use the 1-mile Bridge Trail, which leads from the Ya Gub Weh Tuh trailhead/ campground to a trail bridge over the San Joaquin River to two trails on the opposite side of the river, the Pa'san Ridge and Wuh-ki'o Trails. All three trails (Bridge, Pa'san Ridge, and Wuh-ki'o Trails) compose the National Recreation Trail within the SJRG SRMA.

The 6-mile Pa'san Ridge Trail begins on the north side of the San Joaquin River. This loop trail leads to uplands dominated by chaparral, shrubs, and seasonal wildflowers on the south-facing, steep canyon slopes, as well as upland vegetation dominated by oak grassland and oak/foothill pine woodlands with riparian forests bisecting the trail in the side canyons. The trail is a mix of old road and single-track trail and provides strenuous hill climbs. The Wuh-ki'o Trail is a 4-mile out-and-back trail that starts on the western side of the Pa'san Ridge Trail and passes along the river through oak woodlands and foothill pines connecting to the Temperance Flat area within the Millerton Lake SRA via an informal user-created trail. The Wuh-ki'o Trail is popular with mountain bikers, hikers, and equestrians. In 1981, these trails were designated as a National Recreation Trail (American Trails 2013).

Several additional areas provide recreation opportunities in the immediate vicinity of the primary study area. The Big Table Mountain Ecological Reserve and McKenzie Table Mountain Preserve are located between Friant and Prather, on the north side of Auberry Road. The main gate to the McKenzie Table Mountain Preserve is 3.3 miles uphill from the intersection of Auberry Road and Millerton Road. The preserve offers opportunities for hiking, wildlife viewing, and nature appreciation. Most hikes on the preserve include a climb to the top of the table formation where visitors can enjoy views of the San Joaquin River drainage and the Sierra Nevada. In spring, there are displays of wildflowers on the slopes and table tops. Trails are located at the low end of the preserve, including a 4-mile self-guided Discovery Trail along the ranch road and part of the old San Joaquin and Eastern Railroad right-of-way (Sierra Foothill Conservancy 2013).

Kerckhoff Lake provides boating, camping, and access to trails in the Sierra National Forest and will provide access to the San Joaquin River Trail after it is completed in this area. Smalley Cove at Kerckhoff Lake, operated by PG&E, is located just east of the SJRG SRMA and offers group and individual picnic sites, as well as five campsites with fire pits, potable water, and vault toilets (Stewardship Council 2007). The Sierra National Forest provides opportunities for dispersed, undeveloped camping and highly developed campsites with group sites. Nearby Shaver Lake also provides boating and camping opportunities. Camp Edison at Shaver Lake is operated by Edison International Company and provides 252 campsites with resort amenities, including a general store, heated showers, electricity, cable TV, laundry, and Wi-Fi.

Recreational Use

Estimated Annual Recreation Use Table 22-10 presents the total SJRG SRMA annual visitor use from 2006 through 2013. The 8-year average for annual visitation is approximately 54,468, although recent visitation (last 4 years) has been well below this average. As mentioned previously, visitor use varies because of many factors, including time of year, weather, economic conditions, fees, and gas prices. With high summer temperatures common, the most popular use seasons are spring, winter, and fall, but activities such as swimming, fishing, gold panning, and rock climbing are popular in summer and mountain biking occurs year-round. The SJRG SRMA is also especially popular when higher elevation areas in national parks and national forests are closed in fall, winter, and early spring.

Table 22-10. San Joaquin River Gorge Special Recreation Management Area Annual Visitation Estimates

Year	Dispersed Area	Intensive Use Area	Total
2006	53,769	4,822	58,591
2007	61,413	8,475	69,848
2008	78,302	8,275	86,577
2009	82,039	1,132	83,171
2010	16,500	19,650	36,150
2011	16,722	17,450	34,172
2012	15,310	16,825	32.135
2013	16,900	18,200	35,100
8-year Average	--	--	54,468

Sources: BLM 2010a, Rowland 2013
Key:
-- = not applicable
BLM = U.S. Department of the Interior, Bureau of Land Management

It is estimated that most visitors are from the Fresno/Clovis/ Madera area (60 percent) or the Auberry/Prather area (25 percent), with the remainder of visitors from the San Francisco Bay Area (10 percent), and the Los Angeles area or out of state (5 percent). BLM expects a slight increase in visitor use in 2014 and also expects visitation to increase fairly dramatically in the next 5–10 years once the San Joaquin River Trail is completed to the Sierra National Forest (Rowland 2013).

Visitor Participation by Activity By far, the most popular use within the SJRG SRMA is trail use with an estimated 98 percent of visitors using area trails (Table 22-11). About 30 percent of visitors use the San Joaquin River Trail, while 70

percent of visitors use the other trails (Pa'san Ridge, Wuh-ki'o) in the SJRG SRMA. Wildlife viewing/nature observation is the second most popular activity with 50 percent of visitors participating in this activity. Picnicking is also a popular activity, with about 33 percent of visitors participating in picnicking. Other popular activities include interpretive/educational programs (25 percent of visitors participating), hunting (25 percent), and camping (20 percent).

Table 22-11. Estimate of San Joaquin River Gorge Special Recreation Management Area Visitor Participation by Activity

	Percent of SJRG SRMA Visitors Participating
Trail Use	98
San Joaquin River Trail	30
All other trails (Pa'san Ridge, Wuh-ki'o, Bridge)	70
Wildlife viewing/nature observation	50
Picnicking	33
Interpretation/education programs	25
Hunting	25
Camping	20
Gold panning	18
Shoreline fishing	16
Caving	15
Rock climbing	10
Boating	3.5
Whitewater boating	3
General river boating	0.5

Sources: Rowland 2013

Note:

Percentages do not add up to 100 percent because some visitors participate in multiple activities.

Key:

SJRG SRMA = San Joaquin River Gorge Special Recreation Management Area

Other land-based recreation activities receive less participation by SJRG SRMA visitors, including gold panning (18 percent of visitors participating), shoreline fishing (16 percent), caving (15 percent), and rock climbing (10 percent). Few visitors participate in water-based activities such as whitewater boating (3 percent) and general river boating (0.5 percent) (Rowland 2013).

Recreation Use within Fresno and Madera Counties

Generally, the majority of use for each activity occurs in Fresno County, as shown in Table 22-12. This is likely because most facilities within the SJRG SRMA, as well as primary

public access points, are located within Fresno County. Because the county line is located within the San Joaquin River, whitewater and general river boating equally occur in Fresno and Madera counties. Recreation activities that occur exclusively within Fresno County include use of the San Joaquin River Trail and caving as the trail and caves are located solely in Fresno County. Rock climbing and trail use are the only activities that have more use occurring in Madera County than Fresno County. Trail access is available in Madera County without crossing the San Joaquin River Bridge via the Wuh-ki'o Trail, which connects to an informal trail from the Millerton Lake SRA.

Table 22-12. Estimate of San Joaquin River Gorge Special Recreation Management Area Activity Use by County

	Percent of Total Activity Use Occurring in Fresno County	Percent of Total Activity Use Occurring in Madera County
Trail Use	40	60
San Joaquin River Trail	100	0
All other trails (Pa'san Ridge, Wuh-ki'o, Bridge)	15	85
Wildlife viewing/nature observation	75	25
Picnicking	98	2
Interpretation/education programs	90	10
Hunting	65	35
Camping	90	10
Shoreline fishing	90	10
Caving	100	0
Rock climbing	20	80
Boating	50	50
Whitewater boating	50	50
General river boating	50	50

Source: Rowland 2013

There is limited recreation use upstream from the trail bridge over the San Joaquin River within the SJRG SRMA (up to Kerckhoff Dam). There is no trail access upstream from the bridge except for the Pa'san Ridge Trail. When sufficient flow is available, kayakers use the river from Kerckhoff Dam downstream to the trail bridge across the San Joaquin River. Other recreation uses within the river/canyon area include rock climbing/bouldering, gold panning, and swimming in deep holes above Kerckhoff Powerhouse. BLM anticipates the San Joaquin River Trail providing trail access to the area upstream from the trail bridge on the Fresno County side of the river. If

access cannot be acquired the trail would cross the San Joaquin River into Madera County then cross back to Fresno County at Patterson Bend. Only one-quarter mile of access is still needed within this area to connect the trail to the Sierra National Forest boundary (Rowland 2013).

Facility Capacity Estimates Day-use parking capacity at the Ya Gub Weh Tuh trailhead/campground is often exceeded during fall and spring. During these seasons, the campground is also at capacity (Rowland 2013).

Extended Study Area

This discussion addresses recreation opportunities located in the greater San Joaquin Valley in the vicinity of the extended study area, including a description of opportunities, uses, and facilities. It is based on information presented in the SJRRP PEIS/R (SJRRP 2012).

San Joaquin River from Friant Dam to Merced River

Public access to portions of this reach of the San Joaquin River is available in the vicinity of the San Joaquin River Parkway (Parkway). Public access is sparse along most areas of the river downstream from the Parkway, with the exception of access provided by a city park at the Mendota Pool and Federal and State wildlife refuges located along the river in Reaches 4 and 5. Informal access is available to the river corridor at numerous locations where State and local roads are located adjacent to or cross the river channel.

The Parkway is composed of multiple parks, trails, and ecological reserves located along the San Joaquin River between Friant Dam and SR 145. The Parkway is managed by the San Joaquin River Conservancy, a state agency, and several local and State partner agencies. Figure 22-2 identifies the parks, public access areas, and trails located along this reach of the San Joaquin River.

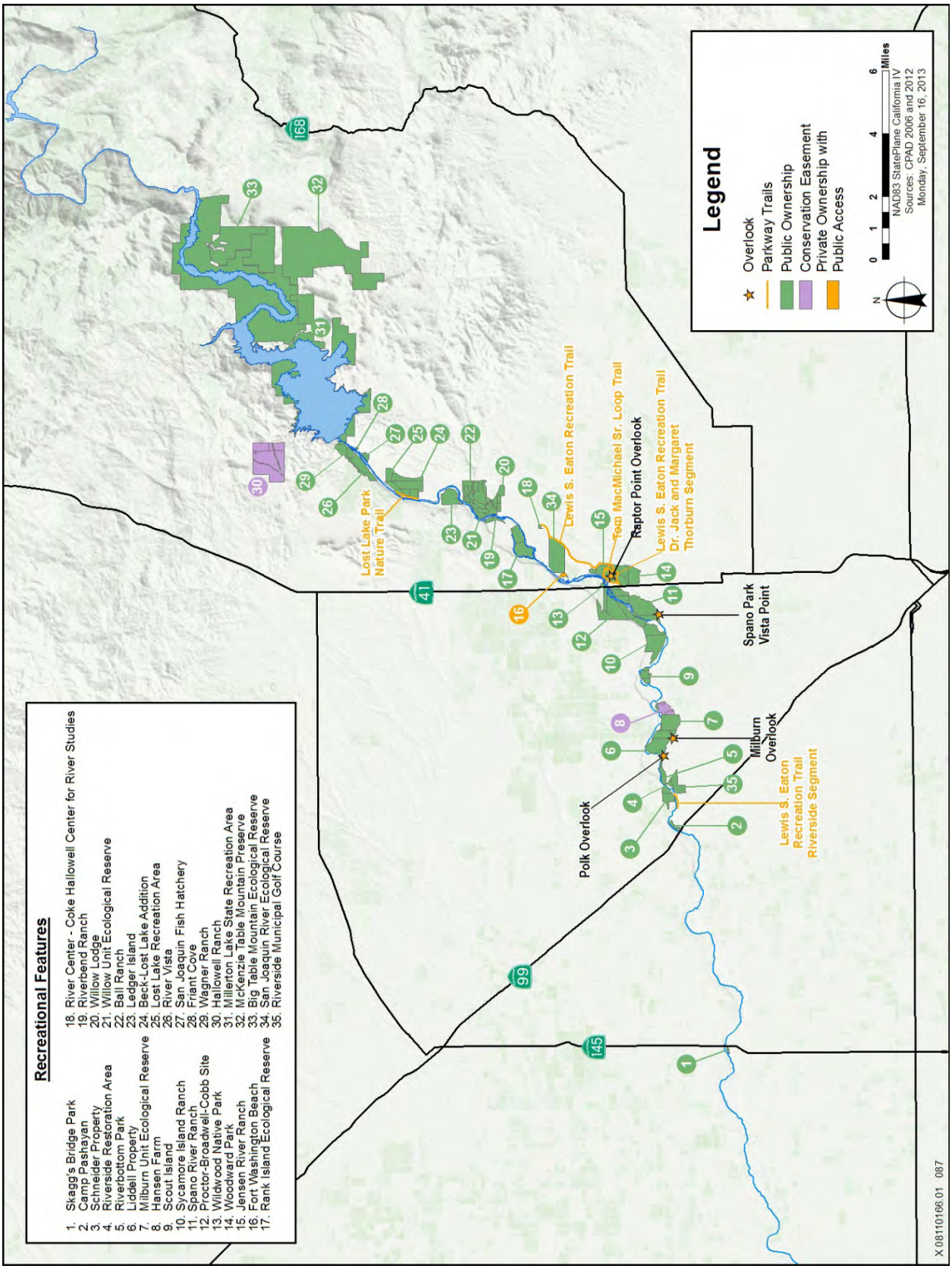

Figure 22-2. Recreation Opportunities near Millerton Lake

Existing recreation opportunities, including water-dependent uses such as boating and fishing, are available in the Parkway because of public access to the river. With the implementation of interim flows of the SJRRP, river boating opportunities have been enhanced from Friant Dam to the Chowchilla Bypass Bifurcation Structure from February through mid-March and from July through late November. Because instream flows are now higher from mid-March through June, boating opportunities on the river in Reach 1 could be reduced because of hazardous conditions when flows approach 1,000 cfs. Additionally, fishing opportunities along the main channel in Reach 1 are greatly reduced during flows over 1,500 cfs because the high flows create hazardous conditions for boating and wading; however, new fishing opportunities could become available along the margins of the main channel when flows are over 1,500 cfs (SJRRP 2009).

A public outreach program was initiated to educate the public, agencies, and organizations of changes in San Joaquin River flows and potential effects on river boating and fishing opportunities. Although instream flows have been restored below the Chowchilla Bypass Bifurcation Structure, the structure is a barrier to boat traffic, and public access is minimal downstream to Mendota Pool. Public access is also minimal in Reach 3 downstream from Firebaugh to Reach 4. Therefore, increased recreation use along the San Joaquin River resulting from implementation of interim flows has occurred primarily upstream from the bypass structure (SJRRP 2009).

Lands adjacent to the San Joaquin River are primarily managed for agricultural land uses; however, several Federal wildlife refuges and State wildlife management areas are located within the valley, along with several State Park units. Some areas are located directly adjacent to the San Joaquin River within the extended study area, while others are some distance away from the river. Several Federal refuges and State wildlife management areas, including the Great Valley Grasslands State Park, are part of the 160,000-acre Grasslands Ecological Area, which represents the largest remaining areas of unplowed land on the Central Valley floor (National Audubon Society 2013).

Both the San Luis and San Joaquin River NWRs are located on the San Joaquin River, but only the San Luis NWR, the largest of the Federal refuges, is in the San Joaquin Valley. The San Luis NWR contains a mixture of managed seasonal and permanent wetlands, riparian habitat associated with the San

Joaquin River and two tributary sloughs, and native grasslands/alkali sinks/vernal pools. The refuge is managed primarily to provide habitat for migratory and wintering birds. Major public uses include interpretive wildlife observation programs and waterfowl and pheasant hunting. Foot traffic is permitted on the three auto tour routes and on trails in the NWR. Fishing, by rod and reel only, is also permitted (USFWS 2007). The Merced NWR is located a few miles east of the San Joaquin River in Merced County. The San Luis NWR receives about 150,000 annual visits, and the Merced NWR receives about 100,000 annual visits (Grasslands Water District 2001). Figure 22-3 shows the refuges in the vicinity of the extended study area.

Two initiatives are underway by Federal and State agencies that include proposals to expand recreation access and opportunities along the San Joaquin River. America's Great Outdoors is a Federal initiative led by the U.S. Department of the Interior to develop a 21st-century conservation and recreation agenda. The America's Great Outdoors initiative has identified projects in all 50 states. The Federal government could partner with states or local communities to advance the goals of the America's Great Outdoors initiative with existing resources by providing technical support and with its administrative authorities. One such project is the San Joaquin River Blueway, proposed by the San Joaquin River Partnership, a collaboration of 13 nonprofit organizations (San Joaquin River Partnership 2011).

The vision for the San Joaquin River Blueway is to create a corridor of recreational access and important landscapes, with a system of recreational and natural areas linked by the river. The San Joaquin River Blueway would provide access and opportunities for boating, fishing, swimming, hiking, biking, wildlife-watching, picnicking, and hunting. The San Joaquin River Partnership also envisions a San Joaquin River Water Trail as an early component of the San Joaquin River Blueway linking existing river access points, and providing enhanced recreational access in the long term and becoming a backbone of the San Joaquin River Blueway (San Joaquin River Partnership 2011). The Central Valley Vision, an initiative of State Parks, proposes two new State parks on the San Joaquin River.

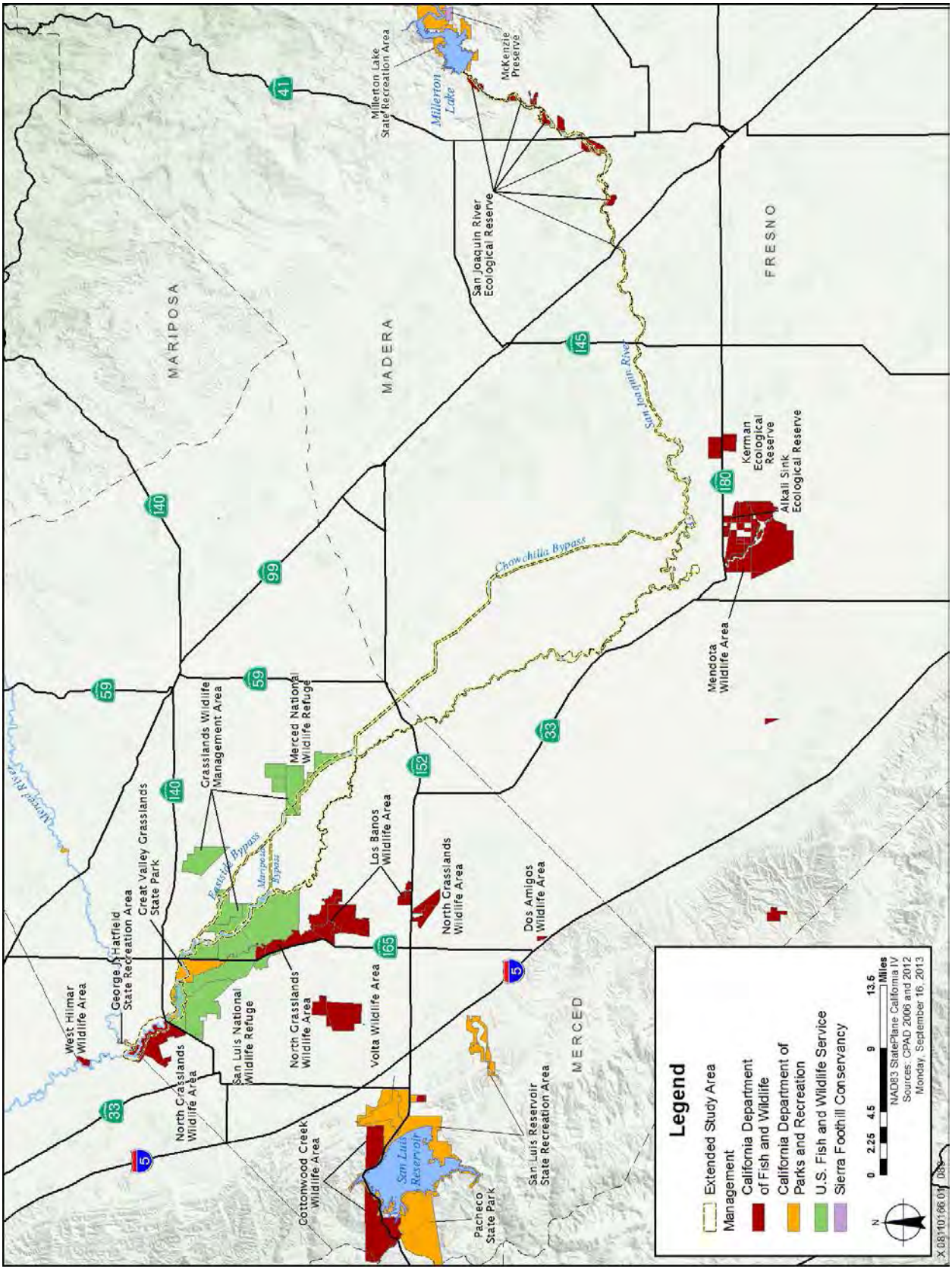

Figure 22-3. Publicly Accessible Open Space in the Extended Study Area

San Joaquin River from Merced River to the Delta

Two Stanislaus County parks provide the only developed recreation access to this segment of the San Joaquin River. The Las Palmas Fishing Access, located a few miles east of the town of Patterson, is a 3-acre park providing a concrete boat ramp and day-use facilities (Stanislaus County 2009a). Laird Park, located 2 miles east of the town of Grayson, is a 97-acre "community park" providing river access and day-use facilities (Stanislaus County 2009b).

The San Joaquin River NWR is located along the San Joaquin River in between the Tuolumne and Stanislaus Rivers, two major tributaries to the San Joaquin River. The refuge boundaries encompass over 7,000 acres of riparian woodlands, wetlands, and grasslands. Although the refuge is primarily undeveloped, a wildlife viewing platform has been constructed at a favored location for viewing geese and other waterbirds (USFWS 2007).

The West Hilmar Wildlife Area, on the west bank of the river a few miles downstream from the Merced River confluence, is a 340-acre State wildlife area, with no facilities and accessible only by boat (DFG 2009).

Not on the San Joaquin River, but in the vicinity, State Parks manages two small developed park units, each less than 75 acres, on the bank of the lower Merced River in Merced County. George J. Hatfield SRA is near the confluence with the San Joaquin River and McConnell SRA is approximately 18 miles upstream from the confluence with the San Joaquin River. Both parks provide access to the Merced River for boating, fishing, swimming, picnicking, camping, and hiking on short trails.

Farther north, the Turlock Lake SRA furnishes camping, boating, and day-use facilities at the 3,500-acre Turlock Lake and the adjacent Tuolumne River, on the eastern edge of the valley in Stanislaus County. Caswell Memorial State Park is located along the Stanislaus River in San Joaquin County, approximately 5 miles upstream from the confluence with the San Joaquin River. This 258-acre park offers opportunities for fishing and swimming in the Stanislaus River and camping facilities and nature trails through the park's riparian oak woodland.

Delta

At the southeast margin of the Delta on the San Joaquin River are two boating facilities that provide access both to the Delta and the river upstream. The Mossdale Crossing Regional Park, operated by San Joaquin County, provides a paved two-lane boat ramp and day-use facilities. Across from the park is the privately operated Mossdale Marina, with 23 boat berths, and services such as fueling, a restaurant and bar, and a store. A few miles downstream is Dos Reis County Park, a San Joaquin County-operated facility providing a boat ramp and day-use area, as well as a 26-site RV camp. Nearby is Haven Acres Marina, a small private facility with a boat ramp and bar and grill.

Numerous additional recreation opportunities are available in the Delta. The Delta has many miles of rivers and sloughs for boating and fishing, and recreation visitors have a choice of many private recreation facilities, primarily small marinas and resorts, and two State Park units. Brannan Island SRA, in the central Delta on the Sacramento River, offers boat access to the river and sloughs, and camping, swimming, and day-use facilities. Franks Tract SRA consists of a large flooded island that was formerly farmland, surrounded by remnant levees; there are no developed facilities in the SRA.

CVP and SWP Water Service Areas

CVP and SWP water service areas are located throughout much of California. Facilities include multiple dams, reservoirs, and canals that provide substantial water-based recreational activities. Releases from dams on major tributaries to the Sacramento River provide numerous recreational opportunities, especially boating and fishing. Reservoirs such as Folsom, Oroville, and New Melones provide boating, fishing, camping, and other recreational activities.

The CVP and SWP water service areas consist primarily of lands in agricultural production or urban areas composed of residential, commercial, or industrial land uses. Recreational opportunities on agricultural lands are limited to informal recreational activities such as hunting. Recreational opportunities in urban areas vary by community, with recreation facilities limited in some communities to smaller urban parks, whereas in other communities facilities consist of larger open spaces and regional recreation facilities.

Environmental Consequences and Mitigation Measures

This section describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine the significance of impacts on recreation. It then discusses the impacts of the alternatives and proposes mitigation where appropriate. The potential impacts on recreation and associated mitigation measures are summarized in Table 22-13.

Table 22-13. Summary of Impacts and Mitigation Measures for Recreation

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
REC-1: Permanent Loss or Closure of a Recreation Facility	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	S	REC-1a: Allow On-Boat Camping, REC-1b: Create New Shoreline Access Site	LTS
		Alternative Plan 2	S		LTS
		Alternative Plan 3	S		LTS
		Alternative Plan 4	S		LTS
		Alternative Plan 5	S		LTS
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
REC-2: Permanent Loss of a Resource Used for Recreation	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	S	REC-2: Preserve Fine Gold Creek Watershed Cave System	SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS

Table 22-13. Summary of Impacts and Mitigation Measures for Recreation (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
REC-3: Substantial or Long-Term Reduction or Elimination of Recreation Opportunities or Experiences	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	S	REC-3a: Limit Construction Activities near Recreation Areas, REC-3b:Instream Whitewater Boating Improvements, REC-3c: Extend the San Joaquin River Trail through the SJRG SRMA	SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
REC-4: Loss of Access to a Locally Important Recreation Site or Area	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	S	REC-4: Maintain Public Access	SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS

Table 22-13. Summary of Impacts and Mitigation Measures for Recreation (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
REC-5: Increased Use of Existing Neighborhood and Regional Parks or Other Recreation Facilities such that Substantial Physical Deterioration of the Facilities Would Occur or Be Accelerated	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
REC-6: Impacts Associated with New or Expanded Recreation Facilities	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	Beneficial		Beneficial
		Alternative Plan 2	Beneficial		Beneficial
		Alternative Plan 3	Beneficial		Beneficial
		Alternative Plan 4	Beneficial		Beneficial
		Alternative Plan 5	Beneficial		Beneficial
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Key:
LTS = less than significant
NI = no impact
S = significant
SJRG SRMA = San Joaquin River Gorge Special Recreation Management Area
SU = significant and unavoidable

Methods and Assumptions

The project could affect recreation resources by a variety of impact mechanisms. In the primary study area, impacts on recreation facilities and activities at the Millerton Lake SRA and the SJRG SRMA would be associated with inundation of existing recreation facilities, loss of access to recreation facilities, and changes to recreation experiences or opportunities. Additional impacts could result at Millerton Lake SRA from changes in reservoir operations that alter the magnitude, rate, or timing of reservoir drawdown.

In the extended study area, the action alternatives would affect flows and water temperature of the San Joaquin River below Friant Dam.

More specifically, this chapter evaluates the potential impacts on recreation resulting from the following mechanisms:

- Inundation of existing recreation facilities and resources used for recreation activities
- Loss of or changes to motorized and nonmotorized access to recreation sites/areas
- Changes in the magnitude, rate, or timing of reservoir drawdown
- Displacement of users attributable to changes in access, inundation of facilities, or changes in setting
- Changes in surface area and shoreline miles for water-based recreation opportunities and experiences
- Conversion of a riverine recreation setting to a reservoir setting
- Changes to the recreation setting and access from construction activities

Evaluation of direct impacts on recreation was based primarily on a GIS analysis of the inundation area of the proposed Temperance Flat RM 274 Reservoir. The GIS analysis used available information to estimate impacts, including locations of recreation facilities and access roads, topography, management area boundaries, and new reservoir pool acreage based on top-of-active storage elevations. The GIS analysis was used to determine acreage of land inundated and specific

facility components inundated, such as trails, access roads and campgrounds.

During facility planning, several existing recreation facilities would be unable to continue to operate in current locations because of the potential for inundation in some years. These facilities would need to be relocated to lands outside the new inundation zone. Therefore, an additional GIS analysis was conducted to determine whether potential recreation facility relocation areas were present in the vicinity. Suitable areas were considered to have a slope of less than 10 percent, be located on public property, be located within 1 mile of the proposed Temperance Flat RM 274 Reservoir shoreline, be located outside of habitat or protected sensitive species areas, be located within one-half mile or less of existing roads or haul routes, and be located no closer than 1,000 feet from the new dam or outlet structures. The criteria to determine suitability are presented in Table 22-14, and are based on refinements to criteria identified in the 2006 Draft Recreation Opportunities Technical Appendix (Reclamation 2006).

Table 22-14. Suitability Analysis Criteria

	High Suitability	Moderate Suitability	Low Suitability	Not Suitable
Location	Within 1 mile of maximum pool elevation (985 feet)	Within 1 mile of maximum pool elevation (985 feet)	Within 1 mile of maximum pool elevation (985 feet)	Below maximum pool elevation (985 feet)
Property ownership	Public property	Public property	Public property	Private property
Slope	Less than 5% slope	5–10% slope	5–10% slope	Greater than 10% slope
Distance from existing roads/project haul routes	Within one-quarter mile of existing roads or haul routes	Within one-half mile of existing roads or haul routes	Within 1 mile of existing roads or haul routes	More than 1 mile from existing roads or haul routes
Distance from CNDDB sites	More than 1,000 feet	More than 1,000 feet	More than 1,000 feet	Within 1,000 feet
Distance from environmental areas	No overlap with designated environmental reserve areas	No overlap with designated environmental reserve areas	No overlap with designated environmental reserve areas	Overlap with designated environmental reserve areas
Distance from reservoir facilities	More than 1,000 feet from new dam or intake structures	More than 1,000 feet from new dam or intake structures	More than 1,000 feet from new dam or intake structures	Within 1,000 feet of new dam or intake structures

Key:
% = percent
CNDDB = California Natural Diversity Database

After suitable areas were identified, locations were delineated for relocating inundated recreation facilities. Relocation areas were then incorporated into the project description, as presented in Chapter 2, "Alternatives."

Indirect impacts of the action alternatives on recreation opportunities are those impacts that result from the direct impacts listed above, such as potential reductions in recreation use of various types related to loss of the facilities and shoreline land areas that support that use. Other indirect impacts that may occur relate to changes in the types and quality of recreation opportunities under the action alternatives. Examples of such indirect impacts include increased density of use (crowding), increases or decreases in the occurrence of boating hazards (such as submerged rocks), increases or decreases in particular types of recreation opportunities (such as flatwater boating or river boating), or recreation settings (such as developed and primitive settings) accessible to visitors.

Estimating the indirect impacts of implementing any action alternative is based on information such as the number and types of recreation visitors (e.g., shore-based day users, boaters, and campers) who use individual facilities. Visitor use data for the Millerton Lake SRA and SJRG SRMA were available for the management areas as a whole and by activity and location (above/below RM 274 and Fresno/Madera County). Assessment of indirect impacts is also based on existing descriptions of the types of recreation opportunities and settings currently existing in the project area, and similar qualitative information.

CalSim II modeling results characterizing changes to reservoir operations at Millerton Lake were also used to evaluate indirect impacts on recreation. Model simulation data produced using the CalSim II model were provided that indicated the elevation of both Temperance Flat RM 274 Reservoir and Millerton Lake for each month of the year. The analysis for Millerton Lake focused on pool elevation of the lake minus the area that would be inundated with the Temperance Flat RM 274 Dam and focused specifically on the key May through August peak water-based recreation season. Millerton Lake SRA attendance data indicate that nearly two-thirds of use occurs between May and August.

A key factor in determining the impacts of the action alternatives is the influence Temperance Flat RM 274

Reservoir operations would have on the Millerton Lake pool elevation range most conducive to shoreline use that occurs on the lake. This elevation range is approximately 540–560 feet (20–40 feet below top-of-active storage); a pool level that exposes a wide band of gently sloping shoreline in the south shore and north shore areas. Recreation visitors are permitted to drive their vehicles on much of this exposed area, and these areas are very popular for informal beach use by both land-based and boating recreation visitors. Elevations above 560 feet provide little area for this informal use, although developed shoreline day-use areas above the high water line would be available, but parking is limited at these sites. Elevations below 540 feet continue to provide desirable shoreline use conditions, but at a greater distance from developed picnic facilities, paved roads and parking, restrooms, and other amenities located above the high water line. Lower elevations would result in a more substantially reduced reservoir surface area and negative impacts on the operation of the marina as the floating docks must be relocated.

Reservoir operations would also influence recreation opportunities available on the proposed Temperance Flat RM 274 Reservoir created under each action alternative. Recreation opportunities and relocated facilities at the new reservoir would be influenced by operations, particularly by pool elevations most likely to exist during the summer water-based recreation season, and seasonal fluctuation in pool elevation.

The CalSim II results also describe flow characteristics for the San Joaquin River downstream from Friant Dam, and for other rivers downstream from CVP and SWP reservoirs whose operations may be affected by the project. These data were used to determine potential impacts on recreation and public access on the San Joaquin River downstream from Friant Dam and on tributary rivers and CVP and SWP reservoir elevations. Similarly, river temperature modeling was used to determine the suitability of river water temperatures for recreation. Monthly average increases and decreases in flows and river temperatures were considered for the extended study area.

Additional details and results of CalSim II and river temperature modeling are provided in the Modeling Appendix.

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing

the No Action Alternative and other alternatives. Under NEPA, the severity and context of an impact must be characterized. 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines, Section 15126.4[a]).

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, and consideration of the context and intensity of the environmental impacts as required under NEPA. Impacts of an alternative on recreation would be significant if project implementation would do any of the following:

- Result in the permanent loss or closure of a recreation facility
- Result in the permanent loss of a resource used for recreation activities
- Result in the substantial or long-term reduction of recreation opportunities or experiences, including a reduction in area available for a particular type of recreation or substantial reduction in recreation experience quality, or substantial increase in recreation opportunities or experiences
- Result in the loss of access to a locally important recreation site/area
- Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facilities would occur or be accelerated
- Include recreation facilities or require the construction or expansion of recreation facilities that might have an adverse physical impact on the environment

Topics Eliminated from Further Consideration

As described in Chapter 14, "Hydrology – Surface Water Supplies and Facilities Operations," of this Draft EIS, implementing any action alternative would increase water reliability for the Friant Division and SOD CVP and SWP contractors during most water-year types. Delivery of this additional water would not exceed historical maximum deliveries or existing contracted water volumes, result in placing new land into agricultural production, change cropping patterns, or result in other physical changes to the environment.

Implementing any action alternative or the No Action Alternative would not substantially affect recreation opportunities or experiences and would not result in the loss of recreation access or facilities within the CVP and SWP water service areas, the Delta, or along the San Joaquin River downstream from the Merced River confluence. Therefore, impacts on these portions of the extended study area are not discussed further. The extended study area impacts described for the action alternatives and No Action Alternative relate only to the San Joaquin River below Friant Dam to the Merced River confluence.

Direct and Indirect Impacts

This section describes the environmental consequences of implementing any action alternative.

Impact REC-1: Permanent Loss or Closure of a Recreation Facility

Primary Study Area

No Action Alternative Under the No Action Alternative, the Temperance Flat RM 274 Dam would not be built; therefore, there would be no loss or closure of any facility used for recreation attributable to inundation of the San Joaquin River following construction of the new dam. Continued implementation of existing land management and plans would not substantially alter existing recreational facilities in the primary study area.

There would be **no impact** under the No Action Alternative.

Action Alternatives Impoundment of the San Joaquin River by the proposed Temperance Flat RM 274 Dam would inundate about 5,700 acres at top-of-active storage, which would result in the seasonal or permanent inundation of several recreation facilities, or portions of facilities, within the SJRG SRMA and

Millerton Lake SRA. Table 22-15 identifies the recreation facilities that would be inundated by Temperance Flat RM 274 Reservoir at top-of-active storage.

As part of each action alternative, a number of these recreation facilities would be relocated to areas outside the inundation zone during construction and before inundation (Table 22-15). Replacement facilities would be of equivalent overall capacity and quality compared to the affected facilities, would provide comparable shoreline access, where applicable, and would comply with Americans with Disabilities Act and Architectural Barriers Act guidelines.

In addition, to provide shoreline access and reduce water hazards, complete vegetation removal would occur within the inundated area near all new and relocated recreation facilities. There would be no loss of recreation facilities and equivalent capacity, quality, and access provided for those facilities that would be relocated. This impact would be less than significant under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

However, for three recreation facilities, relocation is infeasible or would not completely replace the experience associated with the displaced facility. These facilities consist of Hewitt Valley Environmental Camp, the Temperance Flat boat-in campground, and the trail bridge over the San Joaquin River.

Table 22-15. Recreation Facilities that Would Need to Be Relocated or Replaced

Inundated Facility	Inundated Facility Components	Relocation/Replacement
Hewitt Valley Environmental Camp	Primitive campsites	Relocate the campsites to the peninsula near the Temperance Flat RM 274 Dam on the Madera County side of the Temperance Flat RM 274 Reservoir. Also allow on-boat camping within a portion of the reservoir during periods with lowered water surface, and provide a floating restroom for on-boat campers.
Temperance Flat boat-in campground	25 boat-in campsites, 1 pit toilet	Relocate the campground to the peninsula near the Temperance Flat RM 274 Dam on the Madera County side of the Temperance Flat RM 274 Reservoir. Also allow on-boat camping within a portion of the reservoir during periods with lowered water surface, and provide a floating restroom for on-boat campers.
Temperance Flat vault toilet	1 vault toilet	Relocate toilet uphill of the existing location to the new terminus of Wellbarn Road.
San Joaquin River Trail	14.75 miles of multiuse trail	Relocate the affected portion of the trail (southern end) to follow a ridgetop and then follow the 1,020-foot contour up to relocated facilities in the BLM developed zone.
Road access to Temperance Flat via Wellbarn Road	Road	Wellbarn Road would continue to provide shoreline access but would have a new terminus at the maximum pool elevation. No relocation is necessary.
Fishing Access Day-Use Area at Kerckhoff No. 2 Powerhouse	Picnic area, gravel parking area, single vault toilet, shoreline trail	Relocate the facilities, trail, and parking uphill of the existing location to the end of Smalley Road.
Ya Gub Weh Tuh Trailhead Campground	5 walk-in campsites, paved parking, double vault toilet	Relocate campground uphill of the existing location in the developed zone.
Visitor center/BLM Office	1,300-square-foot building, outdoor classrooms, 10–12 parking spaces, 1 public restroom	Relocate facilities uphill of the existing location in the developed zone.
BLM learning center	1,200-square-foot learning center building, open-sided pole barn, pond classroom, gravel parking area, and 4 toilets	Relocate facilities uphill of the existing location in the developed zone.
BLM Native American village site	No permanent facilities, but estimated 0.6 acre needed for temporary village structures	Relocate site uphill of the existing location in the developed zone.
Wuh-ki'o Trail	1.89 miles	Relocate the affected portion of the trail uphill of the existing location and provide access via a water taxi from the developed zone.
Pa'san Ridge Trail	1.2 miles	Relocate the affected portion of the trail uphill of the existing location and provide access via a water taxi from the developed zone.
Trail bridge over San Joaquin River	Bridge spanning the San Joaquin River and 1 mile of Bridge Trail	Provide a water taxi across the reservoir to reach trails on the Madera County side of the reservoir. Provide a new shoreline access site at the developed zone to continue providing shoreline access and a whitewater boating take-out that was available at the bridge site.

Key:
BLM = U.S. Department of the Interior, Bureau of Land Management
No. = number
RM = river mile

The boat-in camping facilities and Hewitt Valley Environmental Camp sites could be relocated to the peninsula located upstream from the proposed Temperance Flat RM 274 Dam and thus facilities and capacity would be similar to what is currently available to recreationists. However, the peninsula area is steep and because of the drawdown of the water surface elevation anticipated for Temperance Flat RM 274 Reservoir, particularly during summer, campers would have a long, steep walk to the campsites across the drawdown zone, substantially reducing the quality of the recreation experience for boat-in campers. It is anticipated that the campsites would be inhospitable and may be used infrequently during periods with a lowered reservoir water surface, which could occur over several months of the year. Therefore, only relocating the campsites would not provide replacement boat-in camping experiences, resulting in a significant impact on this recreation activity. Mitigation for this impact is proposed below in the Mitigation Measures section.

Currently, the Wuh-ki'o and Pa'san Ridge Trails are accessed by a bridge over the San Joaquin River and the bridge functions as a recreational shoreline access location/boating take-out. This bridge would be inundated with establishment of the Temperance Flat RM 274 Reservoir. Because of the width of the proposed Temperance Flat RM 274 Reservoir, replacing the bridge is infeasible. Access to these trails would be maintained by operation of a water taxi across the Temperance Flat RM 274 Reservoir near the location of the existing footbridge. However, loss of the bridge as a shoreline access location/boating take-out would result in a significant impact on recreation. Mitigation for this impact is proposed below in the Mitigation Measures section.

As part of developing Temperance Flat RM 274 Reservoir, boat ramps would be provided at the new terminus of Wellbarn Road and at the new terminus of Smalley Road. Providing these boat ramps would be part of relocating recreation facilities to allow boat-in camping to occur at the relocated campground. In addition, these new boat ramps would allow on-water recreation, such as fishing, waterskiing, PWC use, and other activities, as well as water-based special events, to occur at the reservoir. However, the large fluctuation in pool levels during the recreation season (ranging from about 75 to 180 feet) may make boat navigation difficult due to submerged hazards and reduced surface area. Therefore, some boating activities, such as high-speed activities like PWC use and waterskiing, may not be safe during lowered reservoir

conditions. Consequently, these activities may require lower speed limits and prohibition in certain areas.

Some level of water-based recreation on Temperance Flat RM 274 Reservoir is anticipated. During periods of lowered water surface elevation, particularly during low water years, the two proposed boat ramps may become inoperable, limiting boating use to smaller craft that could be carried to the water's edge during these periods. Final accessibility limits would need to be defined as part of final design and operations planning. The resource management plan for the reservoir area will include a discussion of allowable water-based recreation uses, as well as management and facilities for such uses.

Temperance Flat RM 274 Reservoir would also affect the location of a future storage building near the visitor center mentioned in the *Business Plan for the San Joaquin River Gorge Special Recreation Management Area* (BLM 2010a), but this facility would be relocated outside of the inundation area to avoid potential impacts.

This impact would be **significant** under the action alternatives. Mitigation for this impact is proposed in the Mitigation Measures section.

Extended Study Area

No Action Alternative Under the No Action Alternative, instream flows in the San Joaquin River downstream from Friant Dam in December, January, and April would be higher than existing conditions with the release of full Restoration Flows. Flows would not exceed instream flows for the SJRRP, which could reach 4,000 cfs. Higher flows have the potential to damage recreation facilities along the river, such as canoe/kayak put-ins, picnic areas, campgrounds, restrooms, and parking areas.

Public and private recreation facilities on the river have withstood flows exceeding 4,000 cfs without permanent damage when Millerton Lake has spilled large volumes of water. Park facilities along the San Joaquin River continued to operate during floods in 2005 and 2006 when flows were well over 4,000 cfs. Increased flows would not affect the two auto tour routes within the San Luis NWR. Thus, it is unlikely that the increased flows under the No Action Alternative would lead to the permanent loss or closure of recreation facilities along the San Joaquin River.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives With implementation of the action alternatives, instream flows in the San Joaquin River below Friant Dam to Mendota Pool would be higher in several months of the year when compared to the No Action Alternative or existing conditions. Operation of the new reservoir would result in increased discharges from Friant Dam in certain months that would reach 4,000 cfs. Because recreation facilities on the San Joaquin River have withstood flows exceeding 4,000 cfs without permanent damage, it is unlikely that the higher flows would result in the permanent loss or closure of recreation facilities along the river.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact REC-2: Permanent Loss of a Resource Used for Recreation

Primary Study Area

No Action Alternative Under the No Action Alternative, the Temperance Flat RM 274 Dam would not be built; therefore, there would be no loss of resources used for recreation attributable to inundation of the San Joaquin River following construction of the new dam. Continued implementation of existing land management and plans would not substantially alter existing recreational resources in the primary study area.

There would be **no impact** under the No Action Alternative.

Action Alternatives At top-of-active storage elevation, the action alternatives would inundate the Millerton Lake Caves system. Inundation of these caves would result in the loss of the cave resources for recreation. Therefore, implementing any action alternative would result in a substantial impact on this recreation resource.

An estimated 10 percent of visitors to the SJRG SRMA participate in rock climbing (bouldering), 80 percent of which occurs in the Madera County portion of the primary study area. Most of the rocks used for climbing are located near the edge of the river channel and would be inundated by creation of Temperance Flat RM 274 Reservoir. Inundation of the rocks along the river would likely eliminate most, if not all, of the identified rock climbing opportunities within the SJRG SRMA.

Because few other rock climbing opportunities are available in the vicinity of the SJRG SRMA, the loss of this climbing area would result in a substantial impact on recreation.

This impact would be **significant** under the action alternatives. Mitigation for this impact is proposed in the Mitigation Measures section.

Extended Study Area
No Action Alternative Under the No Action Alternative, instream flows in the San Joaquin River downstream from Friant Dam in spring and early summer would be substantially greater than historical average flows below Friant Dam during those seasons, due to release of full Restoration Flows. Inundation and damage from debris and sediment associated with these increased flows could affect recreation facilities along Reach 1. However, even the highest scheduled flows are considerably less than the flows that have occurred in recent years during periods of high inflow into Millerton Lake. Also, recreational development on the river has generally been designed to withstand periodic flooding and has withstood high flows in recent years without permanent damage.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives With implementation of the action alternatives, instream flows in the San Joaquin River below Friant Dam would be higher in most months of the year when compared to the No Action Alternative or existing conditions. Operation of the new reservoir would result in increased discharges from Friant Dam in certain months that would reach 4,000 cfs. Because recreation facilities on the San Joaquin River have withstood flows exceeding 4,000 cfs without permanent damage, it is unlikely that the higher flows would result in the permanent loss of resources used for recreation activities along the river.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact REC-3: Substantial or Long-Term Reduction or Elimination of Recreation Opportunities or Experiences

Primary Study Area
No Action Alternative Under the No Action Alternative, the Temperance Flat RM 274 Dam would not be built; therefore,

there would be no substantial or long-term reduction or elimination of recreation opportunities or experiences attributable to inundation of the San Joaquin River from the new dam. Continued implementation of existing land management and plans would not substantially alter existing recreational opportunities in the primary study area. Millerton Lake has historically experienced substantial seasonal fluctuation under normal operations, and would continue to do so under the No Action Alternative.

The annual maximum water level of Millerton Lake would typically occur in June with a median end-of-month pool elevation of about 557 feet (about 24 feet below top-of-active storage). The reservoir would continue to be drawn down about 80–100 feet below top-of-active storage, with the minimum annual elevation occurring in August or September. Overall, changes to reservoir operations from changes in demand and other factors would be small, with the reservoir being operated at slightly lower elevations than under existing conditions.

When no action conditions are compared to existing conditions, the change in Millerton Lake water surface elevation under the No Action Alternative would be minimal, typically ranging between 1 and 14 feet lower. The greatest change would occur during April and May; however, in most years, the reservoir water surface would remain within the preferred shoreline use elevations (between 540 and 560 feet msl) and fall below the preferred elevation range only during drier years. The minor change in reservoir surface elevation would have a minor impact on the recreation opportunities or experiences provided at the Millerton Lake SRA or SJRG SRMA.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives

Impacts on Millerton Lake SRA Placement of Temperance Flat RM 274 Dam, including a permanent restricted-boating area near the dam, would decrease the surface acreage and shoreline available for recreation in the Millerton Lake SRA. The dam would obstruct boat access, including during special boating and fishing events that currently use the area upstream from RM 274, by isolating the Temperance Flat and Big Bend areas from Millerton Lake.

Temperance Flat RM 274 Dam could affect about 20 percent of PWC use, 40 percent of general boating, and 50 percent of boat fishing activities at Millerton Lake. Almost all land-based recreation opportunities at Millerton Lake, such as picnicking/swimming and shoreline fishing occur downstream from RM 274. It is estimated that, currently during the recreation season, about 27 percent of boaters use the area upstream from RM 274. In the off-season, currently about 49 percent of boaters at the Millerton Lake SRA use the area upstream from RM 274 (Gresham 2013).

Temperance Flat RM 274 Dam would also reduce the range of recreation opportunities available from existing Millerton Lake access points because of the loss of recreation opportunities available in Rural Natural and Semi Primitive WROS zones. The Big Bend and Temperance Flat areas are the only Millerton Lake SRA areas offering these WROS classifications; the remainder of the lake is classified as Suburban. Temperance Flat RM 274 Dam would displace boaters that use the Temperance Flat and Big Bend areas to other areas of Millerton Lake or to the proposed Temperance Flat RM 274 Reservoir, or boaters would visit a different location. Displacing visitors to other locations would affect the amount of recreation use within the Millerton Lake SRA.

Creation of Temperance Flat RM 274 Reservoir would provide a new flat water surface area for boating opportunities and provide new shoreline area for recreation opportunities within the Millerton Lake SRA, upstream from the permanent restricted area near the dam. However, this area would be disconnected from Millerton Lake and not accessible from existing Millerton Lake access points.

Temperance Flat RM 274 Reservoir would provide a comparable flat water area for PWC, boaters, and boat fishing users who now use this portion of Millerton Lake. These users, however, would need to access the new reservoir from Wellbarn or Smalley roads.

The impact on boating at Millerton Lake would begin when cofferdams are installed and access upstream from RM 274 was halted for construction of the dam. During construction, displaced users would likely visit other areas of Millerton Lake or visit another reservoir. Overall, the loss of water-based recreation opportunities and experiences within a portion of the Millerton Lake SRA would be a significant impact, but the establishment of additional flat water area associated with

Temperance Flat RM 274 Reservoir and re-operation of Millerton Lake would partially offset the loss of flat water area on Millerton Lake.

Use of the tunnel waste disposal site in Sea Scout Cove and development of the powerhouse (and related facilities), transmission line, and access roads would permanently decrease the surface area for on-water recreation, decrease the shoreline available for recreation, and decrease the land area of the Millerton Lake SRA available for recreation. No existing recreation facilities are located in these areas, and no known recreational uses of the land are located in the area to be used for the powerhouse, transmission line, or access roads. Therefore, the recreation opportunities primarily affected by these project facilities would be boating and fishing activities on the lake. It is likely that any on-water or shoreline users displaced from these areas because of construction activities would visit other areas within the main part of Millerton Lake downstream from RM 274. Because similar boating and fishing opportunities are available on the remainder of the main part of Millerton Lake, this impact would be less than significant. Mitigation for this impact is not needed and thus not proposed.

The Millerton Bottoms whitewater run begins near Kerckhoff No. 2 Powerhouse and ends on the south shore of the Temperance Flat area at Millerton Lake SRA. This whitewater run is the only whitewater run within the Millerton Lake SRA. A typical whitewater boating season extends from August to November, when Millerton Lake has been sufficiently drawn down to expose the upstream river channel. The last rapid on the run appears only when the reservoir is drawn down below 480 feet.

With the inundation of the San Joaquin River from development of the Temperance Flat RM 274 Reservoir and the expected operation of Temperance Flat RM 274 Reservoir under any action alternative, it is unlikely that the reservoir would be drawn down sufficiently (below elevation 520) to create opportunities for whitewater boating on the Millerton Bottoms run.

It is estimated that 75 percent of boat-in camping within the Millerton Lake SRA occurs at the Temperance Flat boat-in campground, which would be inundated by the creation of Temperance Flat RM 274 Reservoir. Relocation related to providing boat-in camping opportunities and experiences is described in the discussion of Impact REC-1.

Existing Millerton Lake shoreline recreation facilities and use would be affected by operation of Temperance Flat RM 274 Reservoir if Millerton Lake pool elevations were altered to a degree affecting recreational use and preferences. Changes that would affect recreation opportunities are of two primary types: (1) increasing or decreasing pool elevation during the first half of the peak recreational use season and (2) extending the peak pool elevation period later into summer.

Hydrologic modeling results indicate that Millerton Lake would maintain a pool elevation of 551 feet for the entire 4-month peak recreational use season with implementation of Alternatives Plans 1through 4. An elevation of 551 feet would be within the preferred shoreline use elevations of 560 and 540 feet. During spring and early summer, a water surface elevation of 551 feet would be both slightly higher and slightly lower than the elevations associated with existing conditions and the No Action Alternative. Implementing Alternatives Plans 1 through 4 would create a water surface elevation that would remain within the preferred shoreline use elevations from April to June; therefore, no impact would occur. Mitigation for this impact is not needed and thus not proposed.

Implementing Alternative Plans 1 through 4 would provide a higher, stable pool elevation during July and August, when, under baseline conditions and the No Action Alternative, the pool elevation would typically fall to an annual minimum elevation. The minimum pool elevation associated with implementing Alternative Plans 1 through 4 would be retained at 551 feet, which is within the preferred shoreline use elevation range. This increase in water surface elevation would provide boaters with additional surface acreage, greatly reduce impacts on marina and floating dock operations from decreasing pool elevation, and allow shoreline use within a comfortable distance of amenities located above the high pool elevation.

Maintaining a 551-foot water surface elevation would also help resolve current capacity issues associated with limited parking capacity on holiday weekends. Because vehicles can drive onto and park on the exposed shoreline slopes, more parking is available at this lower pool elevation, reducing the need for facility closures on holiday weekends when formal parking capacity is exceeded.

The much higher pool elevation during the late season caused by implementing Alternative Plans 1through 4 would also

likely decrease the number of exposed islands and similar obstructions, which would improve boat navigation and the quality of boating experiences on the lake.

Improved shoreline use and boating conditions in the late summer related to a consistent pool elevation of 551 feet under Alternative Plans 1through 4 would improve conditions for recreation and therefore likely increase recreation use (day use primarily) during the late summer (July and August) over an estimated 30,000 visitor days per year. The constant pool elevation would also serve to increase boating and day-use recreation on the Memorial Day and July 4 holiday weekends in wetter years when the lake would have otherwise been at top-of-active storage and facilities would have been closed because of limited parking. This impact would be beneficial.

Under Alternative Plan 5, the reservoir pool elevation would be at elevation 551 feet msl for most of the recreation season. Under future water demand conditions, the reservoir would decrease below the preferred shoreline use elevation of 540 feet msl in August, but would remain within the preferred shoreline use elevation in August under existing water demand conditions. Thus, slightly less benefit to recreation at Millerton Lake would be provided by Alternative Plan 5 compared to the other action alternatives.

Construction activities at the batch plant, at the aggregate quarry, at the staging area, and along the haul roads would temporarily decrease the land available for recreation within the Millerton Lake SRA. However, there are no known recreation uses of these lands. Therefore, temporary use of these lands for construction would have a less-than-significant impact on recreation. Mitigation for this impact is not needed and thus not proposed.

Construction of the powerhouse and related facilities would likely result in noise and visual disturbances for boaters in this area. However, these impacts would be temporary, and boaters could participate in similar boating opportunities within the remainder of Millerton Lake. Therefore, construction of the powerhouse and related facilities would have a less-than-significant impact on boating recreation opportunities and experiences. Mitigation for this impact is not needed and thus not proposed.

The South Finegold picnic area is the only day-use area located upstream from the main body of Millerton Lake. This area

provides picnicking and shoreline fishing opportunities and serves as a trailhead for the San Joaquin River Trail. Although the site is anticipated to remain open during construction, construction activities related to building the powerhouse, transmission line, and access roads could temporarily affect recreation opportunities and experiences for visitors to the picnic area because of delays in accessing the site or visual and noise disturbances to the recreation setting. A substantial reduction in the quality of recreation experiences for picnic area users could occur during construction of the road adjacent to the site if construction were to occur on weekends or holidays, when most recreation use likely occurs at the site.

The Millerton Bottoms whitewater run begins at the Kerckhoff No. 2 Powerhouse and ends at the south side of Temperance Flat, where users walk back upstream to the put-in, get vehicle access to Temperance Flat via Wellbarn Road, or continue paddling 9 miles downstream to the South Finegold picnic area. Temporary impacts on this whitewater boating opportunity and experience could occur from construction of the new Wellbarn Road boat ramp and road, and relocating the San Joaquin River Trail. Noise and visual disturbances may affect the recreation setting, and access delays may occur at the put-in and take-out locations. Given the distance of the river from these construction activities, it is unlikely that the quality of whitewater boating experiences would be substantially reduced.

Removal of vegetation within the new reservoir inundation zone would be an activity that could substantially increase traffic, noise emissions, and visual disturbance upstream from the dam construction site. Depending on when the removal of trees and other vegetation occurs, impacts on recreationists may vary. A significant impact would occur if vegetation removal occurs during higher recreational use periods and would apply to both the Millerton Lake SRA and SJRG SRMA. Other potential impacts on recreational users associated with vegetation removal, such as noise and visual effect, cannot be mitigated to a less-than-significant level because this widespread activity would substantially alter the existing ambient noise level and visual character of the watershed. Therefore, the recreation setting would be greatly adversely affected, resulting in a substantial decrease in the quality of recreation experiences.

Construction activities within the Millerton Lake SRA could affect the archery-only spring turkey hunt by displacing

wildlife in and near construction zones and altering the recreation setting because of visual and noise disturbances. Hunting within the Millerton Lake SRA is limited to a single 14-person archery-only spring turkey hunt each year. This event is the only hunting opportunity within the Millerton Lake SRA; therefore, construction activities could substantially affect recreation experiences for hunters in the Millerton Lake SRA. The loss of this hunt may be considered a loss of an important recreational opportunity.

Construction activities, particularly within the dam and staging areas, as well as construction of new access roads and the outlet works, could alter the recreation setting of the San Joaquin River Trail by creating visual and noise disturbances and delays in accessing trailheads. Construction activities could also potentially require closing portions of the trail. Trail closures or disturbance from construction activities would substantially impact recreation experiences and reduce trail opportunities in the area.

Although the action alternatives would reduce recreation opportunities within the Millerton Lake SRA, the action alternatives would also provide new recreation opportunities and increase recreation use in the area. With the construction of the Wellbarn and Smalley Road boat ramps, additional boating opportunities would be available at Temperance Flat RM 274 Reservoir and thus boating-related recreation use would likely increase. It is anticipated that induced water-based recreation use at Temperance Flat RM 274 Reservoir would increase recreation use within the area over 70,000 visitor days for Alternative Plans 1 through 4 and over 35,000 visitor days for Alternative Plan 5 under future water demand conditions; use is projected to be even higher under existing water demand conditions. These estimates are based on estimated boat launches during the May to September recreation season and surface acres available for boating.

Impacts on the McKenzie Preserve Within the McKenzie Preserve, construction of the new transmission line could temporarily affect recreation opportunities and experiences for visitors because of visual and noise disturbances to the recreation setting. In addition, construction activities could temporarily block access to trails, resulting in reduced recreation opportunities within the preserve. Outside of the preserve, there are few other trail opportunities, and none in a similar setting. The temporary reduction in trail opportunities inside the preserve would be substantial.

Impacts on the SJRG SRMA Inundation of the San Joaquin River and creation of Temperance Flat RM 274 Reservoir would permanently alter the recreation setting of the SJRG SRMA, creating a wide reservoir at the downstream end and a narrow reservoir upstream within the Patterson Bend area. The reservoir would be subject to a large draw down, creating a wide fluctuation zone on the shoreline that would be denuded of vegetation. This would make shoreline recreational use during reservoir drawdown more difficult and less desirable, particularly under Alternative Plan 5, which would have the most reservoir fluctuation and draw down of the action alternatives.

With inundation of the river, recreation opportunities and experiences would be reservoir based rather than river based, therefore generally eliminating activities such as river angling, gold panning, river swimming, general river boating, and river-based interpretation and education activities. When the reservoir was drawn down to 720 feet or less, the river would be exposed within the Patterson Bend area, and water-based river uses could be possible in this area.

However, the river within the developed zone in the SJRG SRMA would rarely be exposed under Alternative Plans 1 through 4 (under both future and existing conditions) in most years, therefore effectively eliminating most river-based recreation opportunities within the SJRG SRMA. Under Alternative Plan 5 with existing water demand conditions, the reservoir would be at elevation 720 or less (50 percent exceedence) from July through December (until February under future water demand conditions), exposing the river down to below the developed zone in the SJRG SRMA during some months. Therefore, some river recreation opportunities would continue to be available under this action alternative, although at a great distance from relocated facilities and within a different recreation setting.

Although recreation opportunities in the Millerton Lake SRA and SJRG SRMA would continue to be available, camping, picnicking, hunting, shoreline fishing, trail use, and wildlife viewing/nature observation activities would occur in a different setting; therefore, different recreation experiences would result. In addition, the relocated facilities and recreation opportunities would be available, but generally significantly farther from the shoreline than under existing conditions, given the draw down anticipated for the reservoir. This would affect visitor experiences and willingness to participate in recreation

activities. The overall change of setting may result in visitors choosing to visit another location for recreation activities. Also, the recreation season may change from a spring/fall season to a predominately summer season because this is the typical use season for reservoirs, such as Millerton Lake. Although shoreline angling may still be possible with creation of the new reservoir, the composition of fish species available for harvesting may be altered.

Based on available existing use estimates, eliminating existing river-based recreation opportunities in the SJRG SRMA would displace about 18.5 percent of recreation users within the SJRG SRMA, including gold panning and general river boating users. Eliminating other river activities (e.g., fishing, swimming) and altering recreation experiences would displace additional visitors. Displaced users could either participate in recreation activities at the new reservoir or visit another river area. Given the permanent change to the river-based recreation setting, a long-term reduction and elimination of recreation opportunities and experiences would occur, resulting in a significant impact on recreational resources.

Temperance Flat RM 274 Reservoir would reduce the land base within the SJRG SRMA for hunting and wildlife viewing/nature observation. Hunting within the SJRG SRMA is a relatively popular activity with an estimated 25 percent of SJRG SRMA visitors participating in this activity. The new reservoir would isolate the Madera County side of the reservoir, affecting 35 percent of hunting use (Table 22-12). Therefore, although a long-term reduction in hunting opportunities would occur, it would have a less-than-significant impact on recreation because most hunting use occurs within Fresno County and could continue, although there would be a slightly smaller land base available for hunting. In addition, hunters could take the water taxi to the Madera County side of the reservoir to access hunting opportunities in this portion of the SJRG SRMA.

Similarly, wildlife viewing and nature observation opportunities would be affected by a reduced land base within the SJRG SRMA. An estimated 50 percent of visitors to the SJRG SRMA participate in wildlife viewing/nature observation. The new reservoir would isolate the Madera County side of the reservoir, affecting 25 percent of wildlife viewing/nature observation use (Table 22-12). Although some long-term reduction in wildlife viewing and nature observation opportunities may occur from inundation, it would have a less-

than-significant impact on recreation because most wildlife viewing/nature observation use occurs within Fresno County and could continue. In addition, visitors could take the water taxi to the Madera County side of the reservoir to access wildlife viewing/nature observation opportunities in this portion of the SJRG SRMA. Mitigation for this impact is not needed and thus not proposed.

Although interpretation and education opportunities would still exist and facilities could be relocated, any interpretive and educational programs that feature the river, particularly in a historical context, would not be possible or would need to be altered because the reservoir would not be comparable to historical river conditions. In addition, the reservoir would eliminate about 10 percent of interpretation and education use that occurs on the Madera County side of the river. The potential decrease in interpretation and educational opportunities from inundation of the river would be a less-than-significant impact on recreation because opportunities exist for other interpretation and educational activities and programs in the area, including within the Fresno County portion of the SJRG SRMA. In addition, visitors could take the water taxi to the Madera County side of the reservoir to access interpretation and education opportunities in this portion of the SJRG SRMA. Mitigation for this impact is not needed and thus not proposed.

An estimated 10 percent of camping and shoreline fishing use occurs in the Madera County portion of the SJRG SRMA, including all backpack camping. Opportunities for camping and shoreline fishing would be slightly reduced because of a decreased ability to access the Madera County side of the reservoir and SJRG SRMA. However, visitors could take the water taxi to the Madera County side of the reservoir to access camping and shoreline fishing opportunities in this portion of the SJRG SRMA. In addition, the campgrounds in the Fresno County portion of the SJRG SRMA would continue to be available for camping and shoreline fishing access within the developed zone. Therefore, the slight decrease in camping and shoreline fishing opportunities would have a less-than-significant impact on recreation. Mitigation for this impact is not needed and thus not proposed. Impacts regarding the general loss of river fishing opportunities are discussed above.

Currently, horseback riding is allowed on the Wuh-ki’o and Pa’san Ridge Trails. Because the San Joaquin River Trail bridge would be inundated, equestrian use of these trails would cease as the water taxi would not be able to support transport of

horses to the Madera County side of the reservoir. This elimination of 11.2 miles of available equestrian trails (Pa'san Ridge and Wuh-ki'o Trails and trail to bridge) would reduce the total trail mileage available for horseback riding opportunities by more than 36 percent. The only remaining trails available to equestrians would be the San Joaquin River Trail in the SJRG SRMA and Millerton Lake SRA, and the Blue Oak and North Shore Trails in the Millerton Lake SRA.

Currently, two whitewater boating runs are located in the SJRG SRMA. The Patterson Bend Run is available during peak runoff in wet years (American Whitewater 2013b); however, the river is reported to be navigable over a wide range of flows, although portaging may be required (Rowland 2013). The Squaw Leap Run is available yearly, and a typical season lasts 4 weeks, from late October to mid-November, when Kerckhoff No. 2 Powerhouse is not operational, and instream releases from Kerckhoff Lake into the Patterson Bend run are low (American Whitewater 2013c). An estimated 3 percent of SJRG SRMA visitors participate in whitewater boating.

Under Alternative Plans 1 through 3, on average, most of the San Joaquin River containing the 6-mile-long Patterson Bend whitewater run would be exposed between August and December. During these 5 months, the reservoir water surface would be below elevation 760, which would expose all but the last 2 miles of the river channel to the developed zone. On average, Alternative Plan 4 would not fall below elevation 760. Under Alternative Plan 5 with future water demand conditions, the reservoir water surface would be below elevation 760 all year on average, exposing almost the entire Patterson Bend run; with existing water demand conditions, the run would be exposed for 7 months of the year (July to January).

San Joaquin River inflow modeling information from Kerckhoff Lake was reviewed to determine whether river flows would be within the 700- to 6,000-cfs boatable flow range for this run. Model results showed that under a wide variety of hydrologic conditions, end-of-month inflows would be within the run's boatable range for the entire year under all five action alternatives. Therefore, when the reservoir was drawn down and the San Joaquin River channel was exposed, conditions would still allow for whitewater boating on the Patterson Bend run.

Although whitewater boating opportunities would still be possible on the Patterson Bend run, the setting would be

different because the vegetation and rock along the run length would be altered. In addition, remnant trees and other debris could create potential boating hazards along the run. Also, the Squaw Leap run would be exposed infrequently, displacing whitewater boaters to other rivers in the region.

Relocation of utilities, the transmission line, the San Joaquin River Trail, and recreation facilities, as well as vegetation removal and construction of the new boat ramp at Smalley Road, could temporarily affect both land- and water-based recreation opportunities and experiences associated with delays in access to recreation facilities and sites or visual or noise disturbances to the recreation setting. All recreation facilities and sites would be expected to remain open for use during construction, although it is assumed that a temporary transition period would occur where visitors would use the replacement facilities and sites while old facilities were being removed.

A substantial reduction in the quality of recreation experiences could occur if construction activities, including vegetation removal, were to occur at night while people were camping, during group/school interpretation and education programs, or on weekends or holidays when most recreation use occurs. This impact would be temporary.

Overall, the action alternatives would result in loss of water-based opportunities within the Millerton Lake SRA, loss of whitewater boating opportunities, degradation of recreation experience quality due to vegetation removal activities, and loss of river-based recreation opportunities and experiences.

This impact would be **significant** under the action alternatives. Mitigation for this impact is proposed in the Mitigation Measures section.

Extended Study Area

No Action Alternative Under the No Action Alternative, instream flows in the San Joaquin River below Friant Dam in December, January, and April would be higher than under existing conditions. Flows would not exceed instream flows for the SJRRP, which could reach 4,000 cfs. Higher flows of more than 1,500 cfs would likely occur only during April and may make it temporarily unsafe to fish on the riverbank or by boat, make conditions undesirable for swimming, and make the river unusable for boating. However, trout fishing and similar boating opportunities would be available on the Kings River, and boaters and anglers would be informed of these

opportunities as well as the changes to river flows from the SJRRP via the Recreation Outreach Program developed for the SJRRP. In addition, swimming is likely not popular in the river in April because of lower air temperatures. It is not expected that increased flows would affect auto touring, hiking, or hunting in the San Luis NWR. Therefore, there would be no substantial or long-term reduction or elimination of recreation opportunities or experiences.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Swimming in the San Joaquin River is a popular activity in summer, when the water and air temperatures are suitably warm. Implementing Alternative Plans 1, 2, or 3 would result in releases from Millerton Lake that would be warmer than releases under the No Action Alternative from December through April, June, July, or September, depending on the water-year type. Releases under Alternative Plans 1, 2, or 3 would be colder than releases under the No Action Alternative in late summer through early winter. Overall, no dramatic difference would occur in river water temperature in summer, when most swimming occurs. This impact would be less than significant. Therefore, mitigation for this impact is not needed and thus not proposed.

Releases from Millerton Lake under Alternative Plan 4 would be colder in late fall and early winter than under the No Action Alternative and Alternative Plans 1, 2, 3 or 5, and warmer than releases under the No Action Alternative and Alternative Plans 1, 2, or 3 in summer. Releases under Alternative Plan 4 would be particularly warmer in summer in wet and normal-wet water-year types, when a faster occurring increase in river water temperature would occur than under Alternative Plans 1, 2, 3 or 5. Overall, there would be no dramatic difference in river water temperature during summer in dry and normal-dry water-year types, resulting in a less-than-significant impact on recreation. In addition, implementing Alternative Plan 4 would provide beneficial impacts on swimming with warmer summer water temperatures in wet and normal-wet water-year types. Therefore, mitigation for this impact is not needed and thus not proposed.

Implementing Alternative Plan 5 would result in warmer releases from Millerton Lake than under the No Action Alternative from January through April, October, or December, depending on the water year type. Releases would be similar to

or slightly colder than the No Action Alternative in fall and early winter. In dry water year types, releases under Alternative Plan 5 would be warmer all year compared to the No Action Alternative. In the summer of normal-dry and dry water year types, releases under Alternative Plan 5 would be the warmest of all action alternatives. However, overall, no dramatic difference would occur in river water temperature in summer, when most swimming occurs.

Under any action alternative, instream flows would be greater in the San Joaquin River below Friant Dam (50 percent exceedence) in most months of the year compared to existing conditions and the No Action Alternative. Although flows could be higher than existing conditions for several months of the year, flows would generally not exceed instream flows for the SJRRP, which may reach up to 4,000 cfs. High flows of more than 1,500 cfs would likely occur only during April and may temporarily affect boating, fishing, and swimming opportunities as described in No Action Alternative section. However, trout fishing and similar boating opportunities would be available on the Kings River, and swimming use is likely low in April because of lower air temperatures. Therefore, there would be no substantial or long-term reduction or elimination of recreation opportunities or experiences.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact REC-4: Loss of Access to a Locally Important Recreation Site or Area

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be built; therefore, there would be no inundation of the San Joaquin River from the new dam. For this reason, access to existing recreation sites and areas would not be altered.

There would be **no impact** under the No Action Alternative.

Action Alternatives

Impacts on Millerton Lake SRA Within the Millerton Lake SRA, construction of the Temperance Flat RM 274 Dam would permanently block existing on-water access to the Temperance Flat and Big Bend areas of Millerton Lake from on-water users of Millerton Lake (from existing access points

on the lake). The Temperance Flat and Big Bend areas are locally important recreation areas and as stated previously, there are no other similar boating areas (with similar WROS classification) at Millerton Lake SRA. These two areas receive between 27 and 49 percent of on-water boating use at Millerton Lake, respectively (Gresham 2013).

Recreational visitors would be able to access the relocated recreation facilities and sites via Wellbarn Road and Smalley Road. This access would provide boaters ability to use the new Temperance Flat RM 274 Reservoir for flat water recreational purposes. Although existing gravel roads that link to Wellbarn Road would be inundated, direct shoreline access at top-of-active storage would continue to be provided at Wellbarn Road, which is currently gated to public access.

Millerton Lake SRA administrative access would also continue to be available via Wellbarn Road. Informal shoreline access below top-of-active storage, which is provided by gravel roads, would be available via the new boat ramp at Wellbarn Road. Therefore, the loss of access from portions of Smalley Road, Wellbarn Road, and informal gravel roads would be a less-than-significant impact. Mitigation for this impact is not needed and thus not proposed.

After construction of the Temperance Flat RM 274 Dam is initiated, boat access to the Temperance Flat boat-in campground and Hewitt Valley Environmental Camp from Millerton Lake would be obstructed; there are no boat ramps upstream from RM 274 from which to access the camping areas. The Temperance Flat boat-in campground is a locally important recreation site because it is the only boat-in campground on Millerton Lake. Therefore, construction activities would result in a temporary significant impact on recreation because access to the Temperance Flat boat-in campground would be eliminated. After the river is inundated, access to (and use of) the relocated campground would be possible.

Construction activities in the Wellbarn Road area could require the closure of public nonmotorized access on Wellbarn Road and the gravel roads linked to the road. The Wellbarn Road area is a locally important recreation area because it is the only area for recreation opportunities such as shoreline fishing and nature observation located between the South Finegold picnic area and the fishing access at Kerckhoff No. 2 Powerhouse.

This area also provides access to the San Joaquin River Trail. This impact would be temporary.

Impacts on the SJRG SRMA Inundation of the San Joaquin River Trail bridge would result in the loss of access to recreation lands on the Madera County side of the SJRG SRMA. Loss of access to these recreation lands would be a significant impact. The proposed water taxi would provide access to the Madera County-side of the SJRG SRMA to partially offset the loss of the bridge; however, visitors would lose some flexibility in when they can access the Madera County side of the reservoir as the water taxi would not be available at all times of the day.

As described above, access to lands in the SJRG SRMA in Madera County would be maintained by operation of a water taxi across the reservoir, retaining opportunities for hunting, wildlife viewing/nature observation, interpretation and education, shoreline fishing, and camping. However, the lands in Madera County are not locally important recreation areas or sites for these activities. There would be a less-than-significant impact related to access to lands in the SJRG SRMA in Madera County for these activities. Therefore, mitigation for this impact is not needed and thus not proposed.

In terms of trail access, the relocated San Joaquin River Trail would continue to provide nonmotorized access between the Millerton Lake SRA and the SJRG SRMA. There is also an informal trail between the Wuh-ki'o Trail and the Temperance Flat area in the Millerton Lake SRA. Because the trail is not a formal trail, inundated portions would not be relocated. Therefore, informal access between the Millerton Lake SRA and the SJRG SRMA on the Madera County side of the reservoir would be obstructed. The Temperance Flat Reservoir Area would be inundated, and formal trail access between the SJRG SRMA and the Millerton Lake SRA would be provided on the relocated San Joaquin River Trail. The loss of this informal trail access would be a less-than-significant impact on recreation. Mitigation for this impact is not needed and thus not proposed.

It is anticipated that modifications to Kerckhoff Dam would affect the area around the dam. Within the lake, some boating may occur near the dam, but use is likely very low, and most of the lake would not be affected by construction activities. The main recreational use of the dam area (downstream side) is as a put-in for the Patterson Bend whitewater run. Closure of access

to the put-in for construction activities would temporarily eliminate access to and use of the run. This impact would be temporary.

Within the SJRG SRMA, construction activities would involve relocating the existing transmission line, recreation facilities, and the San Joaquin River Trail, as well as vegetation removal and construction of the new boat ramp at Smalley Road. Temporary closure of access to any recreation site or facility within the SJRG SRMA would result in a substantial impact on recreation because all recreation facilities and sites within the SJRG SRMA are locally important recreation sites. Recreation facilities within the river corridor are limited.

This impact would be **significant** under the action alternatives. Mitigation for this impact is proposed in the Mitigation Measures section.

Extended Study Area

No Action Alternative Under the No Action Alternative, instream flows in the San Joaquin River below Friant Dam in December, January, and April would be higher than existing conditions. Flows would generally not exceed instream flows that would occur with the SJRRP.

High flows have the potential to damage recreation facilities along the river, such as canoe/kayak put-ins, picnic areas, campgrounds, restrooms, and parking areas. Public and private recreation facilities on the river have withstood flows exceeding 4,000 cfs without permanent damage when Millerton Lake has spilled large volumes of water following very high inflows. Park facilities along the San Joaquin River continued to operate during floods in 2005 and 2006 when flows were substantially more than 4,000 cfs.

Although some facilities could be temporarily closed or have reduced access to the river during or after higher flows (for cleanup), this impact would be temporary. In addition, other similar recreation opportunities and experiences would be available on the Kings River, so access to locally important recreation sites with similar opportunities would be available nearby.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Implementing any action alternative would result in higher flows throughout most of the year on the San Joaquin River below Friant Dam compared to existing conditions and the No Action Alternative. Although instream flows could be higher than existing conditions for several months of the year, flows would generally not exceed instream flows established by the SJRRP. Flows of more than 1,500 cfs would likely occur only during April. Although some facilities could be temporarily closed or have reduced access to the river during higher flow events, this would be a temporary condition. In addition, other similar recreation opportunities and experiences would remain available on the Kings River, so access to locally important recreation sites with similar opportunities would be available nearby.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact REC-5: Increased Use of Existing Neighborhood and Regional Parks or Other Recreation Facilities such that Substantial Physical Deterioration of the Facilities Would Occur or Be Accelerated

Primary Study Area

No Action Alternative Under the No Action Alternative, the Temperance Flat RM 274 Dam would not be built; therefore, recreation facilities would not be inundated, and users would not be displaced to other facilities. Continued implementation of existing land management and plans would not substantially alter existing recreational facilities in the primary study area.

There would be **no impact** under the No Action Alternative.

Action Alternatives Creation of Temperance Flat RM 274 Reservoir would temporarily and/or permanently displace water-based users from upper Millerton Lake; river-based users, such as whitewater boaters, river anglers, or gold prospectors, from the SJRG SRMA; and other recreationists who prefer a natural river recreation setting. These users may be displaced to recreation facilities at Millerton or Kerckhoff Lake or to other nearby facilities, such as parks along the San Joaquin River downstream from Friant Dam or rivers and lakes within Sierra National Forest.

Multiple facilities for displaced visitors are available nearby, and no single nearby facility would completely replace the recreation opportunities and experiences provided at the

facilities within primary study area. It is expected that displaced recreational users would visit a variety of locations, slightly increasing the use of any particular facility. Such an increase would not cause or accelerate substantial physical deterioration of these other facilities.

This impact would be **less than significant** under the action alternatives. Therefore, mitigation for this impact is not needed and thus not proposed.

Extended Study Area

No Action Alternative Under the No Action Alternative, instream flows in the San Joaquin River below Friant Dam in December, January, and April would be higher than existing conditions. Flows would not exceed instream flows established by the SJRRP, which could reach 4,000 cfs. Flows of more than 1,500 cfs would likely occur only during April and may make it temporarily unsafe to fish on the riverbank or by boat, make conditions undesirable for swimming, and make the river unusable for boating. However, trout fishing and similar boating opportunities would be available on the Kings River, and boaters and anglers would be informed of these opportunities, as well as the changes to river flows from the SJRRP via the Recreation Outreach Program developed for the SJRRP (2012).

In addition, swimming is likely not popular in the river in April because of lower air temperatures. Also, it appears that ample capacity exists at Kings River facilities to absorb what is most likely a low number of spring-time anglers and boaters who could be displaced from the San Joaquin River. Therefore, it is unlikely that any regional park facilities would receive an increase in use such that substantial physical deterioration of facilities would occur.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Under any action alternative, instream flows in the San Joaquin River below Friant Dam would be higher in most months of the year compared to existing conditions and the No Action Alternative. Although flows could be higher than existing conditions for several months of the year, flows would not exceed instream flows for the SJRRP, which could reach 4,000 cfs. Flows of more than 1,500 cfs would likely occur only during April and could temporarily affect boating, fishing, and swimming opportunities as

described for the No Action Alternative. However, trout fishing and similar boating opportunities would be available from facilities on the Kings River, and swimming use is likely low in April because of lower air temperatures.

Changes in flows or water temperatures related to implementing any action alternative would not be expected to induce a substantial increase in recreation use, and ample capacity exists at Kings River facilities to absorb what is most likely a low number of spring-time anglers and boaters who could be displaced from the San Joaquin River during high flows. Therefore, it is unlikely that any regional park facilities would receive an increase in use such that substantial physical deterioration of facilities would occur.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact REC-6: Impacts Associated with New or Expanded Recreation Facilities

Primary Study Area
No Action Alternative The No Action Alternative does not include the construction or expansion of recreation facilities. Continued implementation of existing land management and plans would not substantially alter existing recreational facilities in the primary study area.

There would be **no impact** under the No Action Alternative.

Action Alternatives The action alternatives include the construction of recreation facilities to replace facilities that would be inundated by the creation of Temperance Flat RM 274 Reservoir. Construction of these facilities could have an adverse physical impact on the environment, resulting in the loss of vegetation and associated habitat, but would be mitigated to a less than significant impact with implementation of typical facility siting and avoidance measures, where needed.

Relocated recreation facilities would provide the same facility capacity as existing facilities and would assist in providing recreation opportunities and experiences similar to those provided by existing facilities, although the setting would change with the creation of Temperance Flat RM 274 Reservoir. Temporary impacts on recreation from construction

of replacement recreation facilities are addressed in the discussion of Impacts REC-3 and REC-4.

In addition to relocating inundated recreation facilities, two new boat ramps would be constructed at Temperance Flat RM 274 Reservoir, increasing the recreation facilities provided in the area. These boat ramps would allow boating-related activities to occur on the reservoir and would increase recreation use.

This impact would be **beneficial** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Extended Study Area
No Action Alternative The No Action Alternative does not include the construction or expansion of recreation facilities.

There would be **no impact** on under the No Action Alternative.

Action Alternatives The action alternatives do not include the construction of recreation facilities within the extended study area.

There would be **no impact** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Mitigation Measures

This section discusses mitigation measures for each significant impact described in the Direct and Indirect Impacts section, as presented in Table 22-13.

No mitigation is required for Impacts REC-5 and REC-6 within the primary study area or for Impacts REC-1 through REC-6 within the extended study area because there would be no impact or the impacts would be less than significant for all action alternatives.

Impact REC-1 within the primary study area would be significant. Implementing Mitigation Measures REC-1a and REC-1b would reduce this impact to a less-than-significant level. Therefore, Impact REC-1 (within the primary study area) would be **less than significant** under the action alternatives.

Impact REC-2 within the primary study area would be significant. Implementing Mitigation Measure REC-2 would reduce this impact, but not to a less-than-significant level because it would not avoid the loss of the Millerton Lake Cave system or rock climbing opportunities. Therefore, REC-2

(within the primary study area) would be **significant and unavoidable** under the action alternatives.

Impact REC-3 within the primary study area would be significant. Implementing Mitigation Measures REC-3a, REC-3b, and REC-3c would reduce this impact, but not to a less-than-significant level because it would not avoid the permanent loss of water-based opportunities within the Millerton Lake SRA, loss of whitewater boating opportunities, degradation of recreation experience quality due to vegetation removal activities, and loss of river-based recreation opportunities and experiences. Therefore, Impact REC-3 (within the primary study area) would be **significant and unavoidable** under the action alternatives.

Impact REC-4 within the primary study area would be significant. Implementing Mitigation Measure REC-4 would reduce this impact but not to a less-than-significant level because it would not avoid the temporary loss of access to the Temperance Flat boat-in campground or Millerton Lake SRA Temperance Flat and Big Bend areas during construction. Therefore, Impact REC-4 (within the primary study area) would be **significant and unavoidable** under the action alternatives.

Mitigation Measure REC-1a: Allow On-Boat Camping

Reclamation will allow recreational on-boat camping on Temperance Flat RM 274 Reservoir during periods of lowered reservoir water elevation and provide a floating restroom for on-boat campers.

Mitigation Measure REC-1b: Create New Shoreline Access Site

Reclamation will create a new shoreline access site in the developed zone.

Implementing Mitigation Measures REC-1a and REC-1b would reduce the significant impact related to the permanent loss or closure of a facility used for recreation to a less-than-significant level. This impact would be **less than significant** under the action alternatives.

Mitigation Measure REC-2: Preserve Fine Gold Creek Watershed Cave System

Comments received after scoping for the Investigation suggested that a cave system, with similar attributes to the Millerton Lake Cave system, may occur within the Fine Gold

Creek watershed in Madera County (Western Cave Conservancy 2004). Although the nature and extent of the cave system is unknown, such a cave system may be the closest similar cave system to the Millerton Lake Caves. Reclamation will study, explore, and, if appropriate, preserve the Fine Gold Creek watershed cave system.

Implementing Mitigation Measure REC-2 may reduce Impact REC-2, but not to a less-than-significant level. This impact would remain **significant and unavoidable** under the action alternatives.

Mitigation Measure REC-3a: Limit Construction Activities near Recreation Areas

Reclamation will implement the following actions to reduce conflicts with recreation opportunities and experiences in the primary study area:

- A Traffic Management Plan, as identified in Chapter 24, "Transportation, Circulation, and Infrastructure," shall be prepared and implemented to minimize conflicts and hazards that may occur in the vicinity of the area of project features, including portions of the proposed Temperance Flat RM 274 Reservoir area used by recreationists.

- Construction zones and activities shall be located to avoid conflicts along the San Joaquin River Trail east of Wellbarn Road. If existing access cannot be safely maintained, Reclamation will reroute the trail to ensure continued trail-related recreation opportunities east of Wellbarn Road.

- No construction on or near the San Joaquin River Trail east of Wellbarn Road shall occur on weekends, holidays, or during the annual mountain bike race.

- A public information program shall be implemented and a Web site shall be created to provide information (including signage and maps, as appropriate) regarding construction schedule and locations, any facility or access changes and rerouting, and updates on construction schedules and facility relocations. Appropriate signage notifying the public of any trail reroutes shall be posted as needed, and maps and information regarding rerouting shall be provided.

- No construction shall be allowed on weekends or holidays within the McKenzie Preserve. Construction zones and activities shall be located so that the existing trail access and use are not impeded within the McKenzie Preserve. If access cannot be safely maintained, trails shall be rerouted to ensure continued trail-related recreation opportunities.

- No construction shall be allowed in the SJRG SRMA after dusk on weeknights, and no construction shall be allowed on weekends, holidays, or during special events within the SJRG SRMA.

Mitigation Measure REC-3b: Instream Whitewater Boating Improvements

Reclamation will investigate, and if feasible implement, instream modifications to a nearby river to provide Class II-III+ and Class IV+ whitewater boating opportunities similar to those provided on the Millerton Lake Bottom and Squaw Leap runs, respectively. Reclamation will conduct an investigation of rivers within a 2-hour driving distance of the project area to identify any potential stretches where whitewater boating opportunities could be provided at the Class II-III+ or IV+ level similar to the opportunities provided on the Millerton Lake Bottom and Squaw Leap runs. Instream modifications will be limited to Class II-III+ and Class IV+ rapids and limited to areas where public access is already provided or could easily be obtained and public use of the river for whitewater boating would be allowed. If a stretch of river is identified that meets these criteria, Reclamation will implement the necessary instream modifications and if necessary, obtain public access to the river for whitewater boating.

Mitigation Measure REC-3c: Extend the San Joaquin River Trail through the SJRG SRMA

Reclamation will assist BLM with completing the San Joaquin River Trail through the SJRG SRMA to the Sierra National Forest border to provide additional trail mileage for equestrian use.

Implementing Mitigation Measures REC-3a, b, and c would reduce the significant impact related to substantial or long-term reduction or elimination of recreation opportunities or experiences, but not to a less-than-significant level. This impact would remain **significant and unavoidable** under the action alternatives.

Mitigation Measure REC-4: Maintain Public Access

Reclamation will develop and implement a plan to locate construction zones and activities to avoid impeding nonmotorized public access to the San Joaquin River from Wellbarn Road, public access to the San Joaquin River immediately downstream from Kerckhoff Dam, and access to recreation sites and facilities within the SJRG SRMA. If public safety concerns prohibit safe access, public access to the river and/or recreation facilities will be rerouted to ensure continued recreation access.

Implementing Mitigation Measure REC-4 would reduce the significant impact related to loss of access to a locally important recreation site or area but not to a less-than-significant level. This impact would remain **significant and unavoidable** under the action alternatives.

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Chapter 23
Socioeconomics, Population, and Housing

This chapter describes the affected environment for socioeconomics, population, and housing, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. The discussion of socioeconomics, population, and housing focuses on the primary study area (area of project features, Temperance Flat Reservoir Area, and Millerton Lake below RM 274). It also discusses the extended study area (San Joaquin River from Friant Dam to the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas).

The term "socioeconomics" describes basic attributes and resources associated with the human environment, with particular emphasis on population, employment, and housing. Substantial changes in these fundamental socioeconomic indicators may influence related variables, such as provision of community services and utilities and the cost of available housing. Chapter 10, "Environmental Justice," describes race, ethnic origin, and economic status in the primary and extended study areas and analyzes the potential of the action alternatives to result in disproportionately high and adverse impacts on minority and low-income populations.

Affected Environment

This section includes discussion of historic population and housing data, employment and labor force trends, prominent business and industry types, and government and finance. The description of socioeconomic conditions is both qualitative and, where possible, quantitative.

Primary Study Area

The primary study area can be described in terms of Census Tract 64.05 in Fresno County and Census Tract 1.02 in Madera County, which together include the area of project features, the Temperance Flat Reservoir Area, and Millerton Lake below RM 274 (see Figure 10-1 in Chapter 10, "Environmental

Justice"). Census Tract 64.05 and Census Tract 1.02 encompass the area in which most of the impacts of the alternatives would occur.

Because of the often wide-ranging, interdependent nature of socioeconomic resources, economic impacts of the alternatives would be dispersed over a geographical area larger than that encompassed by Census Tract 64.05 and Census Tract 1.02. The following discussion includes a description of population, housing, and socioeconomic conditions for the nearby Cities of Clovis and Fresno within Fresno County and the City of Madera in Madera County because these areas would likely contribute goods and services and housing to the construction activities. Comparable data for the State are also presented below.

Population

Population and Growth Trends Table 23-1 presents historical, current, and projected population trends for Fresno and Madera counties; the nearby Cities of Clovis, Fresno, and Madera; and the State of California as a whole. This information was obtained from the DOF because it provided the most comprehensive dataset for these geographic areas. Current population data for Census Tract 64.05 and Census Tract 1.02 were obtained from the 2010 decennial census because the decennial census is the most recently completed dataset that can be used to show population at the Census Tract level.

As of 2010, the population in Fresno and Madera counties was approximately 1.1 million people. From 2000 to 2010, the Fresno County population increased by 21.4 percent. During this 10-year period, the population of Madera County grew at a greater rate than that of Fresno County, with a growth rate of 22.5 percent. The growth rate between 2000 and 2010 was less in Fresno and Madera counties and in the Cities of Fresno and Madera than the growth rate between 1990 and 2000.

From 2000 to 2010, the population of the Cities of Clovis and Madera increased at a greater rate than the populations of Fresno and Madera counties as a whole. The City of Clovis increased in population by 40.2 percent, and the City of Madera increased in population by 41.6 percent during this 10-year period. Because of Madera's small population, the percent increase was greatest, whereas the actual numeric increase (at 18,046 for the 10-year period) was less than for other cities (e.g., Clovis, Fresno, and Madera).

Table 23-1. Historical, Current, and Projected Population for the Primary Study Area, Fresno County, Madera County, and Nearby Cities, 1990–2050

Geographic Area	Historic/Current Trends					Projected Conditions			
	1990	2000	2010	Percent Change, 1990–2000	Percent Change, 2000–2010	2020	2030	2050	Percent Change, 2010–2050
Fresno County	667,490	799,407	930,450	19.8	21.4	1,083,899	1,232,151	1,535,761	65.1
City of Clovis	50,323	68,197	95,631	35.5	40.2	—	—	—	NA
City of Fresno	354,091	427,224	494,655	20.7	15.8	—	—	—	NA
Madera County	88,090	123,109	150,865	39.8	22.5	183,176	219,908	314,546	108.5
City of Madera	29,283	43,370	61,416	48.1	41.6	—	—	—	NA
State of California	29,758,213	33,871,648	37,253,956	13.8	10.0	40,817,839	44,574,756	51,013,984	36.9

Sources: DOF 2012a; U.S. Census Bureau 2010

Key:
— = data unavailable
NA = not applicable

Population growth projections through 2050 indicate that Madera County is projected to grow at a rate more than double the State's rate of growth (36.9 percent) with a projected increase of 108.5 percent from 2010 to 2050. Fresno County is projected to experience a growth rate (65.1 percent) close to double the State's projected growth rate by 2050.

In 2010, the population of Census Tract 64.05 was 4,795 persons and the population of Census Tract 1.02 was 4,163 persons for a total population of 8,958 persons in the primary study area (U.S. Census Bureau 2010). Therefore, approximately 1 percent of the population in Fresno and Madera counties resided in and near the primary study area.

The community of Auberry is located approximately 10 miles northeast of Millerton Lake in Census Tract 64.05. Almost 50 percent of those persons residing in Census Tract 64.05 live in Auberry (2,369 persons) (U.S. Census Bureau 2010). Future population growth in Census Tract 64.05 would occur from planned and approved development along Millerton Road from the intersection of Millerton Road and Sky Harbour Road in the north to the intersection of Millerton Road and Auberry Road in the south. At buildout, these future developments would generate approximately 8,000–10,000 people in Census Tract 64.05 (see Chapter 17, "Land Use Planning and Agricultural Resources," for further discussion).

Age Distribution Table 23-2 summarizes 2010 age characteristics for the primary study area, Fresno and Madera counties, and the State. School-age children (aged 5–19), adults (19–64), and senior citizens (65 and older) represent approximately 23.1, 56.6, and 10.2 percent, respectively, of the total population in Fresno and Madera counties. This age composition is generally similar to that of the State, with most of the total population of working age.

School-age children (aged 5–19), adults (19–64), and senior citizens (65 and older) represent approximately 17.3, 56.4, and 21.2 percent, respectively, of the total population in the primary study area. Similar to Fresno and Madera counties and the State, most of the population is of working age; however, there is approximately double the percentage of senior citizen population in the primary study area than in both counties and the State. The median age in the primary study area was 49.7, which is greater than that in Fresno and Madera counties and the State.

Table 23-2. Age Distribution for the Primary Study Area, Fresno County, Madera County, and California, 2010

Population Segment	Primary Study Area[1]	Fresno County	Madera County	California
Total population	8,958	930,450	150,865	37,253,956
< 5 years	453	78,980	11,983	2,531,333
5–19 years	1,556	231,755	35,735	7,920,709
20–64 years	5,056	526,294	85,903	22,555,400
65+ years	1,899	93,421	17,244	4,264,514
Median age	49.7	30.6	33.0	35.2

Source: U.S. Census Bureau 2010

Note:
[1] The primary study area consists of Census Tract 64.05 in Fresno County and Census Tract 1.02 in Madera County.

Housing

Table 23-3 presents housing trends as well as the percentage of single-family dwellings, vacancy rates, and average household size for Fresno and Madera counties; nearby Cities of Clovis, Fresno, and Madera; and the State of California as a whole. In 2010, Fresno County and Madera County contained approximately 365,000 housing units. From 2000 through 2010, Fresno and Madera counties experienced a 16.6-percent and 21.7-percent, respectively, increase in the total number of housing units. The Cities of Clovis and Madera had the greatest percent increase in housing units (39.7 percent and 36.2 percent, respectively) during this 10-year period. Similar to the population trends shown in Table 23-1, the percent increase of housing units in the City of Madera was greatest, whereas the actual numeric increase (at 4,529 for the 10-year period) was less than for other cities in the area (e.g., Clovis and Fresno).

Overall, single-family dwelling units in all the jurisdictions listed in Table 23-3 are the predominant housing type and composed more than 64 percent of the total housing units. Vacancy rates were generally higher than the State average (5.9 percent), with the exception of the Cities of Clovis (3.6 percent) and Madera (4.3 percent). Madera County registered the highest vacancy rate, with 10.1 percent of all housing units vacant. As shown on Table 23-3, the majority of housing units were single-family attached and detached homes. Approximately 70 percent and 81 percent of housing units in Fresno and Madera counties, respectively, were single-family housing units.

Table 23-3. Housing Trends and Characteristics of the Primary Study Area, Fresno County, Madera County, Nearby Cities, and California, 2000–2010

Geographic Area	Trends			Characteristics (2010)		
	2000	2010	Percent Change	Single Family[1] (%)	Vacancy (%)	Average Number of Persons per Household
Fresno County	270,767	315,531	16.6	70.2	6.4	3.17
City of Clovis	25,265	35,306	39.7	73.6	3.6	2.86
City of Fresno	149,025	171,288	14.9	64.1	6.0	3.07
Madera County	40,387	49,140	21.7	81.4	10.1	3.23
City of Madera	12,520	17,049	36.2	74.8	4.3	3.63
State of California	12,214,550	13,670,304	11.9	64.4	5.9	2.96

Sources: U.S. Census Bureau 2010; DOF 2012b

Note:

[1] Includes single-family attached and single-family detached homes.

In addition, approximately 25 percent of housing units were multi-family homes and approximately 5 percent were mobile homes. In Madera County, approximately 12 percent of housing units were multi-family homes and approximately 7 percent were mobile homes (DOF 2012b).

The average household size ranged from as low as 2.86 persons per household (Clovis) to as high as 3.63 persons per household (Madera). The average number of persons per household in Fresno County and Madera County (3.17 and 3.23, respectively) was greater than the average number of persons per household at the State level (2.96 persons).

In 2010, Census Tract 64.05 and Census Tract 1.02 contained approximately 5,116 housing units (Table 23-4). This total represents less than 1 percent of the housing units in Fresno and Madera counties. Vacancy rates were generally higher than in Fresno and Madera counties and the State average. The vacancy rate for Census Tract 1.02 was approximately 43.6 percent. This high vacancy rate can be largely attributed to vacant seasonal, recreational, or occasional use rental units (U.S. Census Bureau 2010). The average number of persons per household in Census Tract 64.05 and Census Tract 1.02 (2.63 and 2.34, respectively) was less than the average number of persons per household in Fresno and Madera counties and in the State (2.96 persons).

Table 23-4. 2010 Housing Characteristics of Census Tract 64.05 and Census Tract 1.02

Location	Housing Units	Vacancy (%)	Average Number of Persons per Household
Census Tract 64.05 (Fresno County)	1,967	10.0	2.63
Census Tract 1.02 (Madera County)	3,149	43.6	2.34
Total	**5,116**	**—**	**—**

Source: U.S. Census Bureau 2010

Income Trends

Table 23-5 presents the median household income, per capita income, and proportion of individuals living below the poverty threshold for Census Tract 64.05 and Census Tract 1.02, Fresno and Madera counties, and the State as a whole. Chapter

10, "Environmental Justice," provides greater detail regarding the median income and distribution of low-income populations.

Table 23-5. Median Household Income and Poverty Levels in the Primary Study Area, Fresno County, Madera County, and California, 2011

Geographic Area	Median Household Income	Per Capita Income	Percent of Population Below Poverty Level
Census Tract 64.05 (Fresno County)	$73,750	$34,854	3.9
Census Tract 1.02 (Madera County)	$51,339	$27,547	12.9
Fresno County	$49,903	$20,638	23.4
Madera County	$47,724	$18,817	19.8
California	$60,632	$29,674	14.4

Source: U.S. Census Bureau 2011

Note:
Values are presented in 2011 dollars.

Census Tract 64.05 had a median household income of $73,750, which was substantially greater than the statewide median household income of $60,632, and the per capita income of Census Tract 64.05 ($34,854) was greater than the statewide per capita income of $29,674. Census Tract 1.02 had a median household income of $51,339 and per capita income of $27,547, which were less than the State's averages but greater than the median household income and per capita income of Fresno County and Madera County. The percent of the population below the poverty threshold in Census Tract 64.05 and Census Tract 1.02 was 3.9 percent and 12.9 percent, respectively, and was lower than that for both counties and lower than the per capita income for the State as a whole (14.4 percent).

Table 23-6 shows the historical, current, and projected personal income for Fresno and Madera counties, which provides a measure of consumer consumption. Total personal income consists of total earnings, adjusted for place of residence, plus dividends, interest and rent, and transfer payments received by the residents. The total personal income for Fresno County ($28.5 billion) was approximately seven times more than the total personal income for Madera County ($4.1 billion). Between 2010 and 2030, the total personal income in Fresno and Madera counties is anticipated to increase to $83.4 billion (2010 dollars), which would represent a 155-percent increase

in personal income over the 20-year period. Consumer consumption, which includes spending on durable, non-durable, and services, such as housing, food, gas, insurance, and health care, would also increase over the 20-year period. Therefore, increases in personal income would not necessarily result in greater spending.

Table 23-6. Historical, Current, and Projected Personal Income for Fresno County and Madera County, 2010–2040

County	Total Personal Income (billion $)			
	2010	2020	2030	2040
Fresno County	28.5	45.2	73.0	111.7
Madera County	4.1	6.4	10.4	16.0
Total	32.6	51.6	83.4	127.7

Sources: Caltrans 2013a, 2013b

Note:
Values are presented in 2010 dollars.

Labor Force, Employment, and Industry

Labor force, employment, and industry indicators provide useful insight into an area's economy. A description of industrial composition provides an aggregate depiction of the types of industries that are established in an area, while identifying major employers illustrates which types of businesses are most successful and represent major employment opportunities for the people of the area. The following discussion describes labor force, recent employment trends, unemployment rates, and industry data.

Information regarding labor force, employment, and industry characteristics described in this section was obtained mainly from the California Employment Development Department (EDD) Labor Market Information Division. The discussion focuses on Fresno and Madera counties because of the limited economic data available for their constituent cities and for Census Tracts 64.05 and 1.02.

Labor Force Table 23-7 presents the total number of workers in the labor force for Fresno and Madera counties and the State as a whole from 1990 to 2010. In total, Fresno County and Madera County had a labor force of 507,400 in 2010.

Table 23-7. Labor Force for Fresno County, Madera County, and California, 1990–2010

Geographic Area	Number of Workers in Labor Force			Percent Change, 1990–2010
	1990	2000	2010	
Fresno County	328,900	388,100	440,100	33.8
Madera County	41,600	54,900	67,300	61.8
Total	**370,500**	**443,000**	**507,400**	**37.0**
State of California	15,168,500	16,857,600	18,316,400	20.8

Source: EDD 2010a

EDD reported 440,100 people in the 2010 labor force in Fresno County; this is an increase of 33.8 percent since 1990. Fresno County's labor force was approximately eight times that of Madera County. Madera County has a small labor force (at 67,300 workers in 2010), but the labor force has grown by 61.8 percent since 1990. Overall, the labor force for Fresno and Madera counties has increased by 37.0 percent in the 20-year period from 1990 to 2010.

Employment The United States experienced an economic recession that began in late 2007 and became apparent beginning in 2008. Changes to the California and U.S. economies attributable to the recession resulted in increases in unemployment rates statewide. California's unemployment rate has been generally 2.0 percent greater than the nation's since April 2009, with the difference reaching a high of 3.4 percent in December 2010. Declines in construction spending and related losses in financial sectors are main contributing factors behind the State's long-term unemployment rates (EDD 2012a).

Employment and labor data for Fresno County, Madera County, and the State as a whole from 2007 to 2010 are shown in Table 23-8. The unemployment rate in the State registered at 12.4 percent in 2010. This is generally a result of the seasonality of agricultural workers in these two counties. Since 2007, unemployment rates in Fresno and Madera counties have been consistently and substantially higher than State trends. From 2007 through 2010, unemployment rates in the two counties ranged between 2.1 percent and 4.4 percent above the statewide rate. In 2010, Fresno County registered a 16.8-percent unemployment rate, while unemployment in Madera County totaled 15.6 percent of the population. Unemployment rates are expected to decline to 9.2 percent and 8.6 percent, respectively in Fresno County and Madera County by 2020 and

to 8.7 percent for both counties by 2040 (Caltrans 2013a, 2013b).

Table 23-9 summarizes EDD data regarding the top employers by employee class for each county. This list of employers includes a range of businesses with a payroll of more than 500 people.

As shown on Table 23-9, the top employers in Fresno County consist of universities and local school districts, hospitals and other health care facilities, county service offices, a correctional facility, fruit and vegetable growers, and meat processing operations.

In Madera County, two of the top five businesses provide health care to local residents and the other top employers consist of a casino, correctional institution, a hospital, and a winery.

Table 23-8. Labor Force and Employment for Fresno County, Madera County, and California, 2007–2010

Geographic Area	2007		2008		2009		2010	
	Labor Force	Employment[1]	Labor Force	Employment[1]	Labor Force	Employment[1]	Labor Force	Employment[1]
Fresno County	419,200	383,400 (8.6%)	430,200	385,100 (10.5%)	434,500	369,400 (15.0%)	440,100	366,000 (16.8%)
Madera County	63,500	58,700 (7.5%)	65,100	59,000 (9.4%)	66,500	57,500 (13.6%)	67,300	56,800 (15.6%)
State of California	17,921,000	16,960,700 (5.4%)	18,203,100	16,890,000 (7.2%)	18,208,300	16,144,500 (11.3%)	18,316,400	16,051,500 (12.4%)

Source: EDD 2010a

Note:

[1] Unemployment percentage in parentheses.

Table 23-9. Top Employers in Fresno County and Madera County, 2012

FRESNO COUNTY	
Employee Class Size of More Than 5,000	
Community Regional Medical Center	Fresno Unified School District
County of Fresno	State Center Community College
Employee Class Size of More Than 1,000	
ABC Bartending	Pleasant Valley State Prison
Cargill Meat Solutions	Saint Agnes Medical Center
City of Fresno	Stamoules Produce
Foster Farms	U.S. Veterans Hospital
Fresno County Economic	Valhalla Sales and Marketing
Fresno County Police Department	Zacky Farms
Fresno State University	
Employee Class Size of More Than 500	
Atnea	Pelco-Schneider Electrical
Fresno County Department of Public Heath	Play It Safe International
Harris Ranch	Quest Diagnostics
Kaiser Medical Center	Sun-Maid Growers
MADERA COUNTY	
Employee Class Size of More Than 1,000	
Children's Hospital	Valley State Prison for Women
Chukanski Gold Resort and Casino	
Employee Class Size of More Than 500	
Madera Community Hospital	Mission Bell Winery

Sources: EDD 2013a, 2013b

Industry Table 23-10 shows the industry composition and growth estimate by section for Fresno and Madera counties and for the State for EDD industry categories. The top five industries in both Fresno and Madera counties are the same: government, educational and health services, professional and business services, manufacturing, and wholesale and retail trade. Government represents the largest industry in both Fresno and Madera counties (23.1 percent and 31.3 percent, respectively). Wholesale and retail trade and educational and health services are the second and third largest industries in Fresno County, whereas in Madera County, educational and health services is the second largest industry and wholesale retail trade is the third largest industry. Professional and business services and manufacturing are the fourth and fifth industries, respectively, in both counties.

As shown in Table 23-10, projections of future growth in Fresno County and Madera County coincide in many ways

with the industrial composition of the State as a whole, but they do vary in some respects. Similar to the State, future job growth in educational and health services is expected to substantially increase in both Fresno and Madera counties. The construction industry is expected to be the fastest growing industry in the State at a rate of 26 percent, but less than 3 percent of the job growth in Fresno County and less than 1 percent in Madera County is associated with the construction industry. In both Madera County and the State, the wholesale and retail trade industry is expected to grow by more than 13 percent and 23 percent, respectively, but it is not in the top growth industries of Fresno County.

The transportation, utilities, and warehousing industries are expected to grow by more than 11 percent in both Fresno and Madera counties, but these industries are not identified as a top growth industry in the State. Job growth in Fresno County is expected to occur in information and finance (12.8 percent and 6.8 percent, respectively) and within the State; however, there is no growth projected in these industries in Madera County. The leisure and hospitality industries are expected to grow substantially in the State (25.5 percent). Although growth in leisure and hospitality is also expected to occur in Fresno County and Madera County (more than 6 percent in both counties), leisure and hospitality is not identified in the top growth industries for these counties.

Government and Finance

This section provides background information on local government and recent financial trends. Local governments provide a wide range of services. Using a mix of funding sources, local officials allocate financial resources for a diverse collection of activities, including providing police and public safety, development review, and educational services in their jurisdictions. The two largest sources of revenue for most local jurisdictions are property taxes and funding from the Federal and State governments. These two sources provide a relatively stable revenue base for funding important local programs.

Public health and safety and social services of various forms represent the two biggest expenditures at the local level. These programs serve as a safety net for the local population and are frequently the most visible local programs.

Table 23-10. Industry Composition and Growth Projections by Sector for Fresno County, Madera County, and California

Industry	Fresno County			Madera County			California		
	2008	2018	Percent Change, 2008–2018	2008	2018	Percent Change, 2008–2018	2010	2020	Percent Change, 2008–2020
Mining and Logging	100 (<1%)	200 (<1%)	100	1,900[1] (5.4%)	1,900[1] (5.0%)	0[1]	26,800 (<1%)	28,400 (<1%)	10.4
Construction	17,900 (5.9%)	18,500 (5.8%)	3.4	–[1]	–[1]	–[1]	599,800 (4.3%)	706,400 (4.3%)	26.2
Manufacturing	27,100 (5.9%)	27,600 (5.8%)	1.8	3,300 (9.4%)	3,400 (9.0%)	3.0	1,246,300 (8.9%)	1,246,300 (7.6%)	0.4
Transportation, Utilities, and Warehousing	11,000 (3.6%)	12,300 (3.8%)	11.8	900 (2.6%)	1,000 (2.7%)	11.1	466,300 (3.3%)	544,000 (3.3%)	16.7
Wholesale and Retail Trade	48,300 (15.9%)	50,900 (15.8%)	5.4	4,300 (12.3%)	4,900 (13.0%)	13.9	1,979,300 (14.2%)	2,656,800 (16.3%)	23.2
Information	4,700 (1.6%)	5,300 (1.6%)	12.8	500 (1.4%)	500 (1.3%)	0	427,700 (3.1%)	463,100 (2.8%)	8.3
Finance	14,800 (4.9%)	15,800 (4.9%)	6.8	800 (2.3%)	800 (2.1%)	0	760,200 (5.4%)	868,700 (5.3%)	14.3
Professional and Business Services	30,700 (10.1%)	33,500 (10.4%)	9.1	2,800 (8.0%)	2,900 (7.7%)	3.6	2,074,400 (14.9%)	2,558,100 (15.7%)	23.2
Educational and Health Services	40,100 (13.2%)	44,700 (13.9%)	11.5	5,900 (16.8%)	6,900 (18.3%)	16.9	1,788,300 (12.8%)	2,246,400 (13.8%)	25.6
Leisure and Hospitality	28,000 (1.0%)	29,700 (1.0%)	6.1	2,800 (8.0%)	3,000 (8.0%)	7.1	1,501,600 (10.8%)	1,884,900 (11.5%)	25.5
Other Services	10,600 (3.5%)	11,100 (3.5%)	4.7	800 (2.3%)	900 (2.4%)	12.5	484,900 (3.5%)	551,400 (3.4%)	13.7
Government	70,000 (23.1%)	71,900 (22.4%)	2.7	11,000 (31.3%)	11,500 (18.3%)	4.5	2,448,400 (17.5%)	2,548,800 (15.6%)	4.1
Total Nonfarm	303,200	321,500	6.1	35,100	37,700	7.7	13,961,700	16,333,100	17.0
Farm Employment	48,900 (12.5%)	47,600 (11.6%)	-2.7	10,300 (20.3%)	10,100 (18.7%)	-1.9	382,800 (2.4%)	388,500 (2.1%)	1.5

Sources: EDD 2010b, 2010c, 2012b

Notes:

Numbers in parentheses indicate the share as a percentage of the total employment. Percentages may not add to 100% if employment for specific industries in a county is excluded because of nondisclosure rules.

[1] The EDD logging and mining category in Madera County also includes the construction industry.

The discussion of the local governments focuses on Fresno County and Madera County because of the limited economic data available for their constituent cities and Census Tract 64.05 and Census Tract 1.02. In many cases, cities and towns work with and share funding with their appropriate county governments. Consequently, county data provide an adequate amount of detail for the area.

Fresno County As one of the larger counties in the San Joaquin Valley, Fresno County provides a wide range of services to its almost 930,000 residents. To meet residents' needs, Fresno County employs a number of funding mechanisms, including property taxes, Federal and State funding, permit fees, and other sources (Table 23-11).

Table 23-11. Revenues and Expenditures in Fresno County, 2007–2010

Revenues and Expenditures	Revenues and Expenditures		
	FY 2007–2008	FY 2008–2009	FY 2009–2010
Revenues			
Property taxes	$191,106,721	$212,215,397	$184,660,522
Other taxes	$44,657,748	$42,918,071	$35,635,093
Licenses, permits, fines, forfeitures, etc.	$34,838,622	$33,212,417	$33,764,375
Federal, State, other	$825,206,297	$802,176,727	$819,741,609
Charges for other services	$106,111,460	$117,136,932	$100,076,675
Total miscellaneous revenue	$5,892,009	$5,570,196	$4,668,983
All other financing sources	$50,410,720	$1,794,747	$0
Total Revenue	**$1,258,223,577**	**$1,215,024,487**	**$1,178,547,257**
Expenditures			
Legislative and administrative, finance, and counsel	$76,475,130	$70,661,374	$45,370,963
Police protection, corrections, fire, etc.	$347,260,408	$346,196,142	$335,109,060
Transportation, airport, etc.	$56,736,269	$56,323,885	$48,859,850
Public health, medical care, etc.	$191,159,586	$190,517,026	$175,946,791
Welfare, social services, and other public assistance	$514,468,999	$523,403,242	$513,734,481
Total education	$33,733,214	$31,280,506	$27,470,313
Total recreation facilities	$3,427,332	$3,589,064	$2,596,198
Costs associated with long-term debt (principal and interest)	$35,949,313	$39,868,120	$40,338,686
Total Expenditures	**$1,259,210,251**	**$1,261,839,359**	**$1,184,283,111**

Sources: California State Controller's Office 2009, 2011, 2012
Note:
Revenues and expenditures for fiscal years 2007-2008, 2008-2009, and 2009-2010 are presented in 2008, 2009, and 2010 dollars, respectively.
Key:
FY = Fiscal Year

Through these various sources, Fresno County generated more than $1.18 billion in total revenues in the 2009–2010 fiscal year. This total represented a decrease of 3.1 percent over the 2008–2009 fiscal year revenues of $1.21 billion. In the 2009–2010 fiscal year, the largest source of revenue was Federal and State funding, with more than $819 million. Property taxes represented another large revenue source for Fresno County, at more than $184 million. Similar to total revenues, Fresno County's total expenditures decreased between the 2007–2008 fiscal year and the 2009–2010 fiscal year. Expenditures in the 2007–2008 fiscal year totaled more than $1.2 billion, compared to more than $1.1 billion spent in the 2009–2010 fiscal year (a 6.1-percent decrease) as a result of decreased spending in all categories with the exception of police, fire, and other public safety. Welfare, social services, and other public assistance have consistently been the largest expenditure for Fresno County (more than $513.7 million in the 2009–2010 fiscal year). Police, fire, and other public safety activities represented the second largest expenditure category, with more than $335.1 million in the 2009–2010 fiscal year. Overall, total revenues exceeded total expenditures in all years.

Madera County Because Madera County's population is much smaller than Fresno County, Madera County's total revenues are substantially less than those of Fresno County (Table 23-12). Madera County experienced an overall decrease in revenue growth between 2007 and 2010. In that 3-year period, Madera County's total revenue decreased from $171.6 million in the 2007–2008 fiscal year to $165.9 million in the 2009–2010 fiscal year, a 3.3-percent decrease. Federal and State funding sources made up the largest revenue source in the 2009–2010 fiscal year, with more than $98.5 million directed to Madera County. Property taxes represent another substantial revenue source ($31.5 million in the 2009–2010 fiscal year).

Expenditures in Madera County decreased from $181.2 million in the 2008–2009 fiscal year to $180.3 million in the 2009–2010 fiscal year, a 0.7-percent decrease. The top two expenditures in Madera County in the 2009–2010 fiscal year were police, fire, and other public safety programs ($55.3 million) and welfare and social service programs ($49.9 million); however, spending on these programs and services decreased over the 3-year period, and costs for legislative and administration services, transportation, and long-term debt increased. Total expenditures were more than total revenues during all three fiscal years.

Table 23-12. Revenues and Expenditures in Madera County—Selected Years, 2007–2010

Revenues and Expenditures	Revenues and Expenditures		
	2007–2008	2008–2009	2009–2010
Revenues			
Property taxes	$34,343,351	$34,259,217	$31,497,786
Other taxes	$11,837,448	$12,119,746	$12,218,298
Licenses, permits, fines, forfeitures, etc.	$8,390,283	$8,273,501	$8,790,108
Federal, State, other	$102,558,371	$101,410,226	$98,504,740
Charges for other services	$13,034,923	$13,598,940	$14,440,655
Total miscellaneous revenue	$1,329,334	$1,578,263	$283,718
All other financing sources	$73,685	$1,873	$114,709
Total Revenue	**$171,567,395**	**$171,241,766**	**$165,850,014**
Expenditures			
Legislative and administrative, finance, and counsel	$30,223,234	$26,796,205	$32,411,741
Police protection, corrections, fire, etc.	$55,640,401	$57,937,839	$55,300,575
Transportation, airport, etc.	$12,543,149	$14,946,060	$15,270,913
Public health, medical care, etc.	$27,473,480	$25,537,160	$24,232,356
Welfare, social services, and other public assistance	$50,676,503	$52,794,668	$49,970,423
Total education	$1,851,770	$1,990,831	$1,409,936
Costs associated with long-term debt (principal and interest)	$1,685,724	$1,636,947	$1,724,310
Total Expenditures	**$180,094,261**	**$181,639,710**	**$180,320,254**

Sources: California State Controller's Office 2009, 2011, 2012
Note:
Revenues and expenditures for fiscal years 2007-2008, 2008-2009, and 2009-2010 are presented in 2008, 2009, and 2010 dollars, respectively.

Extended Study Area

The portion of the San Joaquin River extending from Friant Dam to the confluence with the Merced River is now subject to changed instream flows associated with implementing the Settlement. Restoration Flows have not resulted in physical changes that substantially affect socioeconomic, population, and housing conditions.

Each action alternative would deliver some portion of the new water supply to the Friant Division via the Friant-Kern and Madera canals. Alternative Plans 2, 3, 4 and 5 would also deliver new supply to other CVP SOD contractors via the San Joaquin River through exchange at Mendota Pool and the California Aqueduct. Alternative Plans 1, 2, and 4 would also deliver new supply to SWP SOD M&I contractors via the San Joaquin River through exchange at Mendota Pool and the California Aqueduct. Alternative Plan 3 would also deliver new supply to SWP SOD M&I contractors via existing cross-

valley conveyance and the California Aqueduct. Because implementing any of the action alternatives would not substantially alter socioeconomic conditions in downstream counties, including housing supply and vacancy rate, employment, per capita income, or other socioeconomic variables, these counties are not addressed further in this analysis.

CVP and SWP Water Service Areas

Implementing any of the action alternatives would improve surface water supply reliability to the agricultural producers in the CVP and SWP water service areas, resulting in less temporary crop idling and increasing agricultural production on existing agricultural lands. About 30 percent to 60 percent of the water made available for delivery would be conveyed directly to Friant Division water contractors, depending on the alternative plan implemented. Therefore, the increased surface water reliability would provide the greatest economic benefits to agricultural water users in the six counties within the Friant Division and West San Joaquin Division water service areas (i.e., Fresno, Kern, Kings, Madera, Merced, and Tulare counties) (the six-county area).

Agricultural water users in the CVP and SWP water service areas outside of the six-county area would also benefit from increased surface water reliability; however, these economic impacts would be dispersed over the 36 counties that are served by the CVP and SWP and would be less discernible to a single jurisdiction. Therefore, this section emphasizes socioeconomic characteristics in the six-county area.

Population and Housing The Friant Division and West San Joaquin Division water service areas are composed of areas in Fresno, Kern, Kings, Madera, Merced, and Tulare counties (the six-county area). Table 23-13 presents 2010 population and the projected population trends in each of the six counties and in the State. As of 2010, population in the six-county area totaled approximately 2.8 million people.

Between 2010 and 2050, population growth in the six counties is projected to increase by an average of approximately 97.1 percent, and all six counties are expected to grow at a greater rate than the State (36.9 percent increase). Kern County's population is projected to increase by 117.2 percent, which would be the greatest population growth rate among the six counties. This high rate of growth is expected to alter the existing character of Kern County by making it more urban

(i.e., with higher density housing and increased demand for public services). Fresno County is projected to experience the least population growth of the six counties through 2050, at approximately 65.1 percent.

In addition to population estimates and trends, Table 23-13 shows the distribution of housing units, the percentage of single-family dwellings, vacancy rates, and average household size in each of the six counties and in the State. As of 2010, the six counties had a total of approximately 918,300 housing units, representing 6.7 percent of the total number of housing units in the State (approximately 14 million). The highest number of housing units was located in Fresno County, which also had the highest population. Conversely, Kings and Madera counties, which had the smallest populations, also had the fewest number of housing units (43,867 units and 49,140 units, respectively).

Overall, single-family housing makes up the largest proportion of the total housing stock in the six-county area, ranging from 70.2 percent in Fresno County to 81.4 percent in Madera County. Kern County had the highest housing unit vacancy rate at 10.5 percent, and Kings County had the smallest housing unit vacancy rate of the six counties at 6.0 percent.

Households in Kern County (3.15 persons) were the smallest, on average, in the six-county area, whereas Tulare County had the largest average household size (3.36 persons) in 2010.

Table 23-13. Population and Housing Data and Projections for Counties in the Friant Division Water Service Area and California

Characteristic	County						Total	State of California
	Fresno	Kern	Madera	Merced	Kings	Tulare		
2010 total population	930,450	839,631	150,865	255,793	152,982	422,179	2,751,900	37,253,956
2020 projected population	1,083,899	1,041,469	183,176	301,449	179,722	536,429	3,329,144	40,817,839
2030 projected population	1,232,151	1,276,155	219,908	359,789	209,440	636,606	3,934,049	44,574,756
2050 projected population	1,535,761	1,823,277	314,546	506,666	281,866	884,646	5,346,762	51,013,984
Percent change, 2010–2050	65.1	117.2	108.5	98.1	84.2	109.5	97.1	36.9
Total housing units, 2010	315,531	284,367	49,140	83,698	43,867	141,696	918,299	13,670,304
Percent single-family housing	70.2	73.4	81.4	75.8	77.5	78.2	76.1	64.4
Percent Vacancy	6.4	10.5	10.1	9.6	6.0	8.0	8.4	5.9
Average number of persons per household	3.17	3.15	3.23	3.32	3.18	3.36	3.24	2.96

Sources: DOF 2012a, 2012b

Income Trends Table 23-14 presents the median household income and per capita income in 2011 dollars, and the proportion of individuals living below the poverty threshold for the six-county area and the State of California as a whole. The median household income and per capita income were less for the six counties than for the State ($60,632 and $29,674, respectively), and the poverty level was greater for the six counties than for the State. Fresno County had the highest median and per capita income ($49,903 and $20,638, respectively), and Tulare County had the lowest median and per capita income ($43,550 and $17,986, respectively). The percentage of the population at an income level below the poverty threshold ranged from 19.3 percent in Kings County to 23.8 percent in Tulare County.

Table 23-6 and Table 23-15 show the historical, current, and projected personal income in 2010 dollars for the six-county area. The total personal income in the six-county region ranged from $4.1 billion in Madera and Kings counties to $28.5 billion in Fresno County in 2010. Between 2010 and 2040, the total personal income in the six-county region is anticipated to increase to $326.8 billion.

Table 23-14. Median Household Income and Poverty Levels for Counties in the Friant Division Water Service Area and California, 2011

Geographic Area	Median Household Income	Per Capita Income	Percent of Population Below Poverty Level
Fresno County	$49,903	$20,638	23.4
Kern County	$48,021	$20,167	21.4
Kings County	$48,838	$18,296	19.3
Madera County	$47,724	$18,817	19.8
Merced County	$43,945	$18,304	23.0
Tulare County	$43,550	$17,986	23.8
State of California	$60,632	$29,674	14.4

Source: U.S. Census Bureau 2011

Note:
Values are shown in 2011 dollars.

Table 23-15. Personal Income for Counties in the Friant Division Water Service Area and California, 2010–2040

Geographic Area	Total Personal Income (billion $)			
	2010	2020	2030	2040
Kern County	25.1	43.3	68.3	103.5
Kings County	4.1	6.6	10.5	16.0
Merced County	7.0	11.6	19.4	31.0
Tulare County	12.4	20.1	39.9	48.6
Total	**48.6**	**81.6**	**138.1**	**199.1**
State of California	1,558.7	2,627.1	4,190.2	6,354.4

Source: Caltrans 2013c

Note:
Values are presented in 2010 dollars.

Labor Force and Employment The counties within the Friant Division water service area maintain a labor force of more than 1.2 million people, representing approximately 6.9 percent of the labor force of the State (18.3 million) (Table 23-16). In 2010, Fresno County maintained the largest labor force of the six counties, with more than 440,100 people. Kings County maintained the smallest labor force with 61,500 people.

In 2010, all six counties had unemployment rates greater than the State. As shown in Table 23-16, unemployment rates within the six-county area have increased over the 10-year period. The 2010 unemployment rates exceeded 15 percent in each county, with Merced County having the highest unemployment rate at 18.8 percent.

Table 23-16. Labor Force and Employment for Counties in the Friant Division Water Service Areas and California

Geographic Area	2000		2010	
	Labor Force	Employment[1]	Labor Force	Employment[1]
Fresno County	388,100	347,900 (10.4%)	440,100	366,000 (16.8%)
Kern County	293,600	269,400 (8.2%)	373,700	314,300 (15.9%)
Kings County	42,200	44,300 (10.0%)	61,500	51,300 (15.9%)
Madera County	54,900	50,100 (8.7%)	67,300	56,800 (15.6%)
Merced County	90,300	81,600 (9.6%)	109,500	88,800 (18.8%)
Tulare County	171,800	154,000 (10.4%)	208,700	173,400 (16.9%)
Total	**1,040,900**	**947,300 (9.0%)**	**1,260,800**	**1,050,600 (16.7%)**
State of California	17,921,000	16,960,700 (5.4%)	18,316,400	16,051,500 (12.4%)

Sources: EDD 2010a, 2013c

Note:
[1] Unemployment percentage in parentheses.

Industry As shown in Table 23-17, business and industry in the six-county area is composed primarily of four industries: educational and health services, agriculture, retail trade, and leisure and hospitality. The education and health services industry, which consists of elementary and secondary schools, colleges and universities, medical offices, hospitals, and nursing care facilities, was the leading industry in all counties. Manufacturing ranked as a top-five industry in Madera, Merced, and Tulare counties.

Government and Finance Each of the six counties in the Friant Division of the CVP water service area maintains one primary urban center, with a limited number of small cities and towns and large amounts of surrounding rural areas. Because the counties are largely rural jurisdictions, total revenues and expenditures in most of these counties are relatively lower when compared to other counties in the State. Table 23-18 shows revenues and expenditures for each of the six counties in the Friant Division water service area for the 2009–2010 fiscal year. Total revenues were more than total expenditures in Kern and Tulare counties, but expenditures were more than total revenues in Fresno, Kings, Madera, and Merced counties.

Table 23-17. Top Five Industries in Each County in the Friant Division Water Service Area, 2010

Fresno	Kern	Kings	Madera	Merced	Tulare
Educational & Health Services (23.3%)	Educational & Health Services (19.6%)	Educational & Health Services (19.7%)	Educational & Health Services (18.3%)	Educational & Health Services (21.2%)	Educational & Health Services (20.0%)
Retail Trade (11.2%)	Agriculture (14.5%)	Agriculture (16.5%)	Agriculture (17.9%)	Retail Trade (12.1%)	Agriculture (17.3%)
Agriculture (9.8%)	Retail Trade (11.1%)	Public Administration (14.0%)	Retail Trade (11.2%)	Manufacturing (11.9%)	Retail Trade (10.7%)
Professional & Business Services (8.2%)	Leisure & Hospitality (8.4%)	Retail Trade (9.0%)	Maufacturing (8.3%)	Agriculture (11.7%)	Maufacturing (7.9%)
Leisure & Hospitality (8.1%)	Professional & Business Services (8.2%)	Leisure & Hospitality (8.5%)	Leisure & Hospitality (7.5%)	Construction (6.7%)	Leisure & Hospitality (7.1%)

Source: U.S. Census Bureau 2011

Note:

Numbers in parentheses indicate the share as a percentage of the total employment.

Table 23-18. Revenues and Expenditures for Counties in the Friant Division Water Service Area, 2009–2010 Fiscal Year

County	Revenues	Expenditures
Fresno County	$1,178,547,257	$1,184,283,111
Kern County	$1,280,466,587	$1,254,677,156
Kings County	$177,480,965	$184,865,685
Madera County	$165,850,014	$180,320,254
Merced County	$367,348,208	$381,668,855
Tulare County	$636,855,065	$634,359,812
Total	**$3,806,548,096**	**$3,820,174,873**

Source: California State Controller's Office 2012

Note:
Dollar amounts are presented in 2010 dollars.

Environmental Consequences and Mitigation Measures

This section describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine significance for socioeconomics, population, and housing. It then discusses the impacts of the Investigation. The potential impacts on socioeconomics, population, and housing and associated mitigation measures are summarized in Table 23-19.

Table 23-19. Summary of Impacts and Mitigation Measures for Socioeconomics, Population, and Housing

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
SOC-1: Temporary Increases in Employment and Personal Income Resulting from Construction	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
SOC-2: Temporary Increases in Population and Housing Demand Resulting from Construction	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 23-19. Summary of Impacts and Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
SOC-3: Temporary Increases in Business Income and Local Sales Tax Revenue Resulting from Construction	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
SOC-4: Increases in Employment and Personal Income Resulting from Operations and Maintenance	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 23-19. Summary of Impacts and Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
SOC-5: Increases in Spending, Employment, and Personal Income from Increased Recreational Visitation	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
SOC-6: Increases in Population and Housing Demand Resulting from Operations and Maintenance	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 23-19. Summary of Impacts and Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
SOC-7: Increases in Business Income and Local Sales Tax Revenue Associated with O&M and Recreation Visitation	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
SOC-8: Decreases in Property Tax Revenue from Acquisition of Privately Owned Land	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 23-19. Summary of Impacts and Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
SOC-9: Impacts on Agricultural Economics in the CVP and SWP Water Service Areas	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	S	None Required	SU
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial
SOC-10: Increases in Population and Housing Demand Within the CVP and SWP Water Service Areas	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS

Table 23-19. Summary of Impacts and Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
SOC-11: Increases in Business Income and Local Sales Tax Revenue Within the CVP and SWP Water Service Areas	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	S	None Required	SU
		Alternative Plan 1	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 2	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 3	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 4	LTS and Beneficial		LTS and Beneficial
		Alternative Plan 5	LTS and Beneficial		LTS and Beneficial

Key:
LTS = less than significant
NI = no impact
S = significant
SU = significant and unavoidable

Methods and Assumptions

This section presents the methods and assumptions used in this socioeconomic, population, and housing analysis. Impacts of the project on local and regional socioeconomic characteristics were assessed quantitatively, when data were available.

Population and Housing

The evaluation and discussion of the potential impacts of the alternatives on population and housing characteristics is based on a review of published material pertaining to the primary and extended study areas.

Population impacts were evaluated based on changes in the total number of temporary and/or permanent residents resulting from construction and operation activities that would be completed as a part of project implementation. Housing impacts were assessed based on estimated short- and long-term housing needs resulting from population changes expected as a result of the project's construction and operation activities. Impacts of the project on local and regional demographic characteristics were assessed quantitatively, when data were available.

Labor Force, Employment, and Industry

To quantitatively assess the potential impacts to labor force, employment, and industry expenditures, as well as personal income, two models were used. To estimate potential changes in regional employment and personal income associated with construction, O&M, recreation, and agriculture for each action alternative the IMpact analysis for PLANning model (IMPLAN), Version 3.0.17.2, was used. In addition to IMPLAN, the SWAP model was used to determine the impacts of the action alternatives on agricultural water users. The regional economic analysis is documented in the Modeling Appendix and summarized below.

IMPLAN is a computer database and modeling system used to create input-output models for any combination of U.S. counties. IMPLAN is the most widely used input-output model system. IMPLAN assumes that activity would occur exclusively within the defined regional study area, providing economic and employment outputs for only those counties included in the analysis. For the purpose of this analysis, two IMPLAN models were developed. The first incorporated economic activity in the six-county area (i.e., Fresno, Kern, Kings, Madera, Merced, and Tulare counties), and the second addresses effects associated with agriculture at the statewide

level. The direct impacts of quantified changes (e.g., construction and operation spending, recreation expenditures, and agricultural production) are input to IMPLAN regional economic models. The resulting output (employment and income) reflects the change from the 2009 California counties' dataset base model estimate.

SWAP simulates economic output (irrigated crop production) based on changes in water deliveries for agricultural production. The SWAP modeling analysis is documented in the Modeling Appendix. Results from the model include changes in the value of production (crop output multiplied by crop price), net income to growers (crop revenues minus production costs), and irrigated acreage. SWAP incorporates project water supplies (SWP and CVP), other local surface water supplies, and groundwater. As the quantity of available project water supply increases or as the cost of groundwater pumping increases, the SWAP model optimizes production by adjusting the crop mix, water sources and quantities used, and other inputs. The model will generally idle land only if the cost of accessing groundwater exceeds a value to generate positive net returns to crop production. SWAP assumes that farmers select the crops, water supplies, and other inputs to maximize profit subject to resource constraints, technical production relationships, and market conditions. Farmers are assumed to face competitive markets in which no single farmer can influence crop prices, but an aggregate change in production can affect crop price. SWAP modeling was performed for CVP and SWP service areas to capture effects of the action alternatives on agricultural production within the State and six-county area.

The regional economic analysis uses the IMPLAN and SWAP results to estimate the potential economic effects of the alternatives to the regional economy as a result of the following factors:

- Temporary and short-term construction expenditures and employment from construction of the Temperance Flat RM 274 Dam, powerhouse, diversion works, intake structure, transmission facilities, and the new Wellbarn Road Boat Ramp and the demolition and relocation of other recreational facilities that would be affected by creation of the Temperance Flat RM 274 Reservoir

- Expenditures and employment from O&M of the Temperance Flat RM 274 Dam, intake structure, powerhouse, valve house, and permanent access roads

- Increases in recreation visitation and associated increases in spending resulting from more stable lake levels at Millerton Lake and the creation of the Temperance Flat RM 274 Reservoir

- Long-term agricultural production and income from improved surface water supply reliability to the six-county area and other SOD CVP and SWP water service areas

As stated above, regional economic effects associated with construction, O&M, recreation, and agriculture were assessed across the six-county area. Although construction, O&M, and recreation activities may take place in Fresno County and Madera County, economic activity (sales and purchases) would likely extend beyond that area both directly and indirectly. For example, the purchase of supplies, including fuel for transportation, would occur in any county from which recreationists travelling to the primary study area would originate. However, for the purposes of analyzing direct, indirect, and induced economic impacts resulting from construction, O&M, and recreation, it is assumed that most of the economic activity associated with construction, O&M, and recreation would occur within Fresno County and Madera County. Agricultural impacts are assumed to occur within the six-county area and other CVP and SWP water service areas, as modeled.

Construction Impacts Direct, indirect, and induced economic impacts resulting from construction-related activities were modeled for each of the alternatives with IMPLAN (documented in the Modeling Appendix). Construction expenditures and employment would occur over 8 years and would represent a temporary and short-term economic benefit on the six-county area. Construction cost estimates for Temperance Flat RM 274 Reservoir have been completed for the action alternatives, and are displayed in the Public Draft Feasibility Report (Reclamation 2014).

The construction crew size was estimated on an average annual basis, considering the size and duration of the construction activity. The generation of direct construction-related jobs would result in indirect employment in businesses that provide

materials to the construction effort; in service-related industries that provide food, beverages, and other goods to construction workers; and in more technical industries, such as engineering consulting, legal services, and other businesses. Personal income would be directly and indirectly generated through payment of wages to construction workers and employees in construction-related and service-oriented businesses, management earnings, and contractor payments. Induced employment and personal income would be generated by increased household and business spending and would not be limited to construction-related activities.

It is assumed that most of the labor, equipment, and materials would originate in the six-county area and that construction expenditures would represent net new spending in those counties over an 8-year construction period. Direct construction expenditures would be associated with the purchase of raw or refined materials and/or equipment required for the construction process, fuel for vehicles and equipment, and other incidental materials and supplies; technical tasks required for project construction, such as engineering, design, and construction management; environmental mitigation costs; and land acquisition costs. Indirect expenditures would consist of spending on goods and services by industries that produce the items purchased as part of construction, and induced expenditures would consist of spending by the households of workers involved either directly or indirectly in the construction process.

Table 23-20 shows the construction-related expenditures, employment, and personal income that would be generated during construction of any of the action alternatives.

Table 23-20. Construction-Related Expenditures, Employment, and Personal Income Under the Action Alternatives

Economic Impact	Alternative Plan 1, 2, 3, or 5	Alternative Plan 4
Construction Expenditures (million $ per year)[1]		
Direct	267.5	277.0
Indirect and induced	151.6	157.0
Total	419.1	434.0
Employment (jobs per year)[2]		
Direct	450	460
Indirect and induced	1,155	1,196
Total	1,605	1,656
Personal Income (million $ per year)[1]		
Direct	109.4	113.2
Indirect and induced	54.7	56.6
Total	164.1	169.8

Notes:

Construction of any of the action alternatives is expected to occur over 8 years.

IMPLAN modeling analysis is documented in the Modeling Appendix.

[1] Construction-related expenditures and personal income are presented in 2013 dollars.

[2] Jobs per year represent the necessary and appropriate size of the construction crew on an average annual basis considering the size and duration of the construction activities. Jobs per year include full-time, part-time, and temporary positions.

O&M-Related Impacts Direct, indirect, and induced economic impacts resulting from O&M were estimated for each action alternative. It is expected that O&M of the Temperance Flat RM 274 Dam, intake structure, powerhouse, valve house, and permanent access roads would directly result in increases in employment and personal income in the six-county area over the project's 100-year lifetime. Direct expenditures for O&M would include the physical part components and other materials required for maintenance of new facilities and labor. Indirect expenditures would consist of spending on goods and services by industries that produce items purchased as part of maintenance activities, and induced expenditures would consist of spending by the households of workers involved either directly or indirectly in maintenance.

Personal income would be directly and indirectly generated through payment of wages to employees required for O&M-related activities and employees in businesses that manufacture part components or otherwise support O&M. Induced employment and personal income would be generated by

increased household and business spending and would not be limited to O&M-related employment and income.

Table 23-21 shows the O&M-related expenditures, employment, and personal income that would be generated per year under any of the action alternatives over the project's lifetime.

Recreation Impacts Increased recreation visitation to the primary study area related to the modified lake levels at Millerton Lake and the creation of the Temperance Flat RM 274 Reservoir would result in direct, indirect, and induced economic impacts in Fresno County and Madera County. Economic impacts resulting from increased visitation would have a long-term average annual economic impact on the region over the project's 100-year lifetime. The quantification of recreation impacts relies on historic use data, an assessment of recreation opportunities associated with the action alternatives, personal interviews with knowledgeable staff members at Millerton Lake, and estimates of future recreation improvements and associated visitation (see the Modeling Appendix for a complete description of the recreation visitation analysis).

Table 23-21. O&M-Related Expenditures, Employment, and Personal Income Generated Under the Action Alternatives

Economic Impact	Any of the Action Alternatives
Expenditures (million $ per year)[1]	
Direct	8.4
Indirect and induced	1.2
Total	9.6
Employment (jobs per year)[2]	
Direct	28
Indirect and induced	10
Total	38
Personal Income (million $ per year)[1]	
Direct	1.9
Indirect and induced	0.4
Total	2.3

Notes:
O&M-related activities are assumed to occur over the project's lifetime (i.e., 100 years).
IMPLAN modeling analysis is documented in the Modeling Appendix.
[1] O&M-related expenditures and personal income are presented in 2013 dollars.
[2] Jobs per year include full-time, part-time, and temporary positions.
Key:
O&M = operations and maintenance

Total direct, indirect, and induced economic impacts of increased recreation visitation were estimated using IMPLAN. Direct impacts included new jobs and personal income generated by increases in recreation-related expenditures at businesses. Indirect impacts would result from spending on goods and services by industries that support these businesses, and induced impacts would consist of changes in household spending by new employees.

Regional impacts related to recreation spending would be different for visitors that originate from outside the defined region and visitors that originate from inside the region. Outside visitors represent a flow of expenditures into the regional economy while spending by residents within the region may represent a redistribution or substitution of spending for other activities. This is offset in part by greater expenditures per capita by more distant visitors (e.g., for food, lodging, and transportation).

Table 23-22 shows the recreation-related expenditures, employment, and personal income that would be generated per year under any of the action alternatives over the project's lifetime.

Table 23-22. Recreation-Related Expenditures, Employment, and Personal Income Generated Under the Action Alternatives

Economic Impact	Alternative Plan 1	Alternative Plan 2	Alternative Plan 3	Alternative Plan 4	Alternative Plan 5
Recreation-Related Expenditure (million $ per year)[1, 2]					
Direct	1.6	1.6	1.6	1.8	1.2
Indirect and induced	0.8	0.8	0.8	0.9	0.6
Total	2.4	2.4	2.4	2.7	1.8
Employment (jobs per year)[3]					
Direct	27	27	26	30	20
Indirect and induced	6	6	6	7	5
Total	33	33	32	37	25
Personal Income (million $ per year)					
Direct	0.9	0.9	0.8	1.0	0.5
Indirect and induced	0.3	0.3	0.3	0.3	0.2
Total[4]	1.1	1.1	1.1	1.3	0.7

Notes:

IMPLAN modeling analysis is documented in the Modeling Appendix.

[1] Recreation-related expenditures would occur over the project's lifetime (i.e., 100 years).

[2] Construction-related expenditures and personal income are presented in 2013 dollars.

[3] Jobs per year represent full-time, part-time, and temporary positions and would continue throughout the project's lifetime (i.e., 100 years).

[4] All numbers are rounded for display purposes; therefore, line items may not sum to totals.

Agricultural Impacts Key output from the SWAP model used in this analysis includes estimates of irrigated acres and gross revenue. After direct agricultural industry revenue was calculated by SWAP, the total indirect and induced income and direct, indirect, and induced employment and personal income were estimated using IMPLAN. The expenditures on goods and services required to support agricultural operations generate additional income and employment. Employment and personal income are also induced throughout the region as a result of consumer spending by those farm employees who are directly and indirectly affected by agricultural operations. Table 23-23 and Table 23-24 show the agricultural industry revenue, employment, and personal income that would be generated per year in the six-county area and the State under the action alternatives over the project's lifetime.

Table 23-23. Agricultural Industry Revenue, Employment, and Personal Income Generated in the Six-County Area by Action Alternative

Economic Impact	Alternative Plan 1	Alternative Plan 2	Alternative Plan 3	Alternative Plan 4	Alternative Plan 5
Agricultural Industry Revenue (million $ per year)[1, 2]					
Direct	4.5	4.0	4.2	3.0	5.5
Indirect and induced	8.8	8.6	8.9	7.2	11.8
Total	13.3	12.6	13.1	10.2	17.3
Employment (jobs per year)[3]					
Direct	35	40	42	28	62
Indirect and induced	76	73	76	62	100
Total	110	113	118	89	162
Personal Income (million $ per year)					
Direct	1.2	0.9	0.9	0.7	1.1
Indirect and induced	3.1	3.0	3.1	2.5	4.1
Total	4.3	3.9	4.0	3.2	5.2

Notes:

IMPLAN modeling analysis is documented in the Modeling Appendix.

[1] Agriculture-related income is assumed to occur over the project's lifetime (i.e., 100 years).

[2] Agriculture-related income and personal income are presented in 2013 dollars.

[3] Jobs per year represent full-time, part-time, and temporary positions and would continue throughout the project's lifetime (i.e., 100 years).

Table 23-24. Agricultural Industry Revenue, Employment, and Personal Income Generated in the State by the Action Alternatives

Economic Effect	Alternative Plan 1	Alternative Plan 2	Alternative Plan 3	Alternative Plan 4	Alternative Plan 5
Agricultural Industry Revenue (million $ per year)[1, 2]					
Direct	4.1	3.6	3.7	2.7	5.0
Indirect and induced	10.7	10.4	10.8	8.7	14.4
Total	14.8	13.9	14.5	11.4	19.4
Employment (jobs per year)[3]					
Direct	32	34	36	24	53
Indirect and induced	70	67	69	56	92
Total	102	101	106	80	145
Personal Income (million $ per year)					
Direct	1.1	0.7	0.7	0.6	0.9
Indirect and induced	3.6	3.5	3.6	2.9	4.8
Total	4.7	4.2	4.4	3.5	5.7

Notes:

IMPLAN modeling analysis is documented in the Modeling Appendix.

[1] Agriculture-related income is assumed to occur over the project's lifetime (i.e., 100 years).

[2] Agriculture-related income and personal income are presented in 2013 dollars.

[3] Jobs per year represent full-time, part-time, and temporary positions and would continue throughout the project's lifetime (i.e., 100 years).

Government and Fiscal Conditions

Fiscal impacts on local governments would occur from changes to property tax, sales tax, or assessment revenue resulting from implementing any of the action alternatives. The analysis discusses the loss of property tax revenue resulting from potential acquisition of existing privately held land to implement any of the action alternatives. The analysis also discusses potential changes in business incomes and sales tax revenue as a direct result of the estimated construction and operation expenditures and from changes in recreation-related expenditures and agricultural sales.

Because no quantitative analysis of the impact of implementing any of the action alternatives on local government and finance has been completed, this analysis provides a qualitative discussion of potential impacts. Areas of potential impacts were identified by comparing existing conditions and probable future conditions under each alternative. In many cases, the estimates completed as part of the IMPLAN and SWAP modeling served as the basis for impact estimates. These two models determine expected trends in employment, personal incomes, business incomes, and other data types to quantifiably estimate the impacts of implementing any of the action alternatives. Because these characteristics directly influence activities at the local level, they represent critical considerations in the analysis and conclusions presented in this section.

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing the No Action Alternative and other alternatives. Under NEPA, the severity and context of an impact must be characterized. An environmental document prepared to comply with CEQA must identify the potentially significant environmental impacts 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental impacts (State CEQA Guidelines, Section 15126.4[a]).

Under NEPA, economic or social impacts must be discussed if they are interrelated to the natural or physical environmental impacts of a project (40 CFR 1508.14). Economic impacts discussed in this section are not considered physical impacts on the environment; however, an analysis of economic impacts can be used to judge the significance of other changes caused by them, such as changes in water supply or water quality. The significance of those associated environmental impacts is evaluated in each technical section of this Draft EIS. For this analysis, the magnitude of economic impacts resulting from implementing any of the action alternatives was identified and used to help characterize the associated socioeconomic, population, and housing impacts.

The following criteria were developed based on guidance provided by the State CEQA Guidelines and encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. Impacts of an alternative plan on socioeconomics, population, and housing would be significant if project implementation would do any of the following:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)

- Displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere

- Produce a substantial burden on the existing housing stock within the local community because of an increased housing demand created by nonlocal project employees

- Require sizeable numbers of new workers in a particular industrial sector from outside the local area during construction or operation

- Cause a substantial decrease in the number of opportunities for temporary or long-term direct, indirect, or induced employment

- Cause a substantial decrease in the number of opportunities for temporary or long-term increases in personal and/or disposable incomes

- Cause a substantial decrease in recreation visitation and spending during construction and operation

- Cause a substantial decrease in agricultural income (measured as agricultural industry revenue) from changes in surface water supply reliability

- Considerably decrease the incomes of businesses and local sales tax revenue

Topics Eliminated from Further Consideration

No topics related to socioeconomics, population, and housing that are included in the significance criteria listed above were eliminated from further consideration. Each of the topics associated with potential impacts in the primary study area are addressed in the Direct and Indirect Impacts section.

No construction-related, O&M-related, or recreation-related impacts would occur in the extended study area. Therefore, no socioeconomic, population, and housing impacts from these activities would occur in the extended study area, and these topics are not discussed further in this analysis.

Implementing any of the action alternatives would increase water available for delivery from Millerton Lake. Portions of this water would be conveyed directly to Friant Division water contractors or down the San Joaquin River and rediverted or exchanged for delivery to SOD CVP and SWP water contractors. The conveyance of these water supplies would not exceed channel capacity of the San Joaquin River and Delta

waterways and no change in existing use of adjacent lands in the affected counties would occur. The portion of the San Joaquin River extending from Friant Dam to the confluence with the Merced River is now subject to Restoration Flows, and these flows have not resulted in physical changes that substantially affect socioeconomic, population, and housing conditions. These areas are not discussed further in this analysis.

Direct and Indirect Impacts

This section describes the environmental consequences of implementing any of the alternatives. Where the action alternatives would have identical or nearly identical impacts regardless of which action alternative is implemented, the action alternatives are described together. Where impacts would differ, the action alternatives are described separately.

Impact SOC-1: Temporary Increases in Employment and Personal Income Resulting from Construction

Primary Study Area

No Action Alternative Under the No Action Alternative, implementation of the project and associated construction-related activities would not occur, and no construction workers would be needed. The economic trends of each county, however, would be expected to follow current trends and estimates described in the Affected Environment section. These trends indicate that the economies of the six-county area will continue to grow, increasing the local population, labor force, available jobs, personal income, housing, and revenues for local government services. It is anticipated that this growth will be consistent with the general plans of these counties.

This impact would be **less than significant** under the No Action Alternative.

Alternatives Plans 1–3 and 5 Implementing Alternative Plan 1, 2, 3, or 5 would result in temporary increases in employment and personal income in the six-county area as a result of construction-related activities in the primary study area. Constructing the Temperance Flat RM 274 Dam, the powerhouse, the diversion works, the low-level intake structure, transmission facilities, and the new Wellbarn Road Boat Ramp and demolishing and relocating other recreational facilities would require an average of 450 new construction workers per year over the 8-year construction period (Table 23-20). The construction crew size includes general

construction labor, batch plant operators, project managers, on-site Reclamation staff, and truck drivers.

In addition to generating 450 construction jobs, implementing Alternative Plan 1, 2, 3, or 5 would generate 1,155 new indirect and induced jobs per year (Table 23-20). Indirect employment may be to support hiring in businesses that provide materials to the construction effort; in service-related industries that provide food, beverages, and other goods to construction workers; or in more technical industries, legal services, and other businesses. Induced employment would be jobs that are created in the region as a result of increased household spending by workers involved either directly or indirectly and not limited to construction-related activities.

Overall, the total 1,605 direct, indirect, and induced jobs represent a small increase in the total labor force in the six-county area, but the employment opportunities created by implementing Alternative Plan 1, 2, 3, or 5 represent a substantial contribution in these counties because of existing high unemployment rates Unemployment rates exceeded 15 percent in each county, with Merced County having the highest unemployment rate at 18.8 percent (Table 23-16). These new jobs are expected to provide temporary employment opportunities to many unemployed workers.

Constructing Alternative Plan1, 2, 3, or 5 would generate personal income through payment of wages to construction workers and employees in construction-related and service-oriented businesses, management earnings, contractor payments, and subsequent household and business spending in the regional economy. An estimated $109.4 million would be directly paid each year to the approximately 450 construction workers during the 8-year construction period. The additional 1,155 indirect and induced jobs would generate an additional estimated $54.7 million in personal income each year during the construction period. Taken together, it is expected that construction-related direct, indirect, and induced personal income resulting from implementing Alternative Plans 1, 2, 3, or 5 would be approximately $164.1 million per year within the six-county area.

Overall, constructing Alternative Plan 1, 2, 3, or 5 would generate 1,605 direct, indirect, and induced jobs and an estimated $164.1 million in personal income. These new jobs are expected to provide temporary, short-term employment opportunities to many unemployed workers, and spending of

personal income by these workers would result in new local economic activity in the six-county area.

This impact would be **less than significant and beneficial** under Alternative Plans 1, 2, 3, and 5. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 4 Implementing Alternative Plan 4 would result in temporary increases in employment and personal income in the six-county area as a result of construction-related activities in the primary study area. Construction of Alternative Plan 4 would generate an estimated 1,656 direct, indirect, and induced jobs; and personal income of approximately $169.8 million per year.

Construction, demolition, and relocation activities would require an average of 460 new workers per year over the 8-year construction period (Table 23-20). In addition to generating 460 construction jobs, implementing Alternative Plan 4 would generate 1,196 new indirect and induced jobs per year (Table 23-20).

Overall, the total 1,656 direct, indirect, and induced jobs represent a small increase in the total labor force in the six-county area, but the employment opportunities created by implementing Alternative Plan 4 represent a substantial contribution in these counties because of existing high unemployment rates.

An estimated $113.2 million would be directly paid each year to the approximately 460 construction workers during the 8-year construction period. The additional 1,155 indirect and induced jobs would generate an additional estimated $56.6 million in personal income each year during the construction period. Taken together, it is expected that construction-related direct, indirect, and induced personal income resulting from implementing Alternative Plan 4 would be approximately $169.8 million per year within the six-county area. This represents approximately 0.5 percent of the estimated $32.6 billion in personal income in Fresno and Madera counties in 2010 (Table 23-6).

Overall, construction of Alternative Plan 4 would generate 1,656 direct, indirect, and induced jobs and an estimated $169.8 million in personal income. These new jobs are expected to provide temporary, short-term employment opportunities to many unemployed workers, and spending of

personal income by these workers would result in new local economic activity in the region.

This impact would be **less than significant and beneficial** under Alternative Plan 4. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-2: Temporary Increases in Population and Housing Demand Resulting from Construction

Primary Study Area

No Action Alternative Under the No Action Alternative, construction-related activities would not occur. No construction workers would be needed, and the population and housing conditions would be expected to continue following current trends described in the Affected Environment section. These trends indicate that the economies of the six-county area will continue to grow, increasing the local population, labor force, available jobs, personal income, housing, and revenues for local government services. It is anticipated that this growth would be consistent with the general plans of these counties.

This impact would be **less than significant** under the No Action Alternative.

Alternatives Plans 1–3 and 5 Implementing Alternative Plan 1, 2, 3 or 5 would result in temporary increases in population and housing demand in Fresno County and Madera County as a result of construction-related activities in the primary study area. As shown in Table 23-20, construction of Alternative Plan 1, 2, 3, or 5 would generate an estimated 1,605 direct, indirect, and induced jobs.

Because of the availability of the existing labor force and relatively high rate of unemployment within the six-county area, it is expected that an adequate number of new workers could be found within the local area (see the discussion of Impact SOC-1). Even if some workers were to come from outside the local area, sufficient housing capacity (e.g., rental housing and apartment vacancies) exists in the six-county area to house these workers. Vacancy rates in all six counties were generally higher than the State average (5.9 percent) and vacancy rates ranged from 6.0 percent in Kings County to 10.5 percent in Kern County (i.e., single-family attached homes, single-family detached homes, multi-family homes, and mobile homes) (Table 23-13). In addition, nonlocal workers may occupy transient housing, such as hotels and motels.

Campgrounds located in the vicinity of Millerton Lake, some of which would be open during construction, could provide additional transient housing (see Chapter 22, "Recreation"). Furthermore, if nonlocal construction workers were employed for the project, the temporary and short-term nature of the work supports the conclusion that these workers would not typically change residences if temporarily employed at the project construction site. Therefore, substantial impacts on population and housing in the primary study area are not expected.

Because workers serving the project could be expected to come primarily from nearby communities and cities in Fresno County and Madera County, neither substantial population growth nor an increase in housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plans 1, 2, 3, and 5. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 4 Implementing Alternative Plan 4 would result in temporary increases in population and housing demand in Fresno and Madera counties as a result of construction-related activities in the primary study area. As shown in Table 23-20, construction of Alternative Plan 4 would generate an estimated 1,656 direct, indirect, and induced jobs.

Given the availability of the existing labor force and relatively high rate of unemployment within Fresno and Madera counties, it is expected that an adequate number of new workers could be found within the local area (see the discussion of Impact SOC-1). Even if some workers were to come from outside the local area, sufficient housing capacity exists in Fresno County and Madera County to house these workers. In addition, nonlocal workers may occupy transient housing, such as hotels and motels in Fresno and Madera counties. Campgrounds located in the vicinity of Millerton Lake, some of which would be open during construction, could provide additional transient housing (see Chapter 22, "Recreation"). Furthermore, if nonlocal construction workers were employed for the project, the temporary and short-term nature of the work supports the conclusion that these workers would not typically change residences if temporarily employed at the project construction site. Therefore, substantial impacts on population and housing in the primary study area are not expected.

Because workers serving the project could be expected to come primarily from nearby communities and cities in the six-county area, neither substantial population growth nor an increase in housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plan 4. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-3: Temporary Increases in Business Income and Local Sales Tax Revenue Resulting from Construction

Primary Study Area

No Action Alternative Under the No Action Alternative, the project would not be constructed; therefore, there would be no temporary increases in business incomes or local sales tax revenues from spending of personal income and construction-related expenditures in Fresno County and Madera County associated with the project. It is anticipated that business incomes and local sales tax revenues from spending of personal income would increase following current income trends described in the Affected Environment section. These trends indicate that the economies of the six counties will continue to grow, increasing the local population, labor force, available jobs, personal income, housing, and revenues for local government services. It is anticipated that this growth would be consistent with the general plans of these counties.

This impact would be **less than significant** under the No Action Alternative.

Alternative Plans 1–3 and 5 Implementing Alternative Plan 1, 2, or 3 would be expected to generate an estimated $164.1 million in total personal income during the proposed 8-year construction period (see the discussion of SOC-1). In addition to this increase in personal incomes, most of the construction materials would be purchased within the six-county area, generating a substantial amount of sales and revenue for local businesses.

Construction expenditures would also represent net new spending to the six-county area. A large amount of construction material would be required to construct Alternative Plan 1, 2, 3, or 5. These purchases may include raw or refined materials, equipment required for the construction process, fuel for

vehicles and equipment, and other incidental materials and supplies. Of this material, it is expected that most would be procured from businesses within the six-county area.

Other direct construction expenditures consist of technical tasks required for project construction, such as engineering, design, and construction management; environmental mitigation costs; and land acquisition costs. Indirect expenditures would consist of spending on goods and services by industries that produce the items purchased as part of the construction, and induced expenditures would consist of spending by the households of workers involved either directly or indirectly in the construction process.

As a result of the large quantity of purchases expected, implementing Alternative Plan 1, 2, 3, or 5 would be expected to generate more than $419.1 million per year in sales and revenue for construction-related and service-oriented businesses that support the construction industry, with approximately $267.5 million in direct income and $151.6 in indirect and induced income. Increased sales could be reinvested in existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways.

In addition to the business income that would be generated from spending of personal income and construction expenditures, the six counties would receive substantial local sales tax revenues on expenses related to taxable sales. Under California tax regulations, counties could receive sales tax revenues equal to 1 percent of total taxable sales spending for the entire project. The exact amount of local sales tax revenue increases has not yet been calculated; however, this additional spending would result in an appreciable increase in local sales tax revenues. Transient taxes, ranging from 4 to 15 percent, would be collected from the rental of rooms at lodging establishments, and also contribute to revenues in both counties.

This impact would be **less than significant and beneficial** under Alternative Plans 1, 2, 3, and 5. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 4 Implementing Alternative Plan 4 would be expected to generate an estimated $169.8 million in total personal income over the project's lifetime (see the discussion of Impact SOC-1). In addition to this increase in personal

incomes, most of the construction materials would be purchased within the six-county area, generating a substantial amount of sales and revenue for local businesses. Alternative Plan 4 would generate total personal expenditures of $169.8 million per year, and construction-related expenditures of $434.0 million per year.

As a result of the large quantity of purchases expected, implementing Alternative Plan 4 would be expected to generate more than $434.0 million per year in sales for construction-related and service-oriented businesses that support the construction industry, with approximately $277.0 million in direct income and $157.0 in indirect and induced income.

In addition to the business income that would be generated from spending of personal income and construction expenditures, the six-county area would receive substantial local sales tax revenues on expenses related to taxable sales. Under California tax regulations, the six counties could receive sales tax revenues equal to 1 percent of total taxable sales spending for the entire project. The exact amount of local sales tax revenue increases has not yet been calculated; however, this additional spending would result in an appreciable increase in local sales tax revenues. Transient taxes, ranging from 4 to 15 percent, would be collected from the rental of rooms at lodging establishments, and also contribute to revenues in both counties.

This impact would be **less than significant and beneficial** under Alternative Plan 4. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-4: Increases in Employment and Personal Income Resulting from Operations and Maintenance

Primary Study Area

No Action Alternative Under the No Action Alternative, none of the action alternatives would be constructed. No O&M-related activities associated with the project would increase employment, and personal income and the labor force and personal income trends would be expected to follow the current estimates described in the Affected Environment section. These trends indicate that the economies the six-county region will continue to grow, increasing the local population, labor force, available jobs, personal income, housing, and revenues for local government services. It is anticipated that this growth would be consistent with the general plans of these counties.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Implementing any of the action alternatives would result in increases in employment and personal income in Fresno and Madera counties as a result of O&M of the Temperance Flat RM 274 Dam, intake structure, powerhouse, valve house, and permanent access roads. O&M would generate an estimated 28 direct jobs and 10 indirect and induced jobs for a total of 38 new jobs (Table 23-21). It is expected that the workers serving the project would be expected to come from nearby communities and cities in Fresno County and Madera County. Overall, a total of 38 direct, indirect, and induced jobs would represent a small increase in the total labor force in Fresno and Madera counties. Given the large workforce in Fresno County and Madera County, it is anticipated that most of these new jobs would be filled from the existing workforce in the two counties.

O&M would generate personal income through payment of wages to employees and subsequent household and business spending in the regional economy. An estimated $1.9 million would be directly paid each year to the approximately 28 maintenance workers. The additional 10 indirect and induced jobs would generate an additional estimated $0.4 million in personal income. Taken together, it is expected that direct, indirect, and induced personal income resulting from implementing any of the action alternatives would be approximately $2.3 million per year over the project's lifetime. This represents less than 0.01 percent of the estimated $81.2 billion 2010 personal income in these counties (Table 23-6 and Table 23-15).

Overall, O&M of any of the action alternatives would generate 38 direct, indirect, and induced jobs and an estimated $2.3 million in personal income. These new jobs are expected to be filled from the local labor pool, and spending of personal income would result in local economic activity in Fresno County and Madera County. The increase in employment and personal income from O&M-related activities would be small in comparison to the regional economy.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-5: Increases in Spending, Employment, and Personal Income from Increased Recreational Visitation

Primary Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be constructed. However, projects to enhance and manage recreational resources, including those described in the Millerton Lake Resource Management Plan and General Plan, along with population growth in the region, would be expected to increase economic activity, including spending, employment, and personal income, in the Millerton Lake State Recreation Area.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Implementing any of the action alternatives would result in increases in recreation-related spending, employment, and personal income. New recreation participation in the region would be expected with creation of the Temperance Flat RM 274 Reservoir, and Millerton Lake recreational activities would benefit from higher and more constant lake levels during April, July, August, and September, when visitation could increase (see Chapter 22, "Recreation," for a detailed discussion of impacts associated with changes in recreation opportunities from implementing the action alternatives).

New recreation-related spending associated with increased recreation visitation under the action alternatives would generate $2.4 million under Alternative Plans 1, 2, and 3; $2.7 million under Alternative Plan 4; and $1.8 million under Alternative Plan 5 in direct, indirect, and induced income by spending of local and nonlocal visitors in food and convenience stores, eating and drinking establishments, gasoline and service stations, miscellaneous retail stores, and other establishments within Fresno and Madera counties. In turn, this spending by local and nonlocal visitors would directly generate an estimated 27 new jobs and six new indirect and induced jobs under Alternative Plans 1 and 2; 26 new jobs and six new indirect and induced jobs under Alternative Plan 3; 30 new jobs and seven new indirect and induced jobs under Alternative Plan 4; and 20 new jobs and five new indirect and induced jobs under Alternative Plan 5. These new jobs would generate an additional estimated $1.1 million (Alternative Plans 1, 2, and 3), $1.3 million (Alternative Plan 4), or $0.8

million (Alternative Plan 5) in personal income each year over the project's lifetime (Table 23-22).

Overall, increases in recreation visitation would generate spending by local and nonlocal visitors within Fresno County and Madera County, create new jobs, and generate personal income.

This impact would be **less than significant and beneficial** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-6: Increases in Population and Housing Demand Resulting from Operations and Maintenance

Primary Study Area

No Action Alternative Because none of the action alternatives would be constructed under the No Action Alternative, no O&M-related activities associated with the project would increase population and housing demand. The population and housing trends would be expected to follow current estimates described in the Affected Environment section. These trends indicate that the economies of the six-county area will continue to grow, increasing the local population, labor force, available jobs, personal income, housing, and revenues for local government services. It is anticipated that this growth would be consistent with the general plans of these counties.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Implementing any of the action alternatives would not result in increases in population and housing demand. O&M of the proposed Temperance Flat RM 274 Dam, intake structure, powerhouse, valve house, and permanent access roads would generate an estimated 38 direct, indirect, and induced jobs (see the discussion of Impact SOC-4), and new recreation visitation and spending associated with increased recreation visitation to Millerton Lake and the proposed Temperance Flat RM 274 Reservoir would generate between 25 and 37 direct, indirect, and induced jobs (see the discussion of Impact SOC-5).

Because the workers serving the project would be expected to come from nearby communities and cities in Fresno County and Madera County, it is anticipated that most of these new jobs would be filled by the existing workforce in the two counties. Even if some workers were to come from outside the

local area, sufficient housing capacity (e.g., rental housing and apartment vacancies) exists in the area to house these workers. Neither substantial population growth nor an increase in housing demand in the region would be anticipated with generation of these jobs. Therefore, the impact associated with increases in population and housing demand from O&M activities would be minimal.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-7: Increases in Business Income and Local Sales Tax Revenue Associated with O&M and Recreation Visitation

Primary Study Area

No Action Alternative Because none of the action alternatives would be constructed, implementing the No Action Alternative would not result in increases in business income and local sales tax revenue in Fresno and Madera counties from O&M-related activities and new spending associated with increased recreation visitation. The business income and sales tax revenue trends would be expected to follow current estimates described in the Affected Environment section. These trends indicate that the economies of the six-county area will continue to grow, increasing the local population, labor force, available jobs, personal income, housing, and revenues for local government services. It is anticipated that this growth would be consistent with the general plans of these counties.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives O&M-related activities associated with the action alternatives would generate an estimated $2.3 million in personal income, and new recreation-related jobs would generate an estimated $1.1 million (Alternative Plans 1, 2, and 3), $1.3 million (Alternative Plan 4), or $0.8 million (Alternative Plan 5) in personal income (see the discussions of Impacts SOC-4 and SOC-5). In total, implementing the action alternatives would result in an estimated $3.4-million (Alternative Plan 1, 2, or 3), $3.6-million (Alternative Plan 4), or $3.1-million (Alternative Plan 5) increase in personal income per year over the project's lifetime.

In addition to increases in personal income, O&M-related expenditures and spending associated with increased recreation visitation within Fresno County and Madera County would generate a substantial amount of revenue for local businesses. Direct expenditures for O&M are assumed to include the physical part components and other materials required for maintenance of new facilities. Indirect expenditures would consist of spending on goods and services by industries that produce items purchased as part of maintenance activities, and induced expenditures would consist of spending by the households of workers involved either directly or indirectly in maintenance. Implementing the action alternatives would be expected to generate more than $9.6 million per year in revenue for businesses in Fresno and Madera counties, with approximately $8.4 million in direct income and $1.2 million in indirect and induced income.

In addition, new recreation spending associated with increased recreation visitation would generate $2.4 million (Alternative Plans 1, 2, and 3), $2.7 million (Alternative Plan 4), or $1.8 million (Alternative Plan 5) in direct, indirect, and induced income. Increased revenues could be reinvested in existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways. In addition to the business income that would be generated from spending of personal income and construction expenditures, Fresno and Madera counties would receive substantial local sales tax revenues on expenses related to taxable sales. Under California tax regulations, Fresno and Madera counties could receive sales tax revenues equal to 1 percent of total taxable sales spending. The exact amount of local sales tax revenue increases has not yet been calculated; however, this additional spending would result in an increase in local sales tax revenues.

This impact would be **less than significant and beneficial** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-8: Decreases in Property Tax Revenue from Acquisition of Privately Owned Land

Primary Study Area

No Action Alternative Because project implementation would not occur under the No Action Alternative, the permanent decrease in property tax revenue in Fresno County or Madera

County associated with acquiring privately owned land in the primary study area for project purposes would not occur.

There would be **no impact** under the No Action Alternative.

Action Alternatives Implementing any of the action alternatives would require acquiring approximately 170 acres of privately owned land in the primary study area in Fresno County and 110 acres of privately owned land in Madera County for project purposes.

If these properties are acquired in fee title, they would be removed from local tax rolls. The property tax and assessment revenue that could be lost as a result of property acquisition has not yet been calculated because the extent of fee title acquisition is not known at this time; however, the decreases in revenue would result in the loss of a portion of Fresno County tax revenues over the project's lifetime. The right to use other private lands needed for project purposes might be acquired through establishing rights-of-way or easements. The use of these mechanisms would not reduce property tax and assessment revenues to the counties.

More than $184 million in property tax revenue was generated in Fresno County and about $31.5 million was generated in Madera County during the 2009–2010 fiscal year (Table 23-11 and Table 23-12). Although a decrease in property tax revenue would occur with implementation of any of the action alternatives, the decrease would be small in comparison to the total property tax revenue generated in these counties. In addition, as discussed for Impact SOC-7, operations and maintenance activities and new spending associated with increased recreation visitation would generate business income and local sales tax revenue in Fresno County and Madera County that would offset reduced property tax revenues. Therefore, the reduction in tax revenues associated with the permanent acquisition of private property for the project would be minor.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-9: Impacts on Agricultural Economics in the CVP and SWP Water Service Areas

Extended Study Area

No Action Alternative Under the No Action Alternative, Temperance Flat RM 274 Dam would not be constructed, and water supply and flood storage operations at Friant Dam would not change. Therefore, there would be no increase in surface water supply reliability from Millerton Lake. Agricultural production costs and income in the CVP and SWP water service areas would follow the current trends described in the Affected Environment section.

Many SOD CVP and SWP water users have been subjected to reduced water deliveries because of regulatory restrictions on CVP and SWP facility operations. In addition, local groundwater levels have declined, resulting in reduced groundwater supplies or increased extraction costs. These and other factors have adversely affected the agricultural economics of CVP and SWP water users, resulting in increased economic hardship and stress.

Without implementation of any of the action alternatives, the losses of agricultural economic activity, jobs, and tax revenues would continue. It is expected that as economic stress continues, there would be continued impact on agricultural economic activity, jobs, personal spending, and tax revenues.

This impact would be **significant** under the No Action Alternative.

Alternative Plan 1 Improved surface water reliability expected to result from implementing Alternative Plan 1 would result in less crop idling, thereby increasing agricultural production and net income. Within the CVP and SWP water service areas, the increased surface water reliability would provide the greatest economic benefits to agricultural water users in the six-county area. Other agricultural water users in the CVP and SWP water service areas would also benefit from increased surface water reliability; however, these economic impacts would be dispersed over the 36 counties that are served by the CVP and SWP and would be less discernible to a single jurisdiction. The additional agricultural industry revenue would result in direct, indirect, and induced economic benefits to the six-county area and the State. SWAP modeling indicates that implementing Alternative Plan 1 would increase the net agricultural industry revenue by approximately $4.5 million per

year in the six-county area and $4.1 million per year in the State over the project's lifetime. In 2010, the estimated crop value in the six-county area was approximately $22.5 billion and in the State as a whole was approximately $39.4 billion (Caltrans 2013c). This agricultural industry revenue from increased crop production would be small when compared to the overall agricultural industry revenue within the six-county area and the State.

To support the increased agricultural production expected from implementing Alternative Plan 1, additional agricultural workers would be needed. The increase in surface water supply reliability has the potential to result in less crop idling and greater agricultural production in the six-county area. This would enable existing employees to work for a longer period in the fields, while also increasing the total workers needed during the growing season. IMPLAN estimates that 35 agricultural workers would be needed to support additional crop production in the six-county area, and that 32 agricultural workers would be needed to support additional crop production in the State (Table 23-23 and Table 23-24).

An additional estimated $8.8 million and 76 new indirect and induced jobs would be generated in the six-county area, and $10.7 million and 70 new indirect and induced jobs would be generated in the State through purchases from businesses that support the agricultural industry, such as farm and equipment supply stores and from businesses that earn their income by selling, transporting, storing, marketing, and processing agricultural products (Table 23-23 and Table 23-24).

Overall, the total 110 direct, indirect, and induced jobs in the six-county area and the 102 indirect, and induced jobs in the State represent a small increase in the total labor force in the six-county region (approximately 1,260,000 employees in 2010) and State as a whole (18,316,000 employees in 2010), but the employment opportunities created by implementing Alternative Plan 1 represent a substantial contribution in counties that have high unemployment rates. Within the six-county area, the 2010 unemployment rates exceeded 15 percent in each county, and the unemployment rate in the State exceeded 12 percent (Table 23-16). These new jobs are expected to provide employment opportunities to many unemployed workers.

Implementing Alternative Plan 1 would generate personal income through payment of wages to agricultural workers and

employees in agriculture-related businesses. An estimated $1.2 million would be directly paid each year to the approximately 35 agricultural workers in the six-county area over the project's lifetime. The additional 76 indirect and induced jobs would generate an additional estimated $3.1 million in personal income per year.

Within the State, an estimated $1.1 million would be directly paid to the approximately 32 agricultural workers, and the additional 70 jobs would generate an additional estimated $3.6 million in personal income per year over the project's lifetime. Taken together, it is expected that agriculture-related direct, indirect, and induced personal income resulting from implementing Alternative Plan 1 would be approximately $4.3 million per year in the six-county area and $4.7 million per year in the State over the project's lifetime. This represents a small increase in the 2010 personal income ($48.6 billion) within the six-county area and the State ($1,558.7 billion) (Table 23-15).

Overall, implementing Alternative Plan 1 would generate $4.5 million in new agricultural industry revenue from increased crop production on existing agricultural lands in the six-county area; generate $8.8 million in indirect and induced income from agriculture-related spending; create 110 direct, indirect, and induced jobs; and generate an estimated $4.3 million in direct, indirect, and induced personal income. Within the CVP and State, implementing Alternative Plan 1 would generate $4.1 million in new agricultural industry revenue from increased crop production on existing agricultural lands; generate $10.7 million in indirect and induced income from agriculture-related spending; create 102 direct, indirect, and induced jobs; and generate an estimated $4.7 million in direct, indirect, and induced personal income.

The direct, indirect, and induced agriculture-related income and spending would represent new local economic activity and provide employment opportunities to many unemployed workers in the six-county area and the State.

This impact would be **less than significant and beneficial** under Alternative Plan 1. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 2 The effects of improved water supply reliability in the CVP and SWP water service areas associated

with Alternative Plan 2 would be similar to but slightly less than those under Alternative Plan 1.

SWAP modeling indicates the net agricultural industry revenue would increase by approximately $4.0 million per year in the six-county area and $3.6 million per year in the State over the project's lifetime under Alternative Plan 2. This new agricultural industry revenue would be less than under Alternative Plan 1 ($4.5 million in the six-county area and $4.1 million in the State). In 2010, the estimated crop value in the six-county area was approximately $22.5 billion and in the State as a whole was approximately $39.4 billion. This agricultural industry revenue from increased crop production would be small when compared to the overall agricultural industry revenue within the six-county area and the State (Caltrans 2013c).

To support the increased agricultural production expected from implementing Alternative Plan 2, more agricultural workers would be needed. IMPLAN estimates that 40 agricultural workers would be needed to support additional crop production in the six-county area and that 34 agricultural workers would be needed to support additional crop production in the State. An additional $8.6 million in indirect and induced income and 73 new indirect and induced jobs in the six-county area and $10.4 million in indirect and induced income and 67 new indirect and induced jobs in the State would be generated from spending in agriculture-related and service-oriented businesses that support the agriculture industry (Table 23-23 and Table 23-24).

Overall, the total 113 and 101 direct, indirect, and induced jobs in the six-county area and the State, respectively, represent a small increase in the total labor force in the six-county region and State as a whole, but the employment opportunities created by implementing Alternative Plan 2 represent a substantial contribution in counties that have high unemployment rates. Within the six-county area, the 2010 unemployment rates exceeded 15 percent in each county, and the unemployment rate in the State exceeded 12 percent (Table 23-16). These new jobs are expected to provide employment opportunities to many unemployed workers.

Implementing Alternative Plan 2 would generate personal income through payment of wages to agricultural workers and employees in agriculture-related businesses. An estimated $0.9 million would be directly paid each year to the approximately

40 agricultural workers in the six-county area over the project's lifetime. The additional 73 indirect and induced jobs would generate an additional estimated $3.0 million in personal income per year. Within the State an estimated $0.7 million would be directly paid to the approximately 34 agricultural workers, and the additional 67 jobs would generate an additional estimated $3.5 million in personal income per year over the project's lifetime.

Taken together, it is expected that agriculture-related direct, indirect, and induced personal income resulting from implementing Alternative Plan 2 would be approximately $3.9 million per year within the six-county area and $4.2 million per year in the State over the project's lifetime. This represents a small increase in the 2010 personal income ($48.6 billion) within the six-county area and the State ($1,558.7 billion) (Table 23-15).

Overall, implementing Alternative Plan 2 would generate $4.0 million in new agricultural industry revenue from increased crop production on existing agricultural lands in the six-county area; generate $8.6 million in indirect and induced income from agriculture-related spending; create 113 direct, indirect; and induced jobs, and generate an estimated $3.9 million in direct, indirect, and induced personal income. Within the State, implementing Alternative Plan 2 would generate $3.6 million in new agricultural industry revenue from increased crop production on existing agricultural lands; generate $10.4 million in indirect and induced income from agriculture-related spending; create 101 direct, indirect, and induced jobs; and generate an estimated $4.2 million in direct, indirect, and induced personal income.

The direct, indirect, and induced agriculture-related income and spending would represent new local economic activity and provide employment opportunities to many unemployed workers in the six-county area and in the State.

This impact would be **less than significant and beneficial** under Alternative Plan 2. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 3 The effects of improved water supply reliability in the CVP and SWP water service areas associated with Alternative Plan 3 would be similar to but slightly less than those under Alternative Plan 1 and greater than Alternative Plan 2.

SWAP modeling indicates the net agricultural industry revenue would increase by approximately $4.2 million per year in the six-county area and $3.7 million per year in the State over the project's lifetime under Alternative Plan 3. This new agricultural industry revenue would be less than under Alternative Plan 1 ($4.5 million in the six-county area and $4.1 million in the State). In 2010, the estimated crop value in the six-county area was approximately $22.5 billion and in the State as a whole was approximately $39.4 billion. This agricultural industry revenue from increased crop production would be small when compared to the overall agricultural industry revenue within the six-county area and the State (Caltrans 2013c).

To support the increased agricultural production expected from implementing Alternative Plan 3, more agricultural workers would be needed. IMPLAN estimates that 42 agricultural workers would be needed to support additional crop production in the six-county area and that 36 agricultural workers would be needed to support additional crop production in the State. An additional $8.9 million in indirect and induced income and 76 new indirect and induced jobs in the six-county area and $10.8 million in indirect and induced income and 69 new indirect and induced jobs in the State would be generated from spending in agriculture-related and service-oriented businesses that support the agriculture industry (Table 23-23 and Table 23-24).

Overall, the total 118 and 101 direct, indirect, and induced jobs in the six-county area and the State, respectively, represent a small increase in the total labor force in the six-county region and State as a whole, but the employment opportunities created by implementing Alternative Plan 3 represent a substantial contribution in counties that have high unemployment rates. Within the six-county area, the 2010 unemployment rates exceeded 15 percent in each county, and the unemployment rate in the State exceeded 12 percent (Table 23-16. These new jobs are expected to provide employment opportunities to many unemployed workers.

Implementing Alternative Plan 3 would generate personal income through payment of wages to agricultural workers and employees in agriculture-related businesses. An estimated $0.9 million would be directly paid each year to the approximately 42 agricultural workers in the six-county area over the project's lifetime. The additional 76 indirect and induced jobs would generate an additional estimated $3.1 million in personal

income per year. Within the State an estimated $0.7 million would be directly paid to the approximately 36 agricultural workers, and the additional 69 jobs would generate an additional estimated $3.6 million in personal income per year over the project's lifetime.

Taken together, it is expected that agriculture-related direct, indirect, and induced personal income resulting from implementing Alternative Plan 3 would be approximately $4.0 million per year within the six-county area and $4.4 million per year in the State over the project's lifetime. This represents a small increase in the 2010 personal income ($48.6 billion) within the six-county area and the State ($1,558.7 billion) (Table 23-15).

Overall, implementing Alternative Plan 3 would generate $4.2 million in new agricultural industry revenue from increased crop production on existing agricultural lands in the six-county area; generate $8.9 million in indirect and induced income from agriculture-related spending; create 118 direct, indirect; and induced jobs, and generate an estimated $4.0 million in direct, indirect, and induced personal income. Within the State, implementing Alternative Plan 3 would generate $3.7 million in new agricultural industry revenue from increased crop production on existing agricultural lands; generate $10.8 million in indirect and induced income from agriculture-related spending; create 106 direct, indirect, and induced jobs; and generate an estimated $4.4 million in direct, indirect, and induced personal income.

Total direct, indirect, and induced agriculture-related income ($13.1 million), employment (113 jobs), and personal income ($3.9 million) in the six-county area under Alternative Plan 3 would be less than under Alternative Plan 1 ($13.3 million in agriculture-related income, 110 jobs, and $4.3 million in personal income per year) and greater than Alternative Plan 2 ($12.6 million in agriculture-related income, 113 jobs, and $3.9 million in personal income).

The direct, indirect, and induced agriculture-related income and spending would represent new local economic activity and provide employment opportunities to many unemployed workers in the six-county area and in the State.

This impact would be **less than significant and beneficial** under Alternative Plan 3. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 4 The effects of improved water supply reliability in the CVP and SWP water service areas associated with implementing Alternative Plan 4 would be similar to but slightly less than under Alternative Plan 1, 2, or 3. SWAP modeling indicates that implementing Alternative Plan 4 would increase the net agricultural industry revenue by approximately $3.0 million per year in the six-county area and $2.7 million per year in the State over the project's lifetime. In 2010, the estimated crop value in the six-county area was approximately $22.5 billion and in the State as a whole was approximately $39.4 billion.

To support the increased agricultural production expected from implementing Alternative Plan 4, additional agricultural workers would be needed. IMPLAN estimates that 28 agricultural workers would be needed to support additional crop production in the six-county area and that 24 agricultural workers would be needed to support additional crop production in the State. An additional $7.2 million in indirect and induced income and 62 new indirect and induced jobs in the six-county area and $8.7 million and 56 new indirect and induced jobs in the State would be generated from spending in agriculture-related and service-oriented businesses that support the agriculture industry (Table 23-23 and Table 23-24).

Overall, the total 89 and 80 direct, indirect, and induced jobs in the six-county area and the State, respectively, represent a small increase in the total labor force in the six-county region (approximately 1,135,500 employees in 2010) and State as a whole (16,051,500 employees in 2010), but the employment opportunities created by Alternative Plan 4 represent a substantial contribution in counties that have high unemployment rates. Within the six-county area, the 2010 unemployment rates exceeded 15 percent in each county, and the unemployment rate in the State exceeded 12 percent (Table 23-16). These new jobs are expected to provide employment opportunities to many unemployed workers.

Implementing Alternative Plan 4 would generate personal income through payment of wages to agricultural workers and employees in agriculture-related businesses. An estimated $0.7 million would be paid annually to the approximately 28 agricultural workers in the six-county area over the project's lifetime. The additional 62 indirect and induced jobs would generate an additional estimated $2.5 million in personal income per year. Within the State, an estimated $0.6 million would be directly paid to the approximately 24 agricultural

workers, and the additional 56 jobs would generate an additional estimated $2.9 million in personal income per year over the project's lifetime.

Taken together, it is expected that agriculture-related direct, indirect, and induced personal income resulting from implementing Alternative Plan 4 would be approximately $3.2 million per year within the six-county area and $3.5 million per year in the State over the project's lifetime. This represents a small increase in the 2010 personal income within the six-county area ($48.6 billion) and the State ($1,558.7 billion) (Table 23-6 and Table 23-15).

Overall, implementing Alternative Plan 4 would generate $3.0 million in new agricultural industry revenue from increased crop production on existing agricultural lands in the six-county area; generate $7.2 million in indirect and induced income from agriculture-related spending; create 89 direct, indirect, and induced jobs, and generate an estimated $3.2 million in direct, indirect, and induced personal income. Within the State, implementing Alternative Plan 4 would generate $2.7 million in new agricultural industry revenue from increased crop production on existing agricultural lands; generate $8.7 million in indirect and induced income from agriculture-related spending; create 80 direct, indirect, and induced jobs; and generate an estimated $3.5 million in direct, indirect, and induced personal income.

Total direct, indirect, and induced agriculture-related income ($10.2 million), employment (89 jobs), and personal income ($3.2 million) in the six-county area under Alternative Plan 4 would be less than under Alternative Plan 1 ($13.3 million in agriculture-related income, 110 jobs, and $4.3 million in personal income per year); and Alternative Plan 2 ($12.6 million in agriculture-related income, 113 jobs, and $3.9 million in personal income) and Alternative Plan 3 ($13.1 million in agriculture-related income, 118 jobs, and $4.0 million in personal income).

The direct, indirect, and induced agriculture-related income and spending would represent new local economic activity and provide employment opportunities to many unemployed workers in the six-county area and in the State.

This impact would be **less than significant and beneficial** under Alternative Plan 4. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 5 The effects of improved water supply reliability in the CVP and SWP water service areas associated with implementing Alternative Plan 5 would be greater than under Alternative Plan 1, 2, 3, or 4. SWAP modeling indicates that implementing Alternative Plan 5 would increase the net agricultural industry revenue by approximately $5.5 million per year in the six-county area and $5.0 million per year in the State over the project's lifetime. In 2010, the estimated crop value in the six-county area was approximately $22.5 billion and in the State as a whole was approximately $39.4 billion.

To support the increased agricultural production expected from implementing Alternative Plan 5, additional agricultural workers would be needed. IMPLAN estimates that 62 agricultural workers would be needed to support additional crop production in the six-county area and that 53 agricultural workers would be needed to support additional crop production in the State. An additional $11.8 million in indirect and induced income and 100 new indirect and induced jobs in the six-county area and $14.4 million and 92 new indirect and induced jobs in the State would be generated from spending in agriculture-related and service-oriented businesses that support the agriculture industry (Table 23-23 and Table 23-24).

Overall, the total 162 and 145 direct, indirect, and induced jobs in the six-county area and the State, respectively, represent a small increase in the total labor force in the six-county region (approximately 1,135,500 employees in 2010) and State as a whole (16,051,500 employees in 2010), but the employment opportunities created by Alternative Plan 5 represent a substantial contribution in counties that have high unemployment rates. Within the six-county area, the 2010 unemployment rates exceeded 15 percent in each county, and the unemployment rate in the State exceeded 12 percent (Table 23-16). These new jobs are expected to provide employment opportunities to many unemployed workers.

Implementing Alternative Plan 5 would generate personal income through payment of wages to agricultural workers and employees in agriculture-related businesses. An estimated $1.1 million would be paid annually to the approximately 62 agricultural workers in the six-county area over the project's lifetime. The additional 100 indirect and induced jobs would generate an additional estimated $4.1 million in personal income per year. Within the State, an estimated $0.9 million would be directly paid to the approximately 53 agricultural workers, and the additional 92 jobs would generate an

additional estimated $4.8 million in personal income per year over the project's lifetime.

Taken together, it is expected that agriculture-related direct, indirect, and induced personal income resulting from implementing Alternative Plan 5 would be approximately $5.2 million per year within the six-county area and $5.7 million per year in the State over the project's lifetime. This represents a small increase in the 2010 personal income within the six-county area ($48.6 billion) and the State ($1,558.7 billion) (Table 23-6 and Table 23-15).

Overall, implementing Alternative Plan 5 would generate $5.5 million in new agricultural industry revenue from increased crop production on existing agricultural lands in the six-county area; generate $11.8 million in indirect and induced income from agriculture-related spending; create 162 direct, indirect, and induced jobs; and generate an estimated $5.2 million in direct, indirect, and induced personal income. Within the State, implementing Alternative Plan 4 would generate $5.0 million in new agricultural industry revenue from increased crop production on existing agricultural lands; generate $14.4 million in indirect and induced income from agriculture-related spending; create 145 direct, indirect, and induced jobs; and generate an estimated $5.7 million in direct, indirect, and induced personal income.

Total direct, indirect, and induced agriculture-related income ($17.3 million), employment (162 jobs), and personal income ($5.2 million) in the six-county area under Alternative Plan 5 would be greater than under Alternative Plan 1 ($13.3 million in agriculture-related income, 110 jobs, and $4.3 million in personal income per year); and Alternative Plan 2 ($12.6 million in agriculture-related income, 113 jobs, and $3.9 million in personal income); Alternative Plan 3 ($13.1 million in agriculture-related income, 118 jobs, and $4.0 million in personal income); and Alternative Plan 4 ($10.2 million in agriculture-related income, 89 jobs, and $3.2 million in personal income per year).

The direct, indirect, and induced agriculture-related income and spending would represent new local economic activity and provide employment opportunities to many unemployed workers in the six-county area and in the State.

This impact would be **less than significant and beneficial** under Alternative Plan 5. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-10: Increases in Population and Housing Demand Within the CVP and SWP Water Service Areas

Extended Study Area

No Action Alternative Under the No Action Alternative, there would be no increase in surface water supply reliability from Temperance Flat RM 274 Reservoir and Millerton Lake. Crop idling in the CVP and SWP water service areas and agricultural production would be similar to existing conditions. No direct, indirect, or induced employment would occur from the project, and the population and housing conditions would be expected to follow the current trends described in the Affected Environment section.

This impact would be **less than significant** under the No Action Alternative.

Alternative Plan 1 Implementing Alternative Plan 1 would generate an estimated 110 direct, indirect, and induced jobs in the six-county area. Even if some workers were to come from outside this area, sufficient housing capacity (e.g., rental housing and apartment vacancies) exists in the six-county area to house them. Vacancy rates in the six-county region were generally higher than the State average (5.9 percent), ranging from 6.0 percent in Kings County up to 10.5 percent in Kern County (Table 23-13). Furthermore, if nonlocal agricultural workers were employed, the seasonal nature of the work supports the conclusion that these workers would not typically change residences. Therefore, substantial impacts on population and housing in the six-county region are not expected.

Within the State, implementing Alternative Plan 1 would generate an estimated 102 direct, indirect, and induced jobs. These jobs would be dispersed over a broader geographical area and not concentrated in any single county. Therefore, this increase in jobs would have essentially no impact on population and housing in the State.

Because workers serving the project could be expected to come from nearby communities and cities in the six-county area, neither substantial population growth nor an increase in

housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plan 1. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 2 Implementing Alternative Plan 2 would generate an estimated 113 direct, indirect, and induced jobs in the six-county area, which would be three more jobs than generated under Alternative Plan 1. Even if some workers were to come from outside this area, sufficient housing capacity exists in the six-county area to house them. Vacancy rates in the six-county region were generally higher than the State average (5.9 percent), ranging from 6.0 percent in Kings County up to 10.5 percent in Kern County (Table 23-13). Furthermore, if nonlocal agricultural workers were employed, the seasonal nature of the work supports the conclusion that these workers would not typically change residences. Therefore, substantial impacts on population and housing in the six-county region are not expected.

Within the State, implementing Alternative Plan 2 would generate an estimated 101 direct, indirect, and induced jobs, which would be one fewer jobs than would be generated under Alternative Plan 1. These jobs would be dispersed over a greater geographical area and not concentrated in any one county. Therefore, this increase in jobs would have essentially no impact on population and housing in the State.

Because workers serving the project could be expected to come from nearby communities and cities in the six-county area, neither substantial population growth nor an increase in housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plan 2. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 3 Implementing Alternative Plan 3 would generate an estimated 118 direct, indirect, and induced jobs in the six-county area, which would be eight more jobs than generated under Alternative Plan 1 and five more jobs than generated under Alternative Plan 2. Even if some workers were to come from outside this area, sufficient housing capacity exists in the six-county area to house them. Vacancy rates in

the six-county region were generally higher than the State average (5.9 percent), ranging from 6.0 percent in Kings County up to 10.5 percent in Kern County (Table 23-13). Furthermore, if nonlocal agricultural workers were employed, the seasonal nature of the work supports the conclusion that these workers would not typically change residences. Therefore, substantial impacts on population and housing in the six-county region are not expected.

Within the State, implementing Alternative Plan 3 would generate an estimated 106 direct, indirect, and induced jobs, which would be four more jobs than would be generated under Alternative Plan 1 and five more jobs than generated under Alternative Plan 2. These jobs would be dispersed over a greater geographical area and not concentrated in any one county. Therefore, this increase in jobs would have essentially no impact on population and housing in the State.

Because workers serving the project could be expected to come from nearby communities and cities in the six-county area, neither substantial population growth nor an increase in housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plan 3. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 4 Implementing Alternative Plan 4 would generate an estimated 89 direct, indirect, and induced jobs six-county area, which would be approximately 21 fewer jobs than would be generated under Alternative Plan 1, 24 fewer jobs than generated under Alternative 2, and 29 fewer jobs than would be generated under Alternative Plan 3. Even if some workers were to come from outside this area, sufficient housing capacity exists in the six-county area to house them. Vacancy rates in the six-county region were generally higher than the State average (5.9 percent), ranging from 6.0 percent in Kings County up to 10.5 percent in Kern County (Table 23-13). Furthermore, if nonlocal agricultural workers were employed, the seasonal nature of the work supports the conclusion that these workers would not typically change residences. Therefore, substantial impacts on population and housing in the six-county region are not expected.

Within the State, implementing Alternative Plan 4 would generate an estimated 80 direct, indirect, and induced jobs,

which would be 22 fewer jobs than would be generated under Alternative Plan 1, 21 fewer jobs than generated under Alternative Plan 2, and 26 fewer jobs than would be generated under Alternative Plan 3. These jobs would be dispersed over a greater geographical area and not concentrated in any one county. Therefore, this increase in jobs would have essentially no impact on population and housing in the six-county area or the State.

Because workers serving the project could be expected to come from nearby communities and cities in the six-county area, neither substantial population growth nor an increase in housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plan 4. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 5 Implementing Alternative Plan 5 would generate an estimated 162 direct, indirect, and induced jobs six-county area. This would be approximately 52 more jobs than would be generated under Alternative Plan 1, 49 more jobs than generated under Alternative 2, 44 more jobs than would be generated under Alternative Plan 3, and 73 more jobs than generated under Alternative 4. Even if some workers were to come from outside this area, sufficient housing capacity exists in the six-county area to house them. Vacancy rates in the six-county region were generally higher than the State average (5.9 percent), ranging from 6.0 percent in Kings County up to 10.5 percent in Kern County (Table 23-13). Furthermore, if nonlocal agricultural workers were employed, the seasonal nature of the work supports the conclusion that these workers would not typically change residences. Therefore, substantial impacts on population and housing in the six-county region are not expected.

Within the State, implementing Alternative Plan 5 would generate an estimated 145 direct, indirect, and induced jobs. This would be 43 more jobs than would be generated under Alternative Plan 1, 44 more jobs than generated under Alternative Plan 2, 39 more jobs than would be generated under Alternative Plan 3, and 65 more jobs than generated under Alternative Plan 4. These jobs would be dispersed over a greater geographical area and not concentrated in any one county. Therefore, this increase in jobs would have essentially

no impact on population and housing in the six-county area or the State.

Because workers serving the project could be expected to come from nearby communities and cities in the six-county area, neither substantial population growth nor an increase in housing demand in the region is anticipated following generation of these jobs.

This impact would be **less than significant** under Alternative Plan 5. Mitigation for this impact is not needed and thus not proposed.

Impact SOC-11: Increases in Business Income and Local Sales Tax Revenue Within the CVP and SWP Water Service Areas

Extended Study Area

No Action Alternative As discussed under Impact SOC-9, reduced groundwater supplies or increased extraction costs have adversely affected the agricultural economics of CVP and SWP water users, resulting in increased economic hardship and stress.

Without implementation of any of the action alternatives, the losses of agricultural economic activity and personal income would continue, resulting in the loss of business incomes or local tax revenues.

This impact would be **significant** under the No Action Alternative.

Alternative Plan 1 Implementing Alternative Plan 1 would be expected to generate an estimated $4.3 million in total personal income per year in the six-county area and $4.7 million in personal income per year in the State over the project's lifetime. In addition to this increase in personal income, implementing Alternative Plan 1 would be expected to generate approximately $13.3 million per year in the six-county area and $14.8 million per year in the State from new agricultural income related to increased crop production on existing agricultural lands and increased agriculture-related spending. Increased sales could be reinvested in existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways.

In addition to this increase in business income, the six-county area and the State would receive substantial local sales tax revenues on increased expenses related to taxable sales. Under California tax regulations these counties could receive sales tax revenues equal to 1 percent of total taxable sales spending.

This impact would be **less than significant and beneficial** under Alternative Plan 1. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 2 Implementing Alternative Plan 2 would be expected to generate an estimated $3.9 million in total personal income per year in the six-county area and $4.2 million in personal income in the State over the project's lifetime. In addition to this increase in personal income, implementing Alternative Plan 2 would be expected to generate approximately $12.6 million per year in the six-county area and $13.9 million per year in the State from new agricultural income related to increased crop production on existing agricultural lands and increased agriculture-related spending. Increased sales could be reinvested in existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways.

In addition to this increase in business income, the six-county area and the State would receive substantial local sales tax revenues on increased expenses related to taxable sales. Under California tax regulations these counties could receive sales tax revenues equal to 1 percent of total taxable sales spending.

This impact would be **less than significant and beneficial** under Alternative Plan 2. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 3 Implementing Alternative Plan 3 would be expected to generate an estimated $4.0 million in total personal income per year in the six-county area and $4.4 million in personal income in the State over the project's lifetime. In addition to this increase in personal income, implementing Alternative Plan 3 would be expected to generate approximately $13.1 million per year in the six-county area and $14.5 million per year in the State from new agricultural income related to increased crop production on existing agricultural lands and increased agriculture-related spending. Increased sales could be reinvested in existing businesses, invested in new ventures or diversification, translated into

increased salaries and wages for employees, or used in other ways.

In addition to this increase in business income, the six-county area and the State would receive substantial local sales tax revenues on increased expenses related to taxable sales. Under California tax regulations, these counties could receive sales tax revenues equal to 1 percent of total taxable sales spending.

This impact would be **less than significant and beneficial** under Alternative Plan 3. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 4 Implementing Alternative Plan 4 would be expected to generate an estimated $3.2 million in total personal income per year in the six-county area and $3.5 million in personal income per year in the State over the project's lifetime. In addition to this increase in personal income, implementing Alternative Plan 4 would be expected to generate approximately $10.2 million per year in the six-county area and $11.4 million per year in the State from new agricultural income related to increased crop production on existing agricultural lands and increased agriculture-related spending. Increased sales could be reinvested in existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways.

In addition to this increase in business income, the six-county area and the State would receive substantial local sales tax revenues on increased expenses related to taxable sales. Under California tax regulations these counties could receive sales tax revenues equal to 1 percent of total taxable sales spending.

This impact would be **less than significant and beneficial** under Alternative Plan 4. Mitigation for this impact is not needed and thus not proposed.

Alternative Plan 5 Implementing Alternative Plan 5 would be expected to generate an estimated $5.2 million in total personal income per year in the six-county area and $5.7 million in personal income per year in the State over the project's lifetime. In addition to this increase in personal income, implementing Alternative Plan 4 would be expected to generate approximately $17.3 million per year in the six-county area and $19.4 million per year in the State from new agricultural income related to increased crop production on existing

agricultural lands and increased agriculture-related spending. Increased sales could be reinvested in existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways.

In addition to this increase in business income, the six-county area and the State would receive substantial local sales tax revenues on increased expenses related to taxable sales. Under California tax regulations, these counties could receive sales tax revenues equal to 1 percent of total taxable sales spending.

This impact would be **less than significant and beneficial** under Alternative Plan 5. Mitigation for this impact is not needed and thus not proposed.

Mitigation Measures

No mitigation measures are required for Action Alternatives 1-5 because impact conclusions are either no impact, less than significant, or less than significant and beneficial within the primary study area and extended study area.

Chapter 24
Transportation, Circulation, and Infrastructure

This chapter describes the affected environment for transportation, circulation, and associated infrastructure, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. This chapter presents information on the primary study area (area of project features, the Temperance Flat Reservoir Area, and Millerton Lake below RM 274). It also discusses the extended study area (San Joaquin River from Friant Dam to the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas).

Affected Environment

The affected environment for transportation, circulation, and infrastructure includes discussion of existing traffic conditions and the roadways, bicycle facilities, public transit opportunities, railroads, water navigation opportunities, and airports primarily within the primary study area.

Primary Study Area

Roadways

Roadways in the primary study area are described as highways, arterials, collectors, and local roads, according to Fresno County and Madera County definitions (Fresno County 2000, Madera County 1995), and functional classifications are set by Caltrans and the FHWA. Key roadways in the primary study area that are likely to be affected by project-related traffic are listed below and shown in Figure 24-1.

SR 99 varies between a four-lane and six-lane highway and is located west of the primary study area. SR 99 joins Interstate 5 (I-5) south of the City of Bakersfield and continues north into Madera County. Freeway interchanges near the primary study area include those at SR 41, Herndon Avenue, and 4th Street.

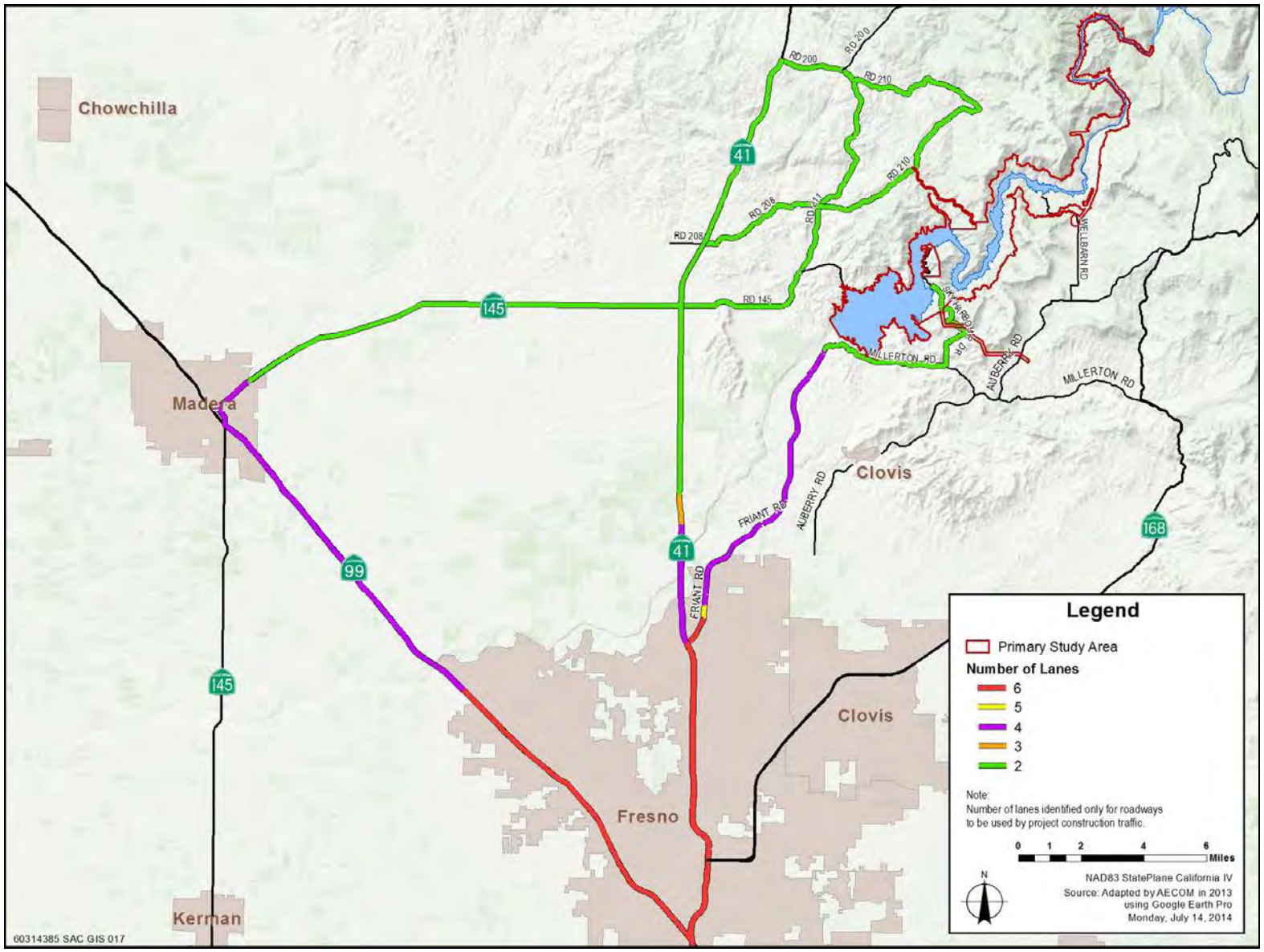

Figure 24-1. Construction Traffic Routes in the Vicinity of the Primary Study Area

SR 41 is a two-lane highway in Madera County and varies between a four- and six-lane highway in Fresno County. It is located west of the primary study area. SR 41 joins SR 99 within the City of Fresno and continues north into Madera County. Roadways that could be accessed from SR 41 toward the primary study area include Friant Road, Road 145, and North Fork Road.

SR 145 begins in Fresno County at I-5 and ends at SR 41 in Madera County. East of SR 41, SR 145 becomes Road 145. Road 145 leads to recreational facilities in the Millerton Lake SRA. SR 145 has two lanes with paved shoulders near SR 41.

Friant Road begins in the City of Fresno and continues north into Fresno County, connecting Millerton Road in the north to SR 41 in the south. Friant Road varies between two and six lanes wide. Within the City of Fresno, Friant Road is a divided roadway that varies between four and six lanes and has a curb, gutter, and sidewalk along both sides of the roadway. North of the City of Fresno, Friant Road has two lanes with soft shoulders between Copper Avenue and Willow Avenue. Between Willow Avenue and Lost Lake Road, it is a four-lane divided road, and between Lost Lake Road and North Fork Road, it is a two-lane rural roadway.

Millerton Road is located south of Millerton Lake and connects the community of Friant with Auberry Road. Millerton Road has two lanes with soft shoulders. The posted speed limit along the roadway is 50 miles per hour (mph). Parking is not allowed along the roadway. Millerton Road would provide access to the transmission line corridor proposed in the southwestern portion of the primary study area.

Sky Harbour Road begins at Millerton Road and continues north to the South Finegold picnic area within the Millerton Lake SRA. It has two lanes with no shoulders. Sky Harbour Road would provide access to the potential haul routes used during construction of the project.

Auberry Road begins in Fresno County at Copper Avenue and continues into the community of Auberry. It is generally a two-lane road with soft shoulders. The speed limit along the roadway is 50 mph, and parking is not allowed on either side of the roadway.

North Fork Road runs between SR 41 and Road 222 within Madera County. It is also known as Road 200. North Fork Road is a two-lane roadway with paved shoulders.

Road 206 extends between Road 145 and Friant Road. It leads to recreational facilities in the Millerton Lake SRA. Road 206 has two lanes with soft shoulders.

Road 208 extends between SR 145 and Road 210. It is also known as Wide Awake Ranch Road west of SR 41. Road 208 is a two-lane roadway with no shoulders.

Road 210 extends between Road 211 and North Fork Road. It has two lanes with no shoulders. Portions of Road 210, east of Road 216 are unpaved. Road 210 would provide access to the potential haul routes used during project construction.

Wellbarn Road extends from Auberry Road and provides access to Temperance Flat. It is a two-lane roadway with soft shoulders. Wellbarn Road would provide access to to new recreational features and to the relocated transmission line corridor proposed in the northeast portion of the primary study area.

Powerhouse Road extends from Auberry Road in Fresno County to Road 222 in Madera County. It connects Madera County with Fresno County via a bridge across Kerckhoff Lake. Powerhouse Road has two lanes with soft shoulders.

In addition, other roads within the primary study area are located on land owned by BLM. Some of these roads are designated as motorized routes, such as Smalley Road, and others are designated as nonmotorized routes. Specific roads located on lands managed by BLM are depicted in travel management maps prepared as part of ongoing BLM land management activities (BLM 2011). No special restrictions have been assigned to these roads as part of current resource management plans.

Operation of the roadway system is typically described in terms of level of service (LOS). LOS is a quantitative indication of the level of delay and congestion experienced by motorists. LOS is designated by the letters “A” through “F,” with “A” corresponding to the lowest level of congestion and “F” corresponding to the highest level of congestion.

The LOS methodology used to analyze the operational conditions of the roadway segments involves examining the

average daily traffic volumes as compared to the daily traffic volume capacity of the roadway facility. Capacity is the volume of traffic that the segment can accommodate in a day and remain at an acceptable LOS. The ratio of the volume to the capacity (volume/capacity) is an indicator of traffic conditions, speeds, and driver maneuverability.

Levels of service are typically defined as follows:

- **LOS A** represents free flow. Individual users are virtually unaffected by others in the traffic stream. The volume/capacity ratio is 0 to 0.60.

- **LOS B** represents stable flow, but the presence of other users in the traffic stream begins to be noticeable. The volume/capacity ratio is 0.61 to 0.70.

- **LOS C** represents stable flow, but the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The volume/capacity ratio is 0.71 to 0.80.

- **LOS D** represents high-density, stable flow. The volume/capacity ratio is 0.81 to 0.90.

- **LOS E** represents operating conditions at or near the capacity level. The volume/capacity ratio is 0.91 to 1.00.

- **LOS F** represents forced or breakdown flow. The volume/capacity ratio is greater than 1.00.

Table 24-1 summarizes the operational assessment of regional and local roadways. It includes only those roadway segments for which roadway volume count data were available.

All roadways currently operate acceptably based on Caltrans, Madera County, and Fresno County LOS standards.

Table 24-1. Existing Traffic Operations

Roadway	Location	LOS Standard	Average Daily Traffic Volume	Roadway Capacity	Volume-to-Capacity Ratio	Existing LOS
SR 99	North of Jenson Avenue	D	99,000	117,500	0.84	D
SR 41	South of Friant Road	D	62,000	117,500	0.53	A
	North of Friant Road	D	42,000	117,500	0.36	A
SR 145	West of SR 41	D	5,300	18,000	0.29	A
Millerton Road	North Fork Road to Brighton Crest Road	C	8,600	14,600	0.59	A
	Brighton Crest Road to Sky Harbor Road	C	8,600	14,600	0.59	A
	Sky Harbor Road to Table Mountain Road	C	7,400	14,600	0.51	A
	Table Mountain Road to Auberry Road	C	4,300	14,600	0.29	A
Friant Road	Willow Avenue to Lost Lake Road	C	9,600	30,900	0.31	A
	Lost Lake Road to North Fork Road	C	9,600	14,600	0.66	A
Road 206	Road 145 to Friant Road	D	3,460	13,000	0.27	A
North Fork Road	East of SR 41	D	2,970	13,000	0.23	A
Copper Avenue	West of Auberry Road	C	5,600	14,600	0.38	A
Auberry Road	East of Morgan Canyon Road	C	9,400	14,600	0.64	A
	Morgan Canyon Road to Wellbarn Road	C	4,000	14,600	0.27	A
	Wellbarn Road to Millerton Road E.	C	3,800	14,600	0.26	A
	Millerton Road E. to Millerton Road W.	C	4,400	14,600	0.30	A
	Millerton Road W. to Copper Avenue	C	5,400	14,600	0.37	A
Wellbarn Road	North of Auberry Road	C	162	5,000 [1]	0.03	A
Smalley Road	West of Powerhouse Road	C	210	5,000 [1]	0.04	A
Powerhouse Road	West of Auberry Road	C	480	5,000 [1]	0.10	A

Sources: ICF International 2010; Caltrans 2012a; Madera County Transportation Commission 2010, 2012

Notes:
[1] Roadway capacity for rural roadway is conservatively estimated to be 5,000 vehicles per day.

Key:
E = East
LOS = level of service
SR = State Route
W = West

Bicycle Facilities

Both the motorized and nonmotorized routes on BLM lands provide opportunities for bicyclists. Mountain biking is a targeted activity on the nonmotorized routes (BLM 2012).

Bikeways in the primary study area are classified as Class I (bike paths), Class II (bike lanes), and Class III (bike routes). Bikeway classifications are defined as follows:

- **Class I (Bike Paths)** – Facilities located in a separate right-of-way for the exclusive use of bicycles and pedestrians, with minimal cross flow by motor vehicles

- **Class II (Bike Lanes)** – Marked lanes on roadways for exclusive use by bicyclists

- **Class III (Bike Routes)** – Roadways in which bicyclists and motorists share the travel lane

The rural bikeways system map contained within the *2011 Regional Transportation Plan* (Council of Fresno County Governments 2010) depicts planned trails and bikeways within the primary study area, which include Friant Road, Millerton Road, and Auberry Road. The San Joaquin River Trail and the Lewis S. Eaton Trail are existing Class I bike paths within the primary study area.

Public Transit

Public transit in the vicinity of the primary study area is limited. Madera County operates the Madera County Connection, a general public, intercity fixed-route system. The Madera route operates Monday through Friday from 5:51 a.m. to 8:09 p.m. within eastern Madera County and has stops at Northfork, Bass Lake, Oakhurst, Coarsegold, Yosemite Lakes, Ranchos, and Children's Hospital (Madera County Transportation Commission 2014). Auberry Transit is a demand-responsive van service affiliated with Fresno County Rural Transit Agency that caters to patrons with disabilities. It offers rides on Tuesdays only by reservation from the Auberry area to the Fresno-Clovis metropolitan area. In addition, local intercommunity service is offered Monday through Friday between the foothill communities and Indian rancherias of Big Sandy and Cold Springs (Fresno County Rural Transit Agency 2013).

Railroads

Within Madera and Fresno counties, freight railroad service is provided by the Burlington Northern Santa Fe (BNSF), Union Pacific (UP), and San Joaquin Valley Railroads (Genessee & Wyoming Inc. 2014). Passenger rail service is provided by Amtrak and operates on the BNSF line with stops in the Cities of Madera and Fresno. The rail line closest to the primary study area boundary is approximately 10 miles away. Both BNSF and UP maintain railyards in the City of Fresno for shipping freight and materials.

Water Navigation

The Millerton Lake SRA provides for recreational activities along Millerton Lake. Water navigation is limited to recreational activities, such as boating and kayaking. There are six boat ramps at Millerton Lake: five located on the south side of the lake and one on the north.

Airports

Airports and airstrips in the region and their distance from the primary study area are listed in Table 24-2.

Table 24-2. Airports and Airstrips in the Vicinity of the Primary Study Area

Name	Approximate Distance and Direction from Primary Study Area
Arnold Ranch Airport	6 miles southwest
Fresno Yosemite International Airport	12 miles south
Sierra Skypark Airport	16 miles southwest
Fresno Chandler Executive Airport	18 miles south
Madera Municipal Airport	20 miles west
Sallaberry Ranch Airstrip	23 miles northwest

Extended Study Area

Many roadways cross the San Joaquin River in the extended study area between Friant Dam and the Merced River confluence. Many of these crossings include a bridge. However, Road 13 crosses the river without a bridge. Road 13 has two lanes with soft shoulders. North of the San Joaquin River, Road 13 is also known as Chowchilla Canal Road. South of the San Joaquin River, Road 13 is also known as San Mateo Road.

A number of local rural roads parallel portions of the section of the San Joaquin River extending from the Merced River to the Delta, located just north of SR 132 (Maze Road). Highways

and roads with bridge crossings of the San Joaquin River include Hills Ferry Road at the Merced River confluence in Merced County, and Crows Landing Road, West Main Avenue, West Grayson Road, and SR 132, all in Stanislaus County.

The Delta region is served by several major freeways. I-5 and SR 99 run north-south and I-80 and U.S. Highway 50 run east-west through Sacramento. Other highways extend from the cities of Sacramento and Stockton to small cities and towns in the region. Local roads in the Delta are often narrow and winding; during peak travel times, traffic in this area often includes slow, oversized farm equipment.

Portions of the CVP and SWP water service areas are crossed by several large interstate and State highways. U.S. Highway 101 extends from San Luis Obispo south to Los Angeles, and I-5 runs north-south through the Central Valley to Los Angeles and on to San Diego. An extensive, intricate freeway system serves the Los Angeles area. I-10 runs east from Los Angeles to Arizona, and I-8 runs east-west from San Diego to Arizona.

The lower San Joaquin River and Delta support recreational and private boating, which is discussed in Chapter 22, "Recreation."

Environmental Consequences and Mitigation Measures

This section describes potential environmental consequences on transportation, circulation, and infrastructure that could result from implementing any alternative. It also describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine the significance of impacts on transportation, circulation, and infrastructure. It then discusses the potential impacts and proposes mitigation where appropriate. The potential impacts on transportation, circulation, and infrastructure and associated mitigation measures are summarized in Table 24-3.

Table 24-3. Summary of Impacts and Mitigation Measures for Transportation, Circulation, and Infrastructure

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
TRN-1: Reduce Level of Service for Designated Roads	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
TRN-2: Increase Traffic Hazards on Local Roads	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	TRN-2: Implement a Traffic Management Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
TRN-3: Interfere With Emergency Access	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	TRN-3: Implement Mitigation Measure TRN-2, Implement a Traffic Management Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 24-3. Summary of Impacts and Mitigation Measures for Transportation, Circulation, and Infrastructure (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation	Level of Significance After Mitigation
TRN-4: Decrease Performance of Bicycle or Pedestrian Facilities	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	TRN-4: Implement Mitigation Measure TRN-2, Implement a Traffic Management Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Key:
NI = no impact
LTS = less than significant
PS = potentially significant

Methods and Assumptions

The primary impact of implementing any action alternative would be associated with introducing construction-related traffic to local roadways. In addition, long-term operation of any alternative would generate vehicular trips associated with operation of the new recreational facilities upstream from RM 274. Operation of any action alternative would not result in additional land use development and therefore would not lead to an increase in trips that would be related to such development. The number of vehicular trips associated with operation and maintenance activities of the project features would be small and less than significant and is not addressed in this discussion. Therefore, this analysis addresses construction- and recreation-related traffic impacts.

Available literature, including documents published by Federal, State, county, and city agencies that document traffic conditions and infrastructure, were reviewed for this analysis.

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing the No Action Alternative and action alternatives. An environmental document prepared to comply with CEQA must identify the potentially significant environmental impacts of a proposed project and a reasonable range of alternatives, if required. 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental impacts (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, and consider the context and intensity of the environmental impacts as required under NEPA. Impacts of an alternative on transportation, circulation, and infrastructure would be significant under CEQA if project implementation would do any of the following:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into

account all modes of transportation, including mass transit and nonmotorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit

- Conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks

- Substantially increase hazards because of a design feature or incompatible uses

- Result in inadequate emergency access or

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities

Topics Eliminated from Further Consideration

Implementing any action alternative would not affect existing air traffic patterns. The airport nearest to the primary study area is the Arnold Ranch Airport, which is located approximately 6 miles southwest of the site. Therefore, this issue is not discussed further in this analysis.

None of the action alternatives involve construction of a facility that would conflict with adopted policies, plans, or programs supporting alternative transportation. Therefore, this issue is not discussed further in this analysis.

Implementing any action alternative could affect traffic operations, transportation facilities, and associated infrastructure during the modification or construction of facilities. Impacts related to San Joaquin River water flow would occur only from Friant Dam to the Delta, and conveyance of these water supplies would not exceed channel capacity of the river or Delta waterways. Within minimal change to San Joaquin River and Delta instream flows, only minor increases in boating use would be expected to occur on

the San Joaquin River, and no changes would occur in boating use in the Delta; consequently, neither is discussed further. Thus, no impacts on current traffic operations, existing transportation facilities, or associated infrastructure would occur in these areas. Therefore, none of the action alternatives would impact transportation resources found in and adjacent to the San Joaquin River or Delta.

Changes to water conveyance to the CVP and SWP water service areas would not exceed historical maximum deliveries and would not result in a change in land use or cropping patterns, or result in other physical changes to the environment. The existing transportation network is sufficient to accommodate anticipated traffic increases associated with the implementation of the action alternatives, without substantially worsening traffic operations. Therefore, none of the action alternatives would impact transportation resources found in the CVP or SWP water service areas. The resources found in these areas are not discussed further in this analysis.

Direct and Indirect Effects

This section describes the environmental consequences of implementing any alternative. Where the action alternatives would have identical or nearly identical impacts regardless of which action alternative is implemented, the action alternatives are described together. Where impacts would differ, the action alternatives are described separately.

Impact TRN-1: Reduce Level of Service for Designated Roads

Primary Study Area

No Action Alternative No project-related construction activities would occur and new recreation opportunities would not be introduced under the No Action Alternative. Although planned land uses in the vicinity of the primary study area call for continued agricultural and open space uses, some future population growth may occur near the primary study area, potentially increasing local traffic volumes along designated roads and highways in the primary study area. Planned land use is addressed in Chapter 17, “Land Use Planning and Agricultural Resources.” As shown in Table 24-1, local roadways in the primary study area operate at LOS A and have capacity sufficient to accommodate increased traffic volumes that could occur in association with planned population growth and land development.

There would be **no impact** under the No Action Alternative.

Action Alternatives Impacts on traffic volumes would be associated with constructing the project features, and with increased recreational visitation to Millerton Lake and the proposed Temperance Flat RM 274 Reservoir.

Implementing any action alternative would involve the construction and operation of numerous project features. The construction of these project features, which would occur over a period of 10 years, would increase the traffic volumes along designated haul routes within the primary study area during this period; however, construction traffic is considered temporary and would cease at the end of construction. Construction-related impacts on traffic would be limited to travel on existing freeways and local roadways to and from the project site and/or the staging yard related to the construction workers' commute, movement of equipment, and material delivery. Assessment of the impact that project construction traffic could have on local and regional roads included review of existing daily traffic volumes and consideration of both the addition of project construction traffic to existing daily traffic levels and the capacity of the road to handle the additional traffic.

The total number of daily trips related to the construction workers' commute, movement of equipment, and material delivery that would be added to area roadways over the entire 10-year construction period would range between 689,924 and 752,421 under Alternative Plan 4, varying according to the three quarries, batch plant, and haul road options. The total number of daily trips added to area roadways for Alternative Plans 1, 2, 3, or 5 over the entire 10-year construction period would be slightly less than for Alternative Plan 4; fewer trips would be required to construct the fixed LLIS associated with Alternative Plans 1, 2, 3, and 5 than the SLIS under Alternative 4. Because the number of truck trips under each action alternative is approximate, for a conservative analysis, construction trips associated with Alternative Plan 4 were used in this analysis to represent all five alternatives.

This analysis focuses on the number of trips added to area roadways during a single day when multiple phases of construction activities are occurring at the same time. Because construction days in August and September of the seventh year of construction would yield the most daily construction trips, August 26, of the seventh year, was chosen as a representative

day for the traffic impact analysis. Based on the anticipated construction phasing for that day, the maximum total number of vehicle trips from construction workers that would be added to area roadways would be 340 for quarry, batch plant, and haul road Options A and B, and 396 for Option C. The maximum number of truck trips attributable to material delivery and disposal that would be required on that single day would be 133 for each quarry, batch plant, and haul road option.

To properly assess the impacts of truck trips generated by the project, a heavy-vehicle factor known as a passenger car equivalent (PCE) value is applied to the project truck traffic. This heavy-vehicle factor is used to account for the additional space occupied, reduced speed, and reduced maneuverability associated with these vehicles as compared to standard automobiles. A PCE value of 2.0 was applied to the construction delivery/waste truck trip generation estimates as recommended by the *Highway Capacity Manual 2000* (Transportation Research Board 2000). Therefore, disposal of construction waste and material delivery would add approximately 266 passenger car equivalents to area roadways on the most congested construction day (i.e., most construction days will experience fewer added vehicles).

In total, all construction-related traffic would add approximately 606 total passenger car equivalents to area roadways on the most congested construction day for quarry, batch plant, and haul road Options A and B. For Option C, construction-related traffic would add approximately 662 total passenger car equivalents to area roadways on the most congested construction day. These daily trips would take place on designated haul routes located on the local and regional roadways discussed earlier.

Tables 24-4, 24-5, and 24-6 summarize LOS results when construction traffic is added to existing roadway traffic volumes. All roadways shown in Tables 24-4, 24-5, and 24-6 would continue to operate acceptably with the addition of project construction traffic according to Fresno County, Madera County, and Caltrans policies and standards.

Table 24-4. Effect of Project Construction Traffic Operations – Alternative Plan 4, Quarry, Batch Plant, and Haul Road Option A

Roadway[1]	Location	LOS Standard	Average Daily Traffic Volume	Daily Construc-tion Traffic Added	Existing + Daily Construction Traffic Volume	Roadway Capacity	Volume-to-Capacity Ratio	Existing LOS	Construc-tion-Related LOS
SR 99	North of Jenson Avenue	D	99,000	560	99,560	117,500	0.85	D	D
SR 41	South of Friant Road	D	62,000	495	62,495	117,500	0.53	A	A
	North of Friant Road	D	42,000	254	42,254	117,500	0.36	A	A
SR 145	West of SR 41	D	5,300	0	5,300	18,000	0.29	A	A
Millerton Road	North Fork Road to Brighton Crest Road	C	8,600	241	8,841	14,600	0.61	A	B
	Brighton Crest Road to Sky Harbor Road	C	8,600	241	8,841	14,600	0.61	A	B
	Sky Harbor Road to Table Mountain Road	C	7,400	0	7,400	14,600	0.51	A	A
	Table Mountain Road to Auberry Road	C	4,300	0	4,300	14,600	0.29	A	A
Friant Road	Willow Avenue to Lost Lake Road	C	9,600	241	9,841	30,900	0.32	A	A
	Lost Lake Road to North Fork Road	C	9,600	241	9,841	14,600	0.67	A	A
Road 206	Road 145 to Friant Road	D	3,460	0	3,460	13,000	0.27	A	A
North Fork Road	East of SR 41	D	2,970	254	3,224	13,000	0.25	A	A
Copper Avenue	West of Auberry Road	C	5,600	44	5,644	14,600	0.39	A	A
Auberry Road	East of Morgan Canyon Road	C	9,400	17	9,417	14,600	0.65	A	B
	Morgan Canyon Road to Wellbarn Road	C	4,000	56	4,056	14,600	0.28	A	A
	Wellbarn Road to Millerton Road E.	C	3,800	44	3,844	14,600	0.26	A	A
	Millerton Road E. to Millerton Road W.	C	4,400	44	4,444	14,600	0.30	A	A
	Millerton Road W. to Copper Avenue	C	5,400	44	5,444	14,600	0.37	A	A
Wellbarn Road	North of Auberry Road	C	162	92	254	5,000	0.05	A	A
Smalley Road	West of Powerhouse Road	C	210	19	229	5,000	0.05	A	A
Powerhouse Road	West of Auberry Road	C	480	19	499	5,000	0.10	A	A

Sources: ICF International 2010; Caltrans 2012a; Madera County Transportation Commission 2010, 2012

Note:

[1] Additional roadway segments, for which roadway volume count data were not available, are discussed qualitatively in the text

Key:

E = East
LOS = level of service
SR = State Route
W= West

Table 24-5. Effect of Project Construction Traffic Operations – Alternative Plan 4, Quarry, Batch Plant, and Haul Road Option B

Roadway[1]	Location	LOS Standard	Average Daily Traffic Volume	Daily Construc-tion Traffic Added	Existing + Daily Construction Traffic Volume	Roadway Capacity	Volume-to-Capacity Ratio	Existing LOS	Construc-tion-Related LOS
SR 99	North of Jenson Avenue	D	99,000	560	99,560	117,500	0.85	D	D
SR 41	South of Friant Road	D	62,000	495	62,495	117,500	0.53	A	A
	North of Friant Road	D	42,000	0	42,000	117,500	0.36	A	A
SR 145	West of SR 41	D	5,300	0	5,300	18,000	0.29	A	A
Millerton Road	North Fork Road to Brighton Crest Road	C	8,600	495	9,095	14,600	0.62	A	B
	Brighton Crest Road to Sky Harbor Road	C	8,600	495	9,095	14,600	0.62	A	B
	Sky Harbor Road to Table Mountain Road	C	7,400	0	7,400	14,600	0.51	A	A
	Table Mountain Road to Auberry Road	C	4,300	0	4,300	14,600	0.29	A	A
Friant Road	Willow Avenue to Lost Lake Road	C	9,600	495	10,095	30,900	0.33	A	A
	Lost Lake Road to North Fork Road	C	9,600	495	10,095	14,600	0.69	A	A
Road 206	Road 145 to Friant Road	D	3,460	0	3,460	13,000	0.27	A	A
North Fork Road	East of SR 41	D	2,970	0	2,970	13,000	0.23	A	A
Copper Avenue	West of Auberry Road	C	5,600	44	5,644	14,600	0.39	A	A
Auberry Road	East of Morgan Canyon Road	C	9,400	17	9,417	14,600	0.65	A	B
	Morgan Canyon Road to Wellbarn Road	C	4,000	56	4,056	14,600	0.28	A	A
	Wellbarn Road to Millerton Road E.	C	3,800	44	3,844	14,600	0.26	A	A
	Millerton Road E. to Millerton Road W.	C	4,400	44	4,444	14,600	0.30	A	A
	Millerton Road W. to Copper Avenue	C	5,400	44	5,444	14,600	0.37	A	A
Wellbarn Road	North of Auberry Road	C	162	92	254	5,000	0.05	A	A
Smalley Road	West of Powerhouse Road	C	210	19	229	5,000	0.05	A	A
Powerhouse Road	West of Auberry Road	C	480	19	499	5,000	0.10	A	A

Sources: ICF International 2010; Caltrans 2012a; Madera County Transportation Commission 2010, 2012

Note:

[1] Additional roadway segments, for which roadway volume count data were not available, are discussed qualitatively in the text

Key:

E = East
LOS = level of service
SR = State Route
W= West

Table 24-6. Effect of Project Construction Traffic Operations – Alternative Plan 4, Quarry, Batch Plant, and Haul Road Option C

Roadway[1]	Location	LOS Standard	Average Daily Traffic Volume	Daily Construc-tion Traffic Added	Existing + Daily Construction Traffic Volume	Roadway Capacity	Volume-to-Capacity Ratio	Existing LOS	Construc-tion-Related LOS
SR 99	North of Jenson Avenue	D	99,000	616	99,616	117,500	0.85	D	D
SR 41	South of Friant Road	D	62,000	551	62,551	117,500	0.53	A	A
	North of Friant Road	D	42,000	0	42,000	117,500	0.36	A	A
SR 145	West of SR 41	D	5,300	0	5,300	18,000	0.29	A	A
Millerton Road	North Fork Road to Brighton Crest Road	C	8,600	551	9,151	14,600	0.63	A	B
	Brighton Crest Road to Sky Harbor Road	C	8,600	551	9,151	14,600	0.63	A	B
	Sky Harbor Road to Table Mountain Road	C	7,400	0	7,400	14,600	0.51	A	A
	Table Mountain Road to Auberry Road	C	4,300	0	4,300	14,600	0.29	A	A
Friant Road	Willow Avenue to Lost Lake Road	C	9,600	551	10,151	30,900	0.33	A	A
	Lost Lake Road to North Fork Road	C	9,600	551	10,151	14,600	0.70	A	A
Road 206	Road 145 to Friant Road	D	3,460	0	3,460	13,000	0.27	A	A
North Fork Road	East of SR 41	D	2,970	0	2,970	13,000	0.23	A	A
Copper Avenue	West of Auberry Road	C	5,600	44	5,644	14,600	0.39	A	A
Auberry Road	East of Morgan Canyon Road	C	9,400	17	9,417	14,600	0.65	A	B
	Morgan Canyon Road to Wellbarn Road	C	4,000	56	4,056	14,600	0.28	A	A
	Wellbarn Road to Millerton Road E.	C	3,800	44	3,844	14,600	0.26	A	A
	Millerton Road E. to Millerton Road W.	C	4,400	44	4,444	14,600	0.30	A	A
	Millerton Road W. to Copper Avenue	C	5,400	44	5,444	14,600	0.37	A	A
Wellbarn Road	North of Auberry Road	C	162	92	254	5,000	0.05	A	A
Smalley Road	West of Powerhouse Road	C	210	19	229	5,000	0.05	A	A
Powerhouse Road	West of Auberry Road	C	480	19	499	5,000	0.10	A	A

Sources: ICF International 2010; Caltrans 2012a; Madera County Transportation Commission 2010, 2012

Note:

[1] Additional roadway segments, for which roadway volume count data were not available, are discussed qualitatively in the text

Key:

E = East
LOS = level of service
SR = State Route
W= West

Project construction traffic would also be added to the following roadway segments, not shown in Tables 24-4, 24-5, and 24-6:

- North Friant Road between SR 41 and Rice Road
- North Friant Road between Rice Road and Copper Avenue
- North Friant Road between Copper Avenue and Willow Avenue
- Auberry Road between Powerhouse Road and SJ&E Road
- Auberry Road between SJ&E Road and Morgan Canyon Road
- County Road 200
- County Road 210
- County Road 211

These roadway segments are not included in Tables 24-4, 24-5, and 24-6 because no existing daily roadway volumes were available for these roadway segments, precluding a quantitative analysis. However, based on the existing traffic volumes and levels of service on adjacent roadway segments along Friant Road, Auberry Road, SR 145, and Road 206 documented in Tables 24-4, 24-5, and 24-6, it is anticipated that the additional roadway segments identified above would have similar traffic volumes and levels of service. Additionally, based on the expected distribution of construction traffic and assignment of construction trips to the roadway network, it is anticipated that the roadway segments listed above would also operate at LOS A under existing conditions and all action alternatives.

It should also be noted that temporary lane closures may be implemented during project construction. However, the roadway segment LOS findings in Tables 24-4, 24-5, and 24-6 conclude that the existing roadway network has sufficient capacity to accommodate diverted vehicles associated with temporary roadway closures.

In the long term, increased recreational opportunities and visitors at Millerton Lake and the proposed Temperance Flat

RM 274 Reservoir would result in additional traffic on area roadways. After project construction, traffic would increase from water-oriented recreationists' use of the Temperance Flat RM 274 Reservoir and because of a sustained water surface elevation at Millerton Lake. The potential annual increase in visitation at Millerton Lake is estimated to be 34,000 visitors, and approximately 82,000–96,000 additional visitors at the proposed Temperance Flat RM 274 Reservoir would be expected. July is the peak month during the recreation season for visitation, and accounts for 28 percent of visitation for the year (Reclamation 2014). Thus, in July, an additional approximately 9,520 visitors and 26,880 visitors would undertake recreational activities at Millerton Lake and Temperance Flat RM 274 Reservoir, respectively.

Assuming that most visits occur during the 8 weekend days in July and that the average vehicle occupancy rate is five persons, an additional approximately 238 vehicle trips per day would be added to area roadways because of improved conditions at Millerton Lake. An additional 672 vehicle trips per day would be added to area roadways because of recreational activities at the new Temperance Flat RM 274 Reservoir. Visitors to both facilities would come primarily from the Fresno metropolitan area. Visitors accessing Millerton Lake would use area roadways such as Friant Road and Millerton Road, whereas visitors to the Temperance Flat RM 274 Reservoir would use local roadways such as Copper Avenue, Auberry Road, and Wellbarn Road.

Table 24-7 provides a summary of the LOS results when long-term recreational traffic from the action alternatives is added to existing roadway traffic volumes. As shown in Table 24-7, all roadways would continue to operate at an acceptable LOS with the addition of project-related recreational traffic according to Fresno County, Madera County, and Caltrans policies and standards.

This impact would be **less than significant** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Table 24-7. Effect of Project Recreational Traffic Operations on Local Roadways

Roadway	Location	LOS Standard	Average Daily Traffic Volume	Daily Recreational Traffic Added	Existing + Daily Recreational Traffic Volume	Roadway Capacity	Volume-to-Capacity Ratio	Existing LOS	Project-Related LOS
SR 99	North of Jenson Avenue	D	99,000	0	99,000	117,500	0.85	D	D
SR 41	South of Friant Road	D	62,000	0	62,000	117,500	0.53	A	A
SR 145	West of SR 41	D	5,300	0	5,300	18,000	0.29	A	A
Millerton Road	North Fork Road to Brighton Crest Road	C	8,600	238	9,076	14,600	0.62	A	B
	Brighton Crest Road to Sky Harbor Road	C	8,600	0	8,600	14,600	0.59	A	A
	Sky Harbor Road to Table Mountain Road	C	7,400	0	7,400	14,600	0.51	A	A
	Table Mountain Road to Auberry Road	C	4,300	0	4,300	14,600	0.29	A	A
Friant Road	Willow Avenue to Lost Lake Road	C	9,600	238	10,076	30,900	0.33	A	A
	Lost Lake Road to North Fork Road	C	9,600	238	10,076	14,600	0.69	A	B
Road 206	Road 145 to Friant Road	D	3,460	0	3,460	13,000	0.27	A	A
North Fork Road	East of SR 41	D	2,970	0	2,970	13,000	0.23	A	A
Auberry Road	East of Morgan Canyon Road	C	9,400	0	9,400	14,600	0.64	A	B
	Morgan Canyon Road to Wellbarn Road	C	4,000	0	4,000	14,600	0.27	A	A
	Wellbarn Road to Millerton Road E.	C	3,800	672	5,144	14,600	0.35	A	A
	Millerton Road E. to Millerton Road W.	C	4,400	672	5,744	14,600	0.39	A	A
	Millerton Road W. to Copper Avenue	C	5,400	672	6,744	14,600	0.46	A	A
Wellbarn Road	North of Auberry Road	C	162	448	610	5,000	0.12	A	A
Smalley Road	West of Powerhouse Road	C	210	224	434	5,000	0.09	A	A
Powerhouse Road	West of Auberry Road	C	480	224	704	5,000	0.14	A	A

Sources: ICF International 2010; Caltrans 2012a; Madera County Transportation Commission 2010, 2012
Key:
E = East
LOS = level of service
SR = State Route
W= West

Impact TRN-2: Increase Traffic Hazards on Local Roads

Primary Study Area

No Action Alternative No project-related construction or operations and maintenance activities would occur under the No Action Alternative. Although planned land uses in the vicinity of the primary study area call for continued agricultural and open space uses, some future population growth may occur near the primary study area, potentially increasing local traffic volumes along designated roads and highways in the primary study area. As presented in Table 24-1, local roadways in the primary study area operate at LOS A and have capacity sufficient to accommodate increased traffic volumes that could occur in association with foreseeable future population growth and land development. There would be no new hazards to local roadways created from a project design feature.

There would be **no impact** under the No Action Alternative.

Action Alternatives Under the action alternatives, the maneuvering of project construction vehicles and equipment among the general-purpose traffic on local roads, many of which are two-lane winding roads, could cause safety hazards. Trucks and heavy equipment used during project construction would interact with vehicle movements on existing roadways.

Traffic safety hazards could occur as a result of (1) the introduction of trucks and other construction-related vehicles that could affect the minimal stopping sight distance, (2) conflicts where road width is narrowed or a roadway is closed during construction activities, or (3) increased truck traffic in general (and trucks' slower speed and wider turning radii) during construction.

In addition to these potential hazards, the use of large trucks to transport equipment and material to and from the project site could affect road conditions on the haul routes by increasing the rate of road wear. The degree to which this impact would occur depends on the design (pavement type and thickness) and the existing condition of the road. Major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The potential impacts are expected to be negligible on those roads. However, lower capacity roadways could be substantially affected by construction equipment traveling on them.

Because of the temporary disruption to traffic flow, roadway wear and tear, the removal or reduction of lanes, minimal stopping sight distance, and the local increase in traffic congestion, drivers would potentially be presented with increased traffic hazards during construction.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact TRN-3: Interfere with Emergency Access

Primary Study Area
No Action Alternative No project-related construction activities would occur under the No Action Alternative. Although planned land uses in the vicinity of the primary study area call for continued agricultural and open space uses, some future population growth may occur near the primary study area, potentially increasing local traffic volumes along designated roads and highways in the primary study area. Thus, there is a potential for roadways to be obstructed and for response times for emergency vehicles to increase; however, because traffic movement would remain in a free-flowing condition, the ability of local agencies to respond to an emergency is not expected to be impaired.

There would be **no impact** under the No Action Alternative.

Action Alternatives Under the action alternatives, emergency access to the primary study area could be affected by construction of the project features. Construction-related traffic could delay emergency vehicles, and lane or road closures or roadway detours could obstruct the movement of emergency vehicles. Thus, construction activities could impair the ability of local agencies to respond to an emergency.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact TRN-4: Decrease Performance of Bicycle or Pedestrian Facilities

Primary Study Area
No Action Alternative No project-related construction activities would occur under the No Action Alternative. Although planned land uses in the vicinity of the primary study area call for continued agricultural and open space uses, some

future population growth may occur, potentially increasing local traffic volumes along designated roads and highways in the primary study area and potentially increasing the number of bicyclists and pedestrians. However, such increases are not expected to cause a decrease in the performance or safety of bicycle or pedestrian facilities.

There would be **no impact** under the No Action Alternative.

Action Alternatives Temporary lane closures may be needed when installing the transmission line, included in all action alternatives, where new power lines would cross over existing roads. The transmission line in the southwestern portion of the primary study area would cross Sky Harbour Road and Auberry Road. In addition, large construction vehicles traveling along local roadways to and from the project site could obstruct bicycle or pedestrian facilities. Temporary road closures or obstructions in the roadway could decrease the performance or safety of bicycle or pedestrian facilities.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Mitigation Measures

This section discusses the mitigation measure for the potentially significant impacts described in the Direct and Indirect Impacts section, as presented in Table 24-3.

No mitigation is required for Impact TRN-1 within the primary study area or for Impacts TRN-1 through TRN-4 within the extended study area because there would be no impact or the impact would be less than significant for all action alternatives. The following mitigation is required for Impacts TRN-2, TRN-3, and TRN-4 in the primary study area for all action alternatives.

Mitigation Measure TRN-2: Implement a Traffic Management Plan

Before construction begins, Reclamation, its contractors, and/or its construction partners will prepare and implement a traffic management plan (TMP) to reduce construction-related traffic impacts on the roadways at or near the work site, as well as to reduce potential traffic safety hazards and ensure adequate access for emergency responders. Reclamation and/or its contractor will coordinate development and implementation of this plan with jurisdictional agencies (e.g., Fresno County),

as appropriate. The TMP will achieve the following performance criteria:

- Maintain traffic flows on affected streets.
- Maintain the maximum amount of travel lane capacity during nonconstruction periods.
- Maintain alternating one-way traffic flow past construction zones.
- Minimize traffic disturbances adjacent to schools and commercial areas.
- Provide appropriate and safe detour routes if closure of a roadway is required.
- Minimize disruption of access to driveways and adjacent land uses.

Measures incorporated into the TMP to achieve the performance criteria may include but would not be limited to the following measures:

- Outline the use of multiple routes to and from construction locations to minimize the daily amount of traffic on individual roadways.
- Identify specific construction methods for affected streets and provide flagger control at sensitive sites to manage traffic control and flows. If visibility is poor at any intersection, highly visible signs will be posted at all approaches to the intersection, stating that construction activity is taking place and that drivers should be aware of construction vehicles traveling on roads in the area.
- Require construction workers to park personal vehicles at the approved staging area and take only the necessary vehicles to the work sites.
- Require that affected roadway rights-of-way be repaired and restored to their original condition after construction is completed.
- Identify detours for bicycles and pedestrians, where applicable, in all areas where pedestrian and bicycle

access and circulation during project construction cannot be safely maintained.

- Include plans to coordinate all construction activities with emergency service providers in the area. Emergency service providers will be notified of the timing, location, and duration of construction activities.
- Limit construction work zone widths.
- Coordinate with local schools and businesses regarding construction activities and transportation routes to identify specific time of day, season, or other circumstances that would warrant special management.
- Post notices of upcoming construction activities to allow motorists to select alternative routes ahead of time.
- Provide appropriate warning signage and lighting for construction zones.
- Identify detour routes, and install signage that warns of road closures and detour routes.

Implementing Mitigation Measure TRN-2 would reduce the potentially significant impact associated with traffic hazards (Impact TRN-2) to a **less-than-significant** level.

Mitigation Measure TRN-3: Implement Mitigation Measure TRN-2, Implement a Traffic Management Plan

Implementing Mitigation Measure TRN-3 would reduce the potentially significant impact associated with emergency access (Impact TRN-3) to a **less-than-significant** level.

Mitigation Measure TRN-4: Implement Mitigation Measure TRN-2, Implement a Traffic Management Plan

Implementing Mitigation Measure TRN-4 would reduce the potentially significant impact associated with the safety of alternative modes of transportation (Impact TRN-4) to a **less-than-significant** level.

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Chapter 25
Utilities and Service Systems

This chapter describes the affected environment for utilities and service systems, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. The discussion of utilities and service systems focuses primarily on the primary study area (area of project features, Temperance Flat Reservoir Area, and Millerton Lake downstream from RM 274). Many utilities and service systems are discussed to some degree in other chapters. Water supply systems and infrastructure (namely, the CVP and SWP facilities) are discussed in Chapter 14, "Hydrology – Surface Water Supplies and Facilities Operations." Hydropower facilities and power generation rates are discussed in Chapter 20, "Power and Energy." Impacts on law enforcement, fire protection, and emergency response providers are discussed in this chapter and also in Chapter 24, "Transportation, Circulation, and Infrastructure."

The potential for growth inducement impacts on utilities and service systems in the primary and extended study areas is addressed in Chapter 28, "Other NEPA and CEQA Considerations."

Affected Environment

The affected environment for utilities and service systems includes discussion of water supply, wastewater infrastructure, stormwater drainage infrastructure, solid waste management, electrical service and infrastructure, telecommunications, fire protection services, and law enforcement protection and emergency services.

No natural gas service is provided and no schools are located in the primary study area; therefore, these topics are not addressed further in this Draft EIS.

Primary Study Area

Water Supply

Area of Project Features The only water supply facilities in the area of project features are located in the vicinity of the transmission line corridor.

Community Service Area (CSA) 34 provides water supply and infrastructure in the vicinity of the transmission line corridor. CSA 34 will eventually provide water service to approximately 3,500 residential units in its 3,281-acre service area located north and south of Millerton Road, north of Auberry Road, and east of Sky Harbour Road. District infrastructure includes pumps that draw water from Millerton Lake, a raw water transmission line, a water treatment plant storage tank, and a distribution system (Fresno LAFCO 2007). CSA 34 has an agreement with the county to provide up to 1,390 acre-feet per year of the county's existing 3,000 acre-feet per year CVP contract entitlement. Currently, CSA 34 services 86 residential lots in the Brighton Crest subdivision located northwest of Millerton Road and north of Auberry Road (Fresno County 2011).

Temperance Flat Reservoir Area The San Joaquin River Gorge Area includes a single well installed in 2005 for the purpose of providing potable water for the BLM administrative site, educational facilities, and the public campgrounds. Water is tested quarterly and the system is operated and maintained by a partnership with the Sierra National Forest. Two 8,000 gallon water tanks were installed to handle the increasing recreational use demands and to provide water for fire suppression activities as needed.

Millerton Lake Downstream from RM 274 Both surface water from Millerton Lake and groundwater are used for the residential and commercial water supply in Millerton Lake downstream from RM 274. Many of the water systems are private and use private groundwater wells, although some are community-wide systems (Reclamation and State Parks 2010). The following discussion describes water supplies and infrastructure in the Millerton Lake SRA and in residential areas along the shoreline of Millerton Lake.

Millerton Lake State Recreation Area The water supply for the North and South Shore areas in the Millerton Lake SRA is regulated under contracts with Reclamation and Fresno County Waterworks Districts (WWD) 18 and 38. The agreement with

Reclamation limits water withdrawal from Millerton Lake to 21 acre-feet per year (Reclamation and State Parks 2010). This includes water used on the North Shore and water purchased from the WWD 18 on the South Shore.

Potable water supply for the South Shore area of the Millerton Lake SRA is purchased from WWD 18, which serves 425 acres located at the base of Friant Dam and Millerton Lake. Treated water from the WWD 18 is pumped to water storage tanks located near the Ranger Station in the Millerton Lake SRA, and potable water is then distributed to the recreation areas on the South Shore (Reclamation and State Parks 2010).

In the North Shore area of the Millerton Lake SRA, campgrounds and day-use areas are served by two water treatment plants, which are located at the Rocky Point and Meadows recreation areas. Under an agreement with Reclamation, water is pumped directly from the lake to these water treatment plants. After treatment, the water is pumped to two 55,000-gallon concrete storage tanks located at Mono (which stores water from Rocky Point treatment plant) and Meadows (which stores water from Meadows treatment plant) and distributed to the campsites and day-use areas. Potable water at South Finegold day-use area is purchased and delivered from WWD 38; however, water is piped directly to the day-use area rather than being stored in an intermediate tank (Reclamation and State Parks 2010).

Residential Uses Along the Millerton Lake Shoreline Water service is provided to residential subdivisions along the shoreline of Millerton Lake by WWD 38 in Fresno County and Maintenance District 1, Hidden Lakes, in Madera County. WWD 38 encompasses 154 acres and provides water supplies and infrastructure to the Sky Harbor subdivision (also known as the Millerton Lake Park Estates) located 6 miles north of the intersection of Sky Harbour Road and Millerton Road in Fresno County. The district owns one groundwater production well, a storage tank system, and fire suppression hydrants (Fresno LAFCO 2011). WWD 38 has 59 residential water service connections, and no new service connections have occurred in the past 2 years.

Maintenance District 1, Hidden Lakes, provides water supplies and infrastructure to the Hidden View Estates subdivision located on the northwestern shoreline of Millerton Lake in Madera County. Raw water is obtained from Millerton Lake through an underwater intake structure and pumped to a small

water treatment plant. Two pumps at the water treatment plant convey treated water to a 135,000-gallon storage tank. Treated water is then distributed by gravity flow to residences. The district currently has 46 water service connections (Madera County 2013).

Wastewater Infrastructure

Area of Project Features The only sewer service or infrastructure in the area of project features is located in the vicinity of the transmission line corridor.

CSA 34 collects, treats, and disposes of wastewater in the Brighton Crest residential subdivision located northwest of Millerton Road and north of Auberry Road in the vicinity of the proposed transmission line corridor. CSA 34 uses a pretreatment system at each residential lot before wastewater is conveyed to an on-site package wastewater treatment plant (Fresno LAFCO 2007).

Temperance Flat Reservoir Area No major sewer service or infrastructure is located in the Temperance Flat Reservoir Area.

Millerton Lake Downstream from RM 274 Most of the area surrounding Millerton Lake SRA is currently served by private septic systems rather than community wastewater treatment facilities. These systems consist of septic systems, vault toilets, and chemical toilets. Individual leach fields generally provide wastewater disposal; however, several septic systems on the south shore of Millerton Lake convey sewage to an evaporative pond on the south side of Millerton Road (Reclamation and State Parks 2010).

As discussed above, WWD 38 provides sewer service to the Sky Harbor subdivision (also known as the Millerton Lake Park Estates) in Fresno County. Forty-seven parcels are connected to the system (Fresno LAFCO 2011). In addition, the South Finegold day-use area is connected to WWD 38 sewer facilities (Reclamation and State Parks 2010). Treated wastewater is disposed of via extended aeration or spray fields.

Stormwater Drainage Infrastructure

Area of Project Features No stormwater drainage infrastructure has been installed in the area of project features. Surface water runoff from the area of project features directly enters the San Joaquin River in the reservoir pool of Millerton Lake.

Temperance Flat Reservoir Area No stormwater drainage infrastructure has been installed in the Temperance Flat Reservoir Area. Runoff in the Temperance Flat Reservoir Area directly enters the San Joaquin River, which flows into Millerton Lake. Numerous creeks and small local tributaries located in the reservoir area also flow into Millerton Lake.

Millerton Lake Downstream from RM 274 No stormwater drainage infrastructure has been installed in the Millerton Lake downstream from RM 274. Stormwater runoff in the Millerton Lake SRA and residential areas along the shoreline of the lake flows into Millerton Lake.

In the vicinity of the proposed transmission line corridor, stormwater runoff is discharged to seasonal drainages, which flow into Millerton Lake.

Solid Waste Management

Area of Project Features Solid waste services in the area of project features are managed by the Fresno County Resources Division and the Madera County Resource Management Agency. This discussion identifies the general characteristics of solid waste management and disposal facilities.

Fresno County Solid waste disposal in Fresno County is managed by the Fresno County Resources Division. The county owns and operates the American Avenue Landfill. The American Avenue Landfill is 440 acres in size, with a permitted disposal area of 361 acres. The landfill is classified as a Class II and Class III landfill and accepts asbestos and general residential, commercial, and industrial refuse for disposal, including municipal solid waste, construction and demolition debris, agricultural debris, and other nonhazardous designated debris.

The American Avenue Landfill is permitted to accept a maximum of 2,200 tons per day (tpd) of solid waste. The site has a permitted maximum capacity of approximately 3.3 million cubic yards and a remaining capacity of 2.9 million cubic yards. The closure date of the American Avenue Landfill is anticipated to be approximately 2031 (CalRecycle 2013a).

Fresno County's construction and demolition debris disposal ban ordinance (Title 8, Chapter 8.25) bans the disposal of construction and demolition debris at the American Avenue Landfill except for individual loads consisting of 3 cubic yards or less; mixed loads where construction and demolition debris

represents less than 20 percent of the load; disaster debris; loads without adequate local market infrastructure; and loads containing nonfriable asbestos that meet county guidelines. Contractors are required to dispose of construction-related debris at recycling facilities such as the Cedar Avenue Recycling/Transfer Station, Kroeker, Inc., the Rice Road Transfer Station (Allied Waste), Sunset Waste, Waste Management, and West Coast Waste in the City of Fresno; Mid-Valley Disposal, Inc., in Kerman; and Pena's Disposal, Inc., in Cutler (Fresno County 2007).

Madera County Solid waste disposal in Madera County is managed by the Madera County Resource Management Agency. The county owns and operates the Fairmead Sanitary Landfill. Fairmead Sanitary Landfill is a total of 121 acres in size, with a permitted disposal area of 77 acres. Fairmead Sanitary Landfill is classified as a Class III municipal solid waste landfill facility and is permitted to accept general residential, commercial, and industrial refuse for disposal, including municipal solid waste, construction and demolition debris, green materials, agricultural debris, and other nonhazardous designated debris (CalRecycle 2013b).

The Fairmead Sanitary Landfill is permitted to accept a maximum of 1,100 tpd of solid waste. The site has a permitted maximum capacity of approximately 9.4 million cubic yards and a remaining capacity of 5.5 million cubic yards. The closure date of the Fairmead Sanitary Landfill is anticipated to be approximately 2028 (CalRecycle 2013b).

The county does not have a postconstruction or residential recycling program but does remove some postconstruction wastes out of the waste stream in the Mammoth Material Recovery Facility.

Temperance Flat Reservoir Area No solid waste collection and disposal service is provided in the Temperance Flat Reservoir Area.

Millerton Lake Downstream from RM 274 Solid waste collection and disposal services provided to the Millerton Lake downstream from RM 274 area are provided by the Fresno County Resources Division and the Madera County Resource Management Agency. These service providers are identified in the preceding discussion.

Electrical Service and Infrastructure

Area of Project Features The only electrical service or infrastructure in the area of project features is located in the vicinity of the transmission line corridor. The PG&E provides electrical service to residences along Sky Harbour Road, Winchell Cove Road, Millerton Road, and Auberry Road; the Eagle Springs Golf Course and Country Club; and the Table Mountain Rancheria casino through underground electrical distribution lines.

Temperance Flat Reservoir Area In the Temperance Flat Reservoir Area, three 115-kV PG&E transmission lines connect the turbine generators at the Kerckhoff and Kerckhoff No. 2 Powerhouses to the regional and statewide electrical grid. East of the Temperance Flat Reservoir Area, a high-voltage PG&E electrical transmission corridor runs in a north to south direction.

Millerton Lake Downstream from RM 274 Electrical service to the Millerton Lake downstream from RM 274 area is provided by PG&E. Aboveground electrical transmission lines run from the electrical grid to electrical utility boxes in the recreation areas around Millerton Lake. The electrical transmission lines from the utility boxes connect to underground electrical distribution lines that serve the administrative buildings, maintenance facilities, and Millerton Courthouse in the South Shore area. Aboveground distribution lines provide electricity to water pumps that supply water to the recreation areas around Millerton Lake. Additional aboveground electrical distribution lines are located along the Millerton Lake boat ramp and Winchell Cove boat ramp (Reclamation and State Parks 2010).

PG&E provides electrical service to residences along Millerton Road, the Sky Harbor subdivision, and Hidden View Estates through underground transmission lines. Electricity to groundwater well pumps associated with residences along Millerton Road is provided by aboveground distribution lines.

Telecommunications

Area of Project Features No telephone service or infrastructure is located in the area of project features.

Temperance Flat Reservoir Area No telephone service or infrastructure is located in the Temperance Flat Reservoir Area.

Millerton Lake Downstream from RM 274 Ponderosa Telephone provides telephone service to the areas of Millerton Lake downstream from RM 274 and in the vicinity of the proposed transmission line corridor. All telephone lines are underground (Reclamation and State Parks 2010). A microwave tower is located near the South Shore administrative offices and provides communication related to dam operations with Reclamation.

Ponderosa Telephone is located in the community of O'Neals, approximately 25 miles northeast of the City of Fresno. The Ponderosa Telephone service area encompasses approximately 3,000 square miles from the southern California to the central California high Sierra and serves approximately 10,000 subscriber lines in rural communities. In the Millerton Lake area, Ponderosa Telephone serves the communities of O'Neil and North Fork in Madera County and Shaver Lake, Auberry, and Friant in Fresno County (Ponderosa Telephone 2011).

Fire Protection Services

Area of Project Features Fire protection services in the area of project features are provided by the Fresno County Fire Protection District and the Madera County Fire Department. The following discussion identifies the general characteristics of fire protection facilities and services.

Fresno County Fire Protection District The Fresno County Fire Protection District encompasses approximately 2,655 square miles and serves a population of more than 220,000 citizens. It is bounded on the east by the Sierra Nevada and on the west by the Coast Ranges. The district provides fire protection services to the communities of Calwa, Easton, Malaga, Del Rey, Caruthers, San Joaquin, Tranquility, Prather, Friant, Tollhouse, Wonder Valley, Cantua Creek, Three Rocks, Five Points, Centerville, Tivy Valley, and Sand Creek and to the Cities of San Joaquin, Parlier, Mendota, and Huron (Fresno County Fire Protection District 2013a).

The daily emergency response staffing for the entire fire district is 48 personnel. This staffing includes six battalion chiefs, 13 two or three-person engine companies, one three-person truck company, one medium rescue unit, water tenders, and patrols housed in 13 full-time fire stations. The district provides a full range of emergency responses services including, but not limited to, structural fire suppression, wildland fire suppression, response to hazardous materials incidents, Urban Search and Rescue, water rescue, vehicle

extrication, technical rescue, and basic life support medical services. The district emergency response personnel respond to over 14,700 incidents annually (Fresno County Fire Protection District 2013b).

The Fresno County Fire Protection District, in cooperation with the California Department of Forestry and Fire Protection (CAL FIRE), provides all risk emergency services from 13 district-staffed fire stations and five district-paid call firefighter stations. The nearest Fresno County Fire Protection District facility in the primary study area is the Millerton Station 72, located at 4091 East Millerton Road in Friant (Fresno County Fire Protection District 2013a, 2013b).

Madera County Fire Department The Madera County Fire Department provides fire protection services to unincorporated areas of Madera County. The district comprises 17 fire stations; a fleet of 56 apparatus and support vehicles; and a personnel staff that includes 32 career fire suppression personnel, 175 paid call firefighters, and seven support personnel (Madera County Fire Department 2013).

The department is administered, and career suppression personnel are provided, through a contract with CAL FIRE. The department assists with providing fire protection to the City of Madera through a mutual aid agreement and has a cooperative agreement with Central California Women's Facility for fire protection services in the north end of Madera County (Madera County Fire Department 2013).

Madera County fire stations are staffed 24 hours a day by a full-time career fire captain or fire apparatus engineer and are augmented by paid call firefighters. The nearest Madera County Fire Protection District facility in the primary study area is the O'Neals Volunteer Fire Station 17, located at Road 201 in O'Neals.

Temperance Flat Reservoir Area Fire protection services in the Temperance Flat Reservoir Area are provided by the Fresno County Fire Protection District and the Madera County Fire Department. These service providers are discussed above.

Millerton Lake Downstream from RM 274 Fire protection services in the Millerton Lake downstream from RM 274 area are provided by the Fresno County Fire Protection District and the Madera County Fire Department. These service providers are discussed above.

Law Enforcement Protection and Emergency Services

Area of Project Features Law enforcement and emergency services in the area of project features are provided by the Fresno County Sheriff's Department, the Madera County Sheriff's Department, and the California Highway Patrol (CHP). The following discussion identifies the general characteristics of law enforcement facilities and services.

Fresno County Sheriff's Department The Fresno County Sheriff's Department provides law enforcement service to the unincorporated areas of the county and to the Cities of Coalinga, Huron, San Joaquin, Kerman, Mendota, and Firebaugh. It is also the contract law enforcement agency for the Cities of San Joaquin and Mendota. Specialized members of the sheriff's department also serve on units, including the Air Support Unit, Off-Road Safety Team, Forensics Laboratory, Boating Enforcement Unit, SWAT Unit, Dive Team, and Search and Rescue Unit (Fresno County Sheriff's Department 2013).

The department provides service to four geographic areas and maintains four stations and two substations. The primary study area is located in Area 4, which includes the eastern mountain region of Fresno County and covers approximately 2,734 square miles. Area 4's northeastern substation located on Auberry Road is nearest to Millerton Lake. Currently, this substation is only used by deputies to meet and serve the public on an occasional basis due to ongoing budget restraints (Fresno County Sheriff's Department 2013).

In addition, the Fresno County Sheriff's Department coordinates emergency evacuation routes and programs for residents and businesses in Fresno County. Large-scale emergency services are handled by the department in cooperation with the FEMA; USFS; the State emergency response network run by the California Office of Emergency Services (OES); CAL FIRE; the CHP; and local fire departments, hospitals, and ambulance services.

Madera County Sheriff's Department Law enforcement in unincorporated areas of Madera County is provided by the Madera County Sheriff's Department. The department is divided into three distinct divisions (Valley Division, Mountain Division, and Administrative Division) Specialized members of the sheriff's department also serve on additional units, including the Agricultural Crimes Unit, Off-Highway Vehicle Unit, SWAT Team, Dive Team, and Search and Rescue Team

(Madera County Sheriff's Department 2013). The nearest facility to the primary study area is located at 14143 Road 28 in the City of Madera.

In addition, the Madera County Sheriff's Department is responsible for coordinating emergency services in Madera County. Area-wide emergency services are handled by the department in cooperation with FEMA; USFS; the State emergency response network run by the OES; CAL FIRE; the CHP; and local fire departments, hospitals, and ambulance services.

California Highway Patrol The CHP provides traffic regulation enforcement, emergency management, and vice assistance on State highways, all Federal interstate highways, and other major roadways in Fresno and Madera Counties. The primary study area is located in the Central Division, which oversees 275 miles of the Interstate 5 corridor and 224 miles of State Route 99 and provides ground and air support for emergencies in its division personnel (CHP 2013).

The CHP Central Division has 15 area offices, six resident posts, two commercial inspection facilities, 667 uniformed officers, and 226 nonuniformed personnel (CHP 2013).

Temperance Flat Reservoir Area Law enforcement protection and emergency services in the Temperance Flat Reservoir Area are provided by the Fresno County Sheriff's Department, the Madera County Sheriff's Department, and the CHP. These service providers are discussed above.

Millerton Lake Downstream from RM 274 Law enforcement protection and emergency services in the Millerton Lake downstream from RM 274 area are provided by the Fresno County Sheriff's Department, the Madera County Sheriff's Department, and the CHP. These service providers are discussed above.

Extended Study Area

In the portion of the extended study area extending from Friant Dam to the Delta, project operations would modify conditions in the San Joaquin River and improve water supply reliability to areas that receive CVP water supplies. These changes in operations would not result in an increased demand for utilities and service systems; therefore, the geographic regions in this portion of the extended study area are not discussed further in this section.

Effects on public parks and recreational facilities are discussed in Chapter 22, “Recreation.”

Environmental Consequences and Mitigation Measures

This section describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine the significance of impacts on utilities and service systems. It then discusses the impacts of the alternatives and proposes mitigation where appropriate. The potential impacts on utilities and service systems and associated mitigation measures are summarized in Table 25-1.

Table 25-1. Summary of Impacts and Mitigation Measures for Utilities and Service Systems

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
UTL-1: Result in Exceeding Wastewater Treatment Requirements or Requiring New or Expanded Wastewater Treatment Facilities	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	PS	UTL-1: Prepare and Implement a Wastewater Management Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
UTL-2: Result in Exceeding Stormwater Drainage Infrastructure Capacity or Requiring New or Expanded Stormwater Drainage Facilities	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 25-1. Summary of Impacts and Mitigation Measures for Utilities and Service Systems (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
UTL-3: Increase in Solid Waste Generation That Exceeds Permitted Landfill Capacity	Primary Study Area	No Action Alternative	LTS	None Required	LTS
		Alternative Plan 1	PS	UTL-3: Prepare and Implement a Solid Waste Management Plan	LTS
		Alternative Plan 2	PS		LTS
		Alternative Plan 3	PS		LTS
		Alternative Plan 4	PS		LTS
		Alternative Plan 5	PS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
UTL-4: Damage to or Disruption of Utility or Service Systems	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	LTS		LTS
		Alternative Plan 2	LTS		LTS
		Alternative Plan 3	LTS		LTS
		Alternative Plan 4	LTS		LTS
		Alternative Plan 5	LTS		LTS
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Key:
LTS = less than significant
NI = no impact
PS = potentially significant

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 BLM RMP, the Millerton Lake RMP, the general plans for Fresno and Madera counties, and other documents obtained for addressing other local service system purveyors.

Impacts are evaluated in relation to changes in levels of service or increased demand for utilities and service systems associated with the alternatives and the actions needed to provide the services that could potentially lead to physical environmental impacts. Impacts on water supply services to Millerton Lake and vicinity were evaluated based on construction and operational activities that would result from project implementation. A long-term impact 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 impact with the service provided, taking into account the ability of the provider to maintain necessary services through alternative means.

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing the No Action Alternative and other alternatives. Under NEPA, the severity and context of an impact must be characterized. An environmental document prepared to comply with CEQA must identify the potentially significant environmental impacts 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental impacts (State CEQA Guidelines, Section 15126.4[a]).

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines and

consideration of the context and intensity of the environmental impacts as required under NEPA. Impacts of an alternative on utilities and service systems would be significant if project implementation would do any of the following:

- Exceed water supplies available to service the project from existing entitlements and resources such that new or expanded entitlements would be needed
- Exceed wastewater treatment requirements of the Central Valley Water Board
- Exceed stormwater drainage infrastructure capacity such that new or expanded infrastructure would be needed
- Fail to 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 service system
- Require relocating utility infrastructure
- Require substantial improvements to the infrastructure or level of staffing of a utility or service 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 impacts
- Disrupt utilities service to create a public health hazard or extended service disruption

Topics Eliminated from Further Discussion

As discussed at the beginning of this chapter, water supply and infrastructure are discussed in Chapter 14, “Hydrology – Surface Water Supplies and Facilities Operations.” Also, no natural gas service is provided and no schools are located in the primary study area. Based on the review of proposed construction methods, described in Chapter 2, “Alternatives,” it

was determined that implementing any of the action alternatives would not affect existing water supply utilities or distribution system in the primary study area or vicinity. Therefore, these issues are not discussed further in this analysis.

Implementing any of the action alternatives would increase the amount of water available for delivery from Millerton Lake. Portions of this water would be conveyed directly to Friant Division water contractors or down the San Joaquin River and rediverted or exchanged for delivery to SOD CVP and SWP water contractors. About 30to 60 percent of the water made available for delivery would be conveyed directly to Friant Division water contractors, depending on the alternative plan implemented. From 28 TAF to 37 TAF would be discharged to the San Joaquin River for conveyance to SOD CVP and SWP water contractors. The conveyance of these water supplies would not exceed channel capacity of the San Joaquin River or Delta waterways. No change in existing use of adjacent lands would occur. Additional flows on the San Joaquin River and the Delta would not affect utilities and service systems because additional flows would not create additional wastewater, increase water demand, or require additional stormwater drainage facilities. Therefore, none of the five action alternatives would have an impact on utilities and service systems found in the San Joaquin River or Delta.

As described in Chapter 14, “Hydrology – Surface Water Supplies and Facilities Operations,” of this Draft EIS, implementing any of the action alternatives would increase water reliability for the Friant Division contractors and SOD CVP and SWP water contractors during most water-year types. A net change in systemwide water deliveries would average about 61to 76 TAF, depending on the alternative plan implemented. Up to 152 TAF would be delivered with less available for delivery in most years. The increased water supplies would equal less than 2 percent of total CVP and SWP average annual SOD water deliveries. The delivery of this additional water would not exceed historic maximum deliveries or existing contracted water volumes, result in placing new land into agricultural production, change cropping patterns, or result in other physical changes to the environment. Additional deliveries to the CVP and SWP service areas would not affect utilities and service systems (i.e., law enforcement, emergency response services, electrical service, and telecommunications) because the additional deliveries would not generate additional wastewater, increase water demand, or require additional

stormwater drainage facilities. Therefore, none of the five action alternatives would have an impact on this resource found in the CVP or SWP service areas. Utilities and service systems found in these areas are not discussed further in this analysis.

Direct and Indirect Impacts

This section describes the environmental consequences of implementing any of the alternatives.

Impact UTL-1: Result in Exceeding Wastewater Treatment Requirements or Requiring New or Expanded Wastewater Treatment Facilities

Primary Study Area

No Action Alternative Trends indicate that Fresno and Madera Counties will continue to grow, increasing the local population, housing, and demand for local utilities and services under the No Action Alternative. This growth would be consistent with the general plans of Fresno and Madera Counties. Existing regional wastewater treatment facilities have sufficient capacity to meet service area demands. Without construction of the new Temperance Flat RM 274 Reservoir, no new facilities would be constructed and no existing facilities would be expanded, altered, or demolished. No changes to wastewater treatment volumes or facilities would occur. Therefore, **no impact** would occur.

Action Alternatives As previously discussed in the "Affected Environment" section of this chapter, the only sewer service or infrastructure is located in the vicinity of the proposed transmission line corridor. This facility would not be affected with implementation of any of the action alternatives.

Construction of project facilities under the action alternatives, such as the dam, powerhouse and transmission facilities, and access roads would not result in the need for new or expanded wastewater facilities because these would be temporary construction projects and not development projects that would require stable, long-term services. Wastewater disposal services would be provided for construction crews where wastewater would be collected and transported to a suitable treatment facility for disposal.

Elements of the action alternatives that would generate wastewater during future operations and maintenance activities are the recreational facilities whose wastewater service

requirements would be met by pumping and hauling wastes to a suitable disposal facility. Increased recreational use of Millerton Lake and the proposed Temperance Flat RM 274 Reservoir could increase visitation to the two facilities by about 100,000 visitors annually. This increase in recreational use would generate wastewater that would need to be collected, conveyed, and treated at sufficient capacity to manage peak use periods. Under the action alternatives, relocated wastewater facilities associated with new or relocated facilities, such as recreational facilities and maintenance buildings, would be designed and constructed to satisfy the conditions of sewage disposal permits issued by Fresno County or Madera County, as applicable.

The action alternatives include a quarry where aggregate for construction can be excavated and hauled to the proposed onsite batch plant where the aggregate would be combined with various other ingredients to form the concrete used for construction of the dam and other project facilities.

Operation of the aggregate quarry and batch plant would generate wastewater from workers as well as wastewater from equipment operations. Given the distance from existing wastewater infrastructure, the quarry and batch plant would use on-site wastewater treatment and disposal. Wastewater discharge is regulated by the Regional Boards, and wastewater discharges would be required to comply with Regional Board requirements.

The increase in wastewater generated during construction and after construction by future recreational users might exceed the ability of existing community wastewater treatment facilities to adequately treat and dispose of wastewater or result in a direct discharge to surface waters in the primary study area.

This impact would be **potentially significant** impact. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact UTL-2: Result in Exceeding Stormwater Drainage Infrastructure Capacity or Requiring New or Expanded Stormwater Drainage Facilities

Primary Study Area

No Action Alternative Under the No Action Alternative, no new facilities would be constructed, and no existing facilities

would be expanded, altered, or demolished. No changes to stormwater drainage infrastructure or capacity would occur.

There would be **no impact** under the No Action Alternative.

Action Alternatives As discussed in the "Affected Environment," section, there is no stormwater drainage infrastructure in the primary study area, and stormwater runoff is discharged to seasonal drainages and flows into the San Joaquin River at Millerton Lake. No stormwater drainage infrastructure is proposed under any of the action alternatives.

There would be **no impact** under the action alternatives. Mitigation for this impact is not needed, and thus not proposed.

Impact UTL-3: Increase in Solid Waste Generation That Exceeds Permitted Landfill Capacity

Primary Study Area

No Action Alternative Trends indicate that Fresno and Madera Counties will continue to grow, increasing the local population, housing, and demand for local utilities and services under the No Action Alternative. This growth would be consistent with the general plans of Fresno and Madera Counties. Existing and future populations will produce solid wastes that will reduce available capacity of existing solid waste disposal facilities. The ongoing and future generation of solid waste would be consistent with growth expressed in the Fresno and Madera County General Plans. When existing solid waste landfill capacity is reached, additional facilities will need to be developed to receive the volume of wastes generated in the landfill service areas.

This impact would be **less than significant** under the No Action Alternative.

Action Alternatives Implementing any of the action alternatives would generate solid waste, including construction debris from the demolition of existing buildings and future dam construction activities, packaging for materials used in the construction of the Temperance Flat RM 274 Reservoir, and other wastes generated by construction crews, and consumptive use of materials during construction of the reservoir. If not disposed of on-site, waste debris from tree removal within the reservoir inundation area may also occur.

The potential volume of solid waste that might be generated during construction is not known. However, potentially, the

volume of waste could substantially reduce the capacity of existing solid waste disposal facilities that serve this source. A substantial reduction of solid waste disposal capacity could have repercussions on the ability and cost to the local community to manage the existing solid waste disposal system.

Engineering plans include a waste disposal site for the permanent disposal of waste rock from diversion tunnel and powerhouse excavation. This area is approximately 21.5 acres in size and is located approximately 3,200 feet southwest of the proposed powerhouse within the existing inundation area of Millerton Lake. Cofferdam materials would be disposed of within the quarry site or elsewhere within the primary study area. Trees removed from the inundation area might be burned or otherwise disposed of within the project site. Additional waste material generated during the construction process would be disposed of on the project site to the extent feasible.

Construction-related debris would be disposed of at waste or recycling facilities in Fresno, Kerman, or Cutler or hauled to other locations, depending on terms with the disposal contractor. Because the volume of solid waste that would be transported to these facilities is not known, the potential exists for the generation of solid waste to result in adverse impacts on the permitted capacity of existing recycling or landfill facilities.

This impact would be **potentially significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact UTL-4: Damage to or Disruption of Utility or Service Systems

Primary Study Area

No Action Alternative Under the No Action Alternative, no new facilities would be constructed, and no existing facilities would be expanded, altered, or demolished. There would be **no impact** under the No Action Alternative.

Action Alternatives The action alternatives include relocating PG&E electric power transmission lines. The transmission lines currently connect the generators at the Kerckhoff and Kerckhoff No. 2 powerhouses with the electrical grid. The existing transmission lines would be removed and reconstructed outside of the reservoir inundation area. New

transmission lines would also be installed to connect the new powerhouse located on Millerton Lake.

The disruption to electrical utilities related to the removal and relocation of the transmission lines would not affect individual utility customers because these existing transmission lines are primary power lines that interconnect the PG&E hydroelectric facilities with the grid and do not convey or deliver retail power supplies. The temporary disruption would result in a temporary reduction of available power to PG&E.

This impact would be **less than significant** under the action alternatives.

Mitigation Measures

This section discusses mitigation measures for each potentially significant impact described in the "Direct and Indirect Impacts" section, as presented in Table 25-1.

No mitigation is required for Impacts UTL-2 and UTL-4 within the primary study area or for Impacts UTL-1 through UTL-4 within the extended study area because there would be no impact or the impact would be less than significant for all action alternatives. Mitigation is required for Impacts UTL-1 and UTL-3 in the primary study area for all action alternatives.

Mitigation Measure UTL-1: Prepare and Implement a Wastewater Management Plan

As part of final design, Reclamation will prepare and implement a wastewater management plan to determine the volume and quality of wastewater to be generated on-site from both domestic and process sources. The plan shall define what portion of wastewater is to be disposed of on-site, the type of treatment to be employed, and the quality of wastewater that would be discharged to local surface water bodies. For wastewater to be treated off-site, the plan shall identify the volume and quality of wastewater to be collected, transported, and disposed of at a suitable existing wastewater treatment facility. A commitment to serve the needed wastewater transport and treatment services from the transporter and treatment facility owner shall be obtained before construction is initiated.

The plan shall also address the long-term collection, transportation, and disposal of wastewater to be generated by future recreation users. This portion of the plan shall be prepared in coordination with the California Department of

Parks and Recreation for services to be provided in the Millerton Lake SRA. Coordination with the established administrative authority over the Temperance Flat RM 274 Reservoir recreation facilities shall be completed as part of preparing and implementing this plan. The plan shall define how wastewater generated by recreational users would be collected, transported, and disposed of.

Implementing Mitigation Measure UTL-1 would reduce the potentially significant impact associated with wastewater treatment (Impact UTL-1) to a **less-than-significant** level.

Mitigation Measure UTL-3: Prepare and Implement a Solid Waste Management Plan

Before construction activities are initiated, Reclamation will prepare a solid waste management plan to:

- Provide an estimate of the volume of solid waste that would require off-site disposal
- Identify appropriate recycling or disposal facilities in accordance with applicable Federal, State, and local regulations regarding solid waste disposal
- Identify facilities with adequate capacity to accommodate the project's construction waste
- Obtain a commitment to serve the wastewater and solid water transport and disposal needs of the project from the appropriate transport and facility owner
- Identify the mechanism and responsibility to separate and manage solid waste suitable for on-site versus off-site disposal

Implementing Mitigation Measure UTL-3 would reduce the potentially significant impact associated with solid waste facilities (Impact UTL-3) to a **less-than-significant** level.

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Chapter 26
Visual Resources

This chapter describes the affected environment setting for visual resources, as well as potential environmental consequences and associated mitigation measures, as they pertain to implementing the alternatives. This chapter presents information on the primary study area (area of project features, the Temperance Flat Reservoir Area, and Millerton Lake below RM 274). It also discusses the extended study area (San Joaquin River from Friant Dam to the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas).

Affected Environment

The project area for visual resources encompasses the landscapes directly affected by the action alternatives and the surrounding areas that would be within view of project facilities. This section includes discussion of the physical environment, viewsheds, and aesthetic qualities in the primary and extended study areas that could be affected by implementation of the alternatives.

Primary Study Area

Key Observation Points in Primary Study Area

Nine key observation points (KOP) were chosen to illustrate elements of the primary study area landscape that reflect the existing scenic quality (Figure 26-1). KOPs were chosen at key access points to represent the various types of users, emphasizing viewpoints that are typical of the different users.

Several KOPs were chosen from areas primarily traversed by recreational users, including motorists, hikers, campground users, and watercraft users. KOPs 1, 2, and 3 were chosen along the SJRG from local roadways leading to campgrounds and river access facilities. KOP 9 was taken directly from the San Joaquin River Trail and represents a typical hiker view of the SJRG. KOPs 5 and 6 were taken directly from recreational facilities along Millerton Lake, including the Meadows campground and boat dock as well as Millerton Courthouse.

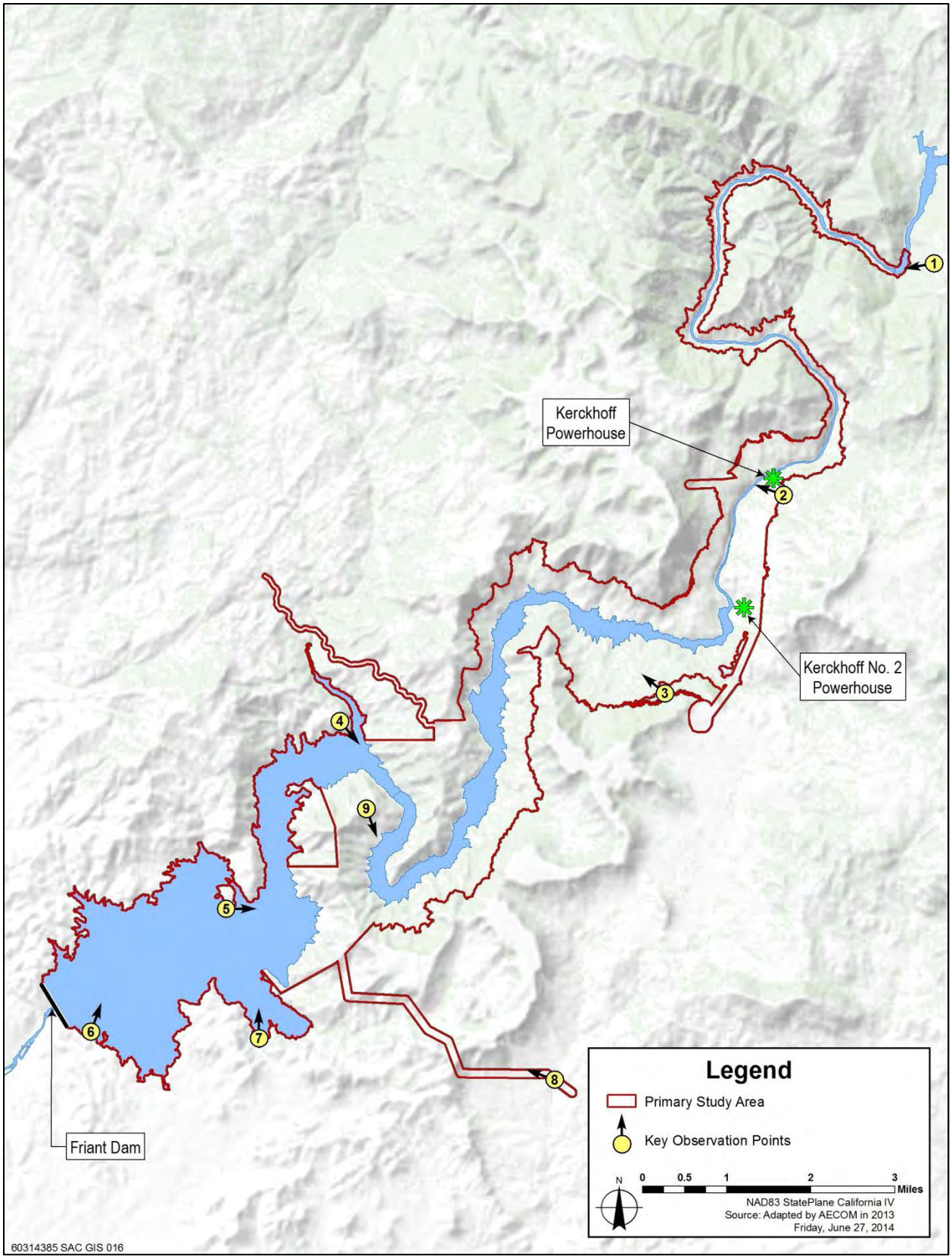

Figure 26-1. Key Observation Points in the Primary Study Area

Homeowners also make up a portion of viewers in the area, represented by KOPs 4 and 7. KOP 8 represents the views of other motorists, residents, and nearby workers near Auberry Road and other local roads.

The following discussion addresses each of these KOPs. Representative photographs from these KOPs are presented in Figure 26-2 through Figure 26-10.

KOP 1—View from Power House Road near Kerckhoff Dam KOP 1 provides a typical motorist view near Kerckhoff Dam. Views in this area also include rafters/kayakers or persons accessing the river (Figure 26-2). The landforms in this area are dominated by steep slopes leading to a narrow gorge with the flowing river. There are few visible human-made alterations in this area and no trails. Although this is a special area and is eligible and suitable to be designated as a wild/scenic river under the Wild and Scenic Rivers Act, few people have access to this area. Whitewater rafting and kayaking are possible only when releases from Kerckhoff Dam create instream flows sufficient to allow watercraft passage. The dominant landscape is the exposed river channel leading uphill to steep gorge slopes. Views are limited by dense vegetation and tree canopy and steep hill slopes.

KOP 2—View from Squaw Leap/Smalley Road This area is accessible to a variety of users, especially recreationists and campers, both on foot and in automobiles (Figure 26-3). Viewers at this location see several human-made facilities, including a transmission line and power house facilities. Nearby features include a footbridge to the west, paved roads, and a few buildings. Viewers looking west may see the footbridge crossing the San Joaquin River, and rolling foothill terrain covered with oak savanna and grasslands, leading to a rocky and steep gorge with the river below.

KOP 3—View from Wellbarn Road Viewers use this road to access the Temperance Flat Boat-in Campground (Figure 26-4). The views along portions of this roadway are limited or obstructed because of the density of oak trees. This area is composed of motorists and other users of Wellbarn Road, which provides access to hiking and camping on the San Joaquin River Trail. A few buildings are located at lower elevations along the river. Within the Millerton Lake inundation area, the maximum water elevation mark can be seen along the gorge bottom, contrasting with upland vegetation.

Figure 26-2. KOP 1: View from Power House Road near Kerckhoff Dam

Figure 26-3. KOP 2: View from Squaw Leap/Smalley Road

Figure 26-4. KOP 3: View from Wellbarn Road

KOP 4—View from Residences on Ralston Ridge Water dominates the view looking east from Ralston Ridge (Figure 26-5). The lake spreads out to the north and south of the vista and is bordered on all sides with rolling hillsides. The Millerton Lake maximum water level mark is an obvious visual feature showing contrast with upland vegetation. This and other views of Millerton Lake change in response to the volume of water stored in the reservoir. As the lake fills, the contrasting exposed ground surface diminishes until the lake is at maximum pool. This dynamic visual feature can also be seen from KOPs 5 to 7. Residents are the most common viewers in this area.

KOP 5—View from Campground and Boat Ramp
Campers, anglers, and others visiting the boat ramp near the Meadows campground area look east across the lake to foothills (Figure 26-6). To the northeast, there is a prominent excavation in the hillside where a road was established along the hillsides to a few homes overlooking the lake. The Millerton Lake maximum water level mark is also obvious from this KOP.

Figure 26-5. KOP 4: View from Residences on Ralston Ridge

Figure 26-6. KOP 5: View from Campground and Boat Ramp

KOP 6—View from Millerton Courthouse Viewers at the Millerton Courthouse stand on a rise overlooking a small marina to the north in the lake below (Figure 26-7). Beyond the marina, the lake dominates the view with rolling hillsides beyond. The view from this KOP primarily includes rock outcrops that are exposed during Millerton Lake drawdown. As the lake fills, these features are inundated.

KOP 7—View from Residences near Winchell Cove Road Views from Winchell Cove Road encompass views across the lake to the north (Figure 26-8). From this point, a viewer can make out some of the human-made elements in the distance mentioned in the description of KOP 5, including the boat ramp. To the northeast, a viewer can see a building across Winchell Bay. The exposed ground surface within the reservoir inundation zone clearly contrasts with the upland vegetation.

KOP 8—View from Auberry Road Motorists along Auberry Road can look northwest over a graded road cut to rolling hills with scattered oak trees in the distance (Figure 26-9). To the north and south, scattered rural residences can be seen in the grassy landscape.

KOP 9—View from Pincushion Mountain At one of the highest elevations in the area, hikers on the San Joaquin River Trail on Pincushion Mountain can see the bend in the lake where the lake begins to narrow and follow upstream to the SJRG (Figure 26-10). This KOP provides the perspective available to many public hikers of the area immediately upstream from RM 274.

San Joaquin River Gorge Special Recreation Management Area

BLM established a Visual Resource Management (VRM) system to evaluate scenic values and establish management objectives for those values. The inventory system involves identifying the visual resources of an area and assigning them to inventory classes using the BLM visual resource inventory process. BLM delineated the SJRG SRMA portion of the primary study area and designated it as Scenic Quality Rating Unit (SQRU) 01, as described in the *Draft Bakersfield Resource Management Plan & Environmental Impact Statement* (BLM 2011). SQRU 01 is rated as a Class II visual resource, indicating that the visual resource is of high value (Class I representing the highest value) (BLM 1986).

Figure 26-7. KOP 6: View from Millerton Courthouse

Figure 26-8. KOP 7: View from Residences near Winchell Cove Road

Figure 26-9. KOP 8: View from Residences near Winchell Cove Road

Figure 26-10. KOP 9: View from Residences near Winchell Cove Road

This rating takes into account the distance zone, sensitivity quality rating, and sensitivity level of the SQRU. SQRU 01 was classified as consistent with the Foreground-Middle

Ground Distance Zone, meaning that much of the primary study area is visible to viewers from various viewpoints or roadways. This area received a rating of moderate sensitivity because of its frequent recreational use, and it was designated a scenic quality rating of "A" in recognition of its high scenic quality.

In assigning the scenic quality rating, BLM considered several factors, including the sensitivity of viewers to the visual landscape and the qualities of the landscape being assessed. When considered together, they are used to assign a numeric scenic quality rating.

The following tables show the rating of sensitivity level for SQRU 01 (Table 26-1) and describe the visual elements (Table 26-2) contributing to the scenic quality rating as presented in Table 26-3. These ratings are subjective, depending on the reviewer; however, the BLM VRM system attempts to normalize potential bias by asking reviewers to consider the same types of elements in every analysis.

As shown in Table 26-1, SQRU 01 is considered to be moderately sensitive because it includes the SJRG as a special area that experiences a high amount of public use. Because users consist primarily of recreationists, they are considered to be moderately sensitive to landscape change. In addition, public interest in the area is considered moderate. Using these ratings, BLM has found SQRU 01 to have an overall rating of moderate sensitivity.

Table 26-1. Sensitivity Level Rating Sheet for SQRU 01

Type of User	Amount of Use	Public Interest	Adjacent Land Uses	Special Areas	Other Factors	Overall Rating	Explanation
Moderate	High	Moderate	Low	High	—	Moderate	Unit is frequently used for recreation.

Source: BLM 2011

Table 26-2 presents a description of the scenic qualities of SQRU 01 recognized by BLM. Although the descriptions apply to BLM-owned land in SJRG, the scenic quality elements described are similar to those of lands located farther

downstream that are not owned by BLM. The physiographic (or physical geography) similarity within the unit is the basis for why the entire area was designated as a single SQRU.

Table 26-2. Scenic Quality Field Inventory for SQRU 01

	Landform/Water	Vegetation	Structure
Form	Wide v-shaped gorge topped with rolling hills. River drains gorge bottom past boulders. Rock outcrops along gorge sides. Dramatic relief.	Relatively even and uniform on gorge sides and top. Absent close to river.	Flat and paved road. Two flat and paved parking lots. Boxy hydroelectric facility. Flat dirt trails.
Line	Diagonal, meandering gorge sides down to narrow river. Slightly diagonal hills atop gorge. Irregular path of gorge. Slightly diagonal and meandering river.	Diagonal along gorge sides and slightly diagonal atop gorge.	Winding road. Horizontal parking lots. Horizontal and vertical hydroelectric facility. Winding trails.
Color	Tan, gray, and rust rock outcrop. Dark blue and white water.	Light green to dark green. Seasonal variations.	Gray road and parking lots. Tan hydroelectric facility. Tan trails.
Texture	Moderately smooth gorge sides and top. Smooth rock along gorge bottom. Moderately smooth river.	Moderately smooth.	Smooth road and parking lots. Stiff hydroelectric facility. Smooth trails.

Source: BLM 2011

Table 26-3 presents ratings (ranging from 0 to 5, where 0 represents a weak contribution and 5 represents a strong contribution) of the scenic quality elements identified in Table 26-2, indicating the level at which they contribute to the overall scenic quality. As rated, the SJRG landform is distinctive and has the highest rating, and existing cultural modifications are not considered to be contributing factors. The other scenic quality elements that contribute to the overall rating are vegetative cover, presence of water, color of the landscape, and the relative scarcity or uniqueness of the landscape. An SQRU that receives a rating higher than 19 under the BLM VRM system is considered to have high scenic value.

Table 26-3. Scenic Quality Rating Summary for SQRU 01

Landform	Vegetation	Water	Color	Adjacent Scenery	Scarcity	Cultural Modifications	Total Score	Scenic Quality Rating	Explanation
5	4	3	4	3	4	0	23	A	Unit has varying topography, vegetation, and a river. The gorge offers dramatic views. There is minimal disturbance.

Source: BLM 2011

The BLM inventory class provides a basis for considering visual values in the resource management planning process. Visual resource management classes are established through the RMP process for all BLM-administered lands. During the RMP process, the class boundaries are adjusted as necessary to reflect the resource allocation decisions made in the RMP.

The BLM inventory classes have established baseline objectives where the Class I objective is most stringent and Class IV objective accommodates require major landscape modifications. SQRU 01, as established in the visual resources inventory, is assigned VRI Class II, corresponding to the Class II Objective (BLM 2011) as described below:

- **Class I Objective** preserves the character of the landscape. It provides for natural ecological changes but does not preclude limited management activity. The level of change to the characteristic landscape should be low and must not attract attention.

- **Class II Objective** retains the character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

- **Class III Objective** partially retains the character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view

of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

- **Class IV Objective** provides for management activities that require major modifications of the landscape's character. This level of change can be high. The management activities may dominate the view and be the major focus of viewer attention; however, every attempt should be made to minimize their impact through careful location, minimal disturbance, and repetition of the basic elements.

BLM further establishes its visual resource management objectives for the SJRG SRMA within three resource management zones (RMZ), including the Pa'San RMZ, Wu Ki'Oh RMZ, and Tahoot RMZ. In its analysis of recreation and visitor services, BLM identifies the implementation planning framework for the RMZs including the administration of visual resource management. As such, the SJRG SRMA is managed at multiple objective levels, with Pa'San RMZ at VRM Class I, Wu Ku'Oh RMZ at Class II, and Tahoot at Class IV.

Through the resource management planning process, BLM completed a preliminary suitability determination and suggested that the portion of San Joaquin River from Kerckhoff Dam to Kerckhoff Powerhouse is eligible and suitable for inclusion in the NWSRS. Eligibility is based on whether a river segment is both free flowing and possesses at least one ORV, which could be a scenic, recreational, geologic, fish, wildlife, cultural, historic, or other value. In the case of this segment of the San Joaquin River, the scenic quality rating of "A" contributed to the finding that the segment is eligible to be included in the NWSRS. Other qualities contributing to the segment's eligibility included wildlife and cultural ORVs.

Extended Study Area

Visual resources are described below for the San Joaquin River from Friant Dam to the confluence with the Merced River, the San Joaquin River from the Merced River to the Delta, the Delta, and the CVP and SWP water service areas. Overall visual quality was assessed qualitatively with landscapes described as high, moderate, or low, using the following qualitative terms:

- **Vividness** describes the presence of distinctive landscape features, such as topographic relief, geologic

formations, color, or patterns that combine to form a striking or memorable visual pattern.

- **Intactness** describes the integrity of a landscape and the degree to which it is free from incongruous or out-of-place features that detract from the visual pattern.

- **Unity** describes the appearance of the landscape as a whole and the degree to which the visual elements maintain a coherent visual pattern.

San Joaquin River from Friant Dam to the Merced River
Visual resources along the San Joaquin River from Friant Dam to the Merced River are described in the following sections. This discussion is based on information presented in the SJRRP PEIS/R (SJRRP 2012).

The portion of the extended study area extending from Friant Dam to the confluence with the Merced River is now subject to changed instream flows associated with implementing the SJRRP. Restoration Flows could modify environmental conditions in the river channel and bypasses. These instream flows would not result in a physical change in this river reach that would substantially affect visual resources because, as concluded in the SJRRP PEIS/R (SJRRP 2012), the increase in flow volumes and water velocities between Friant Dam and the confluence with the Merced River would alter the distribution of soil deposits and vegetative composition found in portions of the affected reaches, which could enhance the scenic value of this portion of the river and adjacent lands by increasing visual diversity and complexity. The effect from release of Interim Flows in this portion of the extended study area is not discussed further in this section. The visual context of Reaches 1 through 5 of the San Joaquin River from Friant Dam to the Merced River are described below. A map of the river reaches and flood bypass system is provided in Chapter 5, "Biological Resources – Fisheries and Aquatic Resources."

Reach 1 Observers in or adjacent to the river in Reach 1 see a river channel and adjacent vegetated banks and bluffs with views having moderate vividness; however, the concrete structures of Friant Dam and associated diversion structures and canals, buildings, parking lots, and a fish hatchery visible above the river at the upper end of Reach 1A reduce the intactness and unity of views. Downstream from Friant Dam, views are of naturally vegetated open space interspersed with golf courses, instream and offstream gravel operations,

orchards, and row crops. Intactness of the views ranges from low in areas of gravel mining operations to moderate in areas where the riparian corridor and adjacent lands are relatively undisturbed. Unity of the views ranges from low in areas where adjacent land uses produce sharp visual contrasts (disturbed lands adjacent to natural areas) to moderate where land uses have softer edges (riparian corridor adjacent to natural lands or parklands). The overall visual quality in Reach 1A is low to moderate.

Observers adjacent to the river in Reach 1B experience views with low vividness because of the lack of distinctive landscape features and the disturbed riparian corridor. Intactness of the views is somewhat reduced by the limited riparian vegetation coverage, disturbance resulting from gravel mining operations, and the contrasting managed agricultural landscape; intactness is low to moderate. Overall unity is low to moderate. The overall visual quality in Reach 1B is low.

Reach 2 The topography in Reach 2 is characterized by a sandy, meandering channel and adjacent land cover is primarily agricultural. Observers adjacent to the river in Reach 2 experience views with low vividness because this reach lacks distinctive landscape features, including Mendota Pool. Features of Mendota Pool include several pumps and canals to divert flows for meeting demands. Other features of this reach include the San Mateo Road crossing and the Chowchilla Bypass Bifurcation Structure, which is a major intrusive element. Therefore, intactness of this reach is considered low to moderate. Unity is low to moderate also because of intrusion of artificial structures and the contrast between the managed agricultural landscape and the meandering, sparsely vegetated stream channel in this reach. The overall visual quality in this reach is low.

Reach 3 The topography in Reach 3 is characterized by a sandy, meandering channel. This reach conveys perennial flows of Delta water released from the Mendota Pool to Sack Dam, where flows are diverted to the Arroyo Canal. The channel meanders approximately 23 miles through a predominantly agricultural area except where the city of Firebaugh borders the river's west bank for 3 miles. One bridge crosses the river in this reach. A narrow, nearly continuous band of riparian vegetation consisting primarily of cottonwood riparian forest is present on at least one side of the channel, and diversion structures are common in this reach.

Observers adjacent to the river in Reach 3 experience views with low vividness because of a lack of distinctive landscape features. Intactness of the views is low to moderate because of the presence of dams, diversion structures, and urban development, which intrude on views of the river corridor and adjacent agricultural landscape. Overall, the unity of the views is low in the vicinity of the diversion structures and moderate where the distinctive riparian corridor meanders through the more managed agricultural landscape. The overall visual quality in this reach is moderate.

Reach 4 Observers adjacent to the river in Reach 4A experience views with low vividness because of the lack of distinctive landscape features. Intactness of the views in this reach is low because of the presence of intruding artificial structures and the degraded condition of the riparian corridor. Unity is low because of the sharp contrast between the riparian area and the adjacent managed agricultural landscape. The overall visual quality in this subreach is low.

Observers adjacent to the river in Reach 4B1 experience views with low vividness because of the lack of distinctive landscape features. Intactness of the views is generally low (along the altered riparian area) to moderate (across adjoining agricultural land cover). Unity is low because of the sharp contrast between the vegetation-choked river channel and the adjacent managed agricultural landscape. The overall visual quality in this subreach is low.

Observers adjacent to the river in Reach 4B2 experience views with moderate vividness because of the wider floodplain with surrounding natural vegetation, and intactness is moderate because of the limited number of artificial structures that intrude on the views. Unity is moderate also because of the wider riparian corridor and adjacent areas of natural habitat. The overall visual quality in this subreach is moderate.

Reach 5 Observers adjacent to the river in Reach 5 experience views with moderate vividness because of the views of the wider floodplain, with meandering riparian corridors and expanses of surrounding natural vegetation. Intactness of the views is moderate because of the uninterrupted expanses of natural habitat and the limited number of artificial structures that intrude on the views. Unity of the views is moderate because the natural features of the landscape lack abrupt contrasts or changes. The overall visual quality in this reach is moderate.

San Joaquin River from the Merced River to the Delta

The Merced River joins the San Joaquin River in Mariposa County and continues north through Stanislaus and San Joaquin counties into the Delta. Among the most notable visual resources is the San Joaquin River NWR, which is composed of 7,000 acres of habitat, including riparian woodland, wetland, and grassland. Most of the river flows through quiet agricultural bottomlands and avoids most cities and urban areas. For this reason, most viewers are motorists traveling along highway crossings or local roads.

Observers adjacent to the San Joaquin River in this portion of the study area experience views with moderate vividness because of the wider floodplain with its meandering riparian corridors. Intactness of the views is moderate because of the limited number of artificial structures that intrude on the views. Unity of the views is moderate because the natural features of the landscape lack abrupt contrasts or changes. The overall visual quality in this reach is moderate.

Delta

The Delta landscape can be divided into four main landscape categories: agricultural areas, waterways, developed areas, and undeveloped open space. Each of these categories has distinctive visual and scenic attributes that contribute to the dominant visual character of the Delta landscape. This area hosts a variety of land cover and vegetative communities: open water, riparian forest, wetlands and aquatic vegetation, agriculture, grasslands, and urban development. Within each category, specialized dominant features in the visual landscape combine to define more distinct landscape types that share similar visual elements.

The Delta consists of largely undeveloped islands and low-lying tracts of land surrounded by waterways and levees. In addition to the natural waterways, the area contains a variety of water development facilities, such as levees, aqueducts, and intake structures. The construction of levees in the late 1800s and early 1900s resulted in the conversion of wetlands, riparian corridors, and open water to agricultural lands characterized by elevated and vegetated levees surrounding low-lying areas of farmland.

Lands contributing to the visual resources in the Delta include SRAs, wildlife refuges and preserves, marinas and shoreline recreational facilities, the Diablo Range, and the Vaca Mountains. Although the Delta is largely an agricultural area,

human-made structures of aesthetic value, such as bridges and historical homes and town sites, are located along the roadways.

SR 160, a two-lane, State-designated scenic highway, travels primarily along the tops of levees through the central and northern areas of the Delta and provides elevated views of various land uses and landscape types.

The attributes of the Delta landscape change over the course of a year in response to seasonal changes and weather. Vegetation, agricultural crops, and land use patterns vary according to the time of year and farming activities. For instance, a particular field may be fallow through winter and early spring but exhibit substantial vegetative growth through summer. Often stubble or crop remnant can be seen in fall after harvest.

Buildings associated with farms and duck clubs in areas that receive flooding are commonly raised structures that can withstand flooding. These structures are scattered throughout the Delta. The visual character of the Delta landscape is an appealing and sharp contrast against the Sacramento metropolitan region. Views are moderately high in vividness. The artificial intrusions associated with development, agriculture, and infrastructure are low but present, resulting in moderate intactness. The visual quality of the area is also moderately high.

CVP and SWP Water Service Areas

The CVP and SWP deliver water supplies to a variety of agricultural and municipal/industrial land uses south of the Delta. Agricultural lands in the western and middle San Joaquin Valley occupy typically flat open space with views extending to distant land features. Because of the extensive agricultural production, landscapes are often visually limited with visual variety provided by changes in color associated with agricultural crop types.

The Friant Division water service area is located in the eastern portion of the San Joaquin Valley, near the interface between the valley floor and adjacent foothills. In portions of this water service area, the landscape provides greater visual variety because of the more complex visual features influenced by topography, presence of natural vegetation, agricultural crop type, and presence of upland areas to the east.

Municipal and industrial land uses vary widely in appearance, topography, and landscape features. Urban areas are dominated by human-made features consisting of buildings, residences, transportation systems, and other infrastructure. Rural and less urbanized landscapes are composed of varying degrees of human-made features and natural vegetation and cover. These landscapes also vary depending on the proximity of topographic relief, whether the landscapes are located in inland areas or near the coast, whether vegetative canopies are present.

Environmental Consequences and Mitigation Measures

This section describes potential environmental consequences on visual resources that could result from implementing any of the alternatives. It also describes the methods of environmental evaluation, assumptions, and specific criteria that were used to determine the significance of impacts on visual resources. It then discusses the potential impacts and proposes mitigation where appropriate. The potential impacts on visual resources and associated mitigation measures are summarized in Table 26-4.

Methods and Assumptions

Analysis of potential impacts on visual resources is based on guidance developed by BLM. All assessments are qualitative, evaluating potential impacts of the alternatives on the viewshed in relation to local visual character.

Table 26-4. Summary of Impacts and Mitigation Measures for Visual Resources

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
VIS-1: Consistency With Applicable Plans	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	S	None Available	SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
VIS-2: Degradation and/or Obstruction of a Scenic View	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	S	VIS-2: Minimize Construction-Related Visual Impact on Scenic Views from KOPs	SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Table 26-4. Summary of Impacts and Mitigation Measures for Visual Resources (contd.)

Impact	Study Area	Alternative	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation
VIS-3: Generation of Increased Daytime Glare and/or Nighttime Lighting	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	S	VIS-3: Minimize or Avoid Visual Impact of Daytime Glare and Nighttime Lighting	SU
		Alternative Plan 2	S		SU
		Alternative Plan 3	S		SU
		Alternative Plan 4	S		SU
		Alternative Plan 5	S		SU
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
VIS-4: Impacts on a Designated Scenic Highway	Primary Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI
	Extended Study Area	No Action Alternative	NI	None Required	NI
		Alternative Plan 1	NI		NI
		Alternative Plan 2	NI		NI
		Alternative Plan 3	NI		NI
		Alternative Plan 4	NI		NI
		Alternative Plan 5	NI		NI

Key:
NI = no impact
S = significant
SU = significant and unavoidable

A field assessment of the primary study area was conducted to identify areas of visual sensitivity and scenic resources and to assess the character and quality of the visual resources present. Because no changes are anticipated to the aesthetic values of the extended study area, no field assessment was performed. The following analysis emphasizes the potential relationship between the alternatives and sensitive viewers associated with recreational areas, roadways, and commercial and residential development. KOPs were identified, and photograph points were established. The assessment of visual quality presented in this Draft EIS is based on the quality of the scenic resources and the visual sensitivity of the most likely viewer group at a particular KOP. Assessment methods were applied to the alternatives using the following steps:

- **Identify visually sensitive areas** – Areas rated highest for sensitivity are those with views seen by people driving to or from recreational activities or along routes designated as scenic corridors. Stationary views from relatively moderate- to high-use recreational areas and commercial/residential areas are also considered to be sensitive.

- **Define the landscape character** – "Landscape character" refers to the visual and cultural image of a geographic area. It is composed of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Landscape character embodies distinct landscape attributes that exist throughout the area.

- **Identify visually sensitive observation points** – Analysis of the impacts on visual resources from implementing any alternative should consider both construction and postconstruction views. This step identifies visually sensitive observation points in the primary study area. Identification of visually sensitive observation points allows a comparison of existing views and potential visual impacts resulting from implementing any alternative.

- **Identify visually affected KOPs** – Based on the location and distance of potential visual impact areas from the visually sensitive observation points, only a portion of the observation points may be significantly affected. Areas in the foreground-middleground zone are usually less than 3 to 5 miles away and are readily

visible from observation points. Areas farther away, but less than 15 miles away, are in the background. Areas that are not immediately visible or farther than 15 or so miles away are in the seldom-seen zone.

- **Classify scenic quality rating** – Scenic quality ratings are used to categorize visual features as follows: A, distinctive; B, typical; and C, indistinctive.

Criteria for Determining Significance of Impacts

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental impacts that would be caused by, or result from, implementing the No Action Alternative and the range of action alternatives. Under NEPA, the severity and context of an impact must be characterized. An environmental document prepared to comply with CEQA must identify the potentially significant environmental impacts of a proposed project and a reasonable range of alternatives, if required. 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" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental impacts (State CEQA Guidelines, Section 15126.4(a)).

The criteria used to determine the significance of impacts for this analysis are based primarily on the State CEQA Guidelines and other associated criteria, including regulatory agency standards. Federal criteria and NEPA guidance were also considered. The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, and consider the context and intensity of the environmental impacts as required under NEPA. Impacts of an alternative on visual resources would be significant if project implementation would result in any of the following effects:

- Have a substantial adverse impact on a scenic vista

- Substantially damage scenic resources, including trees, rock outcroppings, and historic buildings adjacent to a State scenic highway

- Substantially degrade the existing visual character or quality of the project site and its surroundings

- Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the project area

Additional criteria considered in the analysis include land management standards as described in associated planning documents developed by the Bakersfield BLM regional office. The Bakersfield RMP outlines the visual resource management standards for BLM land in the region (BLM 2012). Because the Bakersfield RMP determined the primary study area to have a scenic quality rating of A, the area is considered to be moderately sensitive, and management of this area is held to a standard of Visual Resource Class III. This designation requires existing management to partially retain existing landscape character. The level of allowable change to the characteristic landscape should be moderate, and management activities may attract attention but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Project-related activities that would result in a greater-than-moderate change to the character of the landscape, attract attention and dominate the view of the casual observer, or diverge from the basic elements found in the predominant natural features of the characteristic landscape would result in inconsistency with BLM resource management objectives designated for Bakersfield BLM SQRU 01 and the SJRG SRMA.

In addition, the primary study area is located along a segment of the San Joaquin River that has been determined to be suitable as an addition to the NWSRS with a recommended classification of wild/scenic. If a waterway is determined to be eligible/suitable for official designation, land management must be taken to protect the free-flowing condition and the ORVs qualifying its eligibility. Because this waterway has segments eligible as either wild or scenic, any impacts on the free-flowing nature of these segments, any impacts on the ORVs in each segment, or watershed development greater than that associated with scenic- or wild-designated river segments could affect NWSRS eligibility, suitability, or classification (wild, scenic, or recreational).

Topics Eliminated from Further Consideration

No topics related to visual resources that are included in the significance criteria listed above were eliminated from further consideration. All relevant topics are analyzed below.

None of the landscapes and visual resource features in the extended study area would be affected by construction or operation activities associated with implementing the action alternatives. Changes to water conveyance to the CVP and SWP water service areas would not exceed historic maximum deliveries and would not result in a change in land use or cropping patterns or affect the visual quality of these areas. Therefore, none of the action alternatives would have an impact on visual resources found in the San Joaquin River, Delta, or the CVP or SWP water service areas. The visual resources found in these areas are therefore not discussed further in this analysis.

Direct and Indirect Effects

The following section describes the potential environmental consequences of the alternatives. Where the action alternatives would have identical or nearly identical impacts regardless of which action alternative is implemented, the action alternatives are described together. Where impacts would differ, the action alternatives are described separately.

Impact VIS-1: Consistency with Applicable Plans

Primary Study Area

No Action Alternative No project-related construction or operation activities would occur under the No Action Alternative. It is expected that there would be no inconsistencies with the Bakersfield RMP or other local plans from other projects that would be expected to occur under the No Action Alternative.

There would be **no impact** under the No Action Alternative.

Alternative Plans 1-4 Despite development that has occurred in the area, (Friant Dam, scattered residences, and recreational facilities) the primary study area retains a high quality visual landscape. Applicable visual resources guidelines for planning BLM actions are primarily sourced from the Bakersfield Proposed RMP for SJRG SRMA (2012). In the Proposed RMP, the primary study area was identified as having Class II visual resources, highlighting the regional high scenic values. The SJRG SRMA further specifies that the gorge area has diverse

management requirements, from low values in the Tahoot RMZ at VRM Class IV, to high values in the Pa' San RMZ at VRM Class I. Implementing Alternative Plans 1-4 would involve constructing and operating numerous structural elements that would permanently add human-made features to the landscape that would contrast with existing natural features and modify the viewshed's character. This would result in a moderate to high change to the characteristic landscape which would result in inconsistency with visual resource objectives designated for the primary study area.

Implementing Alternative Plans 1-4 would involve constructing and operating numerous structural elements that would permanently add human-made features to the landscape that would contrast with existing natural features and modify the viewshed's character. Under Alternative Plans 1-4, the majority of physical structures and landscape modifications affect viewsheds in the Kerckhoff Reservoir and SJRG area. Scenic values in the Millerton Lake area, characterized by KOPs 5, 6, and 7 would remain largely unchanged. Similarly, views from nearby travelers as represented by KOP 8 would not be affected as a result of the action alternatives. For the purposes of visual resources analysis, this discussion focuses on impacts to the SJRG and Kerckhoff Reservoir area as represented by KOPs 1-4 and KOP 9.

The Temperance Flat RM 274 Dam, diversion works and intake structure, powerhouse and transmission facilities, valve house, waste area, and quarry, batch plant, and haul road options A, B, or C would modify the existing visual character of the area by introducing substantial areas of ground disturbance, concrete structures, and a new reservoir. The dam structure would result in a permanent impoundment that would disrupt the natural visual character of the SJRG. The installation of associated structures and permanent access roads would also introduce conflicting color, form, and texture into the landscape. The changes associated with the action alternatives would attract attention and dominate the view of the natural landscape when observed from KOPs.

Operation of the reservoir would result in a substantial change to the upstream shoreline. Existing operation of Millerton Lake allows for a maximum water elevation of 580 feet, and typical seasonal water availability results in elevations between 480 feet and 560 feet. The Temperance Flat RM 274 Reservoir would have a maximum water elevation of 985 feet, a 405-foot increase above the established maximum elevation. Complete

or partial vegetation clearing would occur within some portions this inundation zone. This change would result in a more expansive shoreline and increased visual dominance of the reservoir water body. Furthermore, during periods of drawdown, the reservoir waterline could be reduced to as low as elevation 690. During these periods, a large area of bare soil would be exposed to viewers, creating the bathtub ring effect typical of many water storage facilities. This effect occurs in the existing landscape to a limited extent with Millerton Lake operations. However, implementing the Temperance Flat RM 274 Dam would greatly increase the size of the unvegetated ground, and the operations would expose a zone of approximately 290 feet in height. To illustrate this effect, Figure 26-11 depicts a view from Wellbarn Road, looking northwest at the SJRG. Figure 26-12 and Figure 26-13 show high- and low-water conditions, respectively, that would occur as a result of the proposed dam operations. This bathtub ring effect would draw an observer's attention and would widen the altered impact of unvegetated, bare soil to the landscape.

Figure 26-11. Existing View from Wellbarn Road (KOP 3)

Figure 26-12. Visual Simulation of the Reservoir (High Water) from Wellbarn Road (KOP 3)

Figure 26-13. Visual Simulation of the Reservoir (Low Water) from Wellbarn Road (KOP 3) – Alternative Plans 1-4

Quarry, batch plant, and haul road options A, B, or C would provide aggregate for the main dam and cofferdams during

construction. Each site would be approximately 92 acres in size. Pending geotechnical investigation, one of the three quarry, batch plant, and haul road options would be constructed under the action alternatives. The selected quarry option would be excavated to elevation 600 feet yielding an estimated 10 million cubic yards. For quarry, batch plant, and haul road options A, B, and C, the quarry would be sited at or below the proposed inundation elevation 985 feet. As previously discussed, complete or partial vegetation clearance within some of the inundation zone is already proposed under the action alternatives. The remaining quarry excavation would be hidden underwater during high-water conditions or would appear similar to the surrounding bare soil "bathtub ring" during periods of drawdown. Grading of the quarry, batch plant, and haul road areas would overlap with the reservoir construction areas and would not substantially contribute to changes in the visual character of the landscape.

Temporary project-related construction activities would result in grading and vegetation clearance surrounding the Temperance Flat RM 274 Dam site; staging area; quarry, batch plant, and haul road options; and other nearby sites. To the extent feasible, some of these areas would be revegetated, or plant colonization would be allowed to occur naturally. These disturbed areas may take years to redevelop plant cover and would not necessarily return to a forested or other condition similar to that of the existing landscape. This would result in a temporary but long-term impact on the visual character of the area that would be highly perceptible to viewers, including nearby residents and recreationists.

This impact would be **significant** under Alternative Plans 1-4. No feasible avoidance or minimization measures are available to reduce this impact below the level of significance. Mitigation for this impact is not proposed because no feasible mitigation is available to reduce the impact to a less-than-significant level.

Alternative Plan 5 This impact would be similar to Alternative Plans 1-4. Implementing Alternative Plan 5 would involve constructing and operating numerous structural elements that would permanently add human-made features to the landscape that would contrast with existing natural features and modify the viewshed's character. This would result in a moderate to high change to the characteristic landscape which would result in inconsistency with visual resource objectives designated for the primary study area. All of the proposed

project components would be the same as Alternative Plans 1to 4 with exception to the operation of the Temperance Flat RM 274 Dam. As such, this discussion focuses on the dam operation unique to Alternative Plan 5.

Similar to Alternative Plans 1-4, operation of the proposed Temperance Flat RM 274 Reservoir would result in a substantial change to the upstream shoreline. Existing operation of Millerton Lake allows for a maximum water elevation of 580 feet, and typical seasonal water elevations between 480 feet and 560 feet. The Temperance Flat RM 274 Reservoir would have a maximum water elevation of 985 feet, a 405-foot increase above the established maximum elevation. This change would result in a more expansive shoreline and increased visual dominance of the reservoir water body.

As a result of dam operations unique to Alternative Plan 5, during periods of drawdown the reservoir waterline could be reduced further than Alternative Plans 1-4 to as low as elevation 603. During these periods, a large area of bare soil would be exposed to viewers, creating the bathtub ring effect typical of many water storage facilities. This effect occurs in the existing landscape to a limited extent with Millerton Lake operations. However, implementing Alternative Plan 5 would greatly increase the size of the bare ground, and the operations would expose a zone of approximately 382 feet in height. To illustrate this effect, Figure 26-11 depicts a view from Wellbarn Road, looking northwest at the SJRG. Figure 26-12 and Figure 26-14 show high- and low-water conditions, respectively, that would occur as a result of the proposed dam operations. This bathtub ring effect would draw an observer's attention and would widen the altered impact of unvegetated, bare soil to the landscape.

This impact would be **significant** under Alternative Plan 5.

No feasible avoidance or minimization measures are available to reduce this impact below the level of significance. Mitigation for this impact is not proposed because no feasible mitigation is available to reduce the impact to a less-than-significant level.

Figure 26-14. Visual Simulation of the Reservoir (Low Water) from Wellbarn Road (KOP 3) – Alternative Plan 5

Impact VIS-2: Degradation and/or Obstruction of a Scenic View

Primary Study Area

No Action Alternative No designated scenic vistas are located in the primary study area. Under the No Action Alternative, the existing scenic views would not be degraded or obstructed because the project would not be constructed. The visual setting would remain the same as under existing conditions.

There would be **no impact** under the No Action Alternative.

Alternative Plans 1-4 As described in the discussion of Impact VIS-1, Alternative Plans 1-4 would introduce a new dam, associated infrastructure, power facilities, and reservoir operations, resulting in a bathtub ring effect. Introduction of these new features would alter and degrade the character of the natural landscape. Existing scenic views of areas where infrastructure would be built or relocated could be obstructed or degraded. Views from some KOPs would be degraded or obstructed during construction. Throughout the primary study area, vegetation retention or removal activities would also degrade scenic views.

Figure 26-11 presents a view of the existing SJRG from Wellbarn Road. The view from this KOP would be affected by the establishment of Temperance Flat RM 274 Reservoir, its operations, and associated construction activities. The existing site exhibits relatively undisturbed forested hills with a sinuous riverbed below. Figure 26-12 and Figure 26-13 depict visual simulations representative of the proposed reservoir during high-water and low-water conditions, respectively. As shown, the dominant presence of high water would draw attention and reduce the amount of upland vegetation present in the viewshed. The establishment of the reservoir would change the scenic characteristic from a flowing riverbed to a larger, more static body of water. During periods of reservoir drawdown, a wide bathtub ring effect would be present as a result of reservoir operation and management activities. This bare soil is less visually complex than the combination of water and upland vegetation and as such would reduce the natural character of the landscape.

Figure 26-15 depicts a view of the existing San Joaquin River from residences and roads on Ralston Ridge. The existing site exhibits forested ridges and hillsides where the San Joaquin River widens and enters the main body of Millerton Lake. The existing Millerton Lake operation results in a variable bathtub ring effect, as indicated by a ring of bare soil and rocks. The view from this KOP would be affected by introducing Temperance Flat RM 274 Dam, its operations, and construction activities. Figure 26-16 depicts a visual simulation representative of the proposed Temperance Flat RM 274 Dam site. The dam introduces a dominant human-made element into the existing viewshed. Views to locations upriver of the dam would be obstructed. Construction activities in and around the dam site would also result in removal of vegetation and introduce a presence of construction equipment and nighttime lighting that would degrade the quality of the view from this KOP during this period.

This impact would be **significant** under Alternative Plans 1-4. Mitigation for this impact is proposed below in the Mitigation Measures section.

Figure 26-15. Existing View from Residences on Ralston Ridge (KOP 4)

Figure 26-16. Visual Simulation of the Dam from Residences on Ralston Ridge (KOP 4)

Alternative Plan 5 This impact would be similar to Alternative Plans 1-4. As described in the discussion of Impact VIS-1, Alternative Plan 5 would introduce a new dam, associated infrastructure, power facilities, and reservoir operations, resulting in a bathtub ring effect. Introduction of these new features would alter and degrade the character of the natural landscape. Existing scenic views of areas where infrastructure would be built or relocated could be obstructed or degraded. Views from some KOPs would be degraded or obstructed during construction. Throughout the primary study area, vegetation retention or removal activities would also degrade scenic views. All of the proposed project components would be the same as Alternative Plans 1-4 with the exception of operations of Temperance Flat RM 274 Reservoir and Millerton Lake. As such, this discussion focuses on the reservoir operations unique to Alternative Plan 5.

Figure 26-11 presents a view of the existing SJRG from Wellbarn Road. The view from this KOP would be affected by the establishment of Temperance Flat RM 274 Reservoir, its operations, and associated construction activities. The existing site exhibits relatively undisturbed forested hills with a sinuous riverbed below. Similar to Alternative Plans 1-4, Figure 26-12 depicts visual simulations representative of the proposed reservoir during high-water conditions. As shown, the dominant presence of high water would draw attention and reduce the amount of upland vegetation present in the viewshed. The establishment of the reservoir would change the scenic characteristic from a flowing riverbed to a larger, more static body of water.

Figure 26-14 depicts a visual simulation representative of the proposed reservoir during low-water conditions unique to Alternative Plan 5. During periods of reservoir drawdown, a bathtub ring effect—wider than that of Alternative Plans 1-4—would be present as a result of reservoir operation and management activities. This bare soil is less visually complex than the combination of water and upland vegetation and as such would reduce the natural character of the landscape.

This impact would be **significant** under Alternative Plan 5. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact VIS-3: Generation of Increased Daytime Glare and/or Nighttime Lighting

Primary Study Area
No Action Alternative Under the No Action Alternative, daytime glare and/or nighttime lighting would not increase because Temperance Flat RM 274 Dam would not be constructed. The visual setting would remain the same as under existing conditions.

There would be **no impact** under the No Action Alternative.

Action Alternatives The increased area of light-colored soil around the Temperance Flat RM 274 Reservoir shoreline that would be exposed during periods of drawdown and, conversely, the increased area of water surface associated with high water would increase the potential for daytime glare. New infrastructure, such as the powerhouse, transmission facilities, and quarry, batch plant, and haul road options, and new access roads, would also create new sources of reflective daytime glare. In addition, construction equipment could be a temporary source of reflective daytime glare. Construction activities at night requiring the use of vehicle and perimeter lighting, particularly in the vicinity of Temperance Flat RM 274 Dam, would be necessary for several years. New sources of permanent nighttime lighting would be required for some locations, such as relocated recreational facilities, new roads, and power facilities.

This impact would be **significant** under the action alternatives. Mitigation for this impact is proposed below in the Mitigation Measures section.

Impact VIS-4: Impacts on a Designated Scenic Highway

Primary Study Area
No Action Alternative Under the No Action Alternative, there would not be any inconsistencies with Federal and State scenic byway requirements because Temperance Flat RM 274 Dam would not be constructed. The visual setting would remain the same as under existing conditions.

There would be **no impact** under the No Action Alternative.

Action Alternatives No Federal or State scenic highways are designated in the primary study area. There are a few designated State scenic highways in the area surrounding the primary study area. Several eligible highways in the region

have not yet been designated. The nearest scenic highway, SR 168, is eligible for designation; however, as discussed in the Regulatory Setting section of this chapter, travelers cannot see the primary study area while on this road. No other officially designated or eligible scenic highways are located near the primary study area.

There would be **no impact** under the action alternatives. Mitigation for this impact is not needed and thus not proposed.

Mitigation Measures

This section discusses mitigation measures for each significant impact described in the Direct and Indirect Impacts section, as presented in Table 26-4.

No mitigation is required for Impact VIS-4 within the primary study area because there would be no impact for all action alternatives. Impacts VIS-1 through VIS-4 would not occur in the extended study area.

Impacts VIS-1, VIS-2, and VIS-3 would be significant within the primary study area. No feasible mitigation measures are available at the time of preparation of this Draft EIS to reduce Impact VIS-1 to less-than-significant levels. Therefore, Impact VIS-1 (within the primary study area) would be **significant and unavoidable**. The following mitigation is required for Impacts VIS-2 and VIS-3 in the primary study area for all action alternatives.

Mitigation Measure VIS-2: Minimize Construction-Related Visual Impact on Scenic Views from KOPs Reclamation will implement the following actions to minimize potential impacts on visual resources during project construction:

- Store construction equipment in the designated contractor staging area when it is not in use (e.g., after hours or when not required for the day's construction activities).

- Ensure, when practicable, that construction materials that will remain permanently on-site are consistent in color, texture, and pattern with the surrounding environment.

Implementing this mitigation measure would reduce the visual impacts of the project related to the degradation and/or obstruction of a scenic view, but it would not necessarily

reduce them to a less-than-significant level. There are no additional feasible mitigation measures that could be implemented to further reduce the visual impact of construction of the large-scale facilities associated with the action alternatives in a relatively natural environment. Impact VIS-2, therefore, would be **significant and unavoidable** under the action alternatives.

Mitigation Measure VIS-3: Minimize or Avoid Visual Impact of Daytime Glare and Nighttime Lighting
Reclamation will implement the following actions to minimize or avoid potential impacts on visual resources from daytime glare and nighttime lighting as a result of permanent lighting or construction equipment and staging:

- Avoid constant nighttime lighting and overly bright lighting to the extent possible. The location of lighting will correspond to the anticipated use and should not exceed the amount of light actually required by users.

- Screen lights and direct them away from residences to the highest degree possible, and minimize to the highest degree possible the amount of nighttime light used. Lighting fixtures will include shielding to minimize off-site light spill and glare. In addition, the following measures will apply:

  - The spacing of luminaire lamps (or comparable vandal-resistant lighting) shall be the maximum allowable for traffic safety.

  - Luminaires (or comparable vandal-resistant lighting) shall be cutoff-type fixtures that cast low-angle illumination to minimize incidental spillover of light onto adjacent private properties and undeveloped open space. Fixtures that project upward or horizontally will not be used.

  - Luminaire lamps (or comparable vandal-resistant lighting) shall be used to provide good color rendering and natural light qualities.

Implementing this mitigation measure would reduce the visual impacts of the project related to the generation of increased daytime glare and/or nighttime lighting, but it would not necessarily reduce them to a less-than-significant level. There are no additional feasible mitigation measures that could be

implemented to further reduce this impact. Impact VIS-3, therefore, would be **significant and unavoidable** under the action alternatives.

Chapter 27
Cumulative Effects

This chapter provides an analysis of overall cumulative effects of the alternatives. Cumulative effects are determined by analyzing the potential for impacts of an alternative to combine with the impacts of other past, present, and reasonably foreseeable future projects to produce project-related impacts. This analysis follows applicable guidance provided by CEQ in *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997) and *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005).

Definitions of Cumulative Effects

The CEQ regulations that implement NEPA provisions define a cumulative effect as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7).

Cumulative impacts can result from individually minor but collectively significant actions over time, and they differ from indirect impacts (40 CFR 1508.8). They are caused by the incremental increase in total environmental effects that occurs when the evaluated project is added to other past, present, and reasonably foreseeable future actions. Cumulative effects can thus originate from causes that are unrelated to the project being evaluated, and the analysis of cumulative effects looks at the life cycle of the effects. These effects can be either adverse or beneficial.

Cumulative impacts are defined in the State CEQA Guidelines (14 CCR Section 15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from

individually minor but collectively significant projects taking place over a period of time" (14 CCR Section 15355(b)).

Consistent with the State CEQA Guidelines (14 CCR Section 15130(a)), the discussion of cumulative impacts focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (14 CCR Section 15130(b)) state that:

> *The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.*

Relationship to CALFED Programmatic Cumulative Impacts Analysis

The analysis of cumulative effects in this Draft EIS tiers to the cumulative effects assessment in the CALFED PEIS/R. The "Millerton Lake Enlargement or Equivalent" project was included in the cumulative impacts analysis of the CALFED PEIS/R as a project in CALFED's Storage Program (CALFED 2000).

This project-specific analysis refines and updates, but stands alone from, the analysis of cumulative effects in the CALFED PEIS/R (CALFED 2000). This analysis focuses on issues resulting from the effects of the action alternatives combined with other reasonably foreseeable future projects. This Draft EIS considers CALFED projects that have been implemented, are being implemented, or are reasonably foreseeable future projects. The projects that have been implemented are considered as part of existing conditions; reasonably foreseeable future projects are considered as part of future conditions.

Methods and Assumptions

For purposes of this Draft EIS, cumulative impacts of an action alternative would be significant if implementing the alternative would make a considerable incremental contribution to a significant cumulative effect. The alternative plan's contribution is evaluated in combination with the effects of other past, present, and reasonably foreseeable future projects to determine whether (1) the overall cumulative effect would be significant and (2) the alternative's contribution would be considerable. Cumulatively significant impacts would do any of the following:

- Cause a significant adverse effect on a resource (using the criteria for significance described in the "Environmental Consequences and Mitigation Measures" sections of Chapters 4 through 26 of this Draft EIS)

- Adversely affect a resource that already has a degraded or declining condition because of substantial adverse effects that have already occurred

- Cause effects that initially were not significant, but would be part of an irreversible degrading or declining trend

Following CEQ guidance, Reclamation has identified associated actions (past, present, or future) that, when viewed with the proposed or alternative actions, may have significant cumulative impacts. Table 27-1 lists the actions and conditions that were considered for each resource area.

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: using a list of past, present, and probable future projects (the "list approach"); or using adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). For this analysis of cumulative impacts, the list approach and the plan approach have been combined in quantitative and qualitative assessments to generate a comprehensive future projection. The methodology for each of these assessments is described following Table 27-1.

Table 27-1. Present and Reasonably Foreseeable Future Actions and Conditions Included in the Analysis of Cumulative Impacts, by Resource Area

Quantitative Assessment of Actions and Conditions Related to Water Resources
Forecasted 2030 Level of Demands for Water Supplies Methodology
Freeport Regional Water Project
Delta Water Supply Project
DWR South Bay Aqueduct Improvement and Enlargement Program
Vernalis Adaptive Management Plan
San Joaquin River Restoration Program
Grassland Bypass Project
Common Assumptions for Water Storage Projects
Coordinated Long-Term Operation of the CVP and SWP
Quantitative Assessment Methodology for Effects on Air Quality
Qualitative Assessment of Actions and Conditions Related to Water/Natural Resource Management and Restoration
Central Valley Project Improvement Act
CALFED Ecosystem Restoration Program
Conveyance of Refuge Water Supply, Mendota Wildlife Area
Coordinated Long-Term Operation of the CVP and SWP
Water Quality Control Plan for the Sacramento and San Joaquin River Basins
Bay Delta Conservation Plan (and Alternative Delta Conveyance Facilities)
San Joaquin River Restoration Program
North-of-Delta Offstream Storage Investigation
Shasta Lake Water Resources Investigation
North Bay Aqueduct Alternative Intake Project
North Delta Flood Control and Ecosystem Restoration Project
Franks Tract Project, North/Central Delta Improvement Study
Dutch Slough Tidal Marsh Restoration Project
Suisun Marsh Management, Preservation, and Restoration Plan
In-Delta Storage Program (Delta Wetlands Project)
Los Vaqueros Reservoir Expansion Project
East Bay Municipal Utility District Water Supply Management Program 2040
San Joaquin River Salinity Management Plan
San Luis Reservoir Low Point Improvement Project and San Luis Reservoir Expansion
Delta-Mendota Canal/California Aqueduct Intertie
Delta-Mendota Canal Recirculation Project
Lower San Joaquin River Flood Improvement Project
Bay Area Water Quality and Supply Reliability Program
Conditional Waiver of Waste Discharge Requirement for Irrigated Lands
Tracy Fish Collection Facility and Tracy Fish Facility Improvement Program
Central Valley Joint Venture

Table 27-1. Present and Reasonably Foreseeable Future Actions and Conditions Included in the Analysis of Cumulative Impacts, by Resource Area (contd.)

Qualitative Assessment of Actions and Conditions Related to Water/Natural Resource Management and Restoration (contd.)
Comprehensive Conservation Management Plans for National Wildlife Refuges
Jensen River Ranch Habitat Enhancement and Public Access Project
Lost Lake Park Master Plan
Riparian Habitat Joint Venture
San Joaquin River Parkway Plan
Fresno County General Plan
Madera County General Plan
City of Fresno General Plan
Brighton Crest/Eagle Springs Golf Course and Country Club
Millerton New Town
Friant Ranch Specific Plan
Millerton Specific Plan
Gunner Ranch West Area Plan
Gateway Village Specific Plan
Rio Mesa Area Plan
North Fork Village
Ventana Hills Estates Annexation
Bureau of Land Management-Bakersfield Office Resource Management Plan
Friant-Kern Canal Reverse Flow Project
Friant-Kern and Madera Canals Capacity Restoration Project
Delta Stewardship Council's Delta Plan
State Water Board Delta Flow Action
San Joaquin River Exchange Contractors Water Authority Water Transfer Program 2014–2038
Westside Regional Drainage Plan
Semitropic Water Storage District Groundwater Banking Project
State Water Project Water Supply Contract Extension Program
State Water Project Water Settlement Agreement
Poso Creek IRWMP
Southern Sierra IRWMP
Kern River IRWMP
Kings Basin IRWMP
Kaweah River Basin IRWMP
Deer Creek & Tule River Authority Groundwater Management Plan Update
Westside Integrate Water Resources Plan
Madera County IRWMP
Merced IRWMP
East Stanislaus Region IRWMP
Eastern San Joaquin IRWMP

Table 27-1. Present and Reasonably Foreseeable Future Actions and Conditions Included in the Analysis of Cumulative Impacts, by Resource Area (contd.)

Qualitative Assessment of Actions and Conditions Related to Flood Management
Central Valley Flood Protection Plan
CALFED Levee System Integrity Program
Folsom Dam Joint Federal Project
Delta Islands and Levees Feasibility Study
South Delta Flood Bypass
Qualitative Assessment of Actions and Conditions Related to Power and Energy
Big Creek Facilities FERC Relicensing
California Department of Water Resources Oroville Facilities FERC Relicensing
PG&E Kerckhoff Hydroelectric Project Licensing
PG&E Crane Valley Hydroelectric Project
New Friant River Outlet Powerhouse
Merced River Hydroelectric Project, FERC Project No. 2179
Don Pedro Project Relicensing, FERC No. 2299
Qualitative Assessment of Actions and Conditions Related to Recreational Resources
Bureau of Land Management-Bakersfield Office Resource Management Plan
Millerton Lake Resource Management Plan and General Plan
San Joaquin River Parkway Plan

Key:
CALFED = CALFED Bay-Delta Program
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
FERC = Federal Energy Regulatory Commission
IFIM = Instream Flow Incremental Methodology
IRWMP = Integrated Regional Water Management Plan
NMFS = National Marine Fisheries Service
PG&E = Pacific Gas and Electric Company
SWP = State Water Project
TMDL = total maximum daily load

Quantitative Assessments

Quantitative assessments were completed for each of the resource areas in this Draft EIS, where feasible. The effects of actions related to water resources and effects of development projects were assessed quantitatively. Quantitative changes to water resources and air quality were evaluated in the consideration of cumulative impacts on affected resources. The methodologies for the quantitative assessments are described below.

Quantitative Assessment of Actions and Conditions Related to Water Resources

In this Draft EIS, the quantitative assessment related to water resources relied primarily on CalSim II modeling to evaluate

the hydrologic conditions of past, present and reasonably foreseeable future actions that could affect the environment, when combined with the effects of the alternatives. As described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," CalSim II was run using two different baselines, one for existing conditions, and one for future conditions. The future conditions analysis includes those projects and conditions in place under existing conditions, (based on a 2005 level of land use development and current facilities in place as of January 2014), modified to reflect a mix of forecasted 2020 and 2030 land use development and reasonably foreseeable future projects and facilities anticipated to be in place by 2030, and provides the basis for quantitative assessment of actions and conditions related to water resources described in this chapter. The future conditions were compared to the existing conditions in the environmental consequences sections of Chapters 4 through 26; conclusions made in those chapters are used to support the cumulative effects analysis presented in this chapter).

The future conditions do not account for potential changes in water demands resulting from the effects of climate change. Potential changes in water demand due to climate change are described qualitatively in the "Qualitative Assessments" section. The past, present, and reasonably foreseeable projections and conditions considered in this cumulative analysis include the following (described separately below):

- Forecasted 2030 level of demands for water supplies
- Freeport Regional Water Project
- Delta Water Supply Project
- DWR South Bay Aqueduct Improvement and Enlargement Project
- VAMP
- SJRRP – Full Restoration Flows
- Grassland Bypass Project
- Common Assumptions for Water Storage Projects

- Coordinated Long-Term Operation of the CVP and SWP

- Quantitative Assessment of Effects on Air Quality

Other reasonably foreseeable actions and conditions with the potential to affect water resources were assessed qualitatively, as described in the Qualitative Assessment of Actions and Conditions Related to Water/Natural Resource Management and Restoration section of this chapter.

Forecasted 2030 Level of Demands for Water Supplies Methodology Reclamation and DWR developed assumptions for evaluating systemwide hydrologic and water supply conditions with CalSim II under existing and future conditions. Detailed descriptions of the CalSim II model, the modeling methodology used in evaluations, and key assumptions (including forecasted 2030 facilities and demands) are provided in the Modeling Appendix. For a summary of the analysis and modeling results, see the Hydrology, Hydraulics, and Water Management Technical Report (in the Physical Resources Appendix).

To quantify cumulative effects on hydrologic conditions, modeling runs with No-Action Alternative (2030) conditions were compared to modeling runs with existing (2005) conditions. For example, the No-Action Alternative (2030 baseline) was compared to existing conditions (2005 baseline) to identify the cumulative impacts of reasonably foreseeable future projects and conditions on hydrologic conditions. Similarly, project alternatives were compared to existing conditions (consistent with CEQA requirements) and to the No-Action Alternative (2030) (satisfying NEPA requirements) to identify the combined cumulative effect of project alternatives and other foreseeable projects and facilities. The No-Action Alternative (2030) includes forecasted year-2030 demands for water. These forecasted demands are considered to be reasonably foreseeable for determining cumulative impacts.

Freeport Regional Water Project The Freeport Regional Water Project provides water for EBMUD customers in dry years and needed water for the Sacramento region by drawing water from the Sacramento River near the town of Freeport. The project consists of a 185-million-gallon-per-day water intake structure and pumping plant on the Sacramento River, a large-diameter pipeline to transport water eastward from the

intake to a Sacramento County Water Agency water treatment plant and to the existing Folsom South Canal. Construction began in 2007 and operations in 2010, and the project is substantially complete. The Freeport Regional Water Project is included only in future conditions for this Draft EIS.

Delta Water Supply Project The Delta Water Supply Project provided a new, supplemental high-quality water supply for the Stockton metropolitan area. The project replaces declining surface water resources, protects groundwater supplies, and provides for current and future water needs in the Stockton metropolitan area. The project included a new intake and pump station that diverts water from the San Joaquin River through miles of underground pipeline to a new 30-million-gallon-per-day water treatment plant. The project will help meet Stockton's water needs through 2025, as detailed in the City of Stockton's general plan. The Delta Water Supply Project was completed in June 2012 and is included only in future conditions for the Investigation.

DWR South Bay Aqueduct Improvement and Enlargement Project The South Bay Aqueduct conveys water from the Delta through more than 40 miles of pipelines and canals to the Zone 7 Water Agency, Alameda County Water District (ACWD), and Santa Clara Valley Water District (SCVWD), (DWR 2014a). The purpose of this project is to increase the capacity of the South Bay Aqueduct from 300 cfs to 430 cfs to meet Zone 7 Water Agency's future needs and provide operational flexibility to reduce the SWP's peak power consumption. The project was completed in 2012. The South Bay Aqueduct Improvement and Enlargement Project is included only in the future conditions for the Investigation.

Vernalis Adaptive Management Plan VAMP was a 12-year experimental management program, which the State Water Board accepted as the implementation of the San Joaquin River flow standard pursuant to D-1641. VAMP expired in 2011. It was initiated to protect juvenile Chinook salmon emigrating through the San Joaquin River and Delta, and to evaluate how Chinook salmon survival rates change in response to alterations in San Joaquin River flows and exports at CVP and SWP facilities in the south Delta when the Head of Old River Barrier is installed. A water acquisition program for in-stream flows and a monitoring program for VAMP were implemented through the San Joaquin River Agreement (SJRA), which was adopted in 2000 and twice extended, finally expiring in December 2011. Signatories to the SJRA included Reclamation, DWR, CDFW, USFWS, San

Joaquin River Group Authority and member agencies, Exchange Contractors, and select CVP and SWP Contractors, San Francisco Public Utilities Commission, and several environmental interest groups.

The expiration of VAMP in 2011 introduced uncertainty regarding responsibility for meeting San Joaquin River flow standards set forth in the 1995 Bay Delta Plan in the interim until new San Joaquin River flow standards are identified. Future State Water Board objectives will likely be as protective as the original VAMP requirements and are anticipated to remain in place through 2030. Additionally, the 2009 NMFS BO RPAs include requirements for a continuation of VAMP-like flow objectives, as described in the Coordinated Long-Term Operation of the CVP and SWP section of this chapter. Accordingly, the Investigation's modeling of existing and future conditions has incorporated full VAMP flow requirements.

San Joaquin River Restoration Program In 1988, a coalition of environmental groups, led by the NRDC, filed a lawsuit challenging the renewal of long-term water service contracts between the United States and water contractors in the Friant Division of the CVP. The Settlement was approved in late 2006 by the District Court (NRDC et al. 2006). The Settlement ended an 18-year legal dispute over the operation of Friant Dam and resolved longstanding legal claims brought by a coalition of conservation and fishing groups led by the NRDC.

The San Joaquin River Restoration Settlement Act, included in Public Law 111-11 and signed into law on March 30, 2009, authorizes and directs the Secretary of the Interior to implement the Settlement. The Settlement establishes two goals. The Restoration Goal is to restore and maintain fish populations in "good condition" in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish. The Water Management Goal is to reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

The Settlement provides for substantial river channel improvements and water flow to sustain a salmon fishery upstream from the confluence of the Merced River tributary,

while reducing or avoiding the water supply impacts of implementing the Settlement on the Friant Division long-term water contractors. At the heart of the Settlement is a commitment to provide continuous flows in the San Joaquin River in the 153-mile stretch of the San Joaquin River between Friant Dam and the Merced River (the Restoration Area).

Reasonably foreseeable SJRRP actions, and their inclusion in existing and future conditions, are described in Chapter 2, "Alternatives."

Grassland Bypass Project The Grassland Bypass Project is a stakeholder initiative designed to improve water quality in the channels used to deliver water to the San Joaquin River and wetland areas in the Grassland watershed. Irrigation of soils containing high levels of salt and selenium has caused high levels of selenium to leach into the subsurface drainage water in the 97,000-acre Grassland Drainage Area.

Approximately 8,200 acres of Grassland's watershed marshes, a portion of the lower San Joaquin River (from the confluence with Mud Slough to the Merced River confluence), and Mud Slough are listed on the CWA Section 303(d) list of impaired waters for exceeding water quality objectives for selenium. Between 1998 and 2009, BMPs implemented by Grassland area farmers prevented the discharge of more than 22,000 pounds of selenium to listed waters. As a result, Salt Slough and a portion of the lower San Joaquin River have been removed from the 303(d) list of impaired waters.

The Grassland Bypass Project, 2010–2019 extension continues the San Luis Drain Use Agreement to allow time to acquire funds and develop feasible drainage water treatment technology to meet revised Basin Plan objectives and waste discharge requirements by December 30, 2019 (in accordance with the Westside Regional Drainage Plan and the San Luis Drainage Feature Reevaluation plan for drainage service); continues the separation of unusable agricultural drainage water discharged from the Grassland Drainage Area from wetland water supply conveyance channels for 2010 to 2019; facilitates drainage management that maintains the viability of agriculture in the Grassland Bypass Project Area; and promotes continuous improvement of water quality in the San Joaquin River (Reclamation and SLDMWA 2009).

For the Investigation, the water operations models for existing conditions and future conditions include partial implementation

and full implementation, respectively, of the Grassland Bypass Project.

Common Assumptions for Water Storage Projects A Common Assumptions Work Group was established to develop common baseline conditions against which the various water storage investigations would assess the feasibility of proposed projects. A major task of the Common Assumptions effort was to develop common analytical tools. The work group assembled a number of modeling tools under one package, termed the Common Model Package.

The Common Model Package includes the CalSim II, DSM2, Sacramento River Water Quality Model (SRWQM), the Salmonid Population Model (SALMOD), LTGen, SWP Power California (SWP Power), the LCPSIM, and the SWAP. CalSim II is a statewide water resources planning model, primarily reflecting the Central Valley and Delta operations of the CVP and SWP. The model is used to evaluate water supply facilities and demands; regulatory standards, including minimum flow requirements, water rights, contracts, and water quality standards; system operations; and likely foreseeable actions. DSM2 simulates hydrodynamic and water quality conditions in the Delta. Temperature and fisheries models specific to the San Joaquin River were incorporated in the Investigation and are described in the Modeling Appendix.

Coordinated Long-Term Operation of the CVP and SWP As described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," the RPAs included in the 2008 USFWS BO and 2009 NMFS BO include conditions for revised water operations, habitat restoration and enhancement actions, and fish passage actions, and are considered reasonably foreseeable future actions for the purposes of this Draft EIS. Water operations defined in RPAs were included in the modeling evaluations in this Draft EIS for both existing and future conditions, and therefore were included in the quantitative cumulative effects analyses as described in the following sections. Other actions included in the RPAs were not included in the modeling evaluations but were assessed qualitatively, as described in the Qualitative Assessments section of this chapter.

The 2008 Long-Term Operations BA outlined several future projects, including the DMC/California Aqueduct Intertie, Freeport Regional Water Project, DWR Oroville Facilities FERC Relicensing, Sacramento River Water Reliability

Project, CCWD Alternative Intake Project, Red Bluff Diversion Dam Pumping Plant, and the South Delta Improvements Program. Where relevant to the assessment of cumulative impacts, these projects are described separately in this chapter.

2009 NMFS Biological Opinion The 2009 NMFS BO included RPAs to improve conditions for anadromous fish in the San Joaquin River basin. These RPAs included revised water operations, habitat restoration and enhancement actions, and fish passage actions. The actions related to the 2009 NMFS BO described below were identified as present or reasonably foreseeable actions, and include Stanislaus River actions and Delta Division actions. Where the actions include specific water or operational limitations that can be captured in the available quantitative tools, those actions were assessed quantitatively and are described below, and others were assessed qualitatively and are described in the Qualitative Assessments section of this chapter. Quantitatively assessed actions were included in the water operations modeling evaluations for both existing and future conditions, and therefore were included in cumulative effects analyses.

The Stanislaus River RPAs were designed to ensure a viable steelhead population in the Stanislaus River by securing freshwater migration routes to and from the Delta and by stopping or rectifying negative modification to steelhead critical habitat (NMFS 2009). The actions that were assessed quantitatively include the following:

- **Provide cold water releases from New Melones Dam** – This action specifies that Reclamation will manage the cold water supply in New Melones Reservoir, and make cold water releases to provide river temperatures to support steelhead rearing, spawning, egg incubation, and adult migration downstream from Goodwin Dam. This is a present action.

- **Operate New Melones Dam, Turlock Dam, and Goodwin Dam to meet minimum flow targets** – This action requires that a minimum base flow be maintained and that releases be managed to provide migratory cues to smolts. This is a present action. The Delta Division RPAs were developed to encourage migrating winter-run and spring-run Chinook salmon, steelhead, and green sturgeon juveniles to remain in the northern portion of the Delta. In the central and southern portion

of the Delta, juveniles are at increased risk of predation, exposure to pollutants, and entrapment in pumping facilities. Actions included in the Delta Division RPAs that were assessed quantitatively are as follows:

- **San Joaquin River Inflow to Export Ratio** – The goal of this RPA is to increase the likelihood of juveniles successfully exiting the Delta at Chips Island. It specifies minimum flow requirements in the San Joaquin River at Vernalis and restricts CVP and SWP export pumping amounts and ratios dependent on San Joaquin River flow at Vernalis. This is a present action.

- **Old and Middle River Flow Management** – The goal of this RPA is to create more suitable hydrologic conditions along the mainstem of the San Joaquin River, thereby encouraging migrating juveniles to avoid channels in the South Delta and the CVP and SWP export pumps. This programs requires that negative flows be limited in the Old and Middle rivers, limiting CVP and SWP exports to support migration of juveniles from the San Joaquin, Mokelumne, and Calaveras rivers past Chips Island. This is a present action.

2008 USFWS Biological Opinion The 2008 USFWS BO concluded that "the coordinated operation of the CVP and SWP, as proposed, [was] likely to jeopardize the continued existence of the delta smelt" and "adversely modify delta smelt critical habitat" and included RPAs for CVP and SWP operations designed to modify CVP and SWP operations to avoid causing jeopardy or adverse modification. The RPAs have provisions that affect the protection of adult, juvenile, and larval delta smelt and habitat improvements for delta smelt growth and rearing.

Actions included in the RPAs that are intended to control Old River and Middle River flows include daily limits and adaptive management that cannot be reflected in CalSim II or other operational simulations with complete accuracy. Therefore, quantitative modeling for this Draft EIS uses a monthly flow standard for Old and Middle rivers as a surrogate for these actions. The actions assessed quantitatively include the following:

- **Action 1** – Limit exports such that the average daily flow in Old and Middle rivers is no more negative (flowing upstream) than -2,000 cfs for a total duration of 14 days, with a 5-day running average no more negative than -2,500 cfs (within 25 percent). This is a present action.

- **Action 2** – The range of net daily flow in the Old and Middle rivers will be no more negative than -1,250 cfs to - 5,000 cfs. Depending on extant conditions, specific Old and Middle River flows within this range are recommended by the Smelt Working Group. The Smelt Working Group will provide weekly recommendations for Old and Middle river flows based upon review of the sampling data, from real-time salvage data at the CVP and SWP, and utilizing most up-to-date technological expertise and knowledge relating population status and predicted distribution to monitored physical variables of flow and turbidity. This is a present action.

- **Action 3** – Net daily flow in the Old and Middle rivers will be no more negative than -1,250 to -5,000 cfs based on a 14-day running average with a simultaneous 5-day running average within 25 percent of the applicable requirement for flow in the Old and Middle rivers. Depending on extant conditions, specific flows in the Old and Middle rivers within this range are recommended by the Smelt Working Group from the onset of Action 3 through its termination. The Smelt Working Group will provide these recommendations based upon weekly review of sampling data, from real-time salvage data at the CVP/SWP, and expertise and knowledge relating population status and predicted distribution to monitored physical variables of flow and turbidity. This is a present action.

Quantitative Assessment Methodologies for Effects on Air Quality

For this analysis of cumulative impacts, regional impacts on air quality are analyzed quantitatively using the plan approach. As described in Chapter 4, "Air Quality and Greenhouse Gas Emissions," significance thresholds for the SJVAB are defined in the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2002). The analysis of local cumulative impacts is based on both the plan approach, which defines impact

thresholds, and the list approach, which identifies projects that may emit pollutants in the same area as the Investigation. SJVAPCD standards for criteria pollutants have been established to limit the emissions of individual projects when considering the cumulative effect of all projects on regional pollutant concentrations. Therefore, a significant direct project impact would also be a cumulatively considerable incremental contribution to a significant cumulative impact.

The 2007 Urban Emissions model (URBEMIS) was used to estimate emissions of pollutants from construction activities. Among the inputs to the model for construction analysis were the types and quantities of construction equipment to be used, along with the hours of use; areas of land to be graded; number of truck trips and trip distances for export of spoils and import of materials; volumes of buildings to be demolished; areas of buildings to be built; and areas of land to be paved. For activities after construction, the principal inputs were the number of vehicle trips and average trip distances. The methods and results of this analysis are described in greater detail in Chapter 4.0, "Air Quality and Greenhouse Gas Emissions."

Qualitative Assessments

Past, present, and reasonably foreseeable future actions and conditions were assessed qualitatively when quantitative information was not readily available. Information on current and historical conditions was used to evaluate the combined effects of past actions and conditions on resource areas and issues. For present and reasonably foreseeable future actions and conditions, a list of related actions was compiled. The combined effects of past, present, and reasonably foreseeable future actions and conditions were then evaluated with effects of the project. Table 27-1 summarizes projects that were evaluated quantitatively and qualitatively.

A large number of past actions and conditions in the study area have strongly influenced existing conditions, and some past actions have created "legacies" that are still affecting resources today. Among the legacies is the San Joaquin River's limited ability to sustain anadromous fish populations as a result of the construction of Friant Dam and other water management facilities, and the conversion of habitat into agricultural land. Additionally, groundwater pumping in the San Joaquin Valley continues to result in land subsidence. The following are the most important combined effects of these past actions:

- Population growth and associated development of socioeconomic resources and infrastructure
- Conversion of natural vegetation and floodplain habitat to agricultural and developed land uses
- Introduction of nonnative plant and animal species
- Development of water supply, particularly the construction and operation of Friant Dam, the rest of the CVP, and the SWP

Further, some unknown subset of the following projects, though not strictly meeting the criteria above, is likely to be implemented: the BDCP (and associated alternative Delta conveyance facilities), the North-of-Delta Offstream Storage Facility (Sites Reservoir), and the SLWRI (Shasta Dam Raise). However, it would be speculative to consider these projects at any more than a conceptual level because these projects and their effects are not far enough along in the planning and decision process to allow meaningful analysis.

The combined effects of past actions and the list of related present and reasonably foreseeable future projects are described further below.

Qualitative Assessment of Actions and Conditions Related to Water/Natural Resource Management and Restoration

In addition to the water resources actions described above in the Quantitative Assessment of Actions and Conditions Related to Water Resources section, the water/natural resources–related management and restoration actions described below were identified as present or reasonably foreseeable.

Central Valley Project Improvement Act The CVPIA (Title 34, Sections 3401 through 3408(h) of Public Law 102-575) was enacted in 1992 and is concerned with restoring anadromous fish populations, providing water supplies for Federal and State refuges, mitigating effects of the CVP on other fish and wildlife, and retiring drainage-impaired farmlands. A major purpose of the CVPIA is to provide equal priority and consideration to protection, restoration, and enhancement of fish, wildlife, and associated habitats of the Delta estuary and tributaries when evaluating the purpose of the CVP. The CVPIA also addresses the operational flexibility of the CVP and methods to expand the use of voluntary water

transfers and improved water conservation. The CVPIA dedicated approximately 1.2 MAF of water annually to fish, wildlife, and habitat restoration. Of this water, 800 TAF is dedicated to environmental needs as Section 3406(b)2 water, approximately 200 TAF was designated for wildlife refuges, and approximately 200 TAF was dedicated for increased Trinity River flows for fisheries restoration. Through operations flexibility, this results in a net reduction of 516 TAF per year on average, and 585 TAF in the driest years, previously available to CVP contractors (Reclamation 2008a).

Ecosystem Restoration Program USFWS and NMFS implement CALFED's Ecosystem Restoration Program (ERP) with guidance from the Delta Stewardship Council and the Delta Plan, and in coordination with the Sacramento–San Joaquin Delta Conservancy. The ERP works to improve the ecological health of the Bay-Delta watershed by restoring and protecting habitats, ecosystem functions, and native species. Since the program's inception, ERP agencies have identified more than 600 programmatic actions and 119 milestones throughout the Bay-Delta watershed. The program includes all projects authorized, funded, and permitted (even if not constructed) to date, particularly in the Delta, that aim to do any of the following:

- Recover at-risk native species dependent on the Delta, Suisun Bay, and San Francisco Bay
- Minimize the downward population trends of native species that are not listed
- Protect and restore functional habitat types in the Bay-Delta estuary and its watershed for ecological and public values
- Prevent the establishment of additional nonnative invasive species and reduce the negative ecological and economic impacts of established nonnative species in the Bay-Delta estuary
- Improve and/or maintain water and sediment quality conditions that fully support healthy and diverse aquatic ecosystems in the Bay-Delta estuary and watershed

Conveyance of Refuge Water Supply, Mendota Wildlife Area Reclamation and the Central California ID have prepared an Environmental Assessment (EA)/Initial Study (IS)

evaluating the potential effects of alternatives to provide reliable year-round water deliveries to the Mendota Wildlife Area, which is located next to Fresno Slough in the San Joaquin Valley, approximately 30 miles west of Fresno (Reclamation 2008b). Under normal operations, Mendota Dam impounds water, creates the Mendota Pool, and fills Fresno Slough, providing water supplies to Mendota Wildlife Area and the CVP Settlement and Exchange Contractors and others. The Mendota Pool is currently drained (dewatered) for several weeks at least once every 2 years to facilitate inspection, maintenance, and any necessary repairs to Mendota Dam. Drops in the Mendota Pool level at other periods during the year also affect the water level of Fresno Slough and restrict the Mendota Wildlife Area pumps from extracting water from Fresno Slough.

The Locally Preferred Alternative would entail constructing a new dam approximately 400 feet downstream from the existing dam. Although the Mendota Pool would continue to be dewatered during flushing and maintenance operations, these periods of dewatering would be briefer than in recent years and manage to avoid disrupting water deliveries to the Mendota Wildlife Area. The Final EA/IS for this project was completed in May 2008 by Reclamation. Operation of the Mendota Pool and proposed new dam could affect the SJRRP; thus, as part of the SJRRP, the proposed new dam would be designed so that it could be retrofitted with a fish passageway in the future, as necessary. Alternatives considered for the SJRRP Mendota Pool Bypass and Reach 2B Channel Improvements project would fulfill constant water supply requirements under section 34069(d) of the CVPIA. The Draft EIS/R for Mendota Pool Bypass and Reach 2B Channel Improvements is expected to be available in 2015 (SJRRP 2014).

Coordinated Long-Term Operation of the CVP and SWP
As previously mentioned in the Quantitative Assessments section of this chapter and described in the following sections, some of the actions required under the 2008 USFWS and 2009 NMFS BOs were assessed qualitatively. The Fish Restoration Program, which addresses specific habitat restoration requirements of the USFWS and NMFS BOs, is also described below. Actions assessed quantitatively are described in the Quantitative Assessments section of this chapter.

2009 NMFS Biological Opinion As described in the Quantitative Assessments section of this chapter, some of the actions required under the 2009 NMFS BO were assessed

quantitatively, and others were assessed qualitatively. Actions assessed qualitatively include Stanislaus River actions and Delta actions. The Stanislaus River actions that were assessed qualitatively include:

- **Real-time operational decision making at New Melones Dam** – To accomplish this, the Stanislaus Operations Groups will ensure that 2009 NMFS BO actions are implemented, monitored, and evaluated. This is a present action.

- **Restore Steelhead habitat** – Under this action, Reclamation is required to improve spawning conditions in the Stanislaus River by adding 50,000 tons of gravel. The gravel replenishing sites will be monitored for geomorphic changes and spawning use. This is a present action.

- **Release floodplain restoration and inundation flows to inundate steelhead juvenile rearing habitat** – On a one to three year schedule, Reclamation is required to release flows necessary to inundate steelhead juvenile rearing habitat every 1 to 3 years. This is a present action.

- **Restore Freshwater migratory habitat through projects to increase floodplain connectivity and reduce migratory predation risk** – Projects to restore freshwater migratory habitat can include flow and non-flow actions, may mitigate for predation by improving rearing habitat to delay juvenile migration, and should mitigate causes of high juvenile mortality rates. This is a present action.

- **Fish Passage Program** – The action requires Reclamation to complete an evaluation of options for providing steelhead access to historic habitat upstream from New Melones Reservoir. This is a reasonably foreseeable action.

Delta Division actions that were assessed qualitatively include:

- **Delta Cross Channel Gate Operations** – This action specifies closing the Delta Cross Channel gates when migrating juveniles are present, discouraging them from entering Georgiana slough and the central Delta.

Migrating juveniles would be directed to Sutter and Steamboat sloughs. This is a present action.

- **Delta Cross Channel Monitoring and Alerts Program** – This action continues current monitoring of Chinook salmon migration in the Sacramento River and Sacramento River flow and temperature conditions to determine when the Delta Cross Channel gates should be closed. The first alert is triggered by one of two conditions: either capture of yearling-sized spring-run Chinook salmon at the mouths of natal tributaries between October and April, or an increase in tributary flow or more than 50 percent over levels preceding the flow spike from October onward. The second alert is triggered by Sacramento River flows greater than 7,500 cfs at Wilkins Slough and water temperatures less than (56.3°F) at Knights Landing. This is a present action.

- **Reduce Likelihood of Entrainment of Salvage at Export Facilities** – This action limits CVP and SWP exports when large numbers of Chinook salmon are migrating into the upper Delta region to reduce the likelihood of migration to the central and southern Delta and the CVP and SWP export pumps. This is a present action.

- **Modifications to the Operations and Infrastructure of the CVP and SWP Fish Collection Facilities** – The goal of this RPA is to increase the efficiency of the Tracy and Skinner Fish Collection Facilities to improve salvage survival of winter-run and spring-run Chinook salmon, steelhead, and green sturgeon. Specific actions include new procedures and modifications to improve current conditions and continued funding and implementation of the CVPIA Tracy Fish Facility Program. This is a present action.

- **Tracy Fish Collection Facility Improvements** – This action includes measures to reduce pre-screen loss and improve screening efficiency at Federal Facilities. This action is further discussed under the qualitative assessment of the Tracy Fish Collection Facility and Tracy Fish Facility Improvement Program. This is a present action.

- **Skinner Fish Collection Facility Improvements** – This RPA requires DWR to achieve a minimum salvage

efficiency of 75 percent at the Skinner Fish Collection Facility for salmon, steelhead, and southern distinct population segments of green sturgeon after the fish enter the primary channel in front of the louvers. DWR is also required to develop predator control methods for the Clifton Court Forebay. This is a present action.

- **South Delta Improvement Program** – This RPA prevents DWR from replacing temporary barriers in the south Delta with permanent operable gates. This is a reasonably foreseeable action.

2008 USFWS Biological Opinion The 2008 USFWS BO is described in the Quantitative Assessments section of this chapter. As mentioned, some of the actions required under the 2008 USFWS BO were assessed quantitatively, and others were assessed qualitatively. Actions assessed quantitatively include daily limits and adaptive management that cannot be reflected in CalSim II or other operational modeling with complete accuracy. Therefore, quantitative modeling for this Draft EIS uses a monthly flow standard for Old and Middle rivers as a surrogate for these action. These actions are therefore also considered qualitatively, in additional to other actions. The actions assessed qualitatively include the following:

- **Action 1** – Limit exports such that the average daily flow in the Old and Middle rivers is no more negative than -2,000 cfs for a total duration of 14 days, with a 5-day running average no more negative than -2,500 cfs (within 25 percent). This is a present action.

- **Action 2** – The range of net daily flow in the Old and Middle rivers will be no more negative than -1,250 cfs to - 5,000 cfs. Depending on extant conditions, specific Old and Middle River flows within this range are recommended by the Smelt Working Group from the onset of Action 2 through its termination. The Smelt Working Group will provide weekly recommendations based upon review of the sampling data, from real-time salvage data at the CVP and SWP, and utilizing most up-to-date technological expertise and knowledge relating population status and predicted distribution to monitored physical variables of flow and turbidity. The USFWS will make the final determination. This is a present action.

- **Action 3** – Net daily flow in the Old and Middle rivers will be no more negative than -1,250 to -5,000 cfs based on a 14-day running average with a simultaneous 5-day running average within 25 percent of the applicable requirement for flow in the Old and Middle rivers. Depending on extant conditions, specific flows in the Old and Middle rivers within this range are recommended by the Smelt Working Group from the onset of Action 3 through its termination. The Smelt Working Group will provide these recommendations based upon weekly review of sampling data, from real-time salvage data at the CVP/SWP, and expertise and knowledge relating population status and predicted distribution to monitored physical variables of flow and turbidity. The USFWS will make the final determination. This is a present action.

- **Action 4** – Subject to adaptive management as described below, provide sufficient Delta outflow to maintain average X2 for September and October no greater (more eastward) than 74 km in the fall following wet years and 81km in the fall following above normal years. The monthly average X2 must be maintained at or seaward of these values for each individual month and not averaged over the two month period. In November, the inflow to CVP/SWP reservoirs in the Sacramento Basin will be added to reservoir releases to provide an added increment of Delta inflow and to augment Delta outflow up to the fall target. The action will be evaluated and may be modified or terminated as determined by USFWS. This is a present action.

- **Action 5** – Do not install the Head of Old River Barrier if delta smelt entrainment is a concern. If installation of the Head of Old River Barrier is not allowed, the agricultural barriers would be installed as described in the Project Description. If installation of the Head of Old River Barrier is allowed, the South Delta Temporary Barrier Project flap gates would be tied in the open position until May 15. This is a present action.

- **Action 6** – A program to create or restore a minimum of 8,000 acres of intertidal and associated subtidal habitat in the Delta and Suisun Marsh is expected to be implemented. A monitoring program will be developed

to focus on the effectiveness of the restoration program. This is a present action.

Fish Restoration Program The Fish Restoration Program Agreement between the CDFW and DWR, addresses specific habitat restoration requirements of the USFWS and NMFS BOs for SWP and CVP operations. The agreement is also intended to address the habitat requirements of the CDFW longfin smelt Incidental Take Permit (ITP) for SWP Delta operations. The agreement was signed by the Directors of DWR and CDFW on October 18, 2010 and has been amended once (November 15, 2010) since that time.

The primary objective of the Fish Restoration Program is to implement the fish habitat restoration requirements and related actions of the NFMS and USFWS BOs and the ITP in the Delta, Suisun Marsh, and Yolo Bypass. The program is focused on restoring 8,000 acres of intertidal and associated subtidal habitat in the Delta and Suisun Marsh to benefit delta smelt, 800 acres of low salinity habitat to benefit longfin smelt, and a number of related actions for salmonids. Habitat restoration actions implemented in compliance with the 2008 USFWS BO that also meet the habitat restoration requirements of the ITP will satisfy the acreage requirements of the ITP (DWR and CDFW 2010).

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 outlines several agricultural water quality control programs, including the San Joaquin River Subsurface Agricultural Drainage Control Program, the Lower San Joaquin River Salt and Boron Control Program, and the San Joaquin River Dissolved Oxygen Control Program, which are being implemented to achieve the water quality objectives outlined in the plan. These programs aim to establish water quality objectives for specific pollutants and to develop strategies to meet those objectives by implementing monitoring programs and limiting pollutant discharges.

Bay Delta Conservation Plan (and Alternative Delta Conveyance Facilities) The BDCP is an HCP and Natural Communities Conservation Plan with the goals of restoring the Delta ecosystem and securing California water supplies. The BDCP would secure California's water supply by building new water delivery infrastructure and operating the system to improve the ecological health of the Delta. The BDCP also would restore or protect approximately 150,000 acres of habitat

to address the Delta's environmental challenges (Reclamation and DWR 2013a).

The DWR, acting as the lead agency for compliance with CEQA, and Reclamation, the USFWS, and NMFS, acting as lead agencies for compliance with NEPA, issued a Draft EIR/EIS for public review and comment in December 2013. The BDCP consists of conservation measures that include components for water conveyance facilities combined with water conveyance operations; conservation components including land acquisition for major habitat restoration efforts in the Delta; and components related to reducing other stressors on the Bay-Delta ecosystem The conservation strategy includes biological goals and objectives; conservation measures; avoidance and minimization measures; and a monitoring, research, and adaptive management program.

Currently, several alternative Delta conveyance facilities are being evaluated as part of the plan. Among these alternatives are a through-Delta facility and an isolated facility that would convey water around the Delta for local supply and export through a hydraulically isolated channel or tunnel.

San Joaquin River Restoration Program As described previously (see the discussion of full SJRRP Restoration Flows in "Quantitative Assessment of Actions Related to Water Resources," above), the SJRRP was established based on the 2006 Settlement of the *Natural Resources Defense Council et al., v. Rodgers, et al*. lawsuit. The program would restore and maintain fish populations in "good condition" in the mainstem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish; and reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement. Reasonably foreseeable SJRRP actions are described in Chapter 2.

North-of-Delta Offstream Storage Investigation The North-of-Delta Offstream Storage Investigation is a feasibility study being performed by Reclamation and DWR, in partnership with local interests. Pursuant to the CALFED solution principles, storage locations that would not add a new dam on a major stream were considered and evaluated. As its name indicates, the North-of-Delta Offstream Storage Investigation focuses on offstream storage north of the Delta –

specifically, potential projects for offstream storage of surface water at Sites Reservoir in the upper Sacramento River basin.

Offstream storage located north-of-the-Delta would require conveying water from the Sacramento River or one of its major tributaries to the new storage location. An offstream storage conveyance system could use either existing diversions and canals or new diversions and conveyance. Water would be diverted during periods of relatively higher flow through the conveyance system, into the new offstream storage reservoir, and stored until it is needed to meet the planning objectives.

Such storage could increase water supply reliability for all beneficial uses (agricultural, urban, and environmental). The Sites Reservoir Project could increase water supplies available for export in years when export supplies otherwise would be limited. This project also could modify the timing and magnitude of upstream reservoir releases in wet years.

A notice of intent/notice of preparation for this project was issued in November 2001. The complete plan formulation report was published in September 2008 and a progress report of current feasibility studies activities and accomplishments was released in December 2013. Ongoing studies include: additional engineering designs, feasibility level cost estimates, mitigation requirements, federal economic analyses, sensitivity analyses related to BDCP, and project financial feasibility (Reclamation and DWR 2013b).

Shasta Lake Water Resources Investigation In June 2013, Reclamation released a Draft EIS in relation to the Shasta Lake Water Resources Investigation. The Draft EIS evaluates the feasibility of raising Shasta dam through five alternatives: 6.5 feet raise, 12.5 feet raise, and three 18.5 feet raises. All alternatives focus on anadromous fish survival and water supply reliability. The project alternatives provide between 47.3 and 113.5 TAF of increased firm water supplies per year, develop between 54 and 117 GWh/year of increased hydropower generation, and reduce flood damages downstream from Shasta Lake. All alternatives also enhance anadromous fish survival through expansion of the cold water pool in Shasta Lake. Additionally, two of the 18.5 feet dam raise alternatives include further fisheries benefits by providing a combination of dedicated cold water pool; adaptive management plans; augmented spawning gravel in the upper Sacramento River; enhanced aquatic habitat in tributaries to Shasta Lake; and restoration of riparian, floodplain, and side

channel habitat in the upper Sacramento River (Reclamation 2013a). Reclamation is preparing the Final EIS for the Shasta Lake Water Resources Investigation.

North Bay Aqueduct Alternative Intake Project DWR proposes to implement the North Bay Aqueduct Alternative Intake Project to improve water quality and to provide reliable deliveries of SWP supplies to its contractors, the Solano County Water Agency and the Napa County Flood Control and Water Conservation District. This proposed project would include the construction and operation of an alternative intake on the Sacramento River, generally upstream from the Sacramento Regional Wastewater Treatment Plant, and connect it to the existing North Bay Aqueduct system by a new segment of pipe. The proposed alternative intake would be operated in conjunction with the existing North Bay Aqueduct intake at Barker Slough. The North Bay Aqueduct Alternative Intake Project would include the following facilities:

- A new alternative intake structure and pump station on the Sacramento River with state-of-the-art, positive-barrier fish screens
- A new pipeline segment to convey the water from the alternative intake to a point of connection with the existing North Bay Aqueduct near the North Bay Regional Water Treatment Plant
- Other project-related support facilities such as surge tanks

The notice of completion and transmittal for the North Bay Aqueduct Alternative Intake Project EIR was published in November 2009 (DWR 2009a). A scoping report was released in February 2010 (ESA 2010). It is anticipated that the public review draft EIR will be available in summer 2014.

North Delta Flood Control and Ecosystem Restoration Project DWR certified the EIR for the North Delta Flood Control and Ecosystem Restoration Project in 2010 and filed a Notice Of Determination with the Governor's Office of Planning and Research on November 9, 2010. This project will implement flood control improvements in the north Delta, principally on and around McCormack-Williamson Tract, Dead Horse Island, and Grizzly Slough, in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. Flood control improvements are needed to reduce

damage to land uses, infrastructure, and the Bay-Delta ecosystem caused by catastrophic levee failures in the Delta. Lack of funding has delayed the implementation of the project (DWR 2014d).

Franks Tract Project, North/Central Delta Improvement Study Reclamation and DWR propose to implement the Franks Tract Project to improve water quality and fisheries conditions in the Delta. Operable gates would be installed to control the flow of water at one of two locations on either Threemile Slough or West False River. The project gates would be operated seasonally (January through September) and during certain hours of the day, depending on fish presence and tidal conditions. The Franks Tract Project is consistent with ongoing planning efforts for the Delta to help balance competing uses and to create a more sustainable system for the future. The North/Central Delta Improvement Study (Delta Cross Channel, Franks Tract, and Through-Delta Facility Evaluation) recommended alternatives include constructing an operable gate on Threemile Slough and an operable gate on West False River for further analysis (Reclamation 2009). The Franks Tract Project has been delayed.

Dutch Slough Tidal Marsh Restoration Project This proposed project is a cooperative partnership between DWR, CALFED, the California Coastal Conservancy, landowners, the Natural Heritage Institute, the City of Oakley, and Ironhouse Sanitary District. The project entails restoring wetlands and uplands and providing public access to the 1,166-acre Dutch Slough property owned by DWR.

The primary goal of the Dutch Slough Tidal Marsh Restoration Project is to provide ecosystem benefits, including habitats for sensitive aquatic species. The project will be designed to maximize opportunities to assess the development of those habitats and measure ecosystem responses so that future Delta restoration projects will be more successful (DWR and California State Coastal Conservancy 2008). Since the release of the Final EIR in 2010, there have been significant changes to the tidal wetlands restoration project near the mouth of Dutch Creek. These changes include construction of flood protection levees, levee setback changes, changes to proposed levee upgrades, new habitat management strategies, trails, and construction methods (DWR and California State Coastal Conservancy 2014). In January 2014, the supplement to the Dutch Slough Tidal Marsh Restoration Project Final EIR was

released to address the environmental effects of the proposed changes to the project.

Suisun Marsh Management, Preservation, and Restoration Plan Federal and State agencies jointly developed this comprehensive 30-year regional plan to address the use of resources on about 52,000 acres of wetland and upland habitats in Suisun Marsh near Fairfield. The focus of the Suisun Marsh Management, Preservation, and Restoration Plan is to achieve an acceptable multiple-stakeholder approach to the restoration of tidal wetlands and the enhancement of managed wetlands and their functions. The plan balances implementation of the CALFED Program, the Suisun Marsh Preservation Agreement, and other management and restoration programs for Suisun Marsh and is based on voluntary participation by private landowners.

DWR and Reclamation have collaboratively prepared the environmental documents with NMFS, CDFW, and the Suisun Resource Conservation District. The Final EIS/EIR was made available in December 2011 (Reclamation et al. 2011), and the ROD was signed April 2014.

In-Delta Storage Program (Delta Wetlands Project) DWR, in coordination with the CALFED Bay-Delta Authority and with technical assistance from Reclamation, completed the State feasibility study for the In-Delta Storage Program in the south Delta, within the extended study area. The In-Delta Storage Project would provide capacity to store approximately 217 thousand acre-feet of water in the south Delta for a wide array of water supply, water quality, and ecosystem benefits. The project would consist of two storage islands (Webb Tract and Bacon Island) and two habitat islands (Holland Tract and Bouldin Island), an embankment design, consolidated inlet and outlet structures, project operations, and habitat management plans. The objectives of the project are to enhance water supply reliability and the operational flexibility of the CVP/SWP system, contribute to ecosystem restoration, and provide water for the Environmental Water Account (DWR 2010a). Detailed planning work by the State on the In-Delta Storage Project has been suspended since July 2006 when State funding was cut (DWR 2010a); however, a Final EIR was certified in 2012 by Semitropic Water Storage District and other environmental documentation is under way (USACE 2013).

Los Vaqueros Reservoir Expansion Project Los Vaqueros Reservoir was completed in 1997 to provide 100,000 acre-feet

of offstream water storage to improve water quality and provide emergency storage for CCWD customers. The purpose of the Los Vaqueros Reservoir Expansion Project is improve Bay Area water supply reliability and quality, develop water supplies for environmental water management, and help meet municipal and industrial water demands during drought and emergency periods, primarily through the expansion of Los Vaqueros Reservoir.

To date, the project has entailed the expansion of Los Vaqueros Reservoir from 100,000 acre-feet to 160,000 acre-feet, which required a dam raise, the relocation of recreation facilities, and an upgrade of the pumps at the Transfer Pump Station. The dam raise to 160,000 acre-feet was completed in 2012 and mitigation activities were completed in 2013. Further expansion of Los Vaqueros Reservoir is feasible to as much as 500,000 acre-feet. New Delta intakes, pumps, and pipelines would be required to fill the additional reservoir capacity, and water deliveries would be made from the expanded reservoir to Bay Area beneficiaries through new conveyance facilities.

Completion of the Draft Federal Feasibility Report is planned for 2015 and a final report is to be completed in 2016. A final decision on further expansion of the reservoir beyond 160,000 acre-feet is expected to occur in 2016, depending on the level of participation by other Bay Area water agencies, Reclamation, and DWR. Project implementation will also consider the CCWD Board Principles and the additional assurances, commitments, and requirements adopted by the CCWD Board on June 25, 2003.

East Bay Municipal Utility District Water Supply Management Program 2040 The Water Supply Management Program 2040 (WSMP 2040) is a program-level effort that estimates EBMUD's water supply needs over a 30-year planning horizon and proposes a diverse portfolio of policy initiatives and potential projects to ensure that those needs can be met in dry years. On October 13, 2009, the EBMUD Board of Directors approved the WSMP 2040. The CEQA analysis was challenged in court, and in a ruling issued on April 11, 2011, EBMUD was directed to analyze certain plan components in more detail. On May 24, 2011, the EBMUD Board set aside certification of the WSMP 2040 Program EIR and directed staff members to revise the program. That revision effort has since been completed, and on April 24, 2012, the EBMUD Board of Directors certified the revised program EIR

and adopted the revised final plan for the WSMP 2040 (EBMUD 2012).

San Joaquin River Salinity Management Plan Reclamation has a Management Agency Agreement with the Central Valley Water Board to meet the San Joaquin River salinity objective at Vernalis and implement a TMDL program to meet the San Joaquin River salt and boron objectives at Vernalis through activities identified in its Salinity Management Plan. This plan outlines actions used for management of water quality to improve salt, boron, and other constituent conditions on the lower San Joaquin River. The plan was developed in conjunction with the Management Agency Agreement and focuses on three major groups of actions taken by Reclamation: providing flows to the system, reducing salt load to the river, and facilitating mitigation.

The TMDL could be implemented through a base load allocation plus offset or mitigation activities, or through the Central Valley Water Board adoption of a stakeholder-developed Real Time Management Program. The first TMDL compliance deadline for Reclamation and westside discharges is July 2014. Reclamation is also evaluating alternatives for a programmatic management approach to meet the salt and boron TMDLs by 2014. Salt load reduction actions include the Grassland Bypass Project, as previously described.

San Luis Reservoir Low Point Improvement Project and San Luis Reservoir Expansion B.F. Sisk Dam (also known as San Luis Dam) is a 300-foot-high, compacted earthfill embankment located on the west side of the Central Valley approximately 12 miles west of Los Banos. Owned by Reclamation and operated by DWR, the dam is more than 3.5 miles long. B.F. Sisk Dam impounds San Luis Reservoir, which has a total capacity of more than 2 million acre-feet The Gianelli Pumping-Generating Plant lifts water from both the California Aqueduct and the Delta-Mendota Canal (via O'Neill Forebay) into San Luis Reservoir for storage. The dam and reservoir are located in an area of high potential for severe earthquakes on active faults, primarily the Ortigalita Fault, which crosses the reservoir.

Reclamation and SCVWD initiated feasibility studies of water supply delivery reliability risks associated with algal blooms and low reservoir levels in San Luis Reservoir in 2001 with the San Luis Low Point Improvement Project (SLLPIP) appraisal study. A feasibility study was subsequently authorized by

Public Law 108-361. The SLLPIP Initial Alternatives Information Report identified raising B.F. Sisk Dam as one alternative to the low-point problem (Reclamation, SCVWD, and San Luis and Delta Mendota Water Authority 2008); however, the alternative was eliminated from study because more cost-effective solutions seemed available at that time (Reclamation, SCVWD, and San Luis and Delta Mendota Water Authority 2011).

In December 2013, Reclamation completed the San Luis Reservoir Expansion Draft Appraisal Report (2013b). The report recommends further studies in coordination with Reclamation's Dam Safety Office, DWR, SCVWD, and the San Luis & Delta-Mendota Water Authority, and other entities to ensure development of a feasible solution to the several risks to CVP and SWP water delivery reliability. Recommendations in the report include restoring one or more San Luis Reservoir expansion alternatives to the SLLPIP to determine (1) actions needed to correct the identified dam safety risks, and (2) technical, environmental, economic, and financial feasibility of increasing south of Delta surface water storage capacity under a wide range of future conditions, including climate change and changes in Delta export and conveyance capacity.

Delta-Mendota Canal/California Aqueduct Intertie
Construction on the DMC/California Aqueduct Intertie project began in October 2010 and was completed in April 2012. The intertie connects the DCM and the California Aqueduct near San Luis Reservoir and is used in a number of ways to achieve multiple benefits, including meeting current water supply demands, allowing for the maintenance and repair of CVP Delta export and conveyance facilities, and providing operational flexibility to respond to emergencies related to both the CVP and SWP.

Delta-Mendota Canal Recirculation Project Reclamation is evaluating the feasibility of the DMC Recirculation Project, which would involve recirculating water from the Delta through CVP pumping and conveyance facilities to the San Joaquin River where it enters the Delta. The project would provide flows to reduce salinity concentrations in the San Joaquin River. It could also reduce reliance on New Melones Reservoir for meeting water quality and fishery flow objectives. Reclamation prepared a plan formulation report in September 2010, and project evaluation is ongoing.

Lower San Joaquin River Flood Improvement Project The Lower San Joaquin River Flood Improvement Project is a component of the CALFED Conveyance Program, and would be designed to improve flood control capacity on the lower San Joaquin River and enhance ecosystem structure and function in the lower San Joaquin River and the south Delta. USACE and DWR are the lead agencies for this project. In February 2009, DWR, USACE, and the San Joaquin Area Flood Control Agency (SJAFCA) signed a cost share agreement. SJAFCA has partnered with Reclamation districts 2042, 2126, 2115, 1608, 2074, 1614, 828, 404, 403, 17, and the City of Lodi. The multi-year feasibility study will extend along the San Joaquin River from the southern portion of San Joaquin County, through Stockton, and up to the Lodi waste water treatment plant.

Bay Area Water Quality and Supply Reliability Program The Bay Area Water Quality and Supply Reliability Program encourages participating Bay Area partners, specifically the Alameda County WD, Alameda County Flood Control and Water Conservation District, Bay Area Water Users Association, CCWD, EBMUD, City of San Francisco, and SCVWD, to develop and coordinate regional exchange projects to improve water quality and supply reliability. This project involves the cooperation of these agencies in operating their water supplies for the benefit of the entire Bay Area, as well as the potential construction of interconnects between existing water supplies. In September 2013, the 2013 Bay Area Integrated Regional Water Management Plan was released and seeks to integrate projects and actions proposed in the 2006 Bay Area Integrated Regional Management Plan. The plan establishes a framework to address water conflicts and challenges in the Bay Area from 2013 to 2033 (Bay Area IRWMP Coordinating Committee 2013). Specific strategies of the plan were updated to be consistent with the California Water Plan Update 2013 and include water use efficiency, integrated flood management, conjunctive groundwater management, water recycling, desalination of brackish and seawater, imported water, surface storage, and water transfers.

Conditional Waiver of Waste Discharge Requirements for Irrigated Lands A conditional waiver is a regulatory process under California's nonpoint source program plan designed to meet requirements of the CWC. The CWC requires any person who is discharging waste, other than to a community water system that could affect the quality of the waters of the State within the Central Valley, to file a report of waste discharge

with the Central Valley RWQCB. The CWC requires the Central Valley RWQCB to prescribe Waste Discharge Requirements (WDR), or waive WDRs, for the discharge. The Central Valley RWQCB's Irrigated Lands Waiver Program (Agricultural Order) was established under Order WQ 2013-0101 and waives the waste discharge permit requirement for discharges from irrigated lands so long as certain compliance conditions are met. The Agricultural Order defines discharges from irrigated lands as tier 1 (least concern), tier 2 (moderate concern), or tier 3 (highest concern) according to the risk the discharges pose to water quality conditions in a water of the State. All discharges are required to implement control to reduce pollutant runoff, such as backflow prevention devices, maintain riparian vegetative over and riparian areas, and prepare of a farm management plan. Tier 2 dischargers are required to implement certain irrigation and nutrient management practice to control nitrates, and tier 3 dischargers are required to maintain water quality buffers (State Water Board 2013).

Tracy Fish Collection Facility and Tracy Fish Facility Improvement Program The Tracy Fish Collection Facility, located in the Central Valley near Stockton, was developed and built in the 1950s by Reclamation with interagency cooperation as part of the CVP. The purpose of the facility was to protect fish from entering the DMC by way of the Tracy Pumping Plant. Reclamation began the Tracy Fish Facility Improvement Program in 1989 with the overall goal of improving fish protection and fish salvage at the Tracy Fish Collection Facility.

Facility improvement under the Tracy Fish Facility Improvement Program have included new fish hauling trucks, new louver cleaner rakes, repair of metals in bypasses, new trash racks, replacement of the upstream trash boom, improved instrumentation for monitoring hydraulic conditions, re-surfacing holding tanks with "fish friendly" coatings, development of on-site fisheries labs, development of research level fish holding facilities for biological testing, installation of a demonstration of a "fish-friendly" pumping system with an above ground holding tank and installation of a large traveling screen for mitten crab removal (Reclamation 2013d).

Central Valley Joint Venture The CVJV is a self-directed coalition consisting of 21 Federal and State agencies and private conservation organizations. This partnership directs its efforts toward the common goal of providing for the habitat

needs of migrating and resident birds in the Central Valley of California. From 1988 through March 2013, the CVJV has protected, restored, and enhanced a total of 762,000 acres in California (CVJV 2013).

Comprehensive Conservation Management Plans for National Wildlife Refuges USFWS is directed to develop comprehensive conservation management plans to guide the management and resource use for each refuge of the National Wildlife Refuge System under requirements of the National Wildlife Refuge Improvement Act of 1997. Refuge planning policy also directs the process and development of comprehensive conservation management plans. A comprehensive conservation management plan describes the desired future conditions and long-range guidance necessary for meeting refuge purposes. It also guides management decisions and sets forth strategies for achieving refuge goals and objectives within a 15-year time frame. Efforts are on-going to complete all required plans.

Jensen River Ranch Habitat Enhancement and Public Access Project The site for this project covers approximately 167 acres on the San Joaquin River north of Fresno, below the Woodward Park bluffs along the north side of Woodward Regional Park. The property is owned by the SJRC, which was created by the State legislature to develop and manage the San Joaquin River Parkway. Phase II of project received grant funding from the California Wildlife Conservation Board in 2011.

When completed, the project will connect the Jensen River Ranch site with Woodward Regional Park via paved and natural public trails, and would include habitat restoration and picnic sites near the San Joaquin River. Currently, the property is accessible through the Lewis S. Eaton Trail and through Woodward Park and an interim loop trail provides access to the San Joaquin River (SJRPCT 2014a).

Lost Lake Park Master Plan Lost Lake Park is located at the southern edge of the community of Friant 1.5 miles downstream from Friant Dam. The Master Plan Study Area is in an unincorporated area of Fresno County and consists of 374 acres owned by the County of Fresno, California Department of Fish and Game, and the San Joaquin River Conservancy. The Lost Lake Park Master Plan seeks to improve recreation areas for the general public, and enhance wildlife habitat values. The plan includes recontouring steep slopes to improve

hydrology, habitat, and public access; a native riparian forest and shade tree planting program; upgrades to existing facilities along the San Joaquin River; construction of a new camping area; bicycle and equestrian trails, facilities, parking, and access outside of the 100-year flood plain; a Friant Community Park; and a 11.5 miles inter-connected formal trail system (Fresno County and State of California San Joaquin River Conservancy 2011).

Riparian Habitat Joint Venture The RHJV was initiated in 1994 and includes signatories from 18 Federal, State, and private agencies. The RHJV promotes conservation and the restoration of riparian habitat to support native bird population through three goals:

- Promote an understanding of the issues affecting riparian habitat through data collection and analysis.
- Double riparian habitat in California by funding and promoting on-the-ground conservation projects.
- Guide land managers and organizations to prioritize conservation actions.

RHJV conservation and action plans are documented in the *Riparian Bird Conservation Plan* (RHJV 2004). The conservation plan targets 14 "indicator" species of riparian-associated birds and provides recommendations for habitat protection, restoration, management, monitoring, and policy.

San Joaquin River Parkway Plan The San Joaquin River Parkway and Conservation Trust was created in 1988 with the goal of establishing a continuous greenway along 33 miles of the San Joaquin River in the Fresno-Madera region. Working with Federal, State, and local agencies and governments, to protect lands around the San Joaquin River through acquisitions, easements, and wildlife habitat restoration, the San Joaquin River Parkway & Conservation Trust seeks to provide public access to the river and improve the Lewis S. Eaton Trail. The trust is currently focusing on the 22-mile stretch of River between Friant Dam and Highway 99. The San Joaquin River Parkway Task Force drafted the Interim San Joaquin River Parkway Master Plan in December 1997, and work to update the plan began in 2012 (SJRPCT 2014b).

Fresno County General Plan The *Fresno County General Plan* (Fresno County 2000) was updated in October 2000. In

the study area, Fresno County's land use jurisdiction lies south and west of the San Joaquin River centerline. Agriculture is essential to the visions and goals of the *Fresno County General Plan* (Fresno County 2000). The general plan also identifies as a priority the protection and enhancement of water quality and quantity in Fresno County's streams, creeks, and groundwater basins through the protection of floodplain lands. Notably, the general plan seeks to preserve and enhance the San Joaquin River corridor principally in those areas adjoining the county's river corridor by avoiding adverse impacts from development and encouraging environmentally friendly recreational and agricultural activities.

Madera County General Plan The Madera County General Plan prioritizes the maintenance of agriculturally designated areas for continued agricultural uses and directs urban uses to designated new growth areas, existing communities, and existing cities. It discourages the conversion of prime agricultural land to nonagricultural land uses unless an immediate and clear need can be demonstrated (Madera County 1995a).One of the goals in the general plan is to protect and enhance the natural qualities of Madera County's streams, creeks, and groundwater, minimizing sedimentation and erosion of creeks and damage to riparian habitat. The general plan also prioritizes the protection of wetland communities and related riparian areas throughout Madera County as valuable resources, the protection of riparian zones around natural watercourses, and the conservation of remaining upland habitat areas adjacent to wetlands and riparian areas that are critical to the feeding or nesting of wildlife species associated with these wetland and riparian areas.

City of Fresno General Plan The City of Fresno's 2025 *Fresno General Plan* (2002) was adopted on February 1, 2002. The general plan "constitutes an update of the Master Parks Plan and will be used as a programmatic framework by the City of Fresno to ensure sufficient park facilities and to maintain a variety of meaningful and balanced recreational programs for residents for the upcoming 20-plus year planning horizon" (City of Fresno 2002). The plan supports the San Joaquin River Parkway Master Plan and supports the following actions:

- Delineating the parkway and defining existing uses

- Preserving and enhancing the San Joaquin River and bluffs while allowing appropriate recreational development
- Providing guidance on location and design of recreational facilities in the river bottom and bluff areas
- Minimizing impacts from parkway facilities and uses on adjacent private property
- Providing law enforcement and safety services for the parkway
- Providing facilities and activities that are compatible with surface mining activities in the river
- Providing a parkway trail network and linkages to the city
- Providing new opportunities for equestrian use in parkway areas
- Providing new and enhanced canoeing opportunities on the river

Brighton Crest/Eagle Springs Golf Course and Country Club In December 1990, Fresno County approved a 184-lot subdivision on a 55-acre parcel located south of Millerton Road between the Brighton Crest Subdivision and Friant-Kern Canal, approximately 1.5 miles east of the unincorporated community of Friant. The project is now known as the Eagle Springs Golf Course and Country Club. A golf course has been constructed as part of this development, and a total of 86 water connections have been established for the project. It is unknown when this residential project will be completed.

Millerton New Town Millerton New Town, a self-funded 2,000 acre community, would be located just south of Millerton Lake. Over 4,500 units are proposed that would house between 10,000 and 12,000 people in a range of custom homes, apartments, single-family, and manufactured homes. In additional to water treatment and tertiary wastewater treatment plans and a civic center, Millerton New Town would also include wildlife and cultural resources corridors and a scenic roadway designation (Fresno County 2008).

Friant Ranch Specific Plan As the Lead CEQA agency for this project, Fresno County released the *Friant Community Plan Update & Friant Ranch Specific Plan Draft EIR* in 2011. The Friant Ranch Specific Plan would develop a community for people age 55 and older next to the existing community of Friant northeast of the City of Fresno and near Friant Dam. The plan would develop a mixed use community with 2,638 age-restricted single family residences, 83 age-restricted multifamily residences, 180 non-age-restricted multifamily units, and a 250,000 square foot Village Core. The Plan also includes 15 miles of trails, and parkways, 20 acres of parks and public open space, 92 acres of landscaped slopes, and 275 acres of conservation open space (Fresno County 2009).

Millerton Specific Plan If implemented, the Millerton Specific Plan would develop approximately 540 acres on the northern and southern sides of Millerton Road in Fresno County. The development would include post-graduated residential housing, open space, and institutional lands for use by a private post-graduate medical campus with 2,000 students. The campus will cover at least 175 plus acres of land between Winchell Cove Road and the western edge of the *Millerton Specific Plan Area* (Fresno County 2013).

Gunner Ranch West Area Plan In 1994, the Gunner Ranch West Area Plan was approved. This document builds upon the Madera County General Plan to guide development in the 1,135-acre project site located along the San Joaquin River in southeastern Madera County. The plan proposes increased commercial, industrial, and residential development and also provides guidelines for the associated roadways, landscaping, infrastructure, and open space that should accompany the new development.

Gateway Village Specific Plan Gateway Village is a 1,973-acre area in southeastern Madera County, east of Road 40 and west of the community of Rolling Hills Estates. The Gateway Village Specific Plan was developed in 2006 to establish a cohesive framework for development in the area. The plan aims to "develop a distinctive, master-planned community that fosters interaction with neighbors and between neighborhoods through pedestrian-friendly design."

Rio Mesa Area Plan In 1995, Madera County developed the *Rio Mesa Area Plan*, which is intended to guide the development of the Rio Mesa Area, which is located East of Highway 41 and South of Highway/Road145 and borders the

San Joaquin River and Millerton Lake on the north (Madera County 1995b). The plan also includes rural residential and agricultural lands and a community core that will include housing, retail and service industry developments, and offices.

North Fork Village The North Fork Village project site spans 2,238 acres in the northern most section of the Rio Mesa Area Plan footprint and is adjacent to the northern side of Millerton Lake. The project would develop nearly 3,000 residential units, 1,500,000 square feet of commercial and mixed used space, an elementary school, and 629 acres of open space and revegetation areas on land that is currently used for agricultural use (Madera County 2008a). The Final EIR for the project was released in July 2008, and the most northern portion of the project has been approved for development (Sierra Star 2012).

Ventana Hills Estates Annexation Ventana Hills Estates Annexation is a 310-acre community located north of Auberry Road and south of Millerton Lake. This development consists of 91 lots for custom homes and includes 70 acres of natural open space and a trail system for recreation.

Bureau of Land Management-Bakersfield Office Resource Management Plan The planning area for the Bureau of Land Management-Bakersfield Office RMP comprises 17 million acres within Kings, San Luis Obispo, Santa Barbara, Tulare, Ventura, Madera, eastern Fresno, and western Kern counties and will replace the 1997 Caliente Regional Management Plan. The preferred alternative in the Final RMP and EIS, issued in 2012, specifies continued production of commodities and public land use while preserving important ecological, cultural, and recreational resources. The preferred alternative includes a reduction in non-energy mineral activities, but an increase in agricultural grazing land (BLM 2012).

Friant-Kern Canal Reverse Flow Project The San Joaquin River Restoration Settlement Act authorized the construction of pump-back facilities on the Friant-Kern Canal, subject to feasibility and availability of funds from the SJRRP. The facilities would allow the canal to deliver water conveyed from the Cross-Valley Canal north, in reverse of gravity flows; with a capacity of 500 cfs at the Poso Creek and Shafter check structures and 300 cfs at the Lake Woollomes check structure. Reclamation is currently leading the feasibility study for this project.

Friant-Kern and Madera Canals Capacity Restoration Project The San Joaquin River Restoration Settlement Act authorized the restoration of the Friant-Kern and Madera canals to capacities designed and built by Reclamation, subject to feasibility. The Friant-Kern and Madera canals have developed canal capacity constraints, which limit the delivery of surplus supplies from Friant Dam during wet periods. The Draft EA and Feasibility Report for the Friant-Kern Canal Capacity Restoration Project was released in June 2011 (Reclamation 2011a) and feasibility report was finalized following the public comment period. The EA is expected to be finalized in 2014. Reclamation is currently pursuing implementation in coordination with the Friant Water Authority. Reclamation is currently leading the feasibility study for the Madera Canal Capacity Restoration Project.

Delta Plan The Delta Stewardship Council was established by the California Legislature in 2009 as part of the comprehensive water legislation, SB 1, and is tasked with protecting the Delta and the critical role the Delta serves through implementing two "coequal goals." The coequal goals are (1) providing a more reliable water supply for California, and (2) protecting, restoring, and enhancing the Delta ecosystem. The coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place (CWC Section 85054). Members of the council include representatives from different areas of the State who offer diverse expertise in fields, such as agriculture, science, the environment, and public service.

The California Legislature established the Delta Stewardship Council to do the following:

> *…provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan.*

The Delta Stewardship Council developed the Delta Plan and Program EIR to serve as a basis for future findings of consistency by State and local agencies. The Delta Plan is a legally enforceable, comprehensive management plan for the

Delta and the Suisun Marsh that achieves the coequal goals and all of the inherent subgoals and objectives (Delta Stewardship Council 2013). The document served as the basis for submittal of a Notice of Proposed Rulemaking to the Office of Administrative Law. The Delta Plan advises and urges timely completion of the BDCP by agencies involved. When completed, the BDCP must be incorporated into the Delta Plan if it meets certain statutory requirements described under CWC 85320 (Delta Stewardship Council 2011). Implementing the Delta Plan in conjunction with the BDCP could change CVP and SWP operations and could possibly affect operations of Friant Dam and Millerton Lake.

State Water Board Delta Flow Action Both the CVP and SWP operate pursuant to water right permits and licenses issued by State Water Board for water storage, releases, and diversions. Over time, the State Water Board has issued decisions that modify the terms and conditions of CVP and SWP water rights. As a result of the 2009 Delta Reform Act, the State Water Board has initiated a new administrative process to evaluate water outflow requirements on upstream tributaries to the Delta as a component of updates to the Bay-Delta Plan. This may, if implemented, significantly impact CVP and SWP operations, as well as those of other upstream reservoirs.

San Joaquin River Exchange Contractors Water Authority Water Transfer Program 2014 to 2038 The Exchange Contractors and Reclamation completed a EIS/EIR to support a 25-Year Water Transfer Program, from 2014 to 2038, to allow the transfer of up to 150 TAF of substitute water from the Exchange Contractors to other water users (Reclamation and Exchange Contractors 2013). Under the 25-Year Water Transfer Program, the existing water transfer of up to 80 TAF via conservation measures (primarily tailwater recovery) would continue, up to 50 TAF of water could be made available via land fallowing, and up to 20 TAF of conserved water could be made available under certain specified conditions, for a total water transfer amount of up to 150 TAF. Finally, the 25-Year Water Transfer Program includes the transfer and/or exchange of the transferred water described above to not only those CVP contractors who were included in the existing program but also to other CVP and SWP contractors in Alameda, Contra Costa, Monterey, Santa Cruz, and Kern counties (other receiving areas).

Westside Regional Drainage Plan The Westside Regional Drainage Plan was developed by the Exchange Contractors, Broadview Water District, Panoche Water District, and Westlands Water District to quick-start drainage elements identified in the San Luis Drainage Feature Reevaluation feasibility study. Implementing the Westside Regional Drainage Plan is assumed to result in the elimination of salt discharges to the San Joaquin River from the Grassland Drainage Area. The Westside Regional Drainage Plan seeks to manage subsurface drainage and achieve a salt balance on productive lands through several mechanisms, including the application of drainage to salt-tolerant crops at a regional reuse facility to reduce the volume of water discharged into Mud Slough (North) and improve the water quality of that discharge. An element of the Westside Regional Drainage Plan is the San Joaquin River Water Quality Improvement project. For this project, the Panoche Water District evaluated the acquisition of up to 2,900 acres of land to expand the existing 4,000-acre Phase I In-Valley Treatment/Drainage Reuse Facility to reach up to 6,900 acres of reuse area within the Grassland Drainage Area. The proposed project would also install minor conveyance modifications and plant salt-tolerant crops.

Semitropic Water Storage District Groundwater Banking Project The Semitropic Groundwater Storage Bank began operation in 1990 and is one of the largest groundwater banking programs in the world. The purpose of the Semitropic WSD groundwater banking program is to provide water for agricultural and urban use during drought years. Currently, six banking partners commit surplus water to Semitropic WSD in wet years: MWD, SCVWD, ACWD, Newhall Land and Farming Company, Zone 7 Water Agency, and San Diego County Water Authority. These partners have delivered approximately 700 TAF of water to Semitropic WSD, and more storage will become available when expansion of the facility is complete.

The Stored Water Recovery Unit of the groundwater banking program has been permitted and is ready for construction. This new unit will increase storage by 650 TAF to an expanded total capacity of 1.65 MAF, and will increase recovery capacity to 200 TAF, resulting in a guaranteed water supply or pumpback capacity of 290 TAF per year. This new unit enables Semitropic to deliver up to 423 TAF of water to the SWP in dry years (Semitropic 2014).

State Water Project Water Supply Contract Extension Program The Water Supply Contract Extension Program's goal is to amend the financial provisions of SWP long-term water supply contracts and extend contract terms beyond 2035, through negotiations between DWR and the SWP contractors in a public forum. Bonds used to finance SWP expenditures currently have terms less than 30 years, since most SWP contracts expire in 2035, and challenge the affordability of servicing debt for SWP Contractors. The program will allow for financing through the sale of 30 year bonds, ensuring water supply affordability, while maintaining compliance with CEQA and the Monterey Settlement Agreement. Negotiations began in May 2013 and a final CEQA document is expected in 2015 (DWR 2014c).

State Water Project Water Settlement Agreement In 2013, DWR issued the Final Initial Study/Negative Declaration of a settlement to amend agreements related the SWP long-term water supply contacts for the Solano County Water Agency, the Napa County Flood Control and Water Conservation District, the City of Yuba City, and the County of Butte (Plaintiffs). The Plaintiffs claim that they are entitled to preferred SWP deliveries under Water Code Section 10505 (county of origin statute), Water Code Section 11460 et seq (area of origin statutes), and Article 18 of the SWP Contracts (urban preference and limitations of SWP contractual rights). Implementation of the Settlement would modify SWP allocation to improve water supply reliability and increase volumes of water to the Plaintiffs, which are located NOD. Deliveries to the Plaintiffs have been reduced due to export limitations SOD resulting from regulatory restricts. In the proposed Settlement, additional water delivered to the four contractors would be dependent on hydrologic conditions and regulatory restrictions at the time of delivery. The deliveries would include water available at Delta outflow, available as exports SOD, and available to the four contractors as a different SWP water type. DWR plans to implement the Settlement while continuing to meet regulatory requirements and not encouraging previously unplanned growth (DWR 2013b).

Poso Creek Integrated Regional Water Management Plan The Poso Creek Integrated Regional Water Management Plan (IRWMP) was adopted in July 2007 by the Poso Creek Regional Management Group, which comprises Semitropic Water Storage District, Cawelo Water District, Delano-Earlimart ID, Kern-Tulare Water District, North Kern Water

Storage District, Rag Gulch Water District, Shafter-Wasco ID, and the North West Kern Resource Conservation District. These districts overlay the Tulare Lake Basin Hydrologic area in northern Tulare County and southern Kern County. The goal of the IRWMP is to conjunctively manage the water resources that are available to member agencies (Poso Creek Regional Management Group 2007). These resources include the following:

- SWP via the California Aqueduct
- CVP via the California Aqueduct and Friant-Kern Canal
- Kern River
- Poso Creek
- Common groundwater basin

Projects recommended in the IRWMP and constructed include the Friant-Kern Canal–Lerdo Canal intertie and the Cross Valley Canal–Calloway Canal intertie.

Southern Sierra Integrated Regional Water Management Plan The Southern Sierra IRWMP spans from the headwater of the San Joaquin, Kings, Kaweah, Tule, and Kern River watersheds to the foothills. The IRWMP was completed but has yet to receive funding for projects. It is currently being revised by a workgroup that includes 17 local, state, and federal agencies, as well as local land owners and Native American tribes. Regional priorities include increased water supply reliability, meadow restoration, and land use changes to improve water quality and reduce recreational impacts and fire and flood risk (Southern Sierra IRWMP workgroup 2012).

Kern River Integrated Regional Water Management Plan The purpose of the Kern River IRWMP is to address the expanding M&I water needs and continued agricultural needs in the Tulare Lake Basin portion of Kern County that are currently served by limited SWP and CVP supplies that have been impacted by drought and regulatory restrictions. The IRWMP lists potential projects and establishes a project ranking system that will:

- Increase water supply

- Increase operational efficiency
- Improve water quality
- Promote land use planning and resource stewardship
- Improve regional flood management (Kern County 2011)

In February 2014, the following projects in the IRWMP were awarded Proposition 84 funding: Kern Water Bank Recharge and Recovery Enhancement, Snyder Well Intertie Pipeline for Irrigation and Nitrate Removal, Sycamore Road Flood Reduction, Tehachapi Regional Water Use Efficiency, and Urban Bakersfield Water Conservation Project (DWR 2014b).

Kings Basin Integrated Regional Water Management Plan
The Kings Bain IRWMP was adopted in 2012 and was a collaborative effort between 54 agencies to update the 2007 plan to comply with newer DWR standards. The IRMWP covers approximately 610,000 acres of portions of Fresno, Kings, and Tulare counties, overlaying a sub-basin of the San Joaquin Valley groundwater basin that is located within the Tulare Lake Hydrologic Region. Goals of the IRWMP include the following:

- Reduction of groundwater overdraft
- Increased water supply reliability
- Improved water quality and drinking water reliability
- Enhanced flood protection
- Enhanced ecosystem and services (Kings Basin Water Authority 2012)

In February 2014, five projects were selected to receive Proposition 84 funding: Fresno ID's Southwest Groundwater Banking Project, Laguna ID Recharge Basin 11, Bakman Water Company Water Supply Reliability and Conservation Project, City of San Joaquin Water Supply Reliability and Conservation Project, and City of Kerman Residential Water Meter Project (DWR 2014b). These projects are in addition to several projects that were funded before the 2012 IRWMP update.

Kaweah River Basin Integrated Regional Water Management Plan The Kaweah River Basin IRWMP is currently in development and will build upon the Kaweah Delta Water Conservation District's 1995 and 2006 groundwater management plans. The plan will focus on groundwater management and projects that will reduce groundwater overdraft, but will also include the broader goals of improving water supply, water quality, flood control, and ecosystem restoration. (Kaweah Delta Water Conservation District 2014). In 2011, the Kaweah Delta Water Conservation District received funding for the Groundwater Quality Protection and Investigation Project, the Oakes Basin Habitat Enhancement Project, the Paragien Basin Project, Plum Basin Project, and the Water Reuse Pipeline Project (DWR 2011a).

Deer Creek & Tule River Authority Groundwater Management Plan Update While no IRWMP has been developed for the Tule River, the Deer Creek & Tule River Authority (DCTRA) released a groundwater management plan update in 2012. The groundwater management plan was adopted to monitor and manage groundwater activities, and implement groundwater projects between DCTRA member agencies: Lower Tule River, Pixley, Porterville, Terra Bella, Saucelito, Tea Pot Dome, and Vandalia irrigation districts. The groundwater basin underlying the Tule Basin is critically overdrafted. The plan seeks to mitigate groundwater overdraft through groundwater recharge and extraction management, management of well heads and recharge areas to protect groundwater quality, and conjunctive use policies (DCTRA 2012).

Westside Integrated Water Resources Plan The San Luis & Delta-Mendota Water Authority produced the Westside Integrated Water Resources Plan in 2006, which encompasses all areas served by the Water Authority's member agencies: Banta-Carbona, Byron-Bethany, Patterson, Westside, and West Stanislaus IDs; Centinella, and Del Puerto water districts; and the City of Tracy. The plan specifies projects and actions to address the existing water supply and demand gap, while benefiting the environment and improving socio-economic status through drainage. The plan also includes projects and actions to improve flood control, groundwater management, land use, and water conservation, supply, and efficiency (San Luis & Delta-Mendota Water Authority 2006). Projects listed in the integrated water resources plan include the Westside Regional Drainage Plan and the San Luis Reservoir Low-Point Improvement Project.

Madera County Integrated Regional Water Management Plan The Madera County IRWMP (2008) was developed to address the county's reliance on groundwater to meet domestic and agricultural needs, and to address flood risks in the San Joaquin Valley. In the foothills and mountains in Madera County, the plan recommends:

- Development of new water supply wells, where appropriate
- Protection of groundwater recharge areas
- Use of recycled water
- Protection of groundwater quality
- Implementation of vegetation management projects

On the Valley floor, the plan recommends:

- Participation in water banking, increased use of recharge facilities, and groundwater conjunctive use
- Preserving and better-managing CVP allocations, and purchasing Section 215 water from the CVP
- Storage of water supplied by Temperance Flat RM 274 in water banks
- Importing Merced River water
- Analyzing the feasibility of expanding the Madera Canal
- Development of a county flood control program and emergency management program
- Assessing the legality of imposing limits on groundwater pumping (Madera County 2008b)

Merced Integrated Regional Water Management Plan The Merced IRWMP, adopted in 2013 and covering all of Merced County, seeks to meet water demand for all users while correcting current groundwater overdraft conditions, maximizing water use efficiency, improving flood management, addressing climate change, and protecting restoring, and improving natural resources. Priority projects include recharge basins, flood control projects, surface water

infrastructure upgrades, educational programs, and conservation and water metering projects (Merced ID, County of Merced, and City of Merced 2013). In 2014, Proposition 84 funding was awarded for the Black Rascal Flood Control Project, the El Nido Recharge Basin, the Merced River Education and Enhancement Program, and the Planada Community Services District Water Conservation Project (DWR 2014b).

East Stanislaus Integrated Regional Water Management Plan The East Stanislaus IRWMP was completed in 2013 and covers a region bordered by the Stanislaus River on the north, Tuolumne County on the east, the Merced River, Turlock Groundwater Subbasin and the Turlock ID on the south, and the San Joaquin River on the west. Major rivers within the planning region also include the Tuolumne River and Dry Creek. The plan evaluates surface water and groundwater supplies available to the region, quantifies current and projected water supply demands, and evaluates the potential effects of climate change on water supply timing and availability. The goals of the plan are to:

- Reduce water demand
- Improve operational efficiency and transfers
- Increase water supply
- Improve water quality
- Practice resource stewardship
- Improve flood management (City of Modesto, City of Turlock, City of Ceres, and City of Hughson 2013)

Eastern San Joaquin Integrated Regional Water Management Plan The Eastern San Joaquin IRWMP was adopted in 2007 by the Northeastern San Joaquin County Groundwater Banking Authority, which was formed to mitigate groundwater overdraft conditions in San Joaquin County (Northeastern San Joaquin County Groundwater Banking Authority 2007). The IRWMP defines and integrates water management strategies to mitigate and mange groundwater overdraft. The plan calls for implementation of the Eastern San Joaquin Integrated Conjunctive Use Program. The program would develop 140-160 TAF per year of new water supply for the Basin that would be used to support conjunctive use by the

Groundwater Banking Authority. Potential additional water supply sources were limited based on existing water rights permits, water service contracts and agreements, and pending water rights applications (Northeastern San Joaquin County Groundwater Banking Authority 2011).The Integrated Conjunctive Use Program final PEIR was released in 2011.

Qualitative Assessment of Actions and Conditions Related to Flood Management

The actions related to flood management described below were identified as present or reasonably foreseeable.

Central Valley Flood Protection Plan Legislation passed in 2007 directed DWR to develop three documents to support improvement of integrated flood management in the Central Valley:

- *State Plan of Flood Control Descriptive Document* to inventory and describe the flood management facilities, land, programs, conditions, and mode of operations and maintenance for the State/Federal flood protection system in the Central Valley (DWR 2011b).

- *Flood Control System Status Report* to assess the status of the facilities included in the State Plan of Flood Control Descriptive Document, identifies deficiencies, and makes recommendations (DWR 2011b).

- CVFPP to describe a sustainable, integrated flood management plan that reflects a systemwide approach for protecting areas of the Central Valley that currently receive protection from flooding by existing facilities of the State Plan of Flood Control. The 2012 CVFPP (DWR 2012a) is supported by the *State Plan of Flood Control Descriptive Document* (DWR 2012b), the *Flood Control System Status Report* (DWR 2011b), and the *2012 Central Valley Flood Protection Plan Consolidated Final Program Environmental Impact Report* (DWR 2012c).

The CVFPP is a sustainable, integrated flood management plan that describes the existing flood risk in the Central Valley and recommends actions to reduce the probability and consequences of flooding. Produced in partnership with Federal, tribal, local, and regional partners and other interested parties, the CVFPP also identifies the mutual goals, objectives, and constraints important in the planning process; distinguishes

plan elements that address mutual flood risks; and recommends improvements to the State/Federal flood protection system. The 2012 CVFPP was completed by DWR and adopted by the Central Valley Flood Protection Board in July 2012. It is currently being implemented through regional planning efforts and two basinwide feasibility studies for the Sacramento and San Joaquin river basins, respectively.

CALFED Levee System Integrity Program DWR, CDFW, and USACE implement the CALFED Levee System Integrity Program, which maintains and improves the integrity of the Bay-Delta estuary's levee system. The goal of the Levee System Integrity Program is to reduce risks to land use and associated economic activities, water supply, agricultural and residential uses, infrastructure, and the ecosystem from the effects of catastrophic breaching of Delta levees.

Maintenance has been ongoing along more than 600 miles of eligible project and nonproject levees, and levee stability has been improved for more than 45 additional miles of levees. Large levee rehabilitation projects have been undertaken on numerous islands. Projects have also been implemented to grow native vegetation, reuse more than 2 million cubic yards of dredged material for levee stability and habitat development, and develop approximately 50 acres of riparian and wetland habitat and 3,000 linear feet of shaded riverine aquatic habitat (CALFED 2011).

Folsom Dam Joint Federal Project Folsom Dam regulates flows in the American River for flood control, and releases from Folsom Reservoir are used for irrigation, power, municipal and industrial, fish and wildlife, water quality, and other purposes. The Folsom Joint Federal Project is a collaborative effort by Reclamation and USACE to address the hydrologic risk related to dam safety at the dam, and to improve flood protection. This project, scheduled for completion in 2017, includes construction of a new auxiliary spillway southwest of the existing main concrete dam. The new spillway facility will allow Reclamation's dam operators to better manage large floods by safely releasing more water from Folsom Reservoir earlier during a large storm through both the spillway gates on Folsom Dam and the new auxiliary spillway's six gates, thus reducing hydrologic risk and leaving more storage capacity in the reservoir. Improvements to Folsom Dam also include construction of a 3.5-foot dam raise. USACE is currently preparing an EIS/EIR for the potential dam raise.

Delta Islands and Levees Feasibility Study The Delta Islands and Levees Feasibility Study is USACE's mechanism to participate in a cost-shared solution to address ecosystem restoration needs, flood risk management problems, and related water resources in the Delta and Suisun Marsh area. A Feasibility Cost Share Agreement was executed on May 26, 2006 with DWR, the non-Federal sponsor. A combined Draft Feasibility Report / Draft EIS for the study was issued April 2014 (USACE and DWR 2014). The proposed action is to restore approximately 89.5 acres of lost or degraded tidal marsh habitat in the west central portion of the Delta through transporting and placing dredged material into open water habitat to restore 80.3 acres and 9.2 acres of tidal marsh at Big Break and Little Franks Tract, respectively (USACE and DWR 2014).

South Delta Flood Bypass Construction of a flood bypass through the southern Delta in the vicinity of Paradise Cut and Steward Tract has been considered in recent years by various parties, including USACE, the State of California, SJAFCA, various non-governmental organizations, and land developers. Proposals have suggested that a new bypass could reduce the potential for flooding along the lower San Joaquin River and south Delta, particularly for the communities of Lathrop, Manteca, and Stockton (NRDC 2008). Other proposals have suggested that a new bypass could also contribute to habitat restoration and improvement efforts in the south Delta and provide mitigation for the effects of sea level rise. No specific proposals have reached the environmental review stage at this time, but broad support for the concept would suggest that that some form of action is likely to move forward in the future.

Qualitative Assessment of Actions and Conditions Related to Power and Energy

The actions related to energy that are described below were identified as present or reasonably foreseeable.

Big Creek Facilities FERC Relicensing SCE owns and operates seven hydroelectric projects, collectively comprising the Big Creek System, in the eastern portion of the upper San Joaquin River Basin upstream from Kerckhoff Lake. SCE is completing a multiyear collaborative process for relicensing four of its seven Big Creek hydroelectric projects. FERC provided approval to SCE on March 15, 2000, to use an Alternative Licensing Process (ALP) to relicense four of the seven projects (SCE 2000). A settlement agreement was signed during April 2007 by SCE and more than 45 diverse

stakeholders. The settlement agreement calls for extensive plans to mitigate project-related effects on aquatic, terrestrial, and cultural resources, and improve land and recreation management (SCE 2007) and will become effective once FERC has issued an Order Issuing New License for any of the four facilities. The FERC Final EIS for Hydropower Licenses Big Creek ALP Projects was released on March 13, 2009 (FERC 2009).

California Department of Water Resources Oroville Facilities FERC Relicensing P-2100 The 762-megawatt project is located on the Feather River in Butte County and occupies 6,240 acres of Federal lands. The Final EIR and Notice of Determination were issued in July 2008. The Final EIS was issued in June 2008 (DWR 2007). FERC is currently waiting for the NMFS BO before completing the relicensing process for P-2100.

PG&E Kerckhoff Hydroelectric Project Licensing PG&E owns and operates the Kerckhoff Hydroelectric Project, consisting of Kerckhoff Powerhouse and Kerckhoff No. 2 Powerhouse. On November 27, 2012, PG&E filed an application with FERC to retire Kerckhoff No. 2 Powerhouse (PG&E 2012). The application constitutes a non-capacity amendment as it does not propose enlarging the capacity of the project. The license for the Kerckhoff Hydroelectric Project expires November 30, 2022.

PG&E Crane Valley Hydroelectric Project The Crane Valley Hydroelectric project was constructed between 1895 and 1920 and comprises Willow, Peckinpah, and Whiskey creeks and Bass, Manzanita, Chilkoot, and Corrine lakes. Crane Valley Dam impounds the North Fork Willow Creek and creates Bass Lake. Bass Lake also receives water from the South Fork Willow Creek through the 2-mile Brown Creek conduit, and through other small streams. Water travels beneath Bass Lake through a tunnel to the Crane Valley Powerhouse, then to a forebay upstream from the PG&E San Joaquin No. 3 Powerhouse and empties into Manzanita Lake. Water from Manzanita Lake travels through a conduit to a second forebay before passing through the PG&E San Joaquin No.2 Powerhouse. Water is then conveyed to the PG&E San Joaquin No. 1A Powerhouse and released into Corrine Lake, which serves as the forebay from the A.G. Wishon Powerhouse. Water from the A.G. Wishon Powerhouse is released to the San Joaquin River near the upstream end of Kerckhoff Lake (PG&E 2006b).

New Friant River Outlet Powerhouse A small powerhouse owned by Orange Cove ID using water supplied to the San Joaquin Hatchery is located at Friant Dam, but is not part of the Friant Power Project or associated with the CVP. In March 2008, Orange Cove ID informed FERC of a partnership with the FPA to add a new 1.8 MW powerhouse, the Friant Fishwater Release Hydroelectric Project, under an existing FERC license authorized in October 13, 2006. FPA and Orange Cove ID later filed an amendment to their existing license to construct a new powerhouse at a different location, and to increase installed capacity from 1.8 to 7.0 MW and hydraulic capacity from 130 to 370 cfs. The amendment of license application was filed by FERC on February 22, 2010, and supplemented on May 13, 2010 (FERC 2010). FPA issued a Negative Declaration in May 2010, followed by a Notice of Determination in July 2010. The new powerhouse would share a common penstock connection to an outlet pipe through Friant Dam, controlled from a common control room at Friant-Kern Powerhouse, and would be a separate structure from the existing River Outlet Powerhouse, with a single vertical turbine and synchronous generator (Reclamation 2011b).

Merced River Hydroelectric Project, FERC Project No. 2179 Merced ID's Hydroelectric Project is located on the Merced River near the City of Merced. It consists of a major storage reservoir, Lake McClure, with storage of just over one million acre-feet. The New Exchequer Powerhouse, located at the downstream base of New Exchequer Dam, has a capacity of 94.5 MW. The New Exchequer Powerhouse releases directly into the 9,730 acre-foot McSwain Reservoir, which serves as an afterbay. The main purpose of the project is to provide agricultural water for the Merced ID. The initial FERC license for the Project expired February 28, 2014, and Merced ID is currently pursuing relicensing of the project.

Don Pedro Project Relicensing, FERC No. 2299 Owned by the Modesto ID and the Turlock ID, the project was placed into service in 1971. The Don Pedro Project is a federally-licensed water storage and hydroelectric generating facility located on the Tuolumne River in the Sierra Nevada foothills nearly 130 miles east of San Francisco. It consists of a 2,030,000 AF reservoir and a 203 MW powerhouse. Don Pedro provides water storage for irrigation and domestic use as well as energy from a renewable resource. Don Pedro operations also benefit fish, wildlife, and recreation resources, as well as providing flood control benefits through cooperation with the USACE.

The project operates under a 50-year license granted to the Districts by FERC. The current license extends through April 30, 2016. The Modesto ID and Turlock ID filed the Draft License Application in November 2013 and then the Final License Application for relicensing on April 28, 2014.

Qualitative Assessment of Actions and Conditions Related to Recreational Resources

Bureau of Land Management-Bakersfield Office Resource Management Plan The *Bakersfield Proposed Resource Management Plan & Final Environmental Impact Statement* was released by BLM in 2012. The preferred alternative proposes designating the 5.4 miles of the San Joaquin River Gorge from the base of Kerckhoff Dam to Kerckhoff Powerhouse tailrace as wild and scenic. The preferred alternative proposes to designate 6,490 acres as the San Joaquin River Gorge Special Recreation Management Area to increase hiking, mountain biking horseback riding, camping, and educational opportunities. Additionally, the proposed alternative proposes to designate Millerton Cave as a significant cave due to its important and significant cave resources (BLM 2012).

Millerton Lake Resource Management Plan and General Plan The Millerton Lake RMP and General Plan was developed by Reclamation and California State Parks in 2011. The plan selected in the ROD, Alternative 2, seeks to enhance current recreated uses and public access at Millerton Lake, while protecting natural resources with new or modified land and recreation management practices. The plan manages boat densities and speeds on Millerton Lake and would develop new recreation opportunities while protecting natural resources. Specifically, the plan would upgrade campground, picnic and access areas around Millerton Lake and develop a group camping area at Temperance Flat on the south side of the river. New facilities would be balanced with resource protection and mitigation lands/ buffer lands could be acquired surrounding developments (Reclamation and California Department of Parks and Recreation 2010).

San Joaquin River Parkway Plan The San Joaquin River Parkway and Conservation Trust was created in 1988 with the goal of establishing a continuous greenway along 33 miles of the San Joaquin River in the Fresno-Madera region. Working with Federal, State, and local agencies and governments, to protect lands around the San Joaquin River through acquisitions, easements, and wildlife habitat restoration, the

San Joaquin River Parkway & Conservation Trust seeks to provide public access to the river and improve the Lewis S. Eaton Trail. The trust is currently focusing on the 22-mile stretch of River between Friant Dam and Highway 99. The San Joaquin River Parkway Task Force drafted the Interim San Joaquin River Parkway Master Plan in December 1997, and work to update the plan began in 2012 (SJRPCT 2014b).

Air Quality and Greenhouse Gas Emissions

For criteria air pollutants, the SJVAPCD acknowledges that the entire SJVAB, including Fresno and Madera Counties, is designated as nonattainment area for ozone and $PM_{2.5}$ with regards to the California and National ambient air quality standards, and for PM_{10} with regards to the California Ambient Air Quality Standards due to the combined levels of emissions generated by sources throughout the SJVAB. These sources include, but are not limited to, the following:

- Population growth and associated development of infrastructure and traffic
- Conversion of natural vegetation to agricultural and developed land uses
- Resource extraction (e.g., gravel mining, gold mining, and timber harvesting)
- CVP operations and local water development actions
- PG&E and Southern California Edison hydroelectric projects

With regard to TACs and related levels of health risk exposure, both SJVAPCD and the ARB have acknowledged that background levels of health risk are too high in the SJVAB.

Because climate change-causing GHGs persist in the atmosphere long enough periods to be dispersed around the globe, they are considered global pollutants. Therefore, all past and present GHG-emitting projects formulate the cumulative context for analyzing the contribution to climate change from the GHG emissions generated by the action alternatives.

Table 27-2 summarizes the direct, indirect, and cumulative impacts to air quality.

Table 27-2. Direct, Indirect, and Cumulative Impacts to Air Quality and Greenhouse Gas Emissions

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
AQ-1: Project-Generated Construction-Related Criteria Air Pollutant and Precursor Emissions that would Violate or Contribute Substantially to an Existing or Projected Violation, or Expose Sensitive Receptors to Substantial Pollutant Concentrations	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
AQ-2: Project-Generated Construction-Related Toxic Air Contaminant Emissions that would Expose Sensitive Receptors to Substantial Pollutant Concentrations and Increased Health Risks	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
AQ-3: Project-Generated Operational Criteria Air Pollutant and Precursor Emissions that would Violate or Contribute Substantially to an Existing or Projected Violation, or Expose Sensitive Receptors to Substantial Pollutant Concentrations	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
AQ-4: Generation of Greenhouse Gas Emissions that would Significantly Impact the Environment	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

Reasonably foreseeable probable future projects involving construction or changes in traffic patterns in the vicinity of the primary study area would generate emissions of criteria air pollutants and precursors, as well as TACs and GHGs. These projects include development projects (e.g., Gunner Ranch West Specific Plan, Brighton Crest, Ventana Hills Estates Annexation) and hydroelectric projects (e.g., PG&E Kerckhoff Hydroelectric Project licensing and the Big Creek

Hydroelectric Project). In addition, continued development, as allowed in the Fresno County and Madera County general plans, would result in increases in population and traffic in the primary study area.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area associated with air quality and greenhouse gas emissions.

Impact AQ-1: Project-Generated Construction-Related Criteria Air Pollutant and Precursor Emissions that would Violate or Contribute Substantially to an Existing or Projected Violation, or Expose Sensitive Receptors to Substantial Pollutant Concentrations

Under all action alternatives, construction-related activities would result in a direct effect on air quality from project-generated criteria air pollutant (PM_{10}) and precursor emissions (ROG and NOx) from heavy-duty truck travel on proposed haul routes; and from heavy-duty construction equipment at the activity areas. Based on the modeling conducted, project-generated construction-related ROG, NOx, and PM_{10} emissions would exceed SJVAPCD's significance thresholds. All control measures in compliance with the requirements of Regulation VIII are incorporated into the project description, as described in Chapter 2, "Alternatives." However, the remaining project-generated construction-related fugitive PM_{10} dust emissions would violate or contribute substantially to an existing or projected air quality violation, especially considering the current nonattainment status of the area and could expose nearby existing sensitive receptors to substantial pollutant concentrations. Consequently, project-generated construction-related emissions, when added to other closely related past, present, and reasonably foreseeable probable future projects could further violate or contribute substantially to an existing or projected air quality violation, especially considering the current nonattainment status of the area and expose sensitive receptors to substantial pollutant concentrations. For these reasons, implementation of the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impact** on air quality.

Impact AQ-2: Project-Generated Construction-Related Toxic Air Contaminant Emissions that would Expose Sensitive Receptors to Substantial Pollutant Concentrations and Increased Health Risks

Construction-related activities under all the action alternatives would result in a direct effect on air quality from project-

generated TAC emissions from heavy-duty truck travel on proposed haul routes and heavy-duty construction equipment. Based on the modeling conducted, the worst-case project-generated construction-related excess cancer risk would be less than SJVAPCD's significance threshold of 10 chances per million with implementation of Mitigation Measure AQ-1 and AQ-2, under any of the action alternatives regardless of whether Option A, B, or C is selected. SJVAPCD's threshold is considered to represent the allowable incremental level of health risk exposure without subjecting any exposed sensitive receptors to unacceptable levels of risk while still progressing toward overall risk reduction goals within both the primary study area and the SJVAB. Also, given that exposure to project-related TAC emissions would decrease with increasing distance from the source, TAC emissions from other projects would not combine with project-related emissions to result in substantial increases in cancer risk at nearby sensitive receptors. For these reasons, implementation of the action alternatives would not cause a cumulatively considerable incremental contribution to the overall significant cumulative impact of health risk exposure from TACs.

Impact AQ-3: Project-Generated Operational Criteria Air Pollutant and Precursor Emissions that would Violate or Contribute Substantially to an Existing or Projected Violation, or Expose Sensitive Receptors to Substantial Pollutant Concentrations

As explained above, the project area is designated as nonattainment for the ozone and $PM_{2.5}$ Federal and State ambient air quality standards, and for the PM_{10} California Ambient Air Quality Standards. Under all action alternatives, operations would not result in project-generated criteria air pollutant (PM_{10}) and precursor emissions (ROG and NOx) associated with recreational activities that exceed SJVAPCD's significance thresholds. Emissions for all criteria air pollutants would be considered minor (i.e., less than 1 ton per year). Therefore, operational emissions would be minimal and would not interfere with attainment of Federal or State ambient air quality standards and would not result in a cumulatively considerable incremental contribution to the overall significant cumulative impacts on air quality.

Impact AQ-4: Generation of Greenhouse Gas Emissions that Would Significantly Impact the Environment

Estimated annual GHG emissions would exceed the applicable threshold of 25,000 MT/year for all action alternatives, regardless of the implementation of other projects. Therefore,

the generation of GHG emissions (Impact AQ-4, significant and unavoidable), as described in Chapter 4, "Air Quality and Greenhouse Gas Emissions," would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impact** related to GHG emissions.

Extended Study Area

The action alternatives would not result in any impacts to air quality in the extended study area. Given that the contribution of GHG emissions to climate change is inherently a global issue, GHG emission generated by the proposed project affect both the primary study area and extended study area.

Biological Resources – Fisheries and Aquatic Ecosystems

Actions of past and present projects that have resulted in a change in fisheries and aquatic ecosystems in the primary and extended study areas include:

- Population growth and associated development of socioeconomic resources and infrastructure
- Introduction of nonnative plant and animal species
- Resource extraction (e.g., gravel mining, gold mining, and timber harvesting)
- CVP operations and local water development actions and transfers
- PG&E, Merced ID, Turlock ID, Modesto ID, and Southern California Edison hydroelectric projects

Past and present actions by humans have substantially altered aquatic ecosystems in the central Sierra Nevada foothill region and throughout the Central Valley compared to historical conditions. These past and present actions have resulted in significant adverse impacts on the suitability and connectivity of aquatic ecosystems. The degraded nature of the remaining habitat affects the survivability of native fisheries and other aquatic species.

As discussed in Chapter 5, "Biological Resources – Fisheries and Aquatic Ecosystems," and shown in Table 27-3, the action alternatives could result in direct and/or indirect impacts in

both the primary and extended study areas. There are no HCPs adopted for the primary study area that currently directly protect fisheries resources (although the PG&E HCP, through the protection of riparian habitat, may indirectly benefit fish). Therefore, implementing any of the action alternatives would not result in conflicts with adopted HCPs in the primary study area. As a result, this issue is not evaluated further in the cumulative impact analysis for the primary study area.

Table 27-3. Direct, Indirect, and Cumulative Impacts to Biological Resources – Fisheries and Aquatic Ecosystems

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
FSH-1: Loss of Riverine Habitat for Lotic Fish Species	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
FSH-2: Short-term Degradation of Aquatic Habitat from Accidental Spills or Seepage of Hazardous Materials during Construction of Temperance Flat RM 274 Dam and Other Facilities	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
FSH-3: Short-term Degradation of Aquatic Habitat from Increased Turbidity or Sedimentation during Construction of Temperance Flat RM 274 Dam and Other Facilities	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
FSH-4: Loss of Reservoir Fish Habitat Resulting from Changes in Water Temperature	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
FSH-5: Changes to Reservoir Fish Habitat Caused by Turbidity from Increased Surface Area of Exposed Shoreline	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
FSH-6: Loss of Reservoir Fish Caused by Entrainment	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
FSH-7: Change in Shallow-Water Habitat for Largemouth Bass, Spotted Bass, Smallmouth Bass, and Other Sport Fish Species	Primary Study Area	All	Beneficial	NC
	Extended Study Area	All	NI	NC

Table 27-3. Direct, Indirect, and Cumulative Impacts to Biological Resources – Fisheries and Aquatic Ecosystems (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
FSH-8: Change in Open-Water Habitat for Striped Bass and American Shad	Primary Study Area	All	Beneficial	NC
	Extended Study Area	All	NI	NC
FSH-9: Loss of Spawning Habitat of American Shad and Striped Bass	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
FSH-10: Change in Habitat Potential for Spring-Run Chinook Salmon	Primary Study Area	All	NI	NC
	Extended Study Area	Alternative Plans 1 - 4	LTS and Beneficial	BC
		Alternative Plan 5	PSU	CU
FSH-11: Change in Water Temperature Conditions Supporting Juvenile Salmon and Steelhead Migration	Primary Study Area	All	NI	NC
	Extended Study Area	All	SU	CU
FSH-12: Change to Habitat for Moderately Tolerant Native Fish Species from Altered Water Temperatures	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS and Beneficial	BC
FSH-13: Changes to Habitat for Highly Tolerant Native Fish Species from Altered Water Temperatures	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS and Beneficial	NC
FSH-14: Changes to Spawning and Rearing Habitat from Changes to Flood Pulses and Floodplain Connectivity	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
FSH-15: Change in Fish Habitat and Migratory Behaviors from Changes in Water Temperatures	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC

Table 27-3. Direct, Indirect, and Cumulative Impacts to Biological Resources – Fisheries and Aquatic Ecosystems (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
FSH-16: Change in Fish Habitat and Migratory Behaviors from Changes in Flows	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
FSH-17: Loss of Fish Habitat from Changes in Tributary Flows	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
FSH-18: Effects on Delta Fish Habitat from Changes in Water Temperatures and Dissolved Oxygen Concentrations	Primary Study Area	All	NI	NC
	Extended Study Area	All	PSU	CU
FSH-19: Loss of Suitable Fish Habitat from Salinity Changes in the Delta	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
FSH-20: Loss of Suitable Fish Habitat from Change in Flow Patterns in the South Delta	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
FSH-21: Reduction in Fish Abundance from Changes in Exports and Entrainment in the South Delta	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS and Beneficial	NC
FSH-22: Loss of Suitable Fish Habitat Resulting from Changes in X2	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC

Note:

[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
BC = beneficial contribution
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
PSU = potentially significant and unavoidable
SU = significant and unavoidable

Primary Study Area

A few of the reasonably foreseeable probable future projects in the vicinity of the primary study area have the potential to affect aquatic resources that also may be affected by implementing any of the action alternatives. Examples of these projects include development projects (e.g., Gunner Ranch West Specific Plan, Brighton Crest, Ventana Hills Estates

Annexation) and hydroelectric projects (e.g., PG&E Kerckhoff Hydroelectric Project licensing and the Big Creek Hydroelectric Project). Additionally, throughout the central Sierra Nevada foothill region, alteration of aquatic habitat may occur, affecting native fishes.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact FSH-1: Loss of Riverine Habitat for Lotic Fish Species

Past and present actions, particularly the construction and operation of Friant Dam and other water storage and hydroelectric dams, have contributed to significant habitat loss for lotic fish species. Implementing any of the action alternatives would further contribute to habitat loss for lotic fish, and therefore would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact** to hardhead and Kern brook lamprey.

Impacts FSH-2 Through FSH-5: Changes in Reservoir Water Quality

The impacts of past and present projects upstream from the primary study area have reduced the sediment load entering the San Joaquin River below Kerckhoff Dam and entering Millerton Lake. Reasonably foreseeable projects could contribute sediment to surface waters in the primary study area, but these contributions would be minimized through compliance with regulatory requirements and implementation of mitigation measures, and would be small compared to the reduced sediment load caused by upstream dams and reservoirs.

Under the action alternatives, construction-related activities would have less-than-significant temporary impacts to fish resulting from an increase in sediment input. This impact would be avoided and minimized via implementation of the erosion and sediment control plans and SWPPP. Because the overall cumulative impact is a reduced sediment load to the San Joaquin River and the action alternatives, as well as reasonably foreseeable future projects, would minimize erosion and associated sediment effects, these impacts (FSH-2 through FSH-5) would not cause a cumulatively considerable incremental contribution to the overall significant cumulative impact related to sediment effects on fish in the primary study area.

Impacts FSH-6 through FSH-8: Changes in Reservoir Fish Habitat and Entrainment

Past projects, including the construction and operations of Friant Dam, Millerton Lake, and Kerckhoff Dam and Reservoir, have resulted in overall significant benefits and less-than-significant impacts to reservoir fish. The presence of Millerton Lake created habitat for reservoir fish that did not previously exist, however operations of Friant Dam periodically create conditions less-than-optimal for the fish by the rapidly changing reservoir elevations.

Past, present, and reasonably foreseeable future projects that have the potential to change reservoir elevations or flow directly into Millerton Lake or Temperance Flat RM 274 Reservoir could affect entrainment as well as both shallow water and open water reservoir fish habitat. The PG&E Kerckhoff Hydroelectric Project licensing and the Big Creek Hydroelectric Project could result in altered flows depending on any outcomes in each license renewal process. This could change inflows and/or timing of inflows to Temperance Flat RM 274 Reservoir, which could affect the reservoir elevations of both Temperance Flat RM 274 Reservoir and Millerton Lake (flows in the San Joaquin River downstream from Millerton Lake would not be affected by these projects). Therefore, these impacts (FSH-6 through FSH-9) would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to reservoir fish habitat in the primary study area.

Impact FSH-9: Loss of Spawning Habitat of American Shad and Striped Bass

Operation of the Kerckhoff No. 2 Powerhouse currently provides the hydraulic conditions that create American shad spawning habitat. If any of the action alternatives were to be implemented, PG&E would retire a portion of the Kerckhoff No. 2 Powerhouse, resulting in elimination of American shad spawning habitat. Therefore would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact** to American shad.

Extended Study Area

A number of reasonably foreseeable probable future projects in the vicinity of the extended study area have the potential to affect aquatic resources that also may be affected by implementing any of the action alternatives. Because the aquatic resources vary so greatly between different regions in

the extended area, this section is broken into 4 regions, following the aquatic regions described in Chapter 5, "Biological Resources – Fisheries and Aquatic Ecosystems."

San Joaquin River from Friant Dam to the Merced River

Reasonably foreseeable probable future projects with the potential to affect aquatic resources that also may be affected by implementing any of the action alternatives include various actions under the SJRRP, such as the release of full Restoration Flows, reintroduction of spring-run Chinook salmon, control of piscivorous species, and fish habitat restoration including restoration of spawning gravel and floodplain and riparian habitat in the San Joaquin River between Friant Dam and the Merced River. Overall, the SJRRP is designed to benefit fisheries and aquatic ecosystems in this portion of the extended study area, although some adverse effects would occur (primarily as a result of temporary construction activities). Flows of cooler water to maintain suitable water temperatures in the upper sections of this river to protect the early life stages of spring-run Chinook salmon would be released as part of Restoration Flows. Release of full Restoration Flows under the SJRRP would reduce or avoid peak flood releases in some years but, as described in Chapter 5, "Biological Resources – Fisheries and Aquatic Ecosystems," the SJRRP would substantially increase the number of years with flood pulse flows sufficient to manage for desired floodplain habitat functions.

Projects such as the Grassland Bypass and the DMC Recirculation will improve water quality, and habitat enhancement projects along the San Joaquin River (e.g., Jensen River Ranch Habitat Enhancement, Lost Lake Park Master Plan, and San Joaquin River Parkway Plan) have the potential to improve riparian habitat. The significant changes to fish habitat and to the native fisheries occurring in the San Joaquin River between Friant Dam and the Merced River resulting from the implementation of the SJRRP and other water quality improvement programs is expected to cumulatively benefit the San Joaquin River fisheries.

Impact FSH-10: Change in Habitat for Spring-Run Chinook Salmon Past, present, and reasonably foreseeable projects to improve riparian habitat and water quality in the San Joaquin River would improve conditions for rearing and migrating spring-run Chinook salmon. Alternative Plans 1 through 4 would further reduce or avoid peak flood releases in some years, but the ability to achieve stipulated flood pulse and

peak flows under the SJRRP would be retained as described in Chapter 5, "Biological Resources – Fisheries and Aquatic Ecosystems." Under Alternative Plans 1 through 4, Impact FSH-10 would result in a **beneficial contribution to the overall significant cumulative impact** to fish habitat in the San Joaquin River between Friant Dam and the Merced River confluence.

Alternative Plan 5 would reduce habitat capacity and productivity during certain year types, primarily Wet and Normal-Wet years. This impact was determined to be potentially significant. No feasible mitigation is available to reduce the severity of Impact FSH-10; therefore, Alternative Plan 5 would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact** to spring-run Chinook salmon.

Impact FSH-11: Change in Water Temperature Conditions Supporting Juvenile Salmon and Steelhead Migration The action alternatives all increase simulated water temperatures between December and May and decrease temperatures in mid- to late-summer and fall, which may improve spawning and holding habitat conditions for spring-run Chinook salmon. Each of the action alternatives produces similar simulated effects on the number of weeks below threshold throughout the 84-mile stretch of river extending from Reach 1A through Reach 3. This has the effect of altering the timing and distribution of water temperatures suitable for juvenile salmon and steelhead migration and smolting throughout a large component of the migratory corridor, increasing both the distance and duration of exposure to water temperatures that inhibit smolting transformation. No feasible mitigation is available to reduce the severity of Impact FSH-11; therefore the action alternatives would result in **a cumulatively considerable incremental contribution to the overall significant cumulative impact** to water temperature conditions supporting juvenile salmon and steelhead migration.

Impact FSH-12: Change to Habitat for Moderately Tolerant Native Fish Species from Altered Water Temperatures The action alternatives would have a mixed effect on water temperature conditions for moderately tolerant fish species under most, but not all, circumstances. When averaged across all years, Alternative Plans 1, 2, 3, and 4 either maintain or modestly improve temperature conditions in each reach. Alternative Plan 5 negatively affects temperatures in Reaches 4A and 5 by decreasing the number of weeks during

which water temperatures are under 77°F. However, when the duration of suitable water temperatures is averaged across all reaches, Alternative Plan 5 temperatures are similar to the No Action Alternative. Therefore, these negative impacts may be offset by the large increases in the number of weeks below threshold in Reaches 2A, 2B1, and 2B2. This impact would be less than significant and beneficial under the action alternatives. Impact FSH-12 would result in **a beneficial contribution to the overall significant cumulative impact**.

Impact FSH-13: Change to Habitat for Highly Tolerant Native Fish Species from Altered Water Temperatures
The action alternatives are projected to have small but potentially beneficial effects on water temperature conditions for highly tolerant native fish species in specific years and specific reaches. The action alternatives would produce a mix of water temperature effects that could influence the extent of suitable habitat conditions for highly tolerant fish species at the warmer 90^{th} percentile water temperatures improving conditions in some reaches, and degrading them in others. When averaged across all reaches, the net water temperature effect of each action alternative is small, decreasing the number of 7-day periods with average water temperatures below 84°F by less than 1 week. Impact FSH-13 would not cause a cumulatively considerable incremental contribution to the overall significant cumulative impact related to water temperatures for highly tolerant native fish species.

Impact FSH-14: Changes to Spawning and Rearing Habitat from Changes to Flood Pulses and Floodplain Connectivity
The action alternatives are designed to capture flood flows, resulting in a reduction in peak and annual average spill rates relative to the No Action Alternative. Because each action alternative captures flood peaks, each affects both the size and frequency of extreme flow events exceeding 8,000 cfs at Friant Dam, and the size and frequency of flow peaks between the Restoration Flows and 8,000 cfs. This impact would be minimal under the action alternatives on the basis that, at minimum, the restoration flow requirements in the Settlement would be achieved in all years under each of the action alternatives. Some effects on the duration of flow volumes between 4,000 and 8,000 cfs may occur. Impact FSH-14 would not cause a cumulatively considerable incremental contribution to the overall significant cumulative impact related to spawning and rearing habitat from changes to flood pulses and floodplain connectivity.

San Joaquin River from Merced to Delta

Reasonably foreseeable probable future projects to improve riparian habitat, flows and water quality in the San Joaquin River, including those identified in the 2009 NMFS BO, CALFED ERP, and the San Joaquin River Exchange Contractors water authority water transfer program 2014 – 2038, may potentially improve conditions for rearing and migrating salmonids and other native fish.

Impact FSH-16: Change in Fish Habitat and Migratory Behaviors from Changes in Flows The action alternatives, when considered in combination with past and present actions, would not significantly change the water temperatures in the San Joaquin River downstream from the Merced River, and would not significantly change the magnitude of flows during critical periods for rearing and migrating, such that a significant cumulative effect would result. Past and present, and reasonably foreseeable projects, including actions under the 2009 NMFS BO (e.g., VAMP), CALFED ERP, and the San Joaquin River Exchange Contractors water authority water transfer program 2014 – 2038, would cumulatively improve riparian habitat, flows and water quality in the San Joaquin River between the Merced River confluence and the Delta. Therefore, Impact FSH-16) would not make a contribution to a significant cumulative impact related to rearing and migrating salmonids and other native fish in the San Joaquin River between the Merced River confluence and the Delta.

San Joaquin River Tributaries

Reasonably foreseeable probable future projects in the San Joaquin River tributaries have the potential to affect native fish. Fisheries instream flows in the Merced and the Tuolumne rivers are being negotiated in the ongoing FERC relicensing processes for New Exchequer and Don Pedro dams. Additionally, the NMFS 2009 BO identified fisheries instream flow requirements in the Stanislaus River. These projects are designed to benefit anadromous fish in the San Joaquin River tributaries.

Delta

The Delta is a vital region for fisheries in the Central Valley, both for resident and anadromous species. Therefore, numerous programs have been established and proposed for restoring habitat conditions for native fisheries, many of which are protected under the ESA. Several programs include direct tidal and marsh habitat restoration (e.g., Suisun Marsh, Dutch Slough, and Franks Tract), while others are directed at

protecting the Delta hydrodynamics (e.g., BDCP, VAMP), and fish facilities (i.e., Tracy Fish Collection Facility Improvement Program). Both the NMFS 2009 BO and USFWS 2008 BO have actions directly targeted at improving conditions for listed fish species in the Delta.

Impact FSH-18: Effects on Delta Fish Habitat from Changes in Water Temperatures and Dissolved Oxygen Concentrations Past, present and reasonably foreseeable probable future projects are likely not sufficient to eliminate the risk to fish caused by low DO in the Delta. No feasible mitigation is available to reduce the severity of Impact FSH-18; therefore the action alternatives would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact** to Delta fish habitat from changes in DO concentrations.

Impacts FSH-19 Through FSH-22: Changes in Habitat for Fish in the Delta Past, present and reasonably foreseeable probable future projects intended to improve flows and habitat for fish in the Delta. The action alternatives would not significantly change the conditions in the Delta. Therefore, these impacts (FSH-19 through FSH-22) would not make a contribution to a significant cumulative impact related to Delta fish.

Biological Resources – Botanical and Wetlands

Actions of past and present projects that have resulted in loss and degradation of botanical resources and wetlands in the primary and extended study areas include:

- Population growth and associated development of socioeconomic resources and infrastructure
- Conversion of natural vegetation to agricultural and developed land uses
- Introduction of nonnative plant and animal species
- Resource extraction (e.g., gravel mining, gold mining, and timber harvesting)
- CVP operations and local water development actions

- PG&E and Southern California Edison hydroelectric projects

Past and present actions by humans have substantially altered botanical resources and waters of the United States, including wetlands, in the central Sierra Nevada foothill region compared to historical conditions. These past and present actions have resulted in significant adverse cumulative impacts on the extent, species composition, and functioning of wetlands, riparian habitats, and oak woodland communities and on the distribution and abundance of plant species associated with these habitats. Large areas of wetland, riparian, and oak woodland vegetation have been lost or degraded in the region over the past 100 years. Other contributing factors to significant adverse cumulative impacts include substantial alteration of flow regimes and reduced flows; dewatering of stream reaches; isolation of floodplains from the river channel by channelization and levee construction; substantial reductions in the frequency, magnitude, and duration of floodplain inundation; habitat fragmentation by physical barriers; and poor water quality. The increase in the distribution and abundance of invasive plant species and nonnative plant communities, the large number of plant species listed as threatened or endangered or assigned a California Rare Plant Rank by CDFW, and the dramatic reductions in the extent of wetland and riparian vegetation in the central Sierra Nevada foothill region are evidence of these overall significant adverse cumulative impacts. These actions have altered habitats, biotic interactions, and physical processes that continue to affect botanical and wetland resources in the region today.

As discussed in Chapter 6, “Biological Resources – Botanical and Wetlands,” and shown in Table 27-4, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas.

Table 27-4. Direct, Indirect, and Cumulative Impacts to Biological Resources – Botanical and Wetlands

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
BOT-1: Loss of Special-Status Plants and Loss or Degradation of Special-Status Plant Habitat	Primary Study Area	All	LTS	CU
	Extended Study Area	All	LTS	NC
BOT-2: Loss of Riparian Habitat and Other Sensitive Communities	Primary Study Area	All	SU	CU
	Extended Study Area	All	LTS	NC
BOT-3: Loss or Degradation of Waters of the United States, Including Wetlands, and Waters of the State	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
BOT-4: Introduction and Spread of Invasive Plants	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
BOT-5: Elimination of a Plant Community or Substantial Reduction in the Number or Restriction of the Range of an Endangered, Rare, or Threatened Plant Species	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
BOT-6: Conflict with Local or Regional Policies and Plans Protecting Wetland or Botanical Resources	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
BOT-7: Conflict with Provisions of an Adopted Habitat Conservation Plan Protecting Wetland or Botanical Resources	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

A number of reasonably foreseeable future projects that would be located in the vicinity of the primary study area have the potential to affect botanical resources and wetlands that also may be affected by implementing any of the action alternatives. Examples of these projects include development projects (e.g., Gunner Ranch West Specific Plan, Brighton Crest, Ventana Hills Estates Annexation) and hydroelectric projects (e.g., PG&E Kerckhoff Hydroelectric Project licensing and the Big Creek Hydroelectric Project). In addition, continued development, as allowed in the Fresno County and Madera County general plans, would result in additional loss of wetlands and of riparian and oak woodland habitats, stream fragmentation and alteration, and loss of special-status plant occurrences and habitat. Throughout the central Sierra Nevada foothill region, conversion, fragmentation, and alteration of native plant communities would continue as a result of planned agricultural and urban development. The proponents of projects that would contribute to significant cumulative impacts on botanical resources and wetlands in the central Sierra Nevada foothill region will be required to identify these impacts and provide mitigation in compliance with the Federal ESA and CESA; NEPA and CEQA; and other Federal, State, and local statutes. Even with compliance with regulatory requirements and implementation of mitigation, a continued decline in the extent and quality of botanical resources and wetlands is expected in the region. Therefore, continued net loss of native plant communities and special-status plant habitats that contribute to an overall significant adverse cumulative impact is expected throughout the region.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact BOT-1: Loss of Special-Status Plants and Loss or Degradation of Special-Status Plant Habitat

Implementing any of the action alternatives would result in the direct loss of Madera leptosiphon and tree anemone occurrences and the loss or degradation of their habitat. This loss of habitat cannot be fully mitigated. Continued development in the region will result in the incremental decline in the amount of habitat remaining to support these special-status species. Because implementing any of the action alternatives in the primary study area would contribute to this ongoing decline, it would result in a **cumulatively considerable incremental contribution to the overall**

significant cumulative impact on Madera leptosiphon and tree anemone. No additional feasible mitigation measures are available to avoid or minimize the cumulative considerable incremental contribution of the action alternatives. Therefore, implementing any of the action alternatives would result in a significant and unavoidable cumulative impact.

Impact BOT-2: Loss of Riparian Habitat and Other Sensitive Communities

Oak woodland provides important functions and values to common and special-status plant and wildlife species and functions in carbon sequestration. The extent of oak woodland habitat in the Sierra Nevada foothill region is rapidly declining, and a large percentage of oak woodland has already been lost from the region. Over 1 million acres of California's prior extant oak woodlands have been altered, and 20 percent of the remaining oak woodlands are at risk of being converted to nonwoodland land uses before 2040 (California Oak Foundation 2006). Eighty percent of at-risk oak woodlands are in the Sierra Nevada foothill region. The San Joaquin region (composed of 15 counties extending from Alpine and Amador counties in the north to Kern County in the south) contains 27 percent of the state's oak woodlands, and 10 percent of the region's oak woodlands have already been developed as a result of past projects. It is estimated that approximately 250,000 acres of oak woodland in this region are at risk for loss by 2040 (California Oak Foundation 2006). Most of these losses would occur in the Sierra Nevada foothill belt in Mariposa, Madera, and Fresno counties.

Implementing any of the action alternatives would result in the direct loss of approximately 5,000 acres of oak woodlands. This loss constitutes a cumulatively considerable incremental contribution to the overall significant cumulative impact on oak woodlands in the Sierra Nevada foothills.

Implementing Mitigation Measure BOT-2 would reduce the project's significant impact on oak woodlands; however, there would still be a net loss in oak woodland habitat because the mitigation measure would only preserve existing habitat and would not replace the oak woodland acreage lost from the primary study area. It would be generally infeasible to recreate the functions and values provided by the relatively isolated and undisturbed oak woodland habitat in the primary study area due to a lack of comparable available suitable land and the time it would take to create over 5,000 acres of mature, fully functioning oak woodland communities similar to those that

would be removed by project implementation. Therefore, the impact would remain significant and unavoidable and implementing Alternative Plans 1 through 5 would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact** on oak woodlands.

Implementing any of the action alternatives would result in the loss of approximately 40 acres of native riparian habitat that provides important habitat functions and values. However, Mitigation Measure BOT-2 would replace riparian habitat to achieve no net loss of riparian habitat acreage or functions. Therefore, implementing any of the action alternatives, when added to other closely related past, present, and reasonably foreseeable probable future projects, would not make a cumulatively considerable incremental contribution to the significant cumulative impact on native riparian habitat in the region.

Impact BOT-3: Loss or Degradation of Waters of the United States, Including Wetlands, and Waters of the State

Past and present actions by humans have substantially altered waters of the United States, including wetlands, in the central Sierra Nevada foothill region compared to historical conditions. Future actions would contribute to the cumulative loss of wetlands and other waters in the region. Implementing any of the action alternatives would result in the loss of approximately 12 acres of wetlands consisting of seasonal wetland, swale, and freshwater seep and 22 acres of other waters consisting of ephemeral, intermittent, and perennial streams. Most of the existing waters of the United States within the primary study area would be converted to open water lacustrine habitats, but this would not represent an overall loss of waters of the United States. Furthermore, implementing Mitigation Measure BOT-3 would reduce the project's significant impact by replacing aquatic habitats such that the project would not result in a net loss of acreage or functions. Therefore, implementing any of the action alternatives, when added to other closely related past, present, and reasonably foreseeable probable future projects, would not make a cumulatively considerable incremental contribution to a significant cumulative impact on wetlands and other waters in the region.

Impact BOT-4: Introduction and Spread of Invasive Plants

Past and present actions, particularly cattle grazing, in the primary study area, have resulted in widespread introductions of invasive plant species that have degraded habitat for native

species and altered species composition. Implementing any of the action alternatives could result in the introduction and spread of invasive plant species. Implementing Mitigation Measure BOT-4 would reduce the project's potentially significant impact by requiring the implementation of a weed management plan that would prevent the introduction and spread of invasive plant species as a result of project implantation. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the significant cumulative impact related to the spread of noxious invasive species in the central Sierra Nevada foothill region.

Impact BOT-5: Elimination of a Plant Community or Substantial Reduction in the Number or Restriction of the Range of an Endangered, Rare, or Threatened Plant Species

Past projects, including road improvement and hydroelectric projects have resulted in losses of tree anemone, a species that is state listed as threatened. Implementing any of the action alternatives could result in further reduction in the number of occurrences of tree anemone by inundating one existing occurrence. Mitigation would reduce the project's significant impact by requiring the collection of seed from affected populations and establishment of new populations of the species in the watershed, as near as practical to the area affected by their implementation, to replace populations that would be eliminated by the project. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to the elimination of a plant community or reduction in the number or restriction of the range of special-status plant species in the central Sierra Nevada foothill region.

Impact BOT-6: Conflict with Local or Regional Policies and Plans Protecting Wetland or Botanical Resources

The implementation of reasonably foreseeable future projects might result in a variety of physical impacts related to consistency with adopted land use plans. Inconsistencies with adopted land use plans or policies and zoning (Impact LUP-2, significant and unavoidable) generally would not combine to result in cumulative impacts. As described in Appendix G of the State CEQA Guidelines, an impact related to this issue would be significant if implementing an alternative would conflict with any applicable land use plan or policy adopted for the purpose of avoiding or mitigating environmental impacts.

Such a conflict is site specific and is addressed on a project-by-project basis. Land use inconsistency by itself is not considered a significant cumulative impact because it involves land use regulations, not physical environmental impacts. However, inconsistency of an alternative with plans and policies adopted for the purpose of avoiding or mitigating environmental impacts can lead to direct and indirect physical environmental impacts.

Implementing any of the action alternatives would result in significant impacts through conflict with Fresno County and Madera County general plan documents and BLM RMP, including the proposed Wild and Scenic River designation. Depending on the timing of designation with respect to construction of Temperance Flat RM 274 Dam and Reservoir, the action alternatives would either inundate the designated section, or remove the river's eligibility for designation. According to the National Wild and Scenic Rivers System, "as of April 2012, the National System protects 12,598 miles of 203 rivers in 39 states and the Commonwealth of Puerto Rico; this is a little more than one-quarter of one percent of the nation's rivers. By comparison, more than 75,000 large dams across the country have modified at least 600,000 miles, or about 17 percent, of American rivers" (Wild and Scenic Rivers System 2014). Temperance Flat RM 274 Dam and Reservoir would result in less than a 1 percent increase to this total, and would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact** through conflict with local and regional plans and policies.

Extended Study Area

The geographic area being considered in the cumulative impacts analysis of the extended study area is the San Joaquin River and bypass systems extending from Friant Dam to the Delta, Delta waterways, and associated riparian and wetland habitats. The geographic area is limited to riverine, riparian, and wetland habitats because the discharge of water resulting from implementing any of the action alternatives would remain within the current channel capacity of the San Joaquin River, bypass channels, and Delta waterways. Implementing any of the action alternatives would have virtually no impact on land uses, cropping patterns, or botanical or wetland resources in the CVP and SWP water service areas. Therefore, these areas are not included in the geographic extent of this cumulative impacts analysis. Implementing any of the action alternatives would have no impact on wetlands or waters of the United States located in the extended study area, and would not

conflict with local policies or with adopted HCPs. Therefore, consistency with applicable plans or policies is not evaluated further in the cumulative impacts analysis of the extended study area.

Reasonably foreseeable future projects in the extended study area with the potential to affect botanical resources and wetlands include the Jensen River Ranch Habitat Enhancement, Lost Lake Park Master Plan, and San Joaquin River Parkway Plan, which could all contribute to improved riparian habitat in the San Joaquin River between Friant Dam and the Merced River. In the Delta, several programs include direct tidal and marsh habitat restoration (e.g., Suisun Marsh, Dutch Slough, and Franks Tract), which could also benefit riparian species in the area.

The following describes potential cumulative effects to the identified project-related impacts in the extended study area.

Impact BOT-1: Loss of Special-Status Plants and Loss or Degradation of Special-Status Plant Habitat

Within the extended study area, implementing any of the action alternatives would result in minor, less-than-significant impacts on special-status plants, because water deliveries would remain within the current normal range of variation and would not result in hydrological changes that could lead to plant mortality, conversion of habitat, or substantial changes in natural community composition or extent.

The relatively minor changes to San Joaquin River instream flows associated with implementing any of the action alternatives would not result in a cumulatively considerable incremental contribution to existing significant cumulative impacts in the extended study area on special-status plants because instream flow changes would remain within the existing channel capacity of the San Joaquin River, bypass channels, and Delta waterways and would not make a cumulatively considerable incremental contribution to significant cumulative impacts related to special-status plant species in the extended study area.

Impact BOT-2: Loss of Riparian Habitat and Other Sensitive Communities

Within the extended study area, implementing any of the action alternatives would result in minor, less-than-significant impacts on riparian habitats because water deliveries would remain within the current normal range of variation and would not

result in hydrological changes that could lead to conversion of habitat.

The relatively minor changes to San Joaquin River instream flows associated with implementing any of the action alternatives would not result in a cumulatively considerable incremental contribution to existing significant cumulative impacts on extended study area riparian habitats, wetlands, and other sensitive communities because instream flow changes would remain within the existing channel capacity of the San Joaquin River, bypass channels, and Delta waterways and would not make a cumulatively considerable incremental contribution to significant cumulative impacts related to riparian habitats, wetlands, and other sensitive communities in the extended study area.

Impact BOT-4: Introduction and Spread of Invasive Plants
Within the extended study area, implementing any of the action alternatives would result in minor, less-than-significant impacts on introduction and spread of invasive plants because water deliveries would remain within the current normal range of variation and would not result in hydrological changes that could lead to increased spread of invasive plant species. The relatively minor changes to San Joaquin River instream flows associated with implementing any of the action alternatives would therefore not result in a cumulatively considerable incremental contribution to existing significant cumulative impacts involving the introduction or spread of invasive plants.

Biological Resources – Wildlife

Actions of past and present projects that have resulted in loss and degradation of wildlife habitats in the Study Area include the following:

- Population growth and associated development of socioeconomic resources and infrastructure both in the Sierra foothills and the Central Valley
- Conversion of natural vegetation to agricultural and developed land uses
- Introduction of nonnative plant and animal species
- Resource extraction (e.g., gravel mining, gold mining, and timber harvesting)

- CVP and SWP operations and local water development actions

- PG&E and Southern California Edison hydroelectric projects

Past and present actions by humans have substantially altered wildlife habitat in the central Sierra Nevada foothill region compared to historical conditions. These changes include the conversion of natural vegetation to agricultural and developed land uses; hydroelectric power development; and water resource development actions, particularly the construction and operation of Friant Dam and other water storage and hydroelectric dams. In the extended study area, substantial alteration of suitable wildlife habitat has resulted from habitat fragmentation by development, agricultural conversion, and barriers to dispersal corridors such as highways. These past and present actions have resulted in significant adverse impacts on the extent, suitability, and connectivity of wildlife habitat. The degraded nature of the remaining habitat affects the ability of the remaining habitat to support native wildlife species.

As discussed in Chapter 7, “Biological Resources – Wildlife,” and shown in Table 27-5, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas.

Table 27-5. Direct, Indirect, and Cumulative Impacts to Biological Resources – Wildlife

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
WLD-1: Substantial Impact on Special-Status Invertebrates	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-2: Substantial Impact on Special-Status Amphibians and Reptiles	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-3: Substantial Impact on Special-Status Raptors	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
WLD-4: Substantial Impact on Special-Status Passerines or Birds Protected by the Migratory Bird Treaty Act	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-5: Substantial Impact on Ringtail	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-6: Substantial Impact on American Badger	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-7: Substantial Impact on San Joaquin Pocket Mouse	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-8: Substantial Impact on Special-Status Bat Species	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC

Table 27-5. Direct, Indirect, and Cumulative Impacts to Biological Resources – Wildlife (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
WLD-9: Substantial Impact on Migratory and Wintering Deer Herds	Primary Study Area	All	LTS	CU
	Extended Study Area	All	NI	NC
WLD-10: Potential Conflict with Fresno County and Madera County General Plan Objectives and Guidelines	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
WLD-11: Potential Reduction in Habitat or Populations of Special-Status Invertebrates	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
WLD-12: Potential Reduction in Habitat or Populations - of Special Status Amphibians and Reptiles	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
WLD-13: Potential Reduction in Habitat or Populations of Special-Status Bird Species	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
WLD-14: Potential Reduction in Habitat or Populations of Special-Status Mammal Species	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
WLD-15: Potential Interference with Migratory Corridors or Nursery Sites	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
WLD-16: Potential Impact on Riparian Habitat for Special-Status Bird Species	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC

Table 27-5. Direct, Indirect, and Cumulative Impacts to Biological Resources – Wildlife (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
WLD-17: Conflict with Local or Regional Policies Protecting Wildlife Resources	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
WLD-18: Potential Conflict with Adopted Conservation Plans	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

A number of reasonably foreseeable probable future projects in the vicinity of the primary study area have the potential to affect wildlife resources that also may be affected by implementing any of the action alternatives. Examples of these projects include development projects (e.g., Brighton Crest, Gunner Ranch West Specific Plan, Ventana Hills Estates Annexation) and hydroelectric projects (e.g., PG&E Kerckhoff Licensing, Big Creek Facilities FERC Relicensing). In addition, buildout of the Fresno County and Madera County general plans would result in additional losses of natural habitat. Throughout the central Sierra Nevada foothill region, conversion, fragmentation, and alteration of native wildlife habitat could occur because of additional agricultural and urban development.

Most projects that could result in significant impacts on wildlife species or their habitat in the central Sierra Nevada foothill region will be required to identify and provide mitigation in compliance with the Federal ESA and CESA; CEQA; the California Fish and Game Code; and other local, State, and Federal statutes. However, compliance with regulatory requirements and implementation of mitigation would still result in a decline in the extent and quality of natural habitats in the region. Therefore, continued net loss of wildlife habitats is expected throughout the region.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impacts WLD-1 Through WLD-9: Substantial Impact on Wildlife Species

Implementing any of the action alternatives would result in a substantial loss of habitat that supports a variety of wildlife species including special-status species such as bald eagle, golden eagle, and special-status bat species. Impacts on these habitats cannot be fully mitigated because of the overall net loss of habitat that would result from the construction and operation of the project. Continued development in the region will result in the incremental decline in the amount of habitat remaining to support special-status wildlife species. Because development in the primary study area would contribute to this ongoing decline, it would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact**.

Impact WLD-10: Potential Conflict with Fresno County and Madera County General Plan Objectives and Guidelines

The Fresno County and Madera County general plans have an objective to protect natural communities within their boundaries. Implementing any of the action alternatives would result in significant impacts on natural upland and wetland communities that provide habitat for wildlife species that are included in the general plans. Continued development in the region will result in the incremental decline in the amount of habitat remaining to support special-status wildlife species. Because development in the primary study area would contribute to this ongoing decline and would be in conflict with the Fresno County and Madera County general plans, it would result in a **cumulatively considerable incremental contribution to the overall significant cumulative impact**.

Extended Study Area

The geographic area considered in the cumulative impacts analysis for the extended study area is the San Joaquin River and bypass systems extending from Friant Dam to the Delta. Implementing any of the action alternatives would have no impact on land uses or wildlife habitat in the CVP and SWP water service areas. Therefore, these areas are not included in the geographic extent of this cumulative impact analysis. The cumulative impact analysis in the extended study area is limited to riverine, riparian, and wetland habitats within the existing channel of the San Joaquin River because the flow alterations resulting from implementing any of the action

alternatives would remain within the current channel capacity of the San Joaquin River, bypass channels, and Delta waterways.

Reasonably foreseeable future projects in the extended study area with the potential to affect wildlife resources include the Central Valley Joint Venture, and Riparian Habitat Joint Venture, which could contribute to improved riparian habitat in the extended study area.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impacts WLD-11 Through WLD-16: Potential Impact on Wildlife Habitat

Within the extended study area, implementing any of the action alternatives would result in potential impacts on existing habitats, especially riparian habitats, within the area where water deliveries would take place. Water volume and delivery schedules may be altered from their current levels. However, water volumes will continue to be within the range of natural variation and timing for these systems. Therefore, these potential impacts would be less than significant on special-status wildlife and their habitat because water deliveries would remain within the current channel capacity of the San Joaquin River, bypass channels, and Delta waterways and would not result in hydrological changes that could lead to conversion of existing wildlife habitat, or result in substantial changes in natural community composition or extent that would affect the ability of the extended study area to support wildlife species.

The relatively minor changes to flows associated with implementing any of the action alternatives would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on riparian habitats, wetlands, and other sensitive communities, or on special-status plants in the extended study area because any changes would remain within the range of normal flow variability under existing conditions and would not make a cumulatively considerable incremental contribution to significant cumulative impacts to existing habitats or significant adverse impacts on special-status plant species.

Climate Change

Please refer to the Air Quality and Greenhouse Gas Emissions section of this chapter, Impact AIR-4, for a discussion of the cumulative impact associated with generation of GHG emissions.

Cultural Resources

Actions of past and present projects that may have resulted in cumulative impacts to cultural resources in the primary and extended study areas include the following:

- Construction and operations of Friant Dam and Millerton Lake
- Development of infrastructure
- Residential, commercial, and industrial development
- Resource extraction (including gold and gravel mining)

Past and present actions by humans have adversely affected cultural resources throughout the Study Area through disturbance and destruction of these resources.

As discussed in Chapter 9, “Cultural Resources,” and shown in Table 27-6, the action alternatives could result in direct and/or indirect impacts in the primary study area. As no construction activities or changes in the landscape would occur in extended study area under the action alternatives, this geographic area is not considered further in this analysis.

Table 27-6. Direct, Indirect, and Cumulative Impacts to Cultural Resources

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
CUL-1: Disturbance or Destruction of Known or Previously Undiscovered Prehistoric Resources Due to Construction, Inundation, and Project Operation	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
CUL-2: Disturbance or Destruction of Known or Previously Undiscovered Historic-Era Resources Due to Construction, Inundation, and Project Operation	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
CUL-3: Construction and Management of Project Components That would Cause a Substantial Adverse Change in the Significance of a Historical and/or Unique Archaeological Resource, Historic Property, or Historic District	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
CUL-4 Destruction or Damage to Traditional Cultural Properties	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
CUL-5 Destruction or Damage to Indian Sacred Sites	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
CU = considerable and unavoidable contribution
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

A number of reasonably foreseeable future projects that would be located in the vicinity of the primary study area have the potential to affect cultural resources that also may be affected by implementing any of the action alternatives. Examples of these projects include development projects, such as the Brighton Crest/Eagle Springs Golf Course and Country Club and the Millerton New Town Specific Plan, as well as local plans, such as the BLM Bakersfield Proposed RMP, the Business Plan for the SJRG SRMA, and the Millerton Lake RMP/General Plan. Most projects that could result in

significant impacts on cultural resources in the primary study area will be required to identify and provide mitigation in compliance with NEPA, CEQA, and other local, State, and Federal statutes. Despite compliance with regulatory requirements and implementation of mitigation, these projects could still result in impacts to cultural resources in the region.

The following describes potential cumulative effects to the identified project-related impacts to cultural resources in the primary study area.

Impact CUL-1: Disturbance or Destruction of Known or Previously Undiscovered Prehistoric Resources Due to Construction, Inundation, and Project Operation

Within the primary study area, past projects have resulted in an overall significant cumulative impact on prehistoric resources in the primary study area. Various reasonably foreseeable future projects would also involve construction activities or changes in the landscape near the primary study area, and have the potential to adversely impact other cultural resources and contribute to this overall impact.

Surveys of the Millerton Lake State Recreational Area have identified 19 sites that lie below the 578-foot maximum water level and above a 500-foot low water level (e.g., Theodoratus and Crain 1962). These are all prehistoric sites, including 13 bedrock milling sites, four residential sites, and one lithic scatter. Additionally, two large prehistoric residential sites were recorded by Hewes in the 1930s and are fully inundated by Millerton Lake. These seasonally inundated sites may become more regularly inundated with an increase in the carryover pool and increase in the elevation of the low water level. As such, implementation of the action alternatives would contribute to the continued inundation of these sites.

No feasible mitigation is available to reduce the severity of Impact CUL-1; therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on known or previously undiscovered prehistoric resources in the primary study area.

Impact CUL-2: Disturbance or Destruction of Known or Previously Undiscovered Historic-Era Resources Due to Construction, Inundation, and Project Operation

Within the primary study area, past projects have resulted in an overall significant cumulative impact on historic resources in

the primary study area. Construction and operation of any of the action alternatives would also cause significant and unavoidable impacts on known or previously undiscovered historic-era resources.

The survey of known historic-era archaeological resources categorizes the resources as sites, multi-component sites, and structures. Known historic-era sites comprise 8 percent of the survey sample of total archaeological resources, and include two mining sites, one location with two ore crushers, and a series of rock cairns, some of which are located outside of the primary study area. None of these previously recorded historic-era sites has intact standing structures.

When filled, the reservoir fluctuation zone of Temperance Flat RM 274 Reservoir would be subject to the erosive processes of periodic fluctuations in water level. The action alternatives would not change the size of Millerton Lake, but would increase the carryover pool and hence increase the elevation of the low water level. Operation and maintenance of Temperance Flat RM 274 Dam and Reservoir could damage or destroy known and previously undiscovered historic-era cultural resources through exposure in the fluctuation zone, through increased recreational access through new recreation facilities, roads, utilities, trails, etc., and increased recreational access to resources in the fluctuation zone.

No feasible mitigation is available to reduce the severity of Impact CUL-2; therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on known or previously undiscovered historic-era resources in the primary study area.

Impact CUL-3: Construction and Management of Project Components That would Cause a Substantial Adverse Change in the Significance of a Historical and/or Unique Archaeological Resource, Historic Property, or Historic District

Within the primary study area, past projects have contributed to a historical trend in the loss of archeological and historic resources as artifacts of cultural significance and as objects of research importance; therefore, there is an overall significant cumulative impact on cultural resources within the primary study area. Various reasonably foreseeable future projects would involve construction activities or changes in the landscape near the primary study area, and have the potential to

further adversely impact historical and/or unique archaeological resources and contribute to this overall significant cumulative impact.

Construction and operation of any of the action alternatives would cause significant and unavoidable impacts on significance of a historical and/or unique archaeological resource, or historic property or historic district. No feasible mitigation is available to reduce the severity of Impact CUL-3; therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on historical and/or archaeological resources in the primary study area.

Impact CUL-4: Destruction or Damage to Traditional Cultural Properties

Within the primary study area, past projects have resulted in an overall significant cumulative impact on traditional cultural properties in the primary study area. Various reasonably foreseeable future projects would also involve construction activities or changes in the landscape near the primary study area, and have the potential to further adversely impact traditional cultural properties in or near the primary study area.

The records search at the Information Center revealed that no Traditional Cultural Properties have been formally recorded in the primary study area, however, there is a possibility that Traditional Cultural Properties exist within the primary study area. Should Congress authorize and fund the Investigation, additional information about Traditional Cultural Properties in the primary study area will be sought by Reclamation.

Construction and operation of any of the action alternatives would cause additional significant and unavoidable impacts on Traditional Cultural Properties. No feasible mitigation is available to reduce the severity of Impact CUL-4; therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on traditional cultural properties in the primary study area.

Impact CUL-5: Destruction or Damage to Indian Sacred Sites

Within the primary study area, past projects have resulted in an overall significant cumulative impact on Indian sacred sites in the primary study area. Various reasonably foreseeable future projects would also involve construction activities or changes

in the landscape near the primary study area, and have the potential to further adversely impact sacred sites in or near the primary study area.

The records search for sacred areas by the Sacred Lands files of the California Native American Heritage Commission has identified sacred lands within the study area. Their locations are confidential.

Construction and operation of any of the action alternatives would cause additional significant and unavoidable impacts on Indian sacred sites. No feasible mitigation is available to reduce the severity of Impact CUL-5; therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on sacred sites in the primary study area.

Extended Study Area

The action alternatives would not result in any impacts related to cultural resources in the extended study area. Therefore, none of these action alternatives would make a cumulatively considerable incremental contribution to a cumulative impact associated with existing or reasonably foreseeable projects in the extended study area.

Environmental Justice

Actions of past and present projects have resulted in disproportionately high and adverse effects on minority and low-income populations in the primary and extended study areas. These past and present projects are described for each resource topic area throughout this chapter and include conversion of open space and agricultural land to developed land uses; hydroelectric power development; and water development actions, particularly the construction and operation of Friant Dam, Millerton Lake, and Kerckhoff Dam and Reservoir.

A CEVA was prepared for the eight counties that comprise the San Joaquin Valley. The CEVA considers the combined past and present single, multiple, routine, and accidental release of hazardous materials and air quality emissions and produces spatial analysis that identifies the places that are subject to both the highest concentrations of cumulative environmental hazards and the fewest social and economic resources to prevent, reduce, or adapt to these conditions. The CEVA

determined that substantial overlap between environmental hazards and social vulnerability occurs in many rural areas throughout the San Joaquin Valley where minority and low-income communities reside in the vicinity of agricultural fields, regional transportation corridors, and non-agricultural industries such as power plants and waste disposal facilities (Ganlin and London 2012).

As discussed in Chapter 10, "Environmental Justice," and shown in Table 27-7, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas.

Table 27-7. Direct, Indirect, and Cumulative Impacts to Environmental Justice

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation	Contribution to Overall Cumulative Impact
ENJ-1: Disproportionately High and Adverse Impacts on Minority and Low Income Populations	Primary Study Area	All	DHA	CU
	Extended Study Area	All	NDHA	NC

Key:
CU = considerable and unavoidable contribution
DHA = disproportionately high and adverse
NC = no contribution
NDHA = not disproportionately high and adverse

Primary Study Area

Reasonably foreseeable future projects in the primary study area that could affect low-income or minority populations are described for each resource topic area throughout this chapter. Future implementation of planned and approved development in Fresno and Madera counties would result in temporary construction-related impacts and long-term operational impacts in Fresno and Madera counties. Within the primary study area, the Millerton New Town Specific Plan, the Brighton Crest subdivision, and the Ventana Hills Estates Annexation involve constructing residential and commercial land development. Other large-scale planned and approved developments in Fresno and Madera counties include the Friant Ranch Specific Plan, in Fresno County, and the Gunner Ranch West Area Plan, Gateway Village, and Rio Mesa Plan Area in Madera County. Additional infill development and urban development would occur in accordance with the Fresno and Madera county general plans and other applicable city general plans within those counties.

The following describes potential cumulative effects to the identified project-related impacts associated with environmental justice in the primary study area.

Impact ENJ-1: Disproportionately High and Adverse Impacts on Minority and Low-Income Populations

As discussed in Chapter 10, "Environmental Justice," the environmental justice population was determined to be in areas that could be subject to construction- or operation-related impacts associated with implementing any of the action alternatives, including Census Tract 64.05, Census Tract 1.02, and the Auberry CDP in the primary study area. Potentially affected areas outside of the primary study area, consisting of Census Tract 55.15, Census Tract 55.25, Census Tract 10, the Friant CDP, and the Fresno CCD, were also analyzed. Finally, the nearby cities of Clovis, Fresno, and Madera, and the entire Fresno and Madera county areas, were also evaluated.

Implementing any of the action alternatives could cause disproportionately high and adverse impacts on minority and low-income populations because the population percentages of American Indian in the primary study area is meaningfully greater than for the State, the Hispanic population in areas adjacent to the primary study area is greater than 50 percent of the total population and the State as a whole, and there are clusters of low-income populations within this area.

To determine whether the impact on the minority or low-income population would be disproportionately high and adverse, this cumulative impact analysis considers cumulative impacts associated with implementing any of the action alternatives on each resource topic area. If an impact remains cumulatively significant after all mitigation is implemented, then the impact is included in the environmental justice analysis, and the equity of the impact across the affected population is determined. For cumulative impacts determined to be less than significant or less than significant with implementation of mitigation, no additional evaluation is needed because those effects would not result in disproportionate effects on minority and low-income populations.

Cumulative impacts on botanical and terrestrial biological resources, geology and soils, and surface water quality, by themselves, would not result in effects on environmental justice populations. Cumulative impacts associated with air quality and GHG emissions, noise and vibration, power and

energy, and visual resources would affect the populations of the primary study area equally regardless of race, ethnicity, or income level, and would not cause disproportionately high and adverse impacts on minority or low-income populations in the primary study area. Therefore, the direct cumulative effects associated with the conversion of agricultural land would not result in a cumulatively significant incremental contribution to significant and unavoidable cumulative environmental justice effects on minority and low-income populations.

Conversion of farmland to nonagricultural uses would not directly affect minority populations. Rather, the loss of agricultural land from this conversion would indirectly result in the loss of jobs and personal income. As discussed below in "Land Use Planning and Agricultural Resources," it is assumed that reasonably foreseeable probable future projects in Fresno and Madera counties would develop and adopt mitigation to minimize the significance of the impacts on agricultural resources to the extent feasible. In addition, the effect of losses in agricultural production in Fresno and Madera counties would be attenuated by increases in water supply reliability for agricultural water users as a result of implementing any of the action alternatives. Nonetheless, it may not be feasible to fully mitigate all impacts on agricultural resources from numerous projects and it is unlikely that a similar amount of land in the region with similar qualities and productivity could be brought into production to mitigate the effects resulting from the cumulative loss of agricultural land. Employment groups sustaining the greatest effects would include on-site farmworkers, and losses of jobs and income for businesses that support the agricultural industry, including farm and equipment-supply stores and those that earn their income by selling, transporting, storing, marketing, and processing agricultural products, would occur. The effects would occur on the population at large and cannot be reduced to discrete effects for any particular segment of the population, but it is likely that minority and low-income populations would experience the loss of jobs and personal income. Implementing any of the action alternatives in combination with other past, present, or reasonably foreseeable future projects would indirectly result in cumulatively considerable impacts that would be disproportionately high and adverse on minority or low-income populations.

Documented prehistoric and sacred areas are located in the primary study area, and undocumented prehistoric sites, traditional cultural properties, and sacred areas or sacred sites

may also be present in the primary study area. Reclamation would follow the process in the implementing regulations at 36 CFR Part 800 to identify historic properties (including traditional cultural properties, sacred sites, and sacred areas, as appropriate), assess effects, and resolve adverse effects through the consultation process. Consulting parties for the National Historic Preservation Act Section 106 process would include the SHPO, the Advisory Council on Historic Preservation (if it chooses to participate), other Federal agencies where applicable, tribal representatives, and other interested parties (including non-Federally recognized Native Americans, members of the public, and other State or local agencies) to develop methods to avoid, minimize, and mitigate adverse effects. It is assumed that other reasonably foreseeable future projects would comply with applicable Federal and State regulations and implement mitigation measures to reduce the effects of future projects on documented and undocumented prehistoric sites, traditional cultural properties, and sacred areas or sites. However, destruction or damage to prehistoric sites, traditional cultural properties, or Indian sacred sites could occur and implementing any of the action alternatives in combination with other past, present, or reasonably foreseeable future projects would result in cumulatively considerable impacts that would be disproportionately high and adverse on Native American populations.

In summary, implementing any of the action alternatives in combination with other past, present, or reasonably foreseeable future projects would result in **cumulatively considerable incremental contributions to overall significant cumulative impacts** associated with the conversion of agricultural land and destruction or damage to traditional cultural properties or Indian sacred sites. These significant cumulative impacts would be disproportionately high and adverse on minority or low-income populations.

Extended Study Area

Reasonably foreseeable future projects in the extended study area that could affect low-income or minority populations are described for each resource topic area throughout this chapter. Examples of reasonably foreseeable future activities in the extended study area include planned development in city and county general plans; construction of levee improvement and flood control projects, including those proposed in the Central Valley Flood Protection Plan; construction of pipelines, including those proposed in the BDCP; reservoir enlargements, such as the Los Vaqueros Reservoir Expansion Project and

SLWRI; habitat restoration projects, such as those included in the BDCP and SJRRP; and changes to the San Joaquin River instream flows from implementation of the SJRRP.

Impact ENJ-1: Disproportionately High and Adverse Impacts on Minority and Low-Income Populations

As discussed in this chapter, none of the action alternatives would make a cumulatively considerable incremental contribution to significant cumulative impacts in the CVP and SWP water service areas that could cause disproportionately high and adverse impacts on minority and low-income populations. Implementing any of the action alternatives in combination with other past, present, or reasonably foreseeable future projects would not result in cumulatively considerable impacts that would be disproportionately high and adverse on minority or low-income populations.

Geology and Soils

Actions of past and present projects that have resulted in cumulative impacts to geology and soils in the primary and extended study areas include:

- Construction and operations of Friant Dam and Millerton Lake, and Kerckhoff Dam and Reservoir
- Resource extraction (including gold and gravel mining)
- Construction and operations of flood management facilities, including the Chowchilla, Eastside, and Mariposa bypasses and associated diversion and drop structures
- Construction and operations of water supply delivery infrastructure, including Mendota Dam and Pool, Sack Dam, and Arroyo Canal
- Changes in flow regimes under the SJRRP

Past and present projects have substantially altered geology and soils throughout the study area compared to historical conditions. These changes include overall significant cumulative impacts on the geomorphology and hydrology of aquatic habitats and on soil erosion and loss of topsoil due to construction and operations within the primary study area.

As discussed in Chapter 11, "Geology and Soils," and shown in Table 27-8, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas.

Table 27-8. Direct, Indirect, and Cumulative Impacts to Geology and Soils

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
GEO-1: Exposure of Structures and People to Geologic Hazards Resulting from Seismic Conditions and Slope Instability	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
GEO-2: Alteration of Fluvial Geomorphology that would Adversely Affect Aquatic Habitat	Primary Study Area	All	PSU	CU
	Extended Study Area	All	LTS	NC
GEO-3: Loss or Diminished Availability of Known Mineral Resources that Would Be of Future Value to the Region or the State	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
GEO-4: Substantial Soil Erosion or Loss of Topsoil Due to Construction and Operations	Primary Study Area	All	PSU	CU
	Extended Study Area	All	LTS	NC

Table 27-8. Direct, Indirect, and Cumulative Impacts to Geology and Soils (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
GEO-5: Failure of Septic Tanks or Alternative Wastewater Disposal Systems Due to Soils that Are Unsuited to Land Application of Waste	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
PSU = potentially significant impact

Primary Study Area

Reasonably foreseeable future projects in the vicinity of the primary study area with the potential to affect geology and soils include development projects such as Brighton Crest, Gunner Ranch West Specific Plan, and Ventana Hills Estates Annexation. Projects that could result in significant impacts on geology and soils in the primary study area would be required to identify and provide mitigation in compliance with NEPA, CEQA, and/or other local, State, and Federal statutes. Despite compliance with regulatory requirements and implementation of mitigation, these projects could still result in impacts to geology and soils in the region, including temporary (construction-related) and long-term effects related to geologic hazards, use of mineral resources, soil erosion or loss of topsoil, and wastewater disposal systems.

The following describes potential cumulative effects to the identified project-related impacts to geology and soils in the primary study area.

Impact GEO-1: Exposure of Structures and People to Geologic Hazards Resulting from Seismic Conditions and Slope Instability

Past, present, and reasonably foreseeable projects have not contributed to the significant exposure of structures and people to geologic hazards resulting from seismic conditions or slope instability, and therefore, there is not currently a significant cumulative impact. Past and anticipated future development

within the primary study area could expose structures to groundshaking. Construction of Temperance Flat RM 274 could increase this risk through RTS, however the seismic risk of the region is low, and implementation of the Seismic Action Plan under Mitigation Measure GEO-1 would further minimize risk of RTS. The action alternatives would have less-than-significant impacts (after mitigation) to local structures and people in the primary study area related to exposure of structures and people to geologic hazards resulting from seismic conditions and slope instability, and future development in the vicinity would not increase this risk. Therefore, this impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to exposure of structures and people to geologic hazards resulting from seismic conditions and slope instability in the primary study area.

Impact GEO-2: Alteration of Fluvial Geomorphology that would Adversely Affect Aquatic Habitat

Within the primary study area, past projects have resulted in a significant and substantial overall significant cumulative impact on the geomorphology and hydrology of aquatic habitats in the San Joaquin River between Friant Dam and Kerckhoff Dam. Construction and operation of any of the action alternatives would cause additional significant and unavoidable impacts on the geomorphology and hydrology of aquatic habitats, due to the complete or near-complete inundation of the San Joaquin River in this reach. No feasible mitigation is available to reduce the severity of Impact GEO-2; therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on geomorphology of aquatic habitat in the primary study area.

Impact GEO-3: Loss or Diminished Availability of Known Mineral Resources that Would Be of Future Value to the Region or the State

The action alternatives would have less-than-significant impacts to local mineral resources in the primary study area. It is unlikely that any impacted mineral resources would be used in the future for any local or regional needs, including anticipated future developments, which would rely on other established quarries. Aggregate and embankment/fill materials that would be mined within the primary study area under the action alternatives are not currently mapped or used, while gold mine sites that would be inundated have little or no activity.

These resources are likely to be of little value to the region or State. Therefore, this impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to the diminished availability of known mineral resources in the primary study area.

Impact GEO-4: Substantial Soil Erosion or Loss of Topsoil Due to Construction and Operations

Past, present, and reasonably foreseeable projects have or would require excavation, grading and other construction operations. Slope and soil disturbance could under these projects often result in soil erosion and loss of topsoil. Despite compliance with regulatory requirements and implementation of mitigation, these projects could still result in some erosion and loss of topsoil. The action alternatives would have additional significant and unavoidable impacts in the primary study area related to soil erosion or loss of topsoil. All feasible avoidance and minimization measures have been included in the project commitments, but would not reduce this impact below the level of significance. Mitigation for this impact is not proposed because no feasible mitigation is available to reduce the impact to a less-than-significant level. Therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** related to soil erosion in the primary study area.

Impact GEO-5: Failure of Septic Tanks or Alternative Wastewater Disposal Systems Due to Soils that Are Unsuited to Land Application of Waste

Within the primary study area, current activities and facilities including recreational facilities use wastewater facilities permitted by Fresno and Madera counties (as applicable), and have not combined to create a significant cumulative impact. Future projects, including development in the vicinity of the primary study area, if using septic tanks or alternative wastewater disposal systems, would be designed and constructed to satisfy the conditions of sewage disposal permits issued by Fresno County or Madera County, as applicable. The action alternatives would have less-than-significant impacts in the primary study area related to failure of septic tanks or alternative wastewater disposal systems, but these impacts would not overlap those areas affected by past, present, or future projects.. Therefore, this impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative

impacts related to failure of septic tanks or alternative wastewater disposal systems in the primary study area.

Extended Study Area

Reasonably foreseeable future projects in the extended study area with the potential to affect geology and soils include recreation and habitat enhancement or management projects (e.g., SJRRP, Jensen River Ranch Habitat Enhancement and Public Access Project, Lost Lake Park Master Plan, San Joaquin River Parkway Plan, SJRRP, BDCP and other projects throughout the Delta) and water management projects (e.g., SJRRP). Projects that could result in significant impacts on geology and soils in the extended study area would be required to identify and provide mitigation in compliance with NEPA, CEQA, and/or other local, State, and Federal statutes. Despite compliance with regulatory requirements and implementation of mitigation, these projects could still result in impacts to geology and soils in the region, including temporary (construction-related) and long-term effects related to alteration of fluvial geomorphology, use of mineral resources, and soil erosion or loss of topsoil.

Impact GEO-2: Alteration of Fluvial Geomorphology that would Adversely Affect Aquatic Habitat

Past projects in the extended study area from Friant Dam to the confluence of the Merced River have resulted in overall significant cumulative impacts on the on geomorphology of aquatic habitat. Current and future modifications to the channel under the SJRRP are anticipated to have beneficial effects on the geomorphology of aquatic habitat. Construction and operation of any action alternative would affect the flow regime in this portion of the extended study area, and could potentially change downstream stream erosion and geomorphologic characteristics. However, it is expected that the frequency, volume, and duration of high-flow events resulting from this action would be reduced as compared to existing conditions with current operations. Therefore, downstream erosion would not be anticipated to increase. This less-than-significant impact would, therefore, not cause a cumulatively considerable incremental contribution to the overall significant cumulative impacts on the on geomorphology of aquatic habitat in the extended study area.

Impact GEO-3: Loss or Diminished Availability of Known Mineral Resources that Would Be of Future Value to the Region or the State

In the extended study area from Friant Dam to the confluence of the Merced River, the action alternatives would have less-than-significant impacts on the diminished availability of known mineral resources. The impacts of past, present, and reasonably foreseeable projects in the extended study area have not caused significant cumulative impacts in the extended study area from Friant Dam to the confluence of the Merced River, and this project would not increase these impacts to a significant level. Therefore, this impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to the diminished availability of known mineral resources in the extended study area.

Impact GEO-4: Substantial Soil Erosion or Loss of Topsoil Due to Construction and Operations

In the extended study area from Friant Dam to the confluence of the Merced River, past projects have resulted in overall significant cumulative impacts on soil erosion. Construction and operation of any of the action alternatives would affect the flow regime in this portion of the extended study area, and could potentially change downstream stream erosion and geomorphologic characteristics. However, it is expected that the frequency, volume, and duration of high-flow events resulting from this action would be reduced, as compared to existing conditions with current operations. Therefore, net rates of downstream erosion and sedimentation would not increase. This less-than-significant impact would, therefore, not cause a cumulatively considerable incremental contribution to the overall significant cumulative impacts on soil erosion or loss of topsoil in the extended study area.

Hydrology – Flood Management

Actions of past and present projects that have resulted in cumulative impacts to flood management in the primary and extended study areas include:

- Construction and operations of Friant Dam and Millerton Lake, and Kerckhoff Dam and Reservoir
- Increased public access to the floodplain

- Recreational and private development around Millerton Lake
- Urban development and de-vegetation along the San Joaquin River and tributary rivers
- Construction and operations of flood management facilities (including the Chowchilla, Eastside, and Mariposa bypasses and associated diversion and drop structures)
- Construction and operations of water supply infrastructure (including Friant Dam, Millerton Lake, Mendota Dam and Pool, Sack Dam, and other dams and reservoirs; the DMC; Arroyo Canal; and other diversion facilities on the San Joaquin River and in the Delta)
- Regulatory flow objectives
- Changes in flow regimes under the SJRRP
- Conversion of natural vegetation to agricultural and developed land uses
- CVP and SWP operations and local water development actions

Past and present projects have substantially altered flood management throughout the study area compared to historical conditions. These projects have increased the number of people and structures exposed to flood risk in the extended study area and have resulted in increased runoff to Millerton Lake and the San Joaquin River. Within the primary study area, past recreational and private development around Millerton Lake has contributed to runoff into Millerton Lake. However the construction of flood management and water supply facilities have increased the ability to store and manage flood releases, reducing the overall frequency and volume of flood releases within the extended study area.

As discussed in Chapter 12, “Hydrology – Flood Management,” and shown in Table 27-9, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas. However, the action alternatives would not combine with past, present, or reasonably foreseeable future projects to cause overall significant cumulative impacts on flood management in the study areas.

Table 27-9. Direct, Indirect, and Cumulative Impacts to Hydrology – Flood Management

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
FLD-1: Exposure of People or Structures to a Significant Risk of Loss, Injury or Death Involving Flooding, Including Flooding as a Result of the Failure of a Levee or Dam	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS and Beneficial	NC
FLD-2: Substantially Alter the Existing Drainage Pattern of the Site or Area, Including through the Alteration of the Course of a Stream or River, or Substantially Increase the Rate or Amount of Surface Runoff in a Manner which would Result in Onsite or Offsite Flooding	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
FLD-3: Place Within a 100-Year Flood Hazard Area Structures which would Impede or Redirect Flood Flows	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

One reasonably foreseeable projects in the vicinity of the primary study area, the Millerton Lake State RMP and General Plan, may affect flood management by increasing runoff into Millerton Lake by increasing impervious areas or increasing the number of people and structures exposed to flood risk through construction of new facilities.

Impact FLD-1: Exposure of People or Structures to a Significant Risk of Loss, Injury, or Death Involving Flooding, Including Flooding as a Result of the Failure of a Levee or Dam

Within the primary study area, past projects have increased the exposure of people and structures to the risk of flooding as a result of dam failure. Reasonably foreseeable projects, including the Millerton Lake State RMP and General Plan, may develop new facilities around Millerton Lake, increasing the number of people and structures exposed to flood risk in the primary study area. However, Friant Dam is operated and maintained to minimize this risk, consistent with the *Report on*

Reservoir Regulation for Flood Control, Friant Dam and Millerton Lake, San Joaquin River, California (USACE 1980). Additionally, upstream facilities operated by PG&E and SCE provide significant storage during snowmelt and rainfall events (USACE 1955). Consequently, past, present, and reasonably foreseeable projects do not result in an overall significant cumulative impact that increases the exposure of people or structures to a significant risk of loss, injury, or death involving flooding in the primary study area.

Within the primary study area, the action alternatives would not expose people to a significant risk of loss, injury, or death as a result of flooding. The cofferdams and Temperance Flat RM 274 Dam would be constructed according to existing design standards and regulations. Therefore, this less-than-significant impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to exposure of people or structures to a significant risk of loss, injury, or death in the primary study area.

Impact FLD-2: Substantially Alter the Existing Drainage Pattern of the Site or Area, Including Through the Alteration of the Course of a Stream or River, or Substantially Increase the Rate or Amount of Surface Runoff in a Manner which would Result in Onsite or Offsite Flooding

Reasonably foreseeable projects, such as the Millerton Lake State RMP and General Plan, may increase runoff into Millerton Lake by increasing impervious areas. It is expected that development associated with the Millerton Lake State RMP and General Plan will use BMPs to minimize any increase in runoff into Millerton Lake (Reclamation and California Department of Parks and Recreation 2010). Consequently, past, present, and reasonably foreseeable projects do not result in an overall significant cumulative impact that substantially alters the existing drainage pattern of the area, or substantially increases the amount of surface runoff in a manner that would result in flooding in the primary study area.

The action alternatives would increase runoff to San Joaquin RM 274 from construction-related activities and from permanent structures near Temperance Flat RM 274 Reservoir. However, BMPs would be used throughout construction, and would be used to minimize runoff from permanent facilities. This impact would be localized, temporary, and less than

significant. Therefore, this impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to altering the existing drainage pattern in the primary study area.

Extended Study Area

Reasonably foreseeable future projects in the extended study area with the potential to affect flood management include the Jensen River Ranch Habitat Enhancement and Public Access Project, the Lost Lake Park Master Plan, the San Joaquin River Parkway Plan, the Fresno County General Plan, the Madera County General Plan, the City of Fresno General Plan, and the Folsom Dam Joint Federal Project. These projects would affect flood management by increasing the number of people or structures exposed to flood risk, and/or by increasing runoff. The modification of levees and flood management facilities under the SJRRP would directly affect flood management. Projects that could result in significant impacts on flood management in the extended study area would be required to identify and provide mitigation in compliance with NEPA, CEQA, and/or other local, State, and Federal statutes.

Impact FLD-1: Exposure of People or Structures to a Significant Risk of Loss, Injury, or Death Involving Flooding, Including Flooding as a Result of the Failure of a Levee or Dam

Within the extended study area, past, present, and reasonably foreseeable future projects would increase public access to the floodplain, increasing the number of people and structures exposed to flood risk in the extended study area. However, Friant Dam and levees along the San Joaquin River were designed and are operated and maintained to substantially reduce flood risk.

Under the SJRRP, drainage patterns downstream from Friant Dam will change. Construction of levees and berms in Reach 1 (to isolate gravel pits) or in Reaches 2B and 4B1 (to convey flows and provide floodplain habitat) could affect the existing drainage outside the main stem of the river by blocking channels, or by redirecting overland flows, creating interior drainage issues and potential ponding on the landward side of levees. Construction of additional hydraulic structures associated with SJRRP actions to reconfigure floodplains and modify diversion structures, roads, and a bridge also would impact internal drainage channels and facilities, and could create interior drainage, ponding, or other site-specific flooding

issues. These actions could include the installation of flap gates on new or modified levees, as well as realignment or modification of existing drainage channels. As these structures are further studied and designed in project-specific investigations, their impacts to interior drainage features would be further refined and actions would then be taken to avoid these impacts (SJRRP 2012). Consequently, past, present, and reasonably foreseeable projects do not result in an overall significant cumulative impact that increases the exposure of people or structures to a significant risk of loss, injury or death involving flooding in the extended study area.

The additional storage provided by Temperance Flat RM 274 Reservoir would reduce the magnitude and frequency of flood releases from Friant Dam and therefore lower the potential for loss, injury, or death involving flooding in the extended study area. This less-than-significant impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to exposure of people or structures to a significant risk of loss, injury, or death in the extended study area.

Impact FLD-2: Substantially Alter the Existing Drainage Pattern of the Site or Area, Including Through the Alteration of the Course of a Stream or River, or Substantially Increase the Rate or Amount of Surface Runoff in a Manner which would Result in Onsite or Offsite Flooding

Within the extended study area, urban development and de-vegetation along the San Joaquin River and tributary rivers has increased runoff to the San Joaquin River. However, this development has been accompanied by construction of flood control systems on the San Joaquin and Kings rivers that have reduced flooding. As levees are modified under the SJRRP, flood control will improve in the extended study area. Consequently, past, present, and reasonably foreseeable projects do not result in an overall significant cumulative impact that substantially alters the existing drainage pattern of the area, or substantially increases the amount of surface runoff in a manner that would result in flooding in the extended study area.

The action alternatives will not alter the course of the San Joaquin River or alter the rate or amount of surface runoff downstream from Friant Dam, and are expected to have only residual impacts in the extended study area, due to the use of

BMPs in the primary study area. This less-than-significant impact would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to altering the existing drainage pattern in the extended study area.

Hydrology – Groundwater

Actions of past and present projects that have resulted in cumulative impacts to groundwater in the primary and extended study areas include:

- Population growth and associated development of infrastructure both in the Sierra foothills and the Central Valley
- CVP and SWP operations and local water development actions
- Construction and operations of water supply delivery infrastructure (including Mendota Dam and Pool, Sack Dam, and Arroyo Canal)
- Changes in flow regimes under the SJRRP
- Agricultural practices (including the direct use of groundwater and application of pesticides, herbicides, and fertilizers)
- Conversion of natural vegetation to agricultural and developed land uses
- Implementation of conjunctive use projects and groundwater recharge programs (including conjunctive use within the Friant Division)

Past and present actions have led to the decline of groundwater levels throughout the extended study area. In some cases, groundwater pumping has led to upwelling of poor quality groundwater. Subsurface drainage problems extend along the western side of the San Joaquin River and Tulare Lake hydrologic regions from the Delta on the north to the Tehachapi Mountains south of Bakersfield. Few wells pump from this shallow depth to groundwater zone because of high salinity concentrations, present in part because of naturally

occurring soil conditions and because of the application of surface water imported from the Delta.

As discussed in Chapter 13, "Hydrology - Groundwater," and shown in Table 27-10, the action alternatives could result in direct and/or indirect impacts to groundwater levels and quality in the extended study area. In the primary study area, the action alternatives would not result in any impacts to groundwater.

Table 27-10. Direct, Indirect, and Cumulative Impacts to Hydrology – Groundwater

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
GRW-1: Change in Groundwater Levels	Primary Study Area	All	NI	NC
	Extended Study Area	Alternative Plans 1 and 5	LTS	CU
		Alternative Plans 2, 3, and 4	LTS and Beneficial	BC
GRW-2: Change in Groundwater Quality	Primary Study Area	All	NI	NC
	Extended Study Area	Alternative Plans 1 and 5	LTS	CU
		Alternative Plans 2, 3, and 4	LTS and Beneficial	BC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
BC = beneficial contribution
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

In the primary study area, the action alternatives would not result in any impacts to groundwater.

Extended Study Area

Several future reasonably foreseeable actions (e.g., groundwater recharge/banking projects, increased regulation of groundwater by the State, increased agricultural and municipal water supply demands) could affect groundwater pumping in the extended study area. These actions could cause both beneficial and adverse effects to groundwater resources. The following describes potential cumulative effects to the

identified project-related impacts to groundwater in the extended study area.

Impacts GRW-1 and GRW-2: Groundwater Impacts
Impacts GRW-1 and GRW-2 are linked in that increased pumping would both decrease groundwater levels and could degrade groundwater quality. Alternative Plans 1 and 5 could slightly increase reliance on groundwater pumping in the CVP SOD and SWP SOD water service areas, respectively, because of a small reduction in surface water deliveries relative to the No Action Alternative. The action alternatives would have either a less than significant (Alternative Plans 1 and 5) or beneficial (Alternative Plans 2 through 4) impact on groundwater resources. While the impact to groundwater use would be small under Alternative Plans 1 and 5 (the simulated reduction of 11 TAF/year would be less than 0.5 percent of the total deliveries to CVP SOD users), this impact would add to the existing and future demands on groundwater resources in the extended study area. No feasible mitigation is available to reduce the severity of this impact. Thus Alternative Plans 1 and 5 would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on groundwater in the extended study area.

Alternative Plans 2 through 4 would increase surface water deliveries to the extended study area, thereby reducing the need to pump groundwater. Thus Alternative Plans 2 through 4 would result in a **beneficial contribution to the overall significant cumulative impacts** on groundwater in the extended study area**.**

Hydrology – Surface Water Supplies and Facilities Operations

Actions of past and present projects that have resulted in cumulative impacts to surface water supplies and facilities operations in the primary and extended study areas include:

- Construction and operations of flood management facilities (including the Chowchilla, Eastside, and Mariposa bypasses and associated diversion and drop structures)

- Construction and operations of water supply infrastructure (including Friant Dam, Millerton Lake, Mendota Dam and Pool, Sack Dam, and other dams and

reservoirs; the DMC; Arroyo Canal; and other diversion facilities on the San Joaquin River and in the Delta)

- Regulatory flow objectives
- Changes in flow regimes under the SJRRP
- Conversion of natural vegetation to agricultural and developed land uses
- CVP and SWP operations and local water development actions

Past and present actions have substantially altered surface water facilities operations and constrained or enhanced the ability of water users to access available water supplies. Within the primary study area, construction of Friant Dam enabled more reliable access to San Joaquin River flows. Within the extended study area, Friant Dam, the DMC, Mendota Dam and Sack Dam increased access to supplies in this portion of the extended study area. Facilities downstream, including diversions along the San Joaquin River and within the Delta, dams and reservoirs on the Merced, Stanislaus, and Tuolumne rivers and other Delta tributaries, and Jones and Banks pumping plants, and the regulations that govern their operations have led to a highly managed system that attempts to balance ecosystem and water supply needs within the extended study area.

Table 27-11. Direct, Indirect, and Cumulative Impacts to Hydrology – Surface Water Supplies and Facilities Operations

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
SWS-1: Changes in Ability to Divert Water from Friant Dam	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
SWS-2: Changes in Ability to Divert Water from the San Joaquin River	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
SWS-3: Change in Water Levels in the Old River near the Tracy Road Bridge	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
SWS-4: Change in Water Levels in the Grant Line Canal Above the Grant Line Canal Barrier	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
SWS-5: Change in Water Levels in the Middle River near the Howard Road Bridge	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

In the primary study area, the action alternatives would not result in any impacts to surface water supplies or facilities operations.

Extended Study Area

Reasonably foreseeable probable future projects in the extended study area have the potential to affect surface water supplies and facilities operations in the extended study area. Examples of these projects include recreation and habitat enhancement or management projects (e.g., SJRRP, BDCP and

other projects throughout the Delta) and water management projects (e.g., SJRRP, North-of-Delta Offstream Storage Investigation, SLWRI, Freeport Regional Water Project, Delta Water Supply Project, DWR South Bay Aqueduct Improvement and Enlargement Program, North Bay Aqueduct Alternative Intake Project, East Bay Municipal Utility District Water Supply Management Program 2040, State Water Project Water Supply Contract Extension Program, State Water Project Water Settlement Agreement, IRWMPs in the Central Valley, and DMC Recirculation). Many of the projects in the extended study area are targeted at improving access to surface water supplies while minimizing adverse effects to biological resources, such as aquatic ecosystems in the San Joaquin River and the Delta. These projects could also affect Delta inflows and water levels. These changes in Delta conditions could lead to reoperation of CVP and SWP Delta export pumps, which would affect water levels in the south Delta. However, the overall cumulative impact of past projects and continued agricultural and urban development on water supplies and facilities operations is expected to remain significant as compared with historical conditions.

The following describes potential cumulative effects to the identified project-related impacts in the extended study area.

Impacts SWS-3 Through SWS-5: Changes in South Delta Water Levels

Several past, present, and reasonably foreseeable future projects have affected or will affect flows in the San Joaquin and Sacramento rivers, resulting in changing Delta conditions. Maximum decreases in south Delta water levels under the action alternatives would not adversely affect agricultural users' ability to divert irrigation water, and would therefore not cause a cumulatively considerable incremental contribution to a significant cumulative impact in the Delta.

Hydrology – Surface Water Quality

Actions of past and present projects that have resulted in cumulative impacts to surface water quality in the primary and extended study areas include:

- Construction and operation of Friant Dam, Millerton Lake, Kerckhoff Dam and Reservoir, and other dams and reservoirs

- Construction and operations of flood management facilities (including the Chowchilla, Eastside, and Mariposa bypasses and associated diversion and drop structures)
- Construction and operations of water supply delivery infrastructure (including Mendota Dam and Pool, Sack Dam, and Arroyo Canal)
- Changes in flow regimes under the SJRRP
- Agricultural practices (including the application of pesticides, herbicides, and fertilizers)
- Conversion of natural vegetation to agricultural and developed land uses
- Resource extraction (including gold and gravel mining)
- CVP and SWP operations and local water development actions

Past and present actions have substantially altered surface water quality throughout the study area compared to historical conditions. These changes include overall significant cumulative impacts on water temperatures and water quality (including turbidity and metals concentrations) in the primary study area, and overall significant cumulative impacts on sediment, water temperatures, and water quality in the extended study area. The development of housing and recreational resources have likely led to increased sediment loads and TDS within the San Joaquin River and Millerton Lake, but have not caused significant cumulative impacts related to sediment.

As discussed in Chapter 15, "Hydrology – Surface Water Quality," and shown in Table 27-12, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas.

Table 27-12. Direct, Indirect, and Cumulative Impacts to Hydrology – Surface Water Quality

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
SWQ-1: Temporary Construction-Related Sediment Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
SWQ-2: Temporary Construction-Related Water Temperature Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
SWQ-3: Temporary Construction-Related Water Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
SWQ-4: Long-Term Water Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses within the Primary Study Area and San Joaquin River	Primary Study Area	All	LTS	CU
	Extended Study Area	All	LTS	NC
SWQ-5: Long-Term Water Temperature Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses	Primary Study Area	All	LTS and Beneficial	BC
	Extended Study Area	All	LTS and Beneficial	BC
SWQ-6: Long-Term Effects on Delta Salinity that would Violate D-1641 Salinity Objectives	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
SWQ-7: Long-Term Effects on Delta Salinity that would Violate the X2 Standard	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
SWQ-8: Long-Term Effects on Water Quality that would Violate Existing Water Quality Standards or Adversely Affect Beneficial Uses in the CVP/SWP Water Service Areas	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC

Table 27-12. Direct, Indirect, and Cumulative Impacts to Hydrology – Surface Water Quality (contd.)

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
BC = beneficial contribution
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

A number of reasonably foreseeable probable future projects in the vicinity of the primary study area have the potential to affect surface water quality in the primary study area. Examples of these projects include development projects (e.g., Brighton Crest, Gunner Ranch West Specific Plan, Ventana Hills Estates Annexation) and hydroelectric projects (e.g., PG&E Kerckhoff Licensing, PG&E Crane Valley Hydroelectric Project, Big Creek Facilities FERC Relicensing). Most projects that could result in significant impacts on surface water quality in the primary study area will be required to identify and provide mitigation in compliance with NEPA, CEQA, and other local, State, and Federal statutes. Compliance with regulatory requirements and implementation of mitigation could still result in impacts to surface water quality in the region, including temporary (construction-related) and long-term effects on sediment, water temperatures, and water quality.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact SWQ-1: Temporary Construction-Related Sediment Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses

The impacts of past and present projects upstream from the primary study area have reduced the sediment load entering the San Joaquin River below Kerckhoff Dam and entering Millerton Lake. Reasonably foreseeable projects could contribute sediment to surface waters in the primary study area, but these contributions would be minimized through compliance with regulatory requirements and implementation of mitigation measures, and would be small compared to the reduced sediment load caused by upstream dams and reservoirs. Under the action alternatives, construction-related activities would have less-than-significant temporary impacts

on sediment. This impact would be avoided and minimized via implementation of the erosion and sediment control plans and SWPPP. Because the overall cumulative impact is a reduced sediment load to the San Joaquin River and the action alternatives as well as reasonably foreseeable future projects would minimize erosion and associated sediment effects, these impacts would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to sediment effects in the primary study area.

Impacts SWQ-2 and SWQ-3: Temporary Construction-Related Water Temperature and Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses

Past projects, including the construction and operations of Friant Dam, Millerton Lake, and Kerckhoff Dam and Reservoir, have resulted in overall significant cumulative impacts on water temperatures and water quality in the primary study area. Construction-related activities under the action alternatives would further impact water temperatures and water quality; however, these impacts would be less than significant and temporary. Because the action alternatives would have only temporary impacts on water temperatures and water quality in the primary study area, they would not cause cumulatively considerable incremental contributions to the overall significant cumulative impacts on water temperatures and water quality in the primary study area.

Impact SWQ-4: Long-Term Water Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses within the Primary Study Area and San Joaquin River

Past projects, including the construction and operations of Friant Dam and Millerton Lake, have resulted in overall significant cumulative impacts on water quality constituents (including turbidity and metals concentrations) in the primary study area through the process of shoreline erosion. Operations of any of the action alternatives would inundate three abandoned mine sites (Impact SWQ-4). Under Mitigation Measure SWQ-4, Reclamation will prepare and implement a plan to remove or otherwise remediate the Patterson, San Joaquin, and Sullivan mine sites, which have the potential to introduce metals into the proposed Temperance Flat RM 274 Reservoir. Although mitigation would reduce the potential for a discharge of contaminants into the proposed Temperance Flat RM 274 Reservoir, the potential for some contamination would

remain. No further feasible mitigation is available to reduce the severity of Impact SWQ-4; therefore, the action alternatives would cause **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on water quality in the primary study area.

Impact SWQ-5: Long-Term Water Temperature Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses

Past projects, including the construction and operations of Friant Dam, Millerton Lake, and Kerckhoff Dam and Reservoir, have resulted in overall significant cumulative impacts on water temperatures in the primary study area. All action alternatives would increase the total combined volume of cold water in Millerton Lake and Temperance Flat RM 274 Reservoir, with larger available cold-water pools in action alternatives with higher carryover storage in most months. This impact (Impact SWQ-5) would result in a **beneficial contribution to the overall significant cumulative impact** related to water temperatures in the primary study area.

Extended Study Area

Reasonably foreseeable probable future projects in the extended study area have the potential to affect surface water quality in the extended study area. Examples of these projects include recreation and habitat enhancement or management projects (e.g., Jensen River Ranch Habitat Enhancement and Public Access Project, Lost Lake Park Master Plan, San Joaquin River Parkway Plan, SJRRP, BDCP and other projects throughout the Delta), hydroelectric projects (e.g., Merced River Hydroelectric Project, Don Pedro Project Relicensing, Oroville Facilities Relicensing), and water management projects (e.g., SJRRP, North-of-Delta Offstream Storage Investigation, SLWRI, Freeport Regional Water Project, Delta Water Supply Project, DWR South Bay Aqueduct Improvement and Enlargement Program, San Joaquin River Salinity Management Plan, Bay Area Water Quality and Supply Reliability Program, Westside Regional Drainage Plan, IRWMPs in the Central Valley, DMC Recirculation, and WDRs). Many of the projects in the extended study area are targeted at improving surface water quality or related resources such as aquatic ecosystems in the San Joaquin River and the Delta. However, the overall cumulative impact of past projects and continued agricultural and urban development on water quality is expected to remain significant as compared with historical conditions.

The following describes potential cumulative effects to the identified project-related impacts in the extended study area.

Impact SWQ-1: Temporary Construction-Related Sediment Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses

The impacts of past and present projects upstream from Friant Dam and on tributaries to the extended study area have reduced the sediment load entering the San Joaquin River below Friant Dam and entering the San Joaquin River. Reasonably foreseeable projects could contribute sediment to surface waters in the primary study area, but these contributions would be minimized through compliance with regulatory requirements and implementation of mitigation measures, and would be small compared to the reduced sediment load caused by upstream dams and reservoirs. Under the action alternatives, construction-related activities would have less-than-significant temporary impacts on sediment. Implementation of the erosion and sediment control plans and SWPPP would avoid or minimize construction-related impacts in the primary study area. The residual effect to waters in the extended study area would be further minimized through mixing and dilution. Because the overall cumulative impact is a reduced sediment load to the San Joaquin River and the action alternatives as well as reasonably foreseeable future projects would minimize erosion and associated sediment effects, these impacts would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to sediment effects in the primary study area.

Impacts SWQ-2 and SWQ-3: Temporary Construction-Related Water Temperature and Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses

Past and ongoing projects in the extended study area from Friant Dam to the confluence of the Merced River have resulted in overall significant cumulative impacts on sediment, water temperatures, and water quality. Construction impacts of any action alternative would be temporary. These less-than-significant impacts (Impact SWQ-2 and Impact SWQ-3) would, therefore, not cause cumulatively considerable incremental contributions to the overall significant cumulative impacts related to sediment, temperature, or water quality effects in the extended study area.

Impact SWQ-4: Long-Term Water Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses within the Primary Study Area and San Joaquin River

Past and ongoing projects and activities in the extended study area from Friant Dam to the Delta have resulted in overall significant cumulative impacts on surface water quality. The action alternatives would improve surface water quality conditions in some areas through the increased release of flows from Friant Dam, and adversely affect surface water quality in other areas due to the reduction in flood flows. Because the alternatives would not result in any additional violations of existing water quality standards or substantial water quality changes that would adversely affect beneficial uses, or have substantive impacts on public health, these impacts (Impact SWQ-4) would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to sediment effects in the extended study area.

Impact SWQ-5: Long-Term Water Temperature Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses

Past projects in the extended study area from Friant Dam to the confluence of the Merced River have resulted in overall significant cumulative impacts on water temperatures. In particular, the construction of Friant Dam and Mendota Pool, and the diversion and impoundment of water from and in the river have led to increased temperatures that adversely affect beneficial uses, including fisheries, in this reach. The SJRRP may improve water temperature conditions in this reach, but would not reduce this cumulative impact to a less-than-significant impact.

The action alternatives would improve San Joaquin River release temperatures from September through December, at the cost of slightly warmer winter releases than under the No Action Alternative. However, in the winter months, release temperatures would still be cooler than needed for anadromous fish. This impact (Impact SWQ-5) would result in a **beneficial contribution to the overall significant cumulative impact** related to water temperatures in the extended study area.

Impacts SWQ-6 and SWQ-7: Long-Term Effects on Delta Salinity

Past, ongoing, and reasonably foreseeable future projects, including water resources and flood risk management projects

in the San Joaquin and Sacramento River basins, have resulted in overall significant cumulative impacts on Delta salinity. As a result, the Central Valley Water Board and the State Water Board have set water quality standards for waters of the State located within the Delta. In particular, D-1641 establishes standards related to Delta salinity. As previously described, D-1641 establishes maximum salinity objectives, including objectives for salinity (measured as EC) and chloride concentrations, at several locations in the Delta. D-1641 also establishes the X2 standard. The location of the estuarine salinity gradient is regulated from February through June by the location of the X2 objective, and is required to be maintained at not more than 75 km from February through June.

CVP and SWP facilities in the Delta and upstream watersheds are operated to meet the requirements of D-1641, and this would not change under the action alternatives. Therefore, these impacts (Impact SWQ-6 and Impact SWQ-7) would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to Delta salinity.

Impact SWQ-8: Long-Term Effects on Water Quality that would Violate Existing Water Quality Standards or Adversely Affect Beneficial Uses in the CVP/SWP Water Service Areas

Within the CVP and SWP water service areas, past and ongoing projects and practices, including the conveyance of surface water from the Delta to CVP and SWP water service areas, and mixing of these water supplies with lower quality agricultural and urban return flows, have resulted in overall significant cumulative impacts on surface water quality. The quality of water delivered to the CVP and SWP water service areas would not change appreciably under the action alternatives, and when considered with other past, present, and reasonably foreseeable future projects, would not result in violations of existing water quality standards, or substantial water quality changes that adversely affect beneficial uses, or have substantive impacts on public health; therefore, these impacts (Impact SWQ-8) would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to surface water quality in these areas.

Indian Trust Assets

As described in Chapter 16, "Indian Trust Assets," and shown in Table 27-13, the action alternatives would have no impacts related to ITAs. Because there would be no impacts to ITAs as a result of the action alternatives, the action alternatives would not contribute to significant cumulative impacts on ITAs.

Table 27-13. Direct, Indirect, and Cumulative Impacts to Indian Trust Assets

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
ITA-1: Interfere with the Exercise of a Federally Reserved Water Right, or Degrade Water Quality Where There is a Federally Reserved Water Right	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
ITA-2: Interfere with the Use, Value, Occupancy, Character or Enjoyment of an ITA	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
ITA-3: Failure to Protect ITAs from Loss, Damage, Waste, Depletion, or Other Negative Effects	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
NC = no contribution
NI = no impact

Land Use Planning and Agricultural Resources

Actions of past and present projects that have resulted in cumulative impacts to land use planning and agricultural resources in the primary and extended study areas include:

- Population growth and associated development of socioeconomic resources and infrastructure

- Conversion of natural vegetation to agricultural and developed land uses

- Resource extraction (e.g., gravel mining, gold mining, and timber harvesting)

- Construction and operations of flood management facilities (including the Chowchilla, Eastside, and Mariposa bypasses and associated diversion and drop structures)

- Construction and operations of water supply infrastructure (including Friant Dam, Millerton Lake, Mendota Dam and Pool, Sack Dam, and other dams and reservoirs; the DMC; Arroyo Canal; and other diversion facilities on the San Joaquin River and in the Delta)

Past and present actions have substantially altered land use planning and agricultural resources throughout the primary study area compared to historical conditions, resulting in a loss of farmland and forestland and an increase in urban development.

As described in Chapter 17, “Land Use Planning and Agricultural Resources,” and shown in Table 27-14, implementing any of the action alternatives would result in direct and/or indirect impacts on land use and agricultural resources in the primary study area.

Table 27-14. Direct, Indirect, and Cumulative Impacts to Land Use Planning and Agricultural Resources

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
LUP-1: Disruption of Existing Land Uses	Primary Study Area	All	PSU	CU
	Extended Study Area	All	NI	NC
LUP-2: Conflict with Adopted Plans	Primary Study Area	All	PSU	CU
	Extended Study Area	All	NI	NC
LUP-3: Conversion of Farmland to Nonagricultural Uses and Cancellation of Williamson Act Contracts	Primary Study Area	All	PSU	CU
	Extended Study Area	All	NI	NC
LUP-4: Conversion of Forest Land	Primary Study Area	All	PSU	CU
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
CU = considerable and unavoidable contribution
NC = no contribution
NI = no impact
PSU = potentially significant and unavoidable

Primary Study Area

The PG&E HCP plan area is narrowly defined to include all gas and electrical transmission lines and distribution facilities, private access routes to infrastructure associated with operations and maintenance activities, minor facility expansion areas, and mitigation areas for impacts resulting from activities specifically covered by the HCP (PG&E 2006). This HCP provides coverage for routine operations and maintenance activities conducted by PG&E, which are not part of any of the action alternatives. Therefore, the PG&E HCP is not applicable to the action alternatives, nor are there other adopted HCPs or Natural Community Conservation Plans that cover the primary study area. Therefore, no impacts related to this threshold

would occur under any of the alternatives and this issue is not evaluated further in this analysis.

For environmental impacts occurring in the primary study area that are associated with implementing the action alternatives, the geographic context for the cumulative impacts analysis is the central Sierra Nevada foothill region. Reasonably foreseeable future projects within this area that could affect land use planning and agricultural resources include the Comprehensive Conservation Management Plans for National Wildlife Refuges, Lost Lake Master Plan, San Joaquin River Parkway Master Plan, Gunnar Ranch West Specific Plan, Ventana Hills Estates Annexation, and Gateway Village Specific Plan. In addition, continued development, as allowed in the Fresno County and Madera County general plans, would likely result in introducing new land uses and losses of agricultural and forestlands. Throughout the central Sierra Nevada foothill region, conversion, fragmentation, and alteration of agricultural and forestry resources would likely continue as a result of planned development.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impacts LUP-1 and LUP-3: Disruption and Conversion of Existing Land Uses

Implementing any of the action alternatives would result in the loss of agricultural land, including the loss of Williamson Act contracts and FSZ lands. The loss of Williamson Act contracts and FSZ lands is considered a cumulatively considerable incremental contribution to the significant cumulative impact to agricultural lands that would occur from various actions, including inundation of agricultural lands and construction and operation of the quarry and batch plant; past farmland conversions; planned future residential, commercial, and industrial development; flood control projects; and habitat restoration projects in Fresno, Madera, and Merced counties.

Implementing Mitigation Measure LUP-3 would reduce potential impacts on Williamson Act contract and FSZ lands. However, the impacts would not be reduced to a less-than-significant level because cancellation of Williamson Act contracts and conversion of FSZ lands would still occur. This analysis assumes that reasonably foreseeable probable future projects would develop and adopt mitigation to minimize the significance of the impacts on agricultural resources to the extent feasible. Nonetheless, it may not be feasible to fully

mitigate all impacts on agricultural resources from numerous projects, including the selected alternative plan. Therefore, implementing any of the action alternatives would result in a **cumulatively considerable incremental contribution to a significant cumulative impact** on existing land uses and agricultural resources.

Impact LUP-2: Conflict with Adopted Plans

The implementation of reasonably foreseeable future projects might result in a variety of physical impacts related to consistency with adopted land use plans. Inconsistencies with adopted land use plans or policies and zoning generally would not combine to result in cumulative impacts. As described in Appendix G of the State CEQA Guidelines, an impact related to this issue would be significant if implementing an alternative would conflict with any applicable land use plan or policy adopted for the purpose of avoiding or mitigating environmental impacts.

As described in Chapter 17, "Land Use Planning and Agricultural Resources," BLM's proposed RMP would establish 5.4 miles of the San Joaquin River from the Kerckhoff Dam downstream to the Kerckhoff Powerhouse as eligible and suitable for designation as a Federal Wild and Scenic River based on its free-flowing character and ORV. The proposed RMP would establish a corridor along this portion of the river wherein future actions that would alter the free-flowing nature, diminish the stream's ORVs, or otherwise modify the level of watershed development to a degree that would change the classification would require Congressional approval. Implementing any of the action alternatives would result in inconsistency with the proposed RMP, particularly the determination that the San Joaquin River downstream from Kerckhoff Dam is suitable and eligible for wild and scenic river status and likely preclude Congressional approval of this status. Likewise, Congressional approval of the designation of the corridor along this portion of the river as a Federal Wild and Scenic River would likely preclude implementation of the action alternatives. The inconsistency between the action alternatives and the BLM RMP involves a conflict of policies to protect the ORVs maintained by the free-flowing San Joaquin River. If implementing any of the action alternatives occurs before Congressional approval of the wild and scenic designation then the additive effect would be the removal of a designated river from the Wild and Scenic River system list and loss of its values across the wild and scenic river system.According to the National Wild and Scenic Rivers

System, “as of April 2012, the National System protects 12,598 miles of 203 rivers in 39 states and the Commonwealth of Puerto Rico; this is a little more than one-quarter of one percent of the nation's rivers. By comparison, more than 75,000 large dams across the country have modified at least 600,000 miles, or about 17%, of American rivers” (Wild and Scenic Rivers System 2014). Implementing any of the action alternatives would result in less than a 1 percent increase to this total. Therefore, implementing any of the action alternatives would result in a **cumulatively considerable incremental contribution to a significant cumulative impact** related to conflict with adopted plans.

Impact LUP-4: Conversion of Forest Land

Implementing any of the action alternatives would result in a loss of forest land within the reservoir inundation zone and in areas to be used for project features. The permanent conversion of these forest lands to other uses would result in a cumulatively considerable incremental contribution to the significant cumulative impact to forest lands that would occur from various reasonably foreseeable future actions, including residential, commercial, and industrial development projects, flood control projects, and habitat restoration projects in Fresno, Madera, and Merced counties.

No feasible mitigation measures are available to reduce this impact to a less-than-significant level. Although it is assumed that other reasonably foreseeable future projects would develop and adopt mitigation measures to minimize the significance of impacts on forest land to the extent feasible, full mitigation may not be possible. Therefore, implementing any of the action alternatives would result in a **cumulatively considerable incremental contribution to a significant cumulative impact** on forest land.

Extended Study Area

Within the extended study area, implementing any of the action alternatives would not result in impacts on land use planning and agricultural and forestry resources because water deliveries would remain within their historic range and would not result in changes that could lead to increased agricultural production, development, conflicts with adopted land use policies or programs, conversion of agricultural lands to other uses, or conversion of forestry resources. The action alternatives would not have a cumulative impact on land use planning, agricultural lands, or forestry resources in the extended study area.

Noise and Vibration

Actions of past and present projects that have resulted in new noise sources in the primary and extended study areas include:

- New development and infrastructure,
- Development and infrastructure related construction
- Development and infrastructure related traffic
- Recreation on Millerton Lake

Past and present actions have added to existing ambient noise environment in the primary study area. The existing ambient noise is consistent with that of typical rural areas and is defined primarily by human (e.g., people walking and talking, yard maintenance equipment, dogs barking) and natural sounds, (e.g., wind, birds), but is also affected by local roadway traffic and boats in Millerton Lake. These past and present actions have resulted in significant adverse impacts on noise-sensitive land uses, which generally include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose.

As discussed in Chapter 18, “Noise and Vibration,” and shown in Table 27-15, the action alternatives could result in direct and/or indirect impacts in the primary study area; no impacts would occur in the extended study area.

Table 27-15. Direct, Indirect, and Cumulative Impacts to Noise and Vibration

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
NOI-1: Exposure of Sensitive Receptors to Noise Generated by Facility Construction	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
NOI-2: Construction-Generated Ground Vibration	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
NOI-3: Exposure of Sensitive Receptors in the Primary Study Area to Construction-Related Traffic Noise	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
NOI-4: Long-Term Operational Stationary- and Area-Source Noise	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
NOI-5: Long-Term Increases in Traffic Noise	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
BC = beneficial contribution
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

A number of reasonably foreseeable probable future projects in the vicinity of the primary study area have the potential to introduce new construction-related and operational noise sources, including noise-generating vehicle trips, which could affect noise-sensitive receptors areas that also may be affected by implementing any of the action alternatives. Examples of these projects include development projects (e.g., under the Friant Ranch Specific Plan in Fresno County and the North Fork Village project in Madera County) and hydroelectric projects (e.g., Pacific Gas and Electric Company Kerckhoff Licensing, Big Creek Facilities Relicensing). In addition, buildout of the Fresno County and Madera County general

plans would result in additional construction and operational noise sources.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact NOI-1: Exposure of Sensitive Receptors to Noise Generated by Facility Construction

For all of the action alternatives, it was determined that adherence to Mitigation Measure NOI-1 would not be sufficient to avoid significant construction noise impacts. This is because some construction activities would need to occur during the non-exempt times of day, and possibly on Sundays. Also, the feasibility of installing temporary sound barriers is not certain at this time. Because the action alternatives could result in construction noise impacts to sensitive receptors (Impact NOI-1), even with implementation of Mitigation Measure NOI-1, they could make a **cumulatively considerable incremental contribution to the overall significant cumulative impact**.

Impact NOI-2: Construction-Generated Ground Vibration

Groundborne vibration generated during the construction phases under the action alternatives would not result in exceedence of applicable vibration level standards (i.e., FTA's maximum acceptable vibration standard of 80 VdB or the perception threshold of 0.1 inches/second PPV established by Madera County General Plan Policy 7.A.9) at off-site sensitive receptors (Impact NOI-2). While construction activity associated with other projects in or near the primary study area may generate ground vibration that adversely affects nearby sensitive receptors, it is very unlikely that ground vibration from these projects would affect the same receptors as those that could be potentially affected by construction under the action alternatives. This is due to the localized nature of ground vibration. Hence, the action alternatives would not make a cumulatively considerable incremental contribution to overall significant cumulative impacts associated with sources of groundborne vibration.

Impact NOI-3: Exposure of Sensitive Receptors in the Primary Study Area to Construction-Related Traffic Noise

Under all of the action alternatives, construction-generated traffic would contribute to traffic noise levels along affected roadways. With regard to the SEL levels near residences that could be created by truck passbys during construction of the action alternatives, it was determined that limiting

construction-related haul truck trips on some key roadway segments to the less noise-sensitive daytime hours, as required by Mitigation Measure NOI-3, would be sufficient to minimize awakenings by truck passbys and avoid significant impacts. While the SELs from construction-related truck passbys would be considered less than significant with implementation of Mitigation Measure NOI-3, there is no guarantee that truck trips generated by other projects in the area would not pass near noise-sensitive receptors during noise-sensitive nighttime hours. Therefore, significant cumulative SEL impacts associated with truck passbys could occur. However, because the action alternatives would not result in truck passbys during noise-sensitive nighttime hours with implementation of Mitigation Measure NOI-3, they would not contribute to any related cumulative SEL impacts.

Under Options B and C, it was determined that the addition of construction-related vehicle trips to affected roadways would not result in traffic noise increases that exceed applicable L_{dn} standards or standards regarding the incremental increase in L_{dn} noise levels from traffic (Impact NOI-3).Under Option A traffic noise levels would increase by more than 5 dBA L_{dn} during the construction period along the segment of County Road 211 between North Fork Road and Hildreth Road and the segment of County Road 210 County Road 211 and Haul Road #1. Regardless of which Option is implemented, however, the construction and/or operation of other development in the region could add vehicle trips to many of the same roadways and result in traffic noise levels that exceed applicable standards of Fresno County and/or Madera County. Therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on traffic noise in the primary study area for the duration of the construction period.

Impact NOI-4: Long-Term Operational Stationary- and Area-Source Noise

Long-term operational stationary- and area-source noise generated under the action alternatives, including operation of the new powerhouse, recreational boating activity on Temperance Flat RM 274 Reservoir, and corona noise from the new and relocated electrical transmission lines, would not expose any noise-sensitive receptors to levels of noise that exceed applicable noise standards of Fresno and Madera counties (Impact NOI-4). While operational noise sources associated with other development in or near the primary study area—such as development under the Friant Ranch Specific

Plan in Fresno County and the North Fork Village project in Madera County—may introduce new noise stationary and area noise sources, it is not anticipated that noise from these projects would affect the same receptors as those that could be potentially affected by noise sources that would operate under the action alternatives. This is largely due to the fact that noise effects are generally localized because noise levels are not directly additive, and attenuate rapidly with distance. Therefore, the action alternatives would not cause a cumulatively considerable incremental contribution to the overall significant cumulative impacts associated with operational stationary and area noise sources.

Impact NOI-5: Long-Term Increases in Traffic Noise

For all of the action alternatives, it was determined that the addition of vehicle trips to the segment of Wellbarn Road north of Auberry Road and the segment of Smalley Road west of Power House Road would result in traffic noise increases that exceed applicable Fresno County's incremental increase traffic noise standard and thereby be a significant and unavoidable impact. The same analysis determined, however, that long-term traffic noise increases along other modeled roadway segments would not exceed applicable L_{dn} standards or Fresno County's standards for incremental increases in traffic noise. Development growth in the region, including projects such as the Friant Ranch Specific Plan near Friant in Fresno County and North Fork Village Specific Plan in Madera County, would contribute vehicle trips to many, if not all, of the same roadways segments affected by operations under the action alternatives. (It is not known at this time whether other development projects in the area would also contribute traffic to Wellbarn Road and Smalley Road.) If the combined increases in traffic noise exceed the L_{dn} standard established by Fresno or Madera counties or result in traffic noise increases that exceed applicable increase standards then they would be cumulatively significant and long-term traffic noise increases resulting from the vehicle trips associated with the action alternatives would be cumulatively considerable. Because the magnitude, specific timing, and location of additional traffic associated with related projects cannot be known at this time, no feasible mitigation can be identified to reduce this impact. Therefore, the action alternatives could cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** on long-term increases in traffic noise in the primary study area.

Extended Study Area

The action alternatives would not result in any impacts related to noise and vibration in the extended study area.

Paleontological Resources

Actions of past and present projects that have resulted in cumulative impacts to paleontological resources in the primary and extended study areas include:

- Construction and operations of Friant Dam and Millerton Lake
- Development of infrastructure
- Residential, commercial, and industrial development
- Resource extraction (including gold and gravel mining)

As discussed in Chapter 19, "Paleontological Resources," and shown in Table 27-16, the action alternatives could result in direct and/or indirect impacts in the primary study area; no impacts would occur in the extended study area. The action alternatives would not combine with past, present, or reasonably foreseeable future projects to cause overall significant cumulative impacts on paleontological resources in the study areas.

Table 27-16. Direct, Indirect, and Cumulative Impacts to Paleontological Resources

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
PAL-1: Potential for Damage to or Destruction of Unique Paleontological Resources	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
NI = no impact
LTS = less than significant
NC = no contribution

Primary Study Area

A number of reasonably foreseeable future projects that would be located in the vicinity of the primary study area have the potential to affect paleontological resources that also may be affected by implementing any of the action alternatives. Examples of these projects include development projects, such as Brighton Crest/Eagle Springs Golf Course and Country Club, and local plans, such as the BLM Bakersfield Proposed RMP, and the Business Plan for the San Joaquin River Gorge Special Recreation Management Area.

The following describes potential cumulative effects to the identified project-related impact in the primary study area.

Impact PAL-1: Potential for Damage to or Destruction of Unique Paleontological Resources

Fossil discoveries resulting from excavation and earthmoving activities associated with development and the construction of infrastructure are occurring with increasing frequency throughout California. The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils; the fossils' rarity; the extent to which they have already been identified and documented; and the ability to recover similar materials under more controlled conditions, such as part of a research project. Unique, scientifically important fossil discoveries are relatively rare, and the likelihood of encountering them is specific to each site and is based on the type of specific geologic rock formations that are present. These geologic formations vary from location to location.

A portion of the new transmission line route that would be located south of Millerton Lake is underlain by the Mehrten Formation, which is paleontologically sensitive. Thus, the potential exists to encounter unique paleontological resources during construction-related earthmoving activities.

As described in Chapter 28, "Other NEPA and CEQA Considerations," project-related activities on Federal and State lands are required to conform to several plans, policies, regulations, and laws intended to protect paleontological resources. Other projects that are undertaken by local jurisdictions on private land are required to conform to general plans and policies contained therein that require the protection of paleontological resources. Therefore, because any project involving development that would take place in a paleontologically sensitive rock formation would be required to

implement appropriate mitigation measures, implementing these projects would not result in a significant impact related to damage to or destruction of unique paleontological resources.

Implementing Mitigation Measure PAL-1 would reduce the impact of any of the action alternatives on previously undiscovered paleontological resources to a less-than-significant level. Because project site evaluations and mitigation measures to protect paleontological resources are required by the Federal, State, and local laws and plans for both the Investigation and reasonably foreseeable future projects, a significant cumulative impact from damage to or destruction of unique paleontological resources would not occur. The project also would not make a cumulatively considerable incremental contribution to a significant cumulative impact on paleontological resources.

Extended Study Area

The action alternatives would not result in any impacts related to paleontological resources in the extended study area. Therefore, none of the action alternatives would make a cumulatively considerable incremental contribution to a cumulative impact associated with existing or reasonably foreseeable projects in the extended study area.

Power and Energy

Actions of past and present projects that have resulted in cumulative impacts to power and energy in the primary and extended study areas include:

- Licensing of PG&E Kerckhoff Hydroelectric Project
- Licensing of Friant Dam powerhouses
- Licensing/Relicensing of other hydropower facilities in California
- Increased renewable energy generation (e.g., wind, solar)
- CVP and SWP operations and local water development actions

- Population growth and associated development of infrastructure and energy demands

Past and present actions have substantially altered power and energy facilities operations and constrained or enhanced hydropower energy and ancillary services. Within the primary study area, licensing the Kerckhoff Hydroelectric Project and the various Friant Dam powerhouses increased energy and ancillary services to the region. Within the extended study area, licensing various Federal, State, and local hydropower generation projects increased energy and ancillary services to the region. Additional renewable energy generators have increased energy, but have also required additional ancillary service facilities. Federal, State, and local water supply operations have both enhanced and constrained hydropower in both the primary and extended study areas by augmenting or decreasing dam releases, reservoir elevations, and water supply conveyance pumping requirements.

Table 27-17. Direct, Indirect, and Cumulative Impacts to Power and Energy

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
PWR-1: Decrease in Kerckhoff Hydroelectric Project Energy Generation and Ancillary Services	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
PWR-2: Change in Energy Generation at Friant Dam Powerhouses	Primary Study Area	All	Beneficial	BC
	Extended Study Area	All	NI	NC
PWR-3: Change in Energy Generation and Use Within the Friant Division of the CVP Water Service Area	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS and Beneficial	NC

Table 27-17. Direct, Indirect, and Cumulative Impacts to Power and Energy (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
PWR-4: Decrease in CVP System Energy Generation	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
PWR-5: Decrease in SWP System Energy Generation	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
PWR-6: Increase in CVP System Pumping Energy Use	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
PWR-7: Increase in SWP System Pumping Energy Use	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
BC = beneficial contribution
CU = considerable and unavoidable contribution
LTS = less than significant
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

No reasonably foreseeable future projects have or would decrease energy generation or ancillary services at the Kerckhoff Hydroelectric Project. Construction and operation of the New Friant River Outlet Powerhouse would increase energy generation capacity at Friant Dam.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact PWR-1: Decrease in Kerckhoff Hydroelectric Project Energy Generation and Ancillary Services

All action alternatives would have significant and unavoidable impacts in the primary study area related to the decrease in Kerckhoff Project energy generation. No feasible mitigation is available to reduce the severity of Impact PWR-1; therefore, all action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** related to the decrease in Kerckhoff Hydroelectric Project energy generation.

Impact PWR-2: Change in Energy Generation at Friant Dam Powerhouses

Impact PWR-2 would be beneficial for all of the action alternatives. Under the action alternatives, there would be an increase in simulated average annual generation. Construction and operation of the New Friant River Outlet Powerhouse would further increase energy generation capacity at Friant Dam. Therefore this impact would result in a **beneficial contribution to the overall significant cumulative impact** related to energy generation at Friant Dam powerhouses.

Extended Study Area

Other reasonably foreseeable future projects, including the SLWRI and Oroville Facilities FERC relicensing, will lead to changes in CVP and SWP system energy generation and use, either directly or through affecting flows in the Sacramento River, San Joaquin River, or Delta, which in turn influence reservoir operations. These projects would decrease (due to relicensing restrictions), maintain, or increase CVP and SWP system energy generation and use. The following describes potential cumulative effects to the identified project-related impact in the extended study area.

Impacts PWR-3 Through PWR-7: Changes in CVP and SWP System Energy Generation and Use

Impact PWR-3 would be less than significant and beneficial for all of the action alternatives. Under the action alternatives, there would be an increase in simulated average annual generation at Madera Canal powerhouses owned and operated by Madera Chowchilla Water and Power Authority compared to the No Action Alternative. Additionally, there would be a decrease in pumping energy use through increases in surface water deliveries. When any of the action alternatives are combined with other present and reasonably foreseeable projects, river flows and reservoir elevations would be likely to change, but not considerably. The action alternatives would not

cause substantial changes in energy generation in the CVP (increases and decreases of less than 1 percent) (Impact PWR-4, less than significant and beneficial) or the SWP (increases of less than 2 percent) (Impact PWR-5, less than significant and beneficial) systems. The action alternatives also would not cause substantial changes in energy use in the CVP (increases of less than 2 percent) (Impact PWR-6) or SWP (increases of less than 3 percent) (Impact PWR-7) systems. The increases in energy use anticipated under the action alternatives would exceed energy generation, but would remain a small portion of the overall energy generation and use in the CVP and SWP systems, while reasonably foreseeable future projects such as the SLWRI and the New Friant River Outlet Powerhouse are expected to increase energy generation in the CVP and SWP. Therefore, the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact on power generation and consumption.

Public Health and Hazards

Actions of past and present projects in in the primary and extended study areas that have resulted in risks to human health and safety include:

- Population growth and associated development of socioeconomic resources and infrastructure
- Conversion of natural vegetation to agricultural and developed land uses
- Agricultural practices (including the application of pesticides, herbicides, and fertilizers)
- Conversion of natural vegetation to agricultural and developed land uses
- Resource extraction (e.g., gravel mining, gold mining, and timber harvesting)

These projects and actions have led to risks including exposure of people to unacceptable levels of toxic substances in soil or water, such as gasoline and pesticides; of people to hazardous materials associated with utility poles, transformers, and associated electric power transmission facilities; of people to West Nile virus or vector-borne illnesses and valley fever; and

of people or structures to a significant risk of loss, injury, or death involving wildland fires. Public health and hazards impacts associated with the past or current uses of a project site usually occur on a project-by-project basis, and are generally limited to the specific project site; in this case, the immediate area located in the vicinity of project features and nearby roadways.

Table 27-18. Direct, Indirect, and Cumulative Impacts to Public Health and Hazardous Materials

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
HAZ-1: Potential for Exposure to Hazardous Materials	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-2: Potential Emission of Hazardous Materials within 0.25 Mile of a School	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-3: Increase Hazards from a Known Hazardous Materials Contamination Site	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-4: Interfere with Evacuation Routes and Emergency Vehicle Access	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-5: Locate Electrical Transmission Facilities near a School	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
HAZ-6: Increase Hazards of Wildland Fires	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC

Table 27-18. Direct, Indirect, and Cumulative Impacts to Public Health and Hazardous Materials (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
HAZ-7: Increase Hazards of West Nile Virus	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-8: Increase Hazards of Valley Fever	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-9: Increase Exposure to Damage from Acts of Terrorism	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
HAZ-10: Increase Exposure to Hazards Associated with Abandoned Mine Sites	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
HAZ-11: Increase Potential for Blast-Related Injury during Construction	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC

Key:
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

Reasonably foreseeable future projects in the primary study area that would result in temporary construction-related activities and long-term operational activities in Fresno and Madera counties include the Millerton New Town Specific Plan, the Brighton Crest subdivision, and the Ventana Hills Estates Annexation. These projects involve constructing residential and commercial land development. Other large-scale planned and approved developments in the vicinity of the primary study area in Fresno and Madera counties include the Friant Ranch Specific Plan, in Fresno County, and the Gunner Ranch West Area Plan, Gateway Village, and Rio Mesa Plan Area in Madera County.

Reasonably foreseeable future projects would all involve the storage, use, disposal, and transport of hazardous materials to varying degrees during construction and operation; generate construction-related and operational-related traffic on regional and local roadways, including SR 99, SR 41, SR 145, Friant Road, Lake Road, Millerton Road, Sky Harbour Road, Auberry Road, North Fork Road, Road 206, Road 208, Road 210, Wellbarn Road, and Powerhouse Road; increase the potential for wildland fires; create sources of standing water that provide aquatic habitats for mosquitos and other vector species; and involve soil-disturbing activities that increase the risk of exposure to valley fever. Projects that could result in impacts on public health and hazards in the primary study area will be required to comply or provide mitigation in compliance with regulations established by the EPA; California Environmental Protection Agency; the Department of Toxic Substances Control; the State Water Board; CHP; Caltrans; and other applicable local, State, and Federal statutes.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact HAZ-1: Potential for Exposure to Hazardous Materials

Construction and operation of the action alternatives and reasonably foreseeable future projects would involve the storage, use, disposal, and transport of hazardous materials (such as asphalt, fuel, lubricants, and solvents) to varying degrees during construction, and demolition of structures may contain asbestos, lead-based or lead-containing paint, PCBs, and mercury. The storage, use, disposal, and transport of hazardous materials are extensively regulated by various local, State, and Federal agencies, and therefore construction companies and businesses that would handle any hazardous substances would be required by law to implement and comply with these existing hazardous-materials regulations (also see Chapter 2, “Alternatives,” for further discussion of environmental commitments designed to minimize or avoid discharge of materials to surface waters). Any reasonably foreseeable future projects that occur simultaneously would be required to implement and comply with the same existing hazardous-materials regulations. Therefore, a cumulatively significant impact would not occur, and the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact associated with hazardous materials storage and transport.

Impact HAZ-2: Potential Emission of Hazardous Materials within 0.25 Mile of a School

There are no schools located within 0.25 mile of the primary study area. However, Foothill Middle School and Auberry Elementary are located 2.5 miles east of the proposed Temperance Flat RM 274 Reservoir site along Auberry Road, which is a designated truck route for this project. Accidental releases during the transport of hazardous materials or attributable to other equipment or maintenance failure could result in an inadvertent spill or release that could pose a potentially significant hazard to nearby school occupants.

Implementing Mitigation Measure HAZ-2 would reduce the project's potentially significant impact to a less-than-significant level by requiring coordination with the Fresno County Fire Protection District, Madera County Fire Department, the County Sheriff's Offices, California Department of Transportation, the California Highway Patrol, and representatives from Foothill Middle School and Auberry Elementary, and compliance with CHP and Caltrans regulations. Current and reasonably foreseeable future projects would also be required to comply with various local, State, and Federal agencies that regulate the transport of hazardous materials. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the significant cumulative impact related to the potential emission of hazardous materials within 0.25 mile of a school.

Impact HAZ-3: Increase Hazards from a Known Hazardous Materials Contamination Site

The primary study area contains underground storage tanks that are located between 50 feet and 600 feet from the proposed inundation area (see Chapter 21, "Public Health and Hazards"). Inundation of existing underground storage tanks could contaminate water in Millerton Lake and downstream in the San Joaquin River. Implementing Mitigation Measure HAZ-3 would reduce the project's potentially significant impact to a less-than-significant level by removing aboveground and underground storage tanks from areas that are subject to inundation and coordinating with Madera County and Fresno County environmental management departments responsible for hazardous site identification and closure.

Reasonably foreseeable future related project sites could contain existing aboveground or underground storage tanks; however, if storage tanks are located on a project site, the

associated impacts would be localized to those projects and would not be additive to construction of the action alternatives. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the significant cumulative impact related to expose to the general public to known hazardous materials.

Impact HAZ-4: Interfere with Evacuation Routes and Emergency Vehicle Access

Regional and local roadways listed above would likely be affected intermittently during construction activities resulting in decreased emergency access and response times. These additional trips would be temporary and would cease after construction is completed. Implementing Mitigation Measure HAZ-4 would reduce the project's potentially significant impact to a less-than-significant level by preparing and implementing a TMP in coordination with local emergency service providers that would ensure unimpeded emergency vehicular access and passage, develop detours to ensure acceptable traffic flow through and/or around the construction zone, and minimize traffic congestion. In addition, no specific future projects have been identified that would overlap spatially or temporally with affected roadways that could combine with construction of the proposed project to cause a cumulatively significant affect related to decreased emergency access and response times. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the significant cumulative impact related to interference with emergency access and response times during construction.

Recreation-related changes associated with implementing any of the action alternatives—specifically, the improved conditions at Millerton Lake and the creation of the new Temperance Flat RM 274 Reservoir—would, however, lead to an increase in long-term traffic volumes. It is estimated that during peak use, 672 vehicle trips per day would be added to area roadways as a result of increased recreational activity at Millerton Lake and Temperance Flat RM 274 Reservoir. However, the action alternatives' recreation-related contribution to traffic on area roadways would be substantially less than the traffic contribution from the combination of past, present, and reasonably foreseeable future projects; therefore, the action alternatives' recreation-related contribution would not make a cumulatively considerable incremental contribution to a significant cumulative impact on traffic from increased recreational activities at Millerton Lake and the proposed

Temperance Flat RM 274 Reservoir (see the Transportation, Circulation, and Infrastructure section of this chapter for further discussion).

Impact HAZ-5: Locate Electrical Transmission Facilities near a School

New transmission lines and other power facilities would be constructed as part of the action alternatives; therefore, EMF levels would increase and there could be some potential for increased exposure to school occupants at Foothill Middle School and Auberry Elementary. However, none of the project components would be within one-quarter mile of an existing or proposed school and no impact would occur. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the significant cumulative impact related to siting of transmission facilities near a school.

Impact HAZ-6: Increase Hazards of Wildland Fires

Temperance Flat RM 274 Dam site and surrounding areas are located in moderate to high fire hazard severity zones. The use of construction equipment, increased human activity, storage and use of potentially flammable materials, and presence of charged utility lines increase the potential for fire ignition in the primary study area. Operation of motor vehicles on designated access roads and haul roads and throughout the region, particularly when vegetation adjacent to roadways is dry, imparts a certain level of fire potential from accidental combustion (e.g., sparks), hot metal (e.g., tail pipes, motors), or traffic accidents, which could result in fire. Relevant safety standards/procedures related to fire prevention would be incorporated into the project design, and would be used during construction activities and project operation and maintenance. Applicable safety standards and procedures include the CBSC; the Fresno County and Madera County fire plans; USFS safety requirements regarding fire hazards; and CPUC General Order 95, which provides procedures for proper removal, disposal, and placement of poles, wires, and associated infrastructure. In addition, Chapter 2, “Alternatives,” identifies environmental commitments to minimize the risk of wildfire and the potential threat to workers, property, and the public.

No specific future projects have been identified that would overlap spatially or temporally with affected roadways that could in combination with construction of the proposed project to cause a cumulatively significant affect related to decreased emergency access and response times. Any reasonably

foreseeable future projects that occur simultaneously would be required to implement and comply with the same existing safety standards and procedures. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the significant cumulative impact related to interference with emergency access and response times during construction.

Impact HAZ-7: Increase Hazards of West Nile Virus

Implementing the action alternatives would create structures, ground depressions, excavation pits, and other features and establish a new reservoir that holds permanent sources of standing water, resulting in an additional source of vector-borne illness from West Nile virus. Implementing Mitigation Measure HAZ-7 would reduce the action alternatives' potentially significant impact to a less-than-significant level by implementing a project-specific health and safety plan that specifies measures to be taken during construction to dewater, fill, or apply an approved treatment capable of eradicating identified mosquito populations.

There are no other projects located or proposed in the primary study area that would either result in increased mosquito breeding or introduce a new human population that could be subject to increased risk of West Nile virus exposure. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact associated with the increased risk of West Nile virus in the primary study area.

Impact HAZ-8: Increase Hazards of Valley Fever

Ground-disturbing activities associated with the proposed Temperance Flat RM 274 Dam and Reservoir, new and relocated transmission line corridors, and construction of other reservoir-related project features would increase fugitive dust emissions that could lead to valley fever exposure if spores are present. Implementing Mitigation Measure HAZ-7 would reduce the action alternatives' potentially significant impact to a less-than-significant level by implementing a project-specific health and safety plan that is designed to test for presence of valley fever spores in the soil, and provide actions to minimize worker exposure. In addition, Chapter 2, "Alternatives," identifies environmental commitments to reduce fugitive dust emissions.

Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution

to a significant cumulative impact associated with the potential health-related impacts from soil-disturbing activities and exposure to valley fever.

Impact HAZ-9: Increase Exposure to Damage from Acts of Terrorism

While the potential for a terrorist attack exists for any critical infrastructure system, Temperance Flat RM 274 Dam is not considered a high-priority target for acts of terrorism, and the potential threat would be no greater than for other dams of similar scale located throughout the country. Impacts associated with exposure to the public and damage to the environment from acts of terrorism from implementing the action alternatives would be less than significant. There are no other projects located or proposed in the vicinity of the Temperance Flat RM 274 Dam that would provide optimal targets for terrorist acts. Therefore, the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to exposure to the public and damage to the environment from acts of terrorism.

Impact HAZ-10: Increase Exposure to Hazards Associated with Abandoned Mine Sites

Three abandoned mine sites are located within the Temperance Flat Reservoir area, including the Patterson Mine (formerly known as the Diana Mine), San Joaquin Mine, and the Sullivan Mine Group. Potential hazards associated with abandoned mines include undetonated explosives, decomposed support timber, unstable ground and rocks, obscure vertical workings, and water-filled excavations. These hazards pose potential risks to casual entrants. Because none of the project features or recreational facilities would be located in the vicinity of these mine sites, the action alternatives would not expose construction workers or the general public to hazards associated with abandoned mine sites. There are no other projects located or proposed in the vicinity of the Patterson Mine, San Joaquin Mine, and the Sullivan Mine Group that would expose construction workers or the general public to hazards associated with abandoned mine sites. Therefore, the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to exposure to hazards associated with abandoned mine sites.

Impact HAZ-11: Increase Potential for Blast-Related Injury during Construction

Blasting may be required for excavation and removal of rock during construction of the diversion tunnel. Blasting entails the placement of explosive materials into a borehole, which is then ignited. The subsequent explosion generates air blasts and seismic waves that fracture the surrounding rock. Reasonably foreseeable accidents associated with blasting include accidental discharge and expulsion of materials beyond the expected distance (i.e., flyrock). There are no other projects located or proposed in the vicinity of the blasting activities that would expose construction workers or the general public to hazards associated with blasting. Therefore, the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to exposure to hazards associated with abandoned mine sites.

Extended Study Area

The extended study area extending from Friant Dam to the confluence with the Merced River, San Joaquin River from Merced River to the Delta, and the Delta is now subject to changed instream flows associated with implementing the SJRRP. However, these changes in water flow would have no impacts on, nor would they be affected by, anthropogenic factors, valley fever, naturally occurring asbestos, wildland fire, aircraft safety, or EMF.

Public health and hazards associated with West Nile virus do not pertain to the extended study area because implementing any of the action alternatives would not result in modifying land uses or provide increases in water supply that exceed historic amounts. The delivery of water supplies generated by implementing any of the action alternatives and delivering water supplies to the SOD CVP and SWP water service areas would not modify physical conditions that would increase mosquito habitat or associated mosquito populations that could pose an increased risk of West Nile virus. Changes in San Joaquin River flows associated with operations of the action alternatives would remain within the historic flow range and would not be substantially different from no action conditions. Mosquito habitats and populations in the extended study area would not substantially vary from conditions under the No Action Alternative. Implementing any of the action alternatives therefore would not make a cumulatively considerable incremental contribution to a significant cumulative impact to

the existing or future potentially significant cumulative risk of exposure to West Nile virus.

Therefore, the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative impact on public health and hazards in the extended study area.

Recreation

Actions of past and present projects that have resulted in cumulative impacts to recreation in the primary and extended study areas include:

- Construction and operations of Friant Dam and Millerton Lake, and Kerckhoff Dam and Reservoir
- Construction of recreation facilities around Millerton Lake
- Establishment of parks and recreational resources throughout the extended study area, including the San Joaquin River Parkway, NWRs, county parks, SRAs, and reservoirs with public access

Past and present projects have formalized recreation opportunities and access throughout the Study Area compared to historical conditions.

As described in Chapter 22, "Recreation," and shown in Table 27-19, the action alternatives could result in direct and/or indirect impacts on recreation in the primary and extended study areas.

Table 27-19. Direct, Indirect, and Cumulative Impacts to Recreation

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
REC-1: Permanent Loss or Closure of a Recreation Facility	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC

Table 27-19. Direct, Indirect, and Cumulative Impacts to Recreation (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
REC-2: Permanent Loss of a Resource Used for Recreation	Primary Study Area	All	SU	NC
	Extended Study Area	All	LTS	NC
REC-3: Substantial or Long-Term Reduction or Elimination of Recreation Opportunities or Experiences	Primary Study Area	All	SU	NC
	Extended Study Area	All	LTS	NC
REC-4: Loss of Access to a Locally Important Recreation Site or Area	Primary Study Area	All	SU	NC
	Extended Study Area	All	LTS	NC
REC-5: Increased Use of Existing Neighborhood and Regional Parks or Other Recreation Facilities such that Substantial Physical Deterioration of the Facilities Would Occur or Be Accelerated	Primary Study Area	All	LTS	NC
	Extended Study Area	All	LTS	NC
REC-6: Impacts Associated with New or Expanded Recreation Facilities	Primary Study Area	All	Beneficial	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
NI = no impact
LTS = less than significant
SU = significant and unavoidable
NC = no contribution

Primary Study Area

For environmental impacts occurring in the primary study area that are associated with implementing the action alternatives, the geographic context for the cumulative impacts analysis consists of the Millerton Lake SRA and SJRG SRMA. A number of reasonably foreseeable future projects that would be located in the vicinity of the primary study area have the

potential to affect recreation facilities, opportunities, experiences, and access that also may be affected by implementing any of the action alternatives. These projects include FERC hydroelectric project relicensing actions; implementation of the BLM Bakersfield Proposed RMP, *Business Plan for the San Joaquin River Gorge Special Recreation Management Area* (BLM 2010); and the Millerton Lake RMP/General Plan (Reclamation and State Parks 2010).

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impacts REC-1, REC-2, REC-3, REC-4 and REC-6: Recreation Impacts

The Big Creek and Kerckhoff FERC relicensing projects are located upstream from the primary study area. Implementing any of the action alternatives would have a direct impact on the operation and power production of the Kerckhoff Hydroelectric Project; however, no impact on the existing recreation facilities and uses at these upstream facilities would occur.

Implementing any of the action alternatives would result in inconsistencies with recreational provisions defined in the BLM Bakersfield Proposed RMP, *Business Plan for the San Joaquin River Gorge Special Recreation Management Area*, and the Millerton Lake RMP/General Plan. The inconsistencies, as described in impacts REC-1, REC-3, and REC-4, are associated with the displacement of existing recreation facilities, opportunities, and access to locally important recreational sites and areas, which would affect recreation activities and management objectives and policies within the SRA and SJRG SRMA.

Foreseeable projects have the potential to alter CVP and SWP operations, which may, in turn, have an impact on the operation of Millerton Lake and Temperance Flat RM 274 Reservoir thus affecting recreation within the primary study area. These projects include the BDCP, Delta Plan, changes in CVP and SWP water rights, and SLWRI. A change in Friant Dam or Temperance Flat RM 274 Dam operations due to these other projects would likely not alter recreation facilities or access within the primary study area, but could affect the timing and seasonal availability of recreation opportunities and the quality of recreation experiences both at Millerton Lake and Temperance Flat RM 274 Reservoir. However, it is speculative to assume that these projects would substantially alter operation of either water storage facility. Therefore,

although implementing any of the action alternatives would have a significant and unavoidable direct impact on recreation; it would not cause a cumulatively considerable incremental contribution to overall significant cumulative impacts on recreation.

Impact REC-5: Increased Use of Existing Neighborhood and Regional Parks or Other Recreation Facilities such that Substantial Physical Deterioration of the Facilities Would Occur or Be Accelerated

Within the primary study area implementing any of the action alternatives would result in a less-than-significant impact on recreation because multiple facilities for displaced visitors are available within primary study area. It is expected that displaced recreational users would visit a variety of locations, slightly increasing the use of any particular facility. Such an increase would not cause or accelerate substantial physical deterioration of these other facilities.

The reasonably foreseeable projects that would affect the primary study area are not anticipated to significantly impact recreation. Millerton Lake SRA, SJRG SRMA, BLM Bakersfield Proposed RMP, *Business Plan for the San Joaquin River Gorge Special Recreation Management Area,* and the Millerton Lake RMP/General Plan would generally enhance recreation and are not anticipated to result in substantial impacts on fishing, boating, and swimming opportunities in the reservoir. Therefore, creation of Temperance Flat RM 274 Reservoir would not result in a cumulatively considerable incremental contribution to existing significant cumulative impacts on recreation in the primary study area.

Extended Study Area

The geographic area being considered in the cumulative impacts analysis of the extended study area is the San Joaquin River below Friant Dam to the Merced River confluence. Implementing any of the action alternatives would not substantially affect recreation opportunities or experiences, and would not result in the loss of recreation facilities or access within the CVP and SWP water service areas, the Delta, or along the San Joaquin River downstream from the Merced River confluence. Therefore, these areas are not included in the geographic extent of this cumulative impacts analysis.

The following describes potential cumulative effects to the identified project-related impact in the extended study area.

Impacts REC-1, REC-2, REC-3, REC-4, and REC-5: Recreation Impacts

Within the San Joaquin River downstream from Friant Dam to the Merced River confluence, implementing any of the action alternatives would result in a less-than-significant impact on recreation because of higher flows in the San Joaquin River discharged from Friant Dam. The action alternatives would have higher flows, particularly in April, and could potentially affect the ability of users to fish, boat, and swim in the river.

The reasonably foreseeable projects that would affect the San Joaquin River downstream from Friant Dam are not anticipated to significantly impact recreation. Full restoration flows being implemented by the SJRRP are already included within the CalSim II modeling data used to evaluate changes to flows downstream from Friant Dam. Increased San Joaquin River flows downstream from Friant Dam resulting from implementing any of the action alternatives would not exceed full restoration flows. Other projects such as the Lost Lake Park Master Plan and General Plan would generally enhance recreation and are not anticipated to result in substantial impacts on fishing, boating, and swimming opportunities along the river. Therefore, changes to San Joaquin River flows below Friant Dam would not result in a cumulatively considerable incremental contribution to existing significant cumulative impacts on recreation in the extended study area.

Socioeconomics, Population, and Housing

Actions of past and present projects that have resulted in cumulative impacts to socioeconomics, population, and housing in the primary and extended study areas include:

- Population growth and associated development of infrastructure both in the Sierra foothills and the Central Valley
- Residential, commercial, and industrial development
- Construction and operations of Friant Dam and Millerton Lake, and Kerckhoff Dam and Reservoir

Past and present projects have substantially altered socioeconomics, population, and housing throughout the study area compared to historical conditions.

As described in Chapter 23, "Socioeconomics, Population, and Housing," and shown in Table 27-20, the action alternatives could result in direct and/or indirect impacts in the primary and extended study areas.

Table 27-20. Direct, Indirect, and Cumulative Impacts to Socioeconomics, Population, and Housing

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
SOC-1: Temporary Increases in Employment and Personal Income Resulting from Construction	Primary Study Area	All	LTS and Beneficial	BC
	Extended Study Area	All	NI	NC
SOC-2: Temporary Increases in Population and Housing Demand Resulting from Construction	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
SOC-3: Temporary Increases in Business Income and Local Sales Tax Revenue Resulting from Construction	Primary Study Area	All	LTS and Beneficial	BC
	Extended Study Area	All	NI	NC
SOC-4: Increases in Employment and Personal Income Resulting from Operations and Maintenance	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
SOC-5: Increases in Spending, Employment, and Personal Income from Increased Recreational Visitation	Primary Study Area	All	LTS and Beneficial	BC
	Extended Study Area	All	NI	NC
SOC-6: Increases in Population and Housing Demand Resulting from Operations and Maintenance	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC

Table 27-20. Direct, Indirect, and Cumulative Impacts to Socioeconomics, Population, and Housing (contd.)

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
SOC-7: Increases in Business Income and Local Sales Tax Revenue Associated with O&M and Recreation Visitation	Primary Study Area	All	LTS and Beneficial	BC
	Extended Study Area	All	NI	NC
SOC-8: Decreases in Property Tax Revenue from Acquisition of Privately Owned Land	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
SOC-9: Impacts on Agricultural Economics in the CVP and SWP Water Service Areas	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS and Beneficial	CU
SOC-10: Increases in Population and Housing Demand Within the CVP and SWP Water Service Areas	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS	NC
SOC-11: Increases in Business Income and Local Sales Tax Revenue Within the CVP and SWP Water Service Areas	Primary Study Area	All	NI	NC
	Extended Study Area	All	LTS and Beneficial	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
BC = beneficial contribution
CU = considerable and unavoidable contribution
CVP = Central Valley Plan
LTS = less than significant
NC = no contribution
NI = no impact
SWP = State Water Project

Primary Study Area

Future implementation of planned and approved urban development in Fresno and Madera counties would result in temporary construction-related jobs and income in Fresno County and Madera County. Within the primary study area, the Millerton New Town Specific Plan, the Brighton Crest subdivision, and the Ventana Hills Estates Annexation involve construction of residential and commercial land uses. Other large-scale planned and approved developments in Fresno and

Madera counties include the Friant Ranch Specific Plan, immediately south of Millerton Lake in Fresno County, and the Gunner Ranch West Area Plan, Gateway Village, and Rio Mesa Plan Area in Madera County. Implementing these projects would result in construction of residential, commercial, and industrial land uses. Additional infill development and urban development would occur in accordance with the Fresno County and Madera County general plans and city general plans within those counties. Commercial and industrial development associated with these projects would also provide permanent employment opportunities and generate new economic activity in Fresno and Madera counties.

These identified projects vary in size and would establish different amounts of residential, commercial, and industrial development. Construction of these projects could potentially generate a temporary increase in employment in Fresno County and Madera County.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impacts SOC-1, SOC-3, SOC-5, and SOC-7: Socioeconomic Impacts

Implementing any of the action alternatives would create an incremental cumulative contribution to local employment and economic activity. As discussed in Chapter 23, "Socioeconomics, Population, and Housing," substantial employment and personal income in Fresno County and Madera County would be generated from construction-related activities and increased recreational use of Millerton Lake and the new Temperance Flat RM 274 Reservoir. These new jobs would be expected to provide employment opportunities to many unemployed workers, and increases in personal income would result in new local economic activity in Fresno and Madera counties. In addition, implementing any of the action alternatives would also result in a substantial increase in business income and local sales tax revenue in Fresno and Madera counties from spending of personal income. Therefore, implementing any of the action alternatives would result in beneficial and less-than-significant socioeconomic impacts in Fresno County and Madera County and, when combined with the economic activity generated by the other projects, would make a **beneficial contribution to the overall significant cumulative impact.**

Impacts SOC-2 and SOC-6: Increases in Population and Housing Demand

Construction of any of the action alternatives would take place over an 8-year period, and related projects would be constructed during various periods over the next 30 years or more, minimizing the potential overlap of action alternative construction with construction of other future projects. Even if the action alternative and related projects were constructed simultaneously, the supply of general construction labor in Fresno and Madera counties would likely meet the demand associated with constructing both the selected action alternative and the other projects. Within Fresno County and Madera County, the 2010 unemployment rates exceeded 16 percent and 15 percent, respectively. Given the high rate of unemployment, these jobs would provide temporary employment opportunities to many unemployed workers. Therefore, implementing any of the action alternatives would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on population growth or increased housing demand.

Impact SOC-4: Increases in Employment and Personal Income Resulting from Operations and Maintenance

Implementing any of the action alternatives would result in increases in employment and personal income in Fresno and Madera counties as a result of O&M of the Temperance Flat RM 274 Dam, intake structure, powerhouse, valve house, and permanent access roads. In combination with other reasonably foreseeable projects, an incremental cumulative increase in employment and associated personal income could result. However, this increase from O&M-related activities would be small in comparison to the regional economy. Therefore, implementing any of the action alternatives would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on employment or personal income.

Impact SOC-8: Decreases in Property Tax Revenue from Acquisition of Privately Owned Land

Implementing any of the action alternatives would require acquiring privately owned land in the primary study area in Fresno and Madera counties for project purposes. Although a decrease in property tax revenue would occur with implementation of any of the action alternatives, the decrease, even when combined with decreases caused by other past, present, and reasonably foreseeable future projects, would be small in comparison to the total property tax revenue generated

in these counties. Therefore, the reduction in tax revenues associated with the permanent acquisition of private property for the project would be minor and would not contribute to a significant cumulative impact on property tax revenue.

Extended Study Area

Reasonably foreseeable future projects in the extended study area include planned development in city and county general plans; construction of levee improvement and flood control projects, including those proposed in the Central Valley Flood Protection Plan; construction of pipelines, including those proposed in the Bay Delta Conservation Plan; reservoir enlargements, such as the Los Vaqueros Reservoir Expansion Project and Shasta Lake Water Resources Investigation; and habitat restoration projects, such as those included in the Bay Delta Conservation Plan and SJRRP.

The following describes potential cumulative effects to the identified project-related impacts in the extended study area.

Impact SOC-9: Impacts on Agricultural Economics in the CVP and SWP Water Service Areas

Agricultural land conversions would occur through the reasonably foreseeable projects listed above. These projects have the potential to affect surface water supply reliability to agricultural water users in the CVP and SWP water service areas, which could result in providing additional water supplies for existing agricultural land uses. Implementing any of the action alternatives would improve surface water supply reliability to agricultural producers in the CVP and SWP water service areas, resulting in less temporary crop idling, increasing agricultural production on existing agricultural lands, improving agricultural economic value, and generating new economic activity from agriculture-related income and spending. This increase in water supply reliability would contribute to reducing this significant cumulative impact; however, this reduction would not be sufficient to reduce this impact to a less-than-significant level.

The actual amount of agricultural land that might be affected by the other projects is unknown; however, counties in the project region generally are converting farmland faster than land is being brought into agricultural production. Without implementation of a selected alternative plan, the losses of agricultural economic activity, jobs, and tax revenues that have occurred with implementation of past projects would continue as a result of present and planned future projects. This

conversion of agricultural lands and associated declines in agricultural economic value **would make a cumulatively considerable incremental contribution to a cumulatively significant impact**.

Impact SOC-10: Increases in Population and Housing Demand Within the CVP and SWP Water Service Areas

Implementing any of the action alternatives would generate agriculture-related employment that could potentially increase population and housing demand within the CVP and SWP water service areas. Because workers are expected to reside in nearby communities and cities in the CVP and SWP water service areas, neither substantial population growth nor an increase in housing demand would be anticipated as a result of this job generation. Furthermore, these jobs would be dispersed over a large geographical area and would not be concentrated in any one county. Therefore, impacts associated with increases in population and subsequent housing demand would be less than significant, and implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to a cumulatively significant impact on housing demand as a result of agriculture-related employment within the CVP and SWP water service areas.

Impact SOC-11: Increases in Business Income and Local Sales Tax Revenue Within the CVP and SWP Water Service Areas

As discussed in Chapter 23, "Socioeconomics, Population, and Housing," agriculture-related income and spending represent new local economic activity and provide employment opportunities to unemployed workers in the CVP and SWP water service areas. In addition, implementing any of the action alternatives would result in a substantial increase in business income and local sales tax revenue in the CVP and SWP water service areas from spending of personal income. Implementing any of the action alternatives would result in beneficial and less-than-significant socioeconomic impacts in the CVP and SWP water service areas; therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to a cumulatively significant impact on the conversion of agricultural lands and declines in agricultural economic value.

Transportation, Circulation, and Infrastructure

Actions of past and present projects that have resulted in degradation of transportation, circulation, or infrastructure in the primary study area include:

- Population growth, land use development, and associated increases in traffic volumes to area roadways
- Construction activities and associated traffic safety hazards, and lane or road closures

As discussed in Chapter 24, "Transportation, Circulation, and Infrastructure," and shown in Table 27-21, the action alternatives could result in direct and/or indirect impacts in the primary study area. The action alternatives would have no impacts to transportation, circulation, or infrastructure in the extended study area.

Table 27-21. Direct, Indirect, and Cumulative Impacts to Transportation, Circulation, and Infrastructure

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
TRN-1: Reduce Level of Service for Designated Roads	Primary Study Area	All	LTS	LTS
	Extended Study Area	All	NI	NC
TRN-2: Increase Traffic Hazards on Local Roads	Primary Study Area	All	LTS	LTS
	Extended Study Area	All	NI	NC
TRN-3: Interfere with Emergency Access	Primary Study Area	All	LTS	LTS
	Extended Study Area	All	NI	NC
TRN-4: Decrease Performance of Bicycle or Pedestrian Facilities	Primary Study Area	All	LTS	LTS
	Extended Study Area	All	NI	NC

Key:
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

A number of reasonably foreseeable future projects that would be located in the vicinity of the primary study area have the potential to affect transportation, circulation, and infrastructure that also may be affected by implementing any of the action alternatives. Development projects (e.g., Gunner Ranch West Specific Plan, Brighton Crest, Ventana Hills Estates Annexation) and continued development, as allowed in the Fresno county and Madera county general plans, would result in additional traffic and may include roadway improvements, or modifications, such as widening for area roadways.

The proponents of development projects that would contribute to increases in traffic volumes or modifications to the transportation network will be required to identify impacts and provide mitigation in compliance with NEPA, CEQA, and other Federal, State, and local statutes. Even with compliance with regulatory requirements and implementation of mitigation, the traffic volumes generated from these reasonably foreseeable future projects may contribute to an overall significant adverse cumulative impact on roadways in the region. Additionally, these projects could result in temporary impacts to transportation, circulation, or infrastructure during construction.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact TRN-1: Reduce Level of Service for Designated Roads

Past, present, and reasonably foreseeable projects have and would increase traffic volumes along regional and local roadways within the primary study area. Construction of any of the action alternatives would contribute approximately 606 daily trips to the area roadways, and have a less-than-significant impact on the LOS for designated roads or highways (Impact TRN-1).

The traffic volumes generated from the combination of any of the action alternatives with past, present, and reasonably foreseeable projects could potentially decrease the LOS for designated roads or highways in the primary study area. If future projects are constructed simultaneously with the Temperance Flat RM 274 Dam, or would result in additional traffic after construction, the associated traffic would act cumulatively with the Temperance Flat RM 274 Dam construction traffic to affect local roadway LOS. In general,

construction activities are not considered impacts due to their temporary and limited duration. In addition, construction generated traffic would operate along designated routes and occur outside of the peak hours for commute travel, further reducing potential impacts of construction on transportation, circulation, and infrastructure. Therefore, due to the short-term and temporary nature of the construction period, the construction-related trips under the action alternatives would not contribute to any significant cumulative impacts related to the LOS for designated roads or highways in the primary study area.

Recreation-related changes associated with the action alternatives, specifically the improved conditions at Millerton Lake and the creation of the new Temperance Flat RM 274 Reservoir, would lead to an increase in long-term traffic volumes. It is estimated that during peak use, 672 vehicle trips per day would be added to area roadways as a result of increased recreational activity at Millerton Lake and Temperance Flat RM 274 Reservoir, and have a less-than-significant impact on the LOS for designated roads or highways (Impact TRN-1).

The traffic volumes generated from the combination of the project with past, present, and reasonably foreseeable projects could potentially decrease the LOS on area roadways. However, the recreation-related contribution of the action alternatives to traffic on area roadways would be substantially less than the traffic contribution from the combination of past, present, and reasonably foreseeable projects, and would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to the LOS for designated roads or highways in the primary study area.

Impact TRN-2: Increase Traffic Hazards on Local Roads

Past projects in the primary study area have required, and likely many of the present and reasonably foreseeable projects will require, roadway improvements or modifications, such as widening for area roadways. Therefore, implementing the related projects could result in a significant temporary impact from the increase in traffic safety hazards to these facilities during temporary construction activities.

The maneuvering of project construction vehicles and equipment among the general-purpose traffic on local roads could cause safety hazards. Traffic safety hazards could

increase as a result of (1) the introduction of trucks and other construction-related vehicles that could affect the minimal stopping sight distance, (2) conflicts where road width is narrowed or a roadway is closed during construction activities, or (3) increased truck traffic in general (and slower speeds and wider turning radii of trucks) during construction. The combination of any of the action alternatives with past, present, and reasonably foreseeable projects could potentially increase traffic safety hazards on local roadways.

In general, construction activities are not considered to be significant impacts due to their temporary and limited duration. Furthermore, mitigation would reduce Impact TRN-2 to a less-than-significant level by incorporating the measures identified in a TMP. Therefore, implementing any of the action alternatives would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any significant cumulative impacts related to traffic safety hazards on local roadways in the primary study area.

Impacts TRN-3 and TRN-4: Interfere with Emergency Access and Decrease Performance of Bicycle or Pedestrian Facilities

Past projects in the primary study area have included, and likely many of the present and reasonably foreseeable projects would include, roadway improvements or modifications that would require lane or road closures or roadway detours. These projects could therefore result in a significant temporary cumulative impact because lane or road closures could impair the ability of local agencies to respond to an emergency and decrease the performance or safety of bicycle or pedestrian facilities during construction activities.

Construction activities under the action alternative (e.g., temporary lane closures during installation of the new transmission line and the addition of construction-vehicles to the traffic stream) could contribute to a significant temporary cumulative impact for the same reasons identified above for present and reasonably foreseeable projects. Specifically, the action alternative could impair the ability of local agencies to respond to an emergency and decrease the performance or safety of bicycle or pedestrian facilities during construction activities.

In general, construction activities are not considered to be significant impacts due to their temporary and limited duration. Furthermore, mitigation would reduce Impact TRN-3 and

Impact TRN-4 to less-than-significant levels by incorporating the measures identified in a TMP. Therefore, implementing any of the action alternatives would not combine with the impacts of other past, present, or reasonably foreseeable future projects to contribute to any new significant cumulative impacts related to emergency access and circulation or the safety of bicycle or pedestrian facilities in the primary study area.

Extended Study Area

Reasonably foreseeable future projects in extended study area could increase traffic levels on area roadways and result in significant impacts on transportation, circulation, and infrastructure. However, these projects will be required to identify and provide mitigation in compliance with NEPA; CEQA; and other local, State, and Federal statutes. Even with compliance with regulatory requirements and implementation of mitigation, the traffic volumes generated from these reasonably foreseeable future projects may contribute to an overall significant adverse cumulative impact on roadways in the extended study area. Additionally, these projects could result in temporary impacts to transportation, circulation, or infrastructure during construction.

Implementing any of the action alternatives would have virtually no impact on transportation, circulation, and infrastructure in the extended study area because vehicular traffic generated by the action alternatives would be concentrated along designated roadways within the primary study area.

Utilities and Service Systems

Actions of past and present projects that have had impacts on utilities and service systems in the primary and extended study areas include:

- Population growth, land use, and associated development

As discussed in Chapter 25, “Utilities and Service Systems,” and shown in Table 27-22, the action alternatives could result in direct and/or indirect impacts in the primary study area. The action alternatives have no impact to utilities and service systems in the extended study areas.

Table 27-22. Direct, Indirect, and Cumulative Impacts to Utilities and Service Systems

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
UTL-1: Result in Exceeding Wastewater Treatment Requirements or Requiring New or Expanded Wastewater Treatment Facilities	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
UTL-2: Result in Exceeding Stormwater Drainage Infrastructure Capacity or Requiring New or Expanded Stormwater Drainage Facilities	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC
UTL-3: Increase in Solid Waste Generation That Exceeds Permitted Landfill Capacity	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC
UTL-4: Damage to or Disruption of Utility or Service Systems	Primary Study Area	All	LTS	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.
Key:
LTS = less than significant
NC = no contribution
NI = no impact

Primary Study Area

For environmental impacts occurring in the primary study area that are associated with implementing any of the action alternatives, the geographic context for the cumulative impacts analysis is the central Sierra Nevada foothill region. Past and present actions by humans have substantially altered the physical environment through the need for water supply, wastewater and stormwater infrastructure, and solid waste disposal.

Most projects that could result in significant impacts on utilities and service systems will be required to identify and provide mitigation in compliance with Federal ESA and CESA; CEQA; and other local, State, and Federal statutes. These requirements should alleviate impacts to the transportation system. The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impact UTL-1: Result in Exceeding Wastewater Treatment Requirements or Requiring New or Expanded Wastewater Treatment Facilities

Implementing any of the action alternatives would generate solid waste during construction that might require disposal at an off-site facility. Other existing and reasonably foreseeable future projects occurring in the landfill service area would also generate wastes requiring disposal at a landfill. The combined volume of solid waste to be disposed of at the local landfill would decrease the life expectancy to a certain undefined degree. Because the disposal of solid waste from construction of Temperance Flat RM 274 Reservoir would occur for only a short period, the reduction of life expectancy from the action alternatives would be limited. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the potentially significant cumulative impact related to solid waste disposal.

Impact UTL-3: Increase in Solid Waste Generation That Exceeds Permitted Landfill Capacity

Implementing any of the action alternatives would generate wastewater during construction that might require disposal at an off-site facility. Existing regional wastewater treatment facilities and sanitary landfill sites that serve the Fresno and Clovis metropolitan area are likely facilities with available capacity to receive this wastewater based on Wastewater Plant Criteria. Other existing and reasonably foreseeable future projects occurring in the treatment facility service area would also generate wastes requiring treatment at the wastewater facility. The combined wastewater flow would decrease available capacity of the treatment plant. If this were to cause exceedence of rated capacity or water quality limits, it would be considered a significant cumulative impact. The wastewater generated from construction of the Temperance Flat RM 274 Reservoir would be very small relative to regional wastewater generation, and treatment plant upgrades from the minor increase in wastewater would not be needed. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the potentially significant cumulative impact from wastewater generated during construction.

Wastewater generated at recreation facilities at the new reservoir is expected to be disposed of on-site, similar to existing recreation facilities located at Millerton Lake. This wastewater flow would not make a cumulatively considerable

incremental contribution to a significant cumulative impact related to wastewater generation at recreation facilities.

Impact UTL-4: Damage to or Distribution of Utility or Service Systems

Implementing any of the action alternatives would temporarily disrupt the availability of power to PG&G, but not disrupt individual utility customers. The action alternatives include relocating PG&E electric power transmission lines. The transmission lines currently connect the generators at the Kerckhoff and Kerckhoff No. 2 powerhouses with the electrical grid. The existing transmission lines would be removed and reconstructed outside of the reservoir inundation area. New transmission lines would also be installed to connect the new powerhouse located on Millerton Lake. Therefore, implementing any of the action alternatives would not make a cumulatively considerable incremental contribution to the potentially significant cumulative impact related to the distribution of utility or service systems.

Extended Study Area

No impacts to utilities or service systems would occur in the extended study area.

Visual Resources

Actions of past and present projects that have resulted in cumulative impacts to visual resources in the primary and extended study areas include:

- Construction and operations of Friant Dam and Millerton Lake, and Kerckhoff Dam and Reservoir
- Construction of residences and recreation facilities around Millerton Lake
- Conversion of natural vegetation to agricultural and developed land uses
- Population growth and associated development of infrastructure both in the Sierra foothills and the Central Valley
- Construction and operations of flood management facilities (including the Chowchilla, Eastside, and

Mariposa bypasses and associated diversion and drop structures)

- Construction and operations of water supply infrastructure (including Friant Dam, Millerton Lake, Mendota Dam and Pool, Sack Dam, and other dams and reservoirs; the DMC; Arroyo Canal; and other diversion facilities on the San Joaquin River and in the Delta)

- Resource extraction (including gold and gravel mining)

As discussed in Chapter 26, "Visual Resources," and shown in Table 27-23, the action alternatives could result in direct and/or indirect impacts in the primary study area; no impacts would occur in the extended study area.

Table 27-23. Direct, Indirect, and Cumulative Impacts to Visual Resources

Impact	Study Area	Action Alternative	Direct/Indirect Impact Level of Significance After Mitigation[1]	Contribution to Overall Cumulative Impact
VIS-1: Consistency with Applicable Plans	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
VIS-2: Degradation and/or Obstruction of a Scenic View	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
VIS-3: Generation of Increased Daytime Glare and/or Nighttime Lighting	Primary Study Area	All	SU	CU
	Extended Study Area	All	NI	NC
VIS-4: Impacts on a Designated Scenic Highway	Primary Study Area	All	NI	NC
	Extended Study Area	All	NI	NC

Note:
[1] Where the action alternative would have no impact, no contribution to a cumulative impact would occur, and thus the impacts are not discussed further in this section.

Key:
CU = considerable and unavoidable contribution
NC = no contribution
NI = no impact
SU = significant and unavoidable

Primary Study Area

Reasonably foreseeable projects which impact visual resource in the primary study area and which could combine with the action alternatives to contribute to a cumulative adverse impact

include development projects, such as Brighton Crest/Eagle Springs Golf Course and Country Club, Gunnar Ranch West Specific Plan, Ventana Hills Estates Annexation, and Gateway Village Specific Plan, and local plans, such as the BLM Bakersfield Proposed RMP for the SJRG SRMA.

The following describes potential cumulative effects to the identified project-related impacts in the primary study area.

Impacts VIS-1 Through VIS-3: Visual Resources Impacts

Implementing any of the action alternatives would result in impacts on visual resources that would be inconsistent with Bakersfield RMP objectives in parts of the primary study area and would degrade or obstruct scenic views, causing significant and unavoidable visual impacts (Impact VIS-1 and Impact VIS-2). Furthermore, the generation of glare from the introduction of construction equipment and exposed soils and the operation of equipment in active construction areas would be a significant and unavoidable impact (Impact VIS-3).

Mitigation Measures VIS-2 and VIS-3 would be implemented to minimize the significant impacts to the extent practical; however, these measures would not be sufficient to reduce these impacts to a less-than-significant level.

Implementing any of the action alternatives could contribute to a cumulative adverse impact where changes to the landscape occupy the same field of view or in the area of other major facilities and previously altered landscapes. The distance of the action alternatives from downstream activities and the intervening foothill topography preclude views of the new reservoir that share a common viewshed. However, the proposed Temperance Flat RM 274 Dam would be visible from locations on Millerton Lake, including KOP 4. From this observation point, both the new dam and existing Millerton Lake would be visible.

Implementing Alternative Plans 1-4 would stabilize the Millerton Lake water surface elevation, minimize reservoir drawdown, and reduce the exposure of barren side slopes. This reduction would enhance the visual appearance associated with the bathtub ring common to reservoirs in the western United States. Under Alternative Plan 5, Millerton Lake could be drawn down further during the year, increasing the exposure of barren side slopes. Under all of the action alternatives, construction and operation of Temperance Flat RM 274 Dam combined with the existing water surface of Millerton Lake

would create a substantial visual modification, as described in Chapter 26, "Visual Resources."

The substantial visual effect of establishing a new reservoir within a relatively short stretch of the San Joaquin River would be a significant cumulative impact on visual resources on the San Joaquin River. As noted in the discussion of Impact VIS-2, transforming the riverine character to a reservoir is a major visual change. The cumulative visual effect of the downstream Friant Dam, the upstream Kerckhoff Dam, and the new dam at RM 274 (creation of a continuous flat water vista) would substantially alter the existing visual character of this segment of the San Joaquin River. Therefore, the action alternatives would cause a **cumulatively considerable incremental contribution to the overall significant cumulative impacts** related to consistency with guidelines of applicable plans (Impact VIS-1), degradation and/or obstruction of a scenic view (Impact VIS-2), and generation of increased daytime glare and/or nighttime lighting (Impact VIS-3).

Extended Study Area

None of the action alternatives would have a visual impact in the extended study area; therefore, none of these action alternatives would make a cumulatively considerable incremental contribution to the cumulative visual resource impacts associated with existing or reasonably foreseeable projects in the extended study area.

Chapter 28
Other NEPA and CEQA Considerations

Significant Adverse Effects That Cannot Be Avoided If a Project Is Implemented

Section 21100(b)(2)(A) of CEQA requires an EIR to include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Chapters 4 through 7 and 9 through 27 of this Draft EIS analyze in detail all of the project's potentially significant environmental impacts, including cumulative impacts; list feasible mitigation measures that could avoid, minimize, rectify, reduce or eliminate, or compensate for the project's significant impacts; and specify whether these mitigation measures would reduce the impacts to a less-than-significant level. If no feasible mitigation measure is available to reduce a significant impact to a less-than-significant level, then the impact would be significant and unavoidable.

After consideration of actions, operations, and features to avoid, mitigate, and/or compensate for adverse impacts, implementing any of the action alternatives could result in the following potentially significant and unavoidable or significant and unavoidable direct and indirect impacts:

- **Air Quality and Greenhouse Gas Emissions Impacts –** AQ-1: Project-Generated Construction-Related Criteria Air Pollutant and Precursor Emissions that would Violate or Contribute Substantially to an Existing or Projected Violation, or Expose Sensitive Receptors to Substantial Pollutant Concentrations; and AQ-4: Generation of Greenhouse Gas Emissions that would Significantly Impact the Environment.

- **Biological Resources – Fisheries and Aquatic Ecosystems Impacts** – FSH-1: Loss of Riverine Habitat for Lotic Fish Species, FSH-9: Loss of Spawning Habitat of American Shad and Striped Bass, FSH-11: Change in Water Temperature Conditions Supporting Juvenile Salmon and Steelhead Migration,

and FSH-18: Effects on Delta Fish Habitat from Changes in Water Temperatures and Dissolved Oxygen Concentrations.

- **Biological Resources – Botanical and Wetlands Impacts** – BOT-2: Loss of Riparian Habitat and Other Sensitive Communities.

- **Biological Resources – Wildlife Impacts** – WLD-3: Substantial Impact on Special-Status Raptors, and WLD-10: Potential Conflict with Fresno County and Madera County General Plan Objectives and Guidelines.

- **Cultural Resources Impacts** – CUL-1: Disturbance or Destruction of Known or Previously Undiscovered Prehistoric Resources Due to Construction, Inundation, and Project Operation; CUL-2: Disturbance or Destruction of Known or Previously Undiscovered Historic-Era Resources Due to Construction, Inundation, and Project Operation; CUL-3: Construction and Management of Project Components That would Cause a Substantial Adverse Change in the Significance of a Historical and/or Unique Archaeological Resource, Historic Property, or Historic District; and CUL-5 Destruction or Damage to Indian Sacred Sites.

- **Geology and Soils Impacts** – GEO-2: Alteration of Fluvial Geomorphology that would Adversely Affect Aquatic Habitat, and GEO-4: Substantial Soil Erosion or Loss of Topsoil Due to Construction and Operations.

- **Land Use Planning and Agricultural Resources Impacts** – LUP-1: Disruption of Existing Land Uses, LUP-2: Conflict with Adopted Plans, LUP-3: Conversion of Farmland to Nonagricultural Uses and Cancellation of Williamson Act Contracts, and LUP-4: Conversion of Forest Land.

- **Noise and Vibration Impacts** – NOI-1: Exposure of Sensitive Receptors to Noise Generated by Facility Construction, NOI-3: Exposure of Sensitive Receptors in the Primary Study Area to Construction-Related Traffic Noise, and NOI-5: Long-Term Increases in Traffic Noise.

- **Power and Energy Impacts** – PWR-1: Decrease in Kerckhoff Hydroelectric Project Energy Generation and Ancillary Services.

- **Recreation Impacts** – REC-2: Permanent Loss of a Resource Used for Recreation, REC-3: Substantial or Long-Term Reduction or Elimination of Recreation Opportunities or Experiences, and REC-4: Loss of Access to a Locally Important Recreation Site or Area.

- **Visual Resources Impacts** – VIS-1: Consistency With Applicable Plans, VIS-2: Degradation and/or Obstruction of a Scenic View, and VIS-3: Generation of Increased Daytime Glare and/or Nighttime Lighting.

Alternative Plan 5 would likely result in the following additional significant and unavoidable impacts:

- **Biological Resources – Fisheries and Aquatic Ecosystems Impacts** – FSH-10: Change in Habitat Potential for Spring-Run Chinook Salmon.

Implementing any of the action alternatives could also result in the following significant and unavoidable cumulative impacts:

- **Air Quality and Greenhouse Gas Emissions Impacts** – AQ-1: Project-Generated Construction-Related Criteria Air Pollutant and Precursor Emissions that would Violate or Contribute Substantially to an Existing or Projected Violation, or Expose Sensitive Receptors to Substantial Pollutant Concentrations; and AQ-4: Generation of Greenhouse Gas Emissions that would Significantly Impact the Environment.

- **Biological Resources – Fisheries and Aquatic Ecosystems Impacts** – FSH-1: Loss of Riverine Habitat for Lotic Fish Species, FSH-9: Loss of Spawning Habitat of American Shad and Striped Bass, FSH-11: Change in Water Temperature Conditions Supporting Juvenile Salmon and Steelhead Migration, and FSH-18: Effects on Delta Fish Habitat from Changes in Water Temperatures and Dissolved Oxygen Concentrations.

- **Biological Resources – Botanical and Wetlands Impacts** – BOT-1: Loss of Special-Status Plants and Loss or Degradation of Special-Status Plant Habitat,

BOT-2: Loss of Riparian Habitat and Other Sensitive Communities, and BOT-6: Conflict with Local or Regional Policies and Plans Protecting Wetland or Botanical Resources.

- **Biological Resources – Wildlife Impacts** – WLD-1: Substantial Impact on Special-Status Invertebrates, WLD-2: Substantial Impact on Special-Status Amphibians and Reptiles, WLD-3: Substantial Impact on Special-Status Raptors, WLD-4: Substantial Impact on Special-Status Passerines or Birds Protected by the Migratory Bird Treaty Act, WLD-5: Substantial Impact on Ringtail, WLD-6: Substantial Impact on American Badger, WLD-7: Substantial Impact on San Joaquin Pocket Mouse, WLD-8: Substantial Impact on Special-Status Bat Species, WLD-9: Substantial Impact on Migratory and Wintering Deer Herds, and WLD-10: Potential Conflict with Fresno County and Madera County General Plan Objectives and Guidelines

- **Cultural Resources Impacts** – CUL-1: Disturbance or Destruction of Known or Previously Undiscovered Prehistoric Resources Due to Construction, Inundation, and Project Operation; CUL-2: Disturbance or Destruction of Known or Previously Undiscovered Historic-Era Resources Due to Construction, Inundation, and Project Operation; CUL-3: Construction and Management of Project Components That would Cause a Substantial Adverse Change in the Significance of a Historical and/or Unique Archaeological Resource, Historic Property, or Historic District; and CUL-5 Destruction or Damage to Indian Sacred Sites.

- **Environmental Justice Impacts –** ENJ-1: Disproportionately High and Adverse Impacts on Minority and Low Income Populations.

- **Geology and Soils Impacts** – GEO-2: Alteration of Fluvial Geomorphology that would Adversely Affect Aquatic Habitat, and GEO-4: Substantial Soil Erosion or Loss of Topsoil Due to Construction and Operations.

- **Hydrology – Groundwater Impacts –** GRW-1: Change in Groundwater Levels, GRW-2: Change in Groundwater Quality.

- **Hydrology – Surface Water Quality Impacts** – SWQ-4: Long-Term Water Quality Effects that would Violate Water Quality Standards or Adversely Affect Beneficial Uses within the Primary Study Area and San Joaquin River.

- **Land Use Planning and Agricultural Resources Impacts** – LUP-1: Disruption of Existing Land Uses, LUP-2: Conflict with Adopted Plans, LUP-3: Conversion of Farmland to Nonagricultural Uses and Cancellation of Williamson Act Contracts, and LUP-4: Conversion of Forest Land.

- **Noise and Vibration Impacts** – NOI-1: Exposure of Sensitive Receptors to Noise Generated by Facility Construction, NOI-3: Exposure of Sensitive Receptors in the Primary Study Area to Construction-Related Traffic Noise, and NOI-5: Long-Term Increases in Traffic Noise.

- **Power and Energy Impacts** – PWR-1: Decrease in Kerckhoff Hydroelectric Project Energy Generation and Ancillary Services.

- **Socioeconomics, Population, and Housing Impacts** – SOC-9: Impacts on Agricultural Economics in the CVP and SWP Water Service Areas.

- **Visual Resources Impacts** – VIS-1: Consistency With Applicable Plans, VIS-2: Degradation and/or Obstruction of a Scenic View, and VIS-3: Generation of Increased Daytime Glare and/or Nighttime Lighting.

Relationship between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). This involves using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare; create and maintain conditions under which humans and nature can exist

in productive harmony; and fulfill the social, economic, and other requirements of present and future generations of Americans.

All of the action alternatives analyzed in this Draft EIS would involve the construction of a new dam on the San Joaquin River at RM 274, relocating existing hydroelectric power-generating facilities and associated transmission lines, relocating or constructing new recreational facilities and access roads, and removing existing tree canopy and vegetative cover. Specific activities would require decommissioning two Kerckhoff Project powerhouses (including the powerhouse intakes in Kerckhoff Lake), modifying Kerckhoff Dam; and partially relocating transmission lines, the San Joaquin River Trail, primitive campgrounds, and a Native American interpretive exhibit.

Implementing any of the action alternatives would result in indirect and induced employment, which might support hiring in businesses that would provide materials to the construction effort; in service-related industries that would provide food, beverages, and other goods to construction workers; and in more technical industries, such as consulting firms and other businesses (see Chapter 23, “Socioeconomics, Population, and Housing”). Sales and profits for businesses that support the construction industry in the primary study area would increase over the 8-year construction period.

Habitat- and recreation-related losses caused by constructing and operating the new dam and reservoir would irreversibly affect habitats and developments near the dam inundation area. Impacts on habitat areas within the dam inundation area would be partially mitigated by preserving similar habitats elsewhere. Recreation impacts would be offset with the establishment of new or relocated recreation facilities and opportunities associated with the new reservoir, such as boating and water skiing.

Construction activities would include short-term uses of capital, fuels, and construction materials. General commitments of construction materials are irreversible because most construction materials are unsalvageable.

Potential benefits of implementing any of the action alternatives include an increase in water supply reliability and a reduction in the probability of experiencing a potential flood-related loss of resources, property, and human life. Increased

recreational use would be associated with a stabilized storage volume in Millerton Lake and the new Temperance Flat RM 274 Reservoir and facilities. Environmental uses and habitat for a variety of aquatic and terrestrial species along the San Joaquin River and waterways within the extended study area would not be affected with implementation of any of the action alternatives.

Irreversible and Irretrievable Commitments of Resources

CEQA Section 21100 (b)(2)(A) requires a discussion of the significant irreversible environmental changes that would be caused by implementing the project. In addition, an EIS prepared under NEPA must analyze irreversible and irretrievable commitments of resources, such as soils, wetlands, waterfowl habitat, and cultural resources (40 CFR, Section 1502.16).

The irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled or those that are consumed or reduced to unrecoverable forms. Implementing any of the action alternatives would result in the irreversible and irretrievable commitment of the following energy and material resources during project construction and maintenance:

- Construction materials, including soil and rock
- Land area committed to new or expanded project facilities and water inundation areas
- Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction, operations, and maintenance

Nonrenewable resources are expected to account for a minimal portion of the region's resources; the project's use of nonrenewable resources would not affect the availability of these resources for other needs within the region. Construction activities would not result in inefficient use of energy or natural resources. The selected construction contractors would use best available engineering techniques, construction and design practices, and equipment-operating procedures. Furthermore,

mitigation would be provided to partially offset loss of habitat areas and other land uses within the proposed dam inundation areas. Long-term project operation would not result in substantial long-term consumption of energy and natural resources, and operation of the Temperance Flat RM 274 Reservoir would result in increased energy production.

Regulatory Setting

The following section generally describes the Federal, State, and local regulatory setting for the Investigation. With the exception of NEPA (Federal) and CEQA (State), which are presented first, applicable Federal, State, and local regulations are categorized alphabetically.

Federal

National Environmental Policy Act

NEPA is the nation's broadest environmental law, applying to all Federal agencies and most of the activities they manage, regulate, or fund that affect the environment. This law requires Federal agencies to disclose and consider the environmental implications of their proposed actions. NEPA establishes environmental policies for the nation, provides an interdisciplinary framework for Federal agencies to avoid or minimize environmental impacts, and contains action-forcing procedures to ensure that Federal agency decision makers take environmental factors into account.

Antiquities Act of 1906

The Antiquities Act of 1906 (Public Law 59-209; 16 USC 431-433, 34 Statute 225) regulates the collecting "any object of antiquity," which includes fossils, on land managed by BLM, the National Park Service, the USFS, the Department of Energy, and other Federal agencies. This act also establishes criminal sanctions for unauthorized appropriation or destruction of antiquities.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act, enacted in 1940 and amended multiple times since, prohibits the taking of bald and golden eagles without a permit from the Secretary of the Interior. Similar to the ESA, the Bald and Golden Eagle Protection Act defines "take" to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" (16 USC 668-668c). Any disturbance that would injure an

eagle, decrease productivity, or cause nest abandonment – including habitat alterations that could have these results – is considered take and can result in civil or criminal penalties.

Biological Opinions on the Long-Term Operations of the Central Valley Project and State Water Project

As described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," USFWS and NMFS released their BOs on the long-term operations of the CVP and SWP in 2008 and 2009, respectively (USFWS 2008, NMFS 2009). The 2008 USFWS BO and the 2009 NMFS BO included RPAs to avoid jeopardy to the species. The RPAs included conditions for revised water operations, habitat restoration and enhancement actions, and fish passage actions.

Actions were brought challenging the NMFS and USFWS BOs (2008 and 2009) under ESA and the Administrative Procedure Act concerning the effects of the CVP and SWP on endangered fish species. Despite the uncertainty resulting from the ongoing reconsultation process, the 2008 Long-Term Operations BA and the 2008 and 2009 BOs issued by the fishery agencies contain the most recent estimate of potential changes in water operations that could occur in the near future. Furthermore, it is currently anticipated that the final BOs issued by the resource agencies will contain similar RPAs.

Central Valley Project Improvement Act

Implementation of the CVPIA changed management of the CVP by making fish and wildlife protection a project purpose, equal to water supply for agricultural and urban uses. The CVPIA affects water exports from the Delta to San Luis Reservoir and increases operational pressures on the reservoir to meet SOD water demands. CVPIA Section 3406 (b)(2) authorized and directed the Secretary of the Interior, among other actions, to dedicate and manage 800 TAF of CVP yield annually for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized in the CVPIA, to assist the State of California in its efforts to protect the waters of the San Francisco Bay-Delta Estuary, and to help meet obligations legally imposed on the CVP under Federal or State law following the date of enactment of the CVPIA.

CVPIA Section 3406(d)(1) required that the Secretary immediately provide specific quantities of water to the refuges, referred to as Level 2 supplies. The CVPIA requires delivery of

Level 2 water in all year types except critically dry water year conditions, when Level 2 water can be reduced by 25 percent. Section 3406(d)(2) of the CVPIA refers to Level 4 refuge water supplies, which are the quantities required for optimum habitat management of the existing refuge lands. Level 4 water supplies amount to about 163 TAF and are in addition to Level 2 water supplies. The availability of Level 4 refuge water supplies is influenced by the availability of water for transfer from willing sellers, which varies from year to year. CVPIA Section 3406(c)(1) mandated development of a comprehensive plan that is reasonable, prudent, and feasible to be presented to Congress to address fish, wildlife, and habitat concerns on the San Joaquin River. However, the San Joaquin River Restoration Settlement Act declared "that the Settlement satisfies and discharges all of the obligations of the Secretary contained in section 3406(c)(1)."

Clean Water Act

The CWA is the primary Federal legislation governing the water quality aspects of the study area. The objective of the act is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA establishes the basic structure for regulating discharge of pollutants into the waters of the United States and gives EPA the authority to implement pollution control programs such as setting wastewater standards for industries. In certain states such as California, EPA has delegated authority to State agencies.

Section 303 Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. The three major components of water quality standards are designated users, water quality criteria, and antidegradation policy. Section 303(d) of the CWA requires states and authorized Indian tribes to develop a list of water-quality-impaired segments of waterways. The list includes waters that do not meet water quality standards necessary to support the beneficial uses of a waterway, even after point sources of pollution have installed the minimum required levels of pollution control technology. Only waters impaired by "pollutants" (including clean sediments, nutrients such as nitrogen and phosphorus, pathogens, acids/bases, temperature, metals, cyanide, and synthetic organic chemicals (EPA 2002)), not those impaired by other types of "pollution" (e.g., altered flow, channel modification), are to be included on the list.

Section 303(d) of the CWA also requires states to maintain a list of impaired water bodies so that a TMDL can be established. A TMDL is a plan to restore the beneficial uses of a stream or to otherwise correct impairment. It establishes the allowable pollutant loadings or other quantifiable parameters (e.g., pH, temperature) for a water body and thereby provides the basis for establishing water quality-based controls. The calculation for establishing TMDLs for each water body must include a margin of safety to ensure that the water body can be used for the purposes of State designation. Additionally, the calculation also must account for seasonal variation in water quality (EPA 2002). The Central Valley Water Board develops TMDLs for the San Joaquin River (see discussion on the Porter-Cologne Water Quality Control Act below).

Section 401 Under CWA Section 401, applicants for a Federal license or permit to conduct activities that may discharge a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate. If appropriate, the certification must be obtained from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a Federal component and may affect state water quality (including projects that require approval from a Federal agency, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

In California, the authority to grant water quality certification has been delegated to the State Water Board. Applications for water quality certification under CWA Section 401 are typically processed by the regional water quality control board with local jurisdiction – in this case, the Central Valley Water Board. For a project to receive water quality certification, the project's potential impacts must be evaluated in light of water quality standards and CWA Section 404 criteria that govern discharges of dredged and fill materials into waters of the United States.

Section 402 Section 402 of the CWA creates the National Pollutant Discharge Elimination System (NPDES) permit program. This program covers point sources of pollution discharging into a surface water body.

Section 404 Section 404 of the CWA requires that a permit be obtained from USACE for the discharge of dredged or fill material into "waters of the United States, including wetlands."

Waters of the United States are wetlands and lakes, rivers, streams, and their tributaries. Waters of the United States are defined for regulatory purposes, at 33 CFR 328.3, as follows:

> *(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide; (2) All interstate waters, including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) All impoundments of waters otherwise defined as waters of the United States under the definition; (5) Tributaries of waters identified in paragraphs 1–4 in this section; (6) The territorial seas; and (7) Wetlands adjacent to waters identified in paragraphs 1–6 in this section.*

CWA Section 404(b) requires that USACE process permits in compliance with guidelines developed by the EPA. These guidelines (the CWA Section 404(b)(1) Guidelines) require the analysis of available alternatives that meet the project's overall purpose and need, including those alternatives that avoid and minimize discharges of dredged or fill materials in waters. Once alternatives deemed to be practicable have been identified, the only action that USACE can permit must be the least environmentally damaging practicable alternative, based on costs, logistics, and technology.

The ROD for the CALFED PEIS/R includes a CWA Section 404 memorandum of understanding signed by Reclamation, EPA, USACE, and DWR. Under the terms of the memorandum of understanding, when a project proponent applies for a Section 404 individual permit for CALFED projects, the proponent is not required to reexamine program alternatives already analyzed in the programmatic EIS/EIR. Reclamation will provide USACE and EPA project-specific information summarizing the findings of this Draft EIS to allow the agencies to will focus on the project-level alternatives that are consistent with the CALFED PEIS/R when they select the least environmentally damaging practicable alternative at the time of a Section 404 permit decision (CALFED 2000).

Coordinated Operation Agreement

The COA between Reclamation and DWR governs the coordinated operations of the CVP and SWP (Reclamation and DWR 1986) in the Delta. With the goal of using coordinated management of reservoir releases and surplus flows in the Delta to improve Delta export and conveyance capability, the COA received congressional approval in 1986 and became Public Law 99-546. As modified by interim agreements, the COA coordinates operations between the CVP and SWP, and provides for equitable sharing of surplus water entering the Delta.

Council on Environmental Quality Guidance

The CEQ issued guidance in 1997 entitled, *Environmental Justice: Guidance under the National Environmental Policy Act*, that established the role of EO 12898 as it relates to actions subject to NEPA. The guidance also established the criteria for identifying environmental justice populations and how to consider the involvement of environmental justice groups throughout phases of the NEPA process.

Criteria Air Pollutants

At the Federal level, the EPA implements national air quality programs. EPA's air quality mandates are drawn primarily from the CAA, which was enacted in 1970 and most recently amended in 1990.

The CAA required EPA to establish primary and secondary national ambient air quality standards, as shown in Table 4-2 of Chapter 4 – Air Quality and Greenhouse Gas Emissions. The CAA also required each state to prepare an air quality control plan referred to as a State implementation plan (SIP). The Federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all SIPs to determine whether they conform to the mandates of CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in the application of sanctions to transportation funding and stationary air pollution sources in the air basin. Section 112

of the CAA defines "hazardous air pollutants" and sets threshold limits. Asbestos-containing substances are regulated by EPA under the CAA.

Endangered Species Act

USFWS and NMFS share responsibility for implementing the ESA. Generally, USFWS manages terrestrial and freshwater species, while NMFS manages marine and anadromous species, such as Chinook salmon. Both agencies ensure that ESA requirements are followed and evaluate projects that may affect the continued existence of a Federally listed (threatened or endangered) species.

Section 9 of the ESA prohibits the take of Federally listed species. "Take" is defined under the ESA, in part, as killing, harming, or harassing. Under Federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to ESA-listed species by significantly impairing essential behavioral patterns – breeding/rearing, feeding, or sheltering.

Section 7 of the ESA outlines procedures for Federal interagency cooperation to conserve Federally listed species and designated critical habitat. Section 7(a)(2) requires Federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. NMFS also ensures that projects will not adversely affect essential fish habitat, as defined in the 1996 Sustainable Fisheries Act (Public Law 104-297). The goal is to stop or reverse the continued loss of fish habitats by protecting, conserving, and enhancing habitat.

Environmental Compliance Memoranda No. ECM 95-3

The U.S. Department of the Interior, Office of Environmental Policy and Compliance, in a letter responding to an earlier request by the Secretary of the Interior, confirms the requirement of EO 12898 for the Department of the Interior to consider impacts on minority and low-income populations and communities. The memorandum states, "[H]enceforth, all environmental documents should specifically analyze and evaluate the impacts of any proposed projects, actions or decisions on minority and low-income populations and communities, as well as the equity of the distribution of the benefits and risks of those decisions."

Executive Order 11988, Flood Hazard Policy

EO 11988 is a flood hazard policy for all Federal agencies that manage Federal lands, sponsor Federal projects, or provide Federal funds to state or local projects. The order requires that Federal agencies take necessary action to reduce the risk of flood loss; restore and preserve the natural and beneficial values served by floodplains; and minimize the impacts of floods on human safety, health, and welfare.

Executive Order 11990, Protection of Wetlands

EO 11990 is an overall wetlands policy for all Federal agencies that manage Federal lands, sponsor Federal projects, or provide Federal funds to state or local projects. The order requires that Federal agencies follow avoidance, mitigation, and preservation procedures with public input before they propose new construction in wetlands. EO 11990 can restrict the sale of Federal land containing wetlands; however, it does not apply to Federal discretionary authority for non-Federal projects (other than funding) on non-Federal land.

Executive Order 12898, Environmental Justice Policy

EO 12898 requires Federal agencies to identify and address the disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. The requirements of EO 12898 apply to all Federal actions that are located on Federal lands, sponsored by a Federal agency, or funded with Federal monies and may affect minority or low-income populations.

Executive Order 13007, Indian Sacred Sites and April 29, 1994 Executive Memorandum

EO 13007 (May 24, 1996) requires Federal agencies with land management responsibilities to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies are to maintain the confidentiality of sacred sites. Among other things, Federal agencies must provide reasonable notice of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. The agencies must comply with the April 29, 1994, executive memorandum, "Government-to-Government Relations with Native American Tribal Governments."

Executive Order 13112, National Invasive Species Management Plan

EO 11312 directs all Federal agencies to prevent and control introductions of invasive nonnative species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. EO 11312 established the national Invasive Species Council, made up of Federal agencies and departments, and the supporting Invasive Species Advisory Committee, composed of state, local, and private entities. The Invasive Species Council and Advisory Committee oversee and facilitate implementation of the EO, including preparation of a national invasive-species management plan.

Executive Order 13186, Migratory Bird Conservation

EO 13186 (January 10, 2001) directs Federal agencies that have, or are likely to have, a measurable negative impact on migratory bird populations to develop and implement a memorandum of understanding (MOU) with USFWS promoting the conservation of migratory bird populations. Implementation actions and reporting procedures identified in the MOU shall be included in each agency's formal planning process, such as resource management plans and fisheries management plans.

Executive Order 13443, Management of Game Species and Habitats

EO 13443 (August 16, 2007) directs Federal agencies that have programs and activities that have a measurable impact on public land management, outdoor recreation, and wildlife management to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

Farmland Protection Policy Act

The Farmland Protection Policy Act requires that a Federal agency examine the potential impacts of a proposed action on Prime Farmland and Unique Farmland, as defined by the National Resource Conservation Service (NRCS). If the action would adversely affect farmland preservation, the Federal agency must consider alternatives to lessen the adverse effects.

Federal Aviation Administration

Under FAA Title 14 CFR, Part 77, Objects Affecting Navigable Airspace, Section 13(2)i requires an applicant to notify the FAA of the construction of structures within 20,000 feet of the nearest point of the nearest runway of an airport

with at least one runway longer than 3,200 feet. Under Title 14, Part 17, Section 17 requires an applicant to submit a Notice of Proposed Construction or Alteration (FAA Form No. 7460-1) to the FAA for construction within 20,000 feet of the nearest runway of an airport with at least one runway longer than 3,200 feet. 14 CFR 77.21, 77.23, and 77.25 outline the criteria used by the FAA to determine whether an obstruction would create an air navigation conflict. No airports are within 20,000 feet of the primary study area; therefore, these requirements are not applicable. The absence of airports in the vicinity of the primary study area also is discussed in Chapter 21, "Public Health and Hazards."

Federal Cave Resources Protection Act

The Federal Cave Resources Protection Act of 1988 was established to inventory, protect, and maintain significant cave resources to the extent practical. The act requires that a permit be obtained for collection or removal of cave resources and identifies penalties for prohibited acts, including knowingly destroying, disturbing, defacing, removing, or harming any significant cave or altering the free movement of any animal or plant life into or out of any significant cave located on Federal lands without prior authorization.

Federal Clean Air Act

The CAA was enacted to protect and enhance the nation's air quality to promote public health and welfare and the productive capacity of the nation's population. The CAA requires that Federal actions be evaluated to determine their potential impacts on air quality in the project region. California has a corresponding law, which also must be considered during the EIS/EIR process. Local air pollution control districts, such as the SJVAPCD, develop plans and implement control measures in their areas.

For specific projects, Federal agencies must coordinate with the appropriate air quality management district and EPA. This coordination determines whether the project conforms to the CAA and the state implementation plan. The primary study area, and much of the extended study area, is located within the SJVAB. The SJVAPCD implements programs and regulations required by the CAA.

Section 176 of the CAA prohibits Federal agencies from engaging in or supporting an action or activity that does not conform to an applicable state implementation plan. Actions and activities must conform to the plan's purposes of

eliminating or reducing violations of national ambient air quality standards, reducing the severity of violations, and attaining those standards expeditiously.

Federal Energy Regulatory Commission

The FERC was established in 1977 under the Department of Energy Organization Act. FERC's legal authority comes from the Federal Power Act and major amendments made to it by Congress. Additional responsibilities were authorized under the Public Utilities Regulatory Policy Act of 1978 and the Energy Policy Act of 2005. FERC's mission is to regulate and oversee energy industries in interests of the American public. FERC regulates nearly 2,000 non-Federal dams in the United States, with responsibilities that include issuing licenses for the construction of new projects, relicensing existing projects, and overseeing all ongoing project operations, including dam safety inspections and environmental monitoring. All FERC hydropower licenses or projects identified herein are subject to FERC oversight and the conditions of their current licenses. FERC's oversight of mandatory reliability standards extends to Federal powerplants, transmission lines and appurtenant facilities.

Under the action alternatives, the top of active storage level of Temperance Flat RM 274 Reservoir would inundate the Kerckhoff Hydroelectric Project powerhouses. The Kerckhoff Hydroelectric Project would be decommissioned and its FERC license would be surrendered and then terminated in accordance with FERC regulations.

Federal Land Policy and Management Act

Sections 201 and 202 of the Federal Land Policy and Management Act of 1976 (43 USC 1711–1712) and the regulations in 43 CFR 1600 provide guidance and direction for implementing federal land use planning requirements, as established by RMPs. The RMPs and subsequent planning decisions are the basis for every on-the-ground action undertaken by federal agencies.

Federal Transit Administration

To address the human response to ground-borne vibration, the FTA has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses (FTA 2006):

- 65 vibration decibels for land uses where low ambient vibration is essential for interior operations (e.g.,

hospitals, high-tech manufacturing, and laboratory facilities)

- 80 vibration decibels for residential uses and buildings where people normally sleep

- 83 vibration decibels for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, and offices)

Standards have also been established to address the potential for ground-borne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics at the request of EPA (FTA 2006). For fragile structures, this committee recommends a maximum limit of 0.25 inch per second peak particle velocity (FTA 2006). (Peak particle velocity is a measure of the intensity of ground vibration, specifically the time rate of change of the amplitude of ground vibration.)

Federal Water Project Recreation Act

The Federal Water Project Recreation Act requires that Federal agencies with authority to approve water projects include recreation development as a condition of approving permits. Recreation development must be considered along with any navigation, flood control, reclamation, hydroelectric, or multipurpose water resource project. The act states that "consideration shall be given to the opportunities, if any, which the project affords for outdoor recreation and for fish and wildlife enhancement…wherever any such project can reasonably serve either or both of these purposes consistently" (Title 16, Section 460l-12 of the U.S. Code (16 USC 460l-12)).

Fish and Wildlife Coordination Act

Coordination under the Fish and Wildlife Coordination Act is intended to promote conservation of fish and wildlife resources by preventing their loss or damage. It also provides for development and improvement of fish and wildlife resources in connection with water projects. Federal agencies that undertake water projects must fully consider recommendations made by USFWS, NMFS, and the appropriate State fish and wildlife agency – in this case, CDFW – in their project reports and include measures to reduce impacts on fish and wildlife in project plans. Reclamation would consider and incorporate the recommended measures where feasible.

Greenhouse Gases

Mandatory Greenhouse Gas Reporting Rule On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 MTs or more of CO_2 per year. This publicly available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. An estimated 85 percent of the total GHG emissions in the United States, from approximately 10,000 facilities, are subject to this final rule.

Permitting Requirements on Large Industrial Facilities On May 13, 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailor Rule (EPA 2014). This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities.

Supreme Court Ruling and Endangerment Finding The U.S. Supreme Court ruled on April 2, 2007 that CO2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. On December 7, 2009, EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). EPA found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in “high atmospheric levels” of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Therefore, GHGs were found to endanger the public health and welfare of current and future generations. EPA’s final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants.

Hazardous Air Pollutants

Air quality regulations also focus on TACs, or in Federal parlance, HAPs. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health effects may not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable

levels of exposure can be determined and for which the ambient standards have been established. Instead, EPA and the ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum available control technology or best available control technology for toxics to limit emissions. These statutes and regulations establish the regulatory framework for TACs.

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs. National emissions standards for HAPs vary depending on the pollutant source type. The national emissions standards for HAPs for major stationary sources of HAPs could therefore be different than those for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year of any HAP or more than 25 tons per year of any combination of HAPs; all other sources are considered area sources. The emissions standards were to be promulgated in two phases. In the first phase (1992 to 2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring maximum available control technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001 to 2008), EPA was required to promulgate health risk–based emissions standards, where deemed necessary, to address risks remaining after implementation of the technology-based national emission standards for HAPs standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions of benzene and formaldehyde at a minimum. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

Indian Trust Assets

The characterization and application of the United States trust relationship have been defined by case law that interprets congressional acts, EOs, and historic treaty provisions. All Federal agencies have a responsibility to protect Indian trust assets. Indian trust assets are legal interests in assets held in trust by the Federal government for Native American tribes or

individuals. Assets may be owned property, physical assets, intangible property rights, a lease, or the right to use something. Typically, they include lands, minerals, water rights, hunting and fishing rights, natural resources, money, and claims. The BIA provides services to tribes and administers and manages ITAs, including coordination with Federal agencies in identifying potential effects of Federal actions on ITAs.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (commonly known as Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires Federal agencies to consult with NMFS regarding actions or proposed actions permitted, funded, or undertaken that may adversely affect "essential fish habitat." Essential fish habitat is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

The Magnuson-Stevens Act states that migratory routes to and from the spawning grounds of anadromous fish are considered essential fish habitat. The phrase "adversely affect" refers to the creation of any impact that reduces the quality or quantity of essential fish habitat.

The concept of essential fish habitat is similar to that of "critical habitat" under the ESA; however, measures recommended by NMFS to protect essential fish habitat are advisory, not prescriptive. Federal activities that occur outside of essential fish habitat but that may nonetheless affect waters and substrate that constitute essential fish habitat must also be considered in the consultation process.

Under the Magnuson-Stevens Act, effects on habitat managed under the *Pacific Salmon Fishery Management Plan* must also be considered. The Magnuson-Stevens Act states that where appropriate, consultation regarding essential fish habitat should be consolidated with the interagency consultation, coordination, and environmental review procedures required by other Federal statutes, such as NEPA, the Fish and Wildlife Coordination Act, the CWA, and the ESA.

Migratory Bird Treaty Act

The MBTA, first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain

(on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide international protection of migratory birds. The act authorizes the Secretary of the Interior to regulate the taking of migratory birds. It is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in the direct loss of birds, nests, or eggs. To avoid take of migratory birds, exclusion practices or vegetation removal are typically implemented before the nesting season.

Several hundred species, essentially including all native birds, are currently protected by the MBTA. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

National Forest Management Act

The National Forest Management Act requires USFS to "provide for a diversity of plant and animal communities" (16 USC 1604(g)(3)(B)) as part of its multiple-use mandate. USFS must maintain "viable populations of existing native and desired nonnative species in the planning area" (36 CFR 219.19). The Sensitive Species program is designed to meet this mandate and to demonstrate USFS's commitment to maintaining biodiversity on National Forest System lands.

A key requirement of the National Forest Management Act is preparation of land and resource management plans that establish the goals, objectives, and standards and guidelines for managing the lands and resources of National Forest System lands managed by the various National Forests.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 CFR Part 800, as amended in 2004) requires Federal agencies to consider the effects of their actions, or those they fund or permit, on properties that are listed or eligible for listing in the NRHP. The NRHP is a register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and culture. The regulations provided in 36 CFR Part 60.4 describe the criteria to evaluate cultural resources for inclusion in the NRHP. Cultural resources can be significant on the national, state, or local level. Properties may be listed in the NRHP if they possess integrity of location, design, setting, materials, workmanship,

feeling, and association, and meet any one of the following criteria:

1. Are associated with events that have made a significant contribution to the broad patterns of our history

2. Are associated with the lives of persons significant in our past

3. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction

4. Have yielded, or may be likely to yield, information important in prehistory or history

Generally, properties are not considered eligible for the NRHP if they have achieved significance within the past 50 years. Certain exceptions are made in the regulation, such as a religious property deriving primary significance from its architectural distinction, or a grave of a historical figure of outstanding importance if there is no appropriate site directly associated with his productive life.

Archaeological Resources Protection Act The purpose of the Archaeological Resources Protection Act of 1979 (Public Law 95-96 – October 31, 1979) is to protect archaeological resources and sites that are located on public lands and Indian lands, and to foster increased cooperation between governmental authorities, the professional archaeological community, and private individuals in possession of archaeological resources. The act makes it unlawful to excavate, remove or deface archaeological resources, to sell, purchase, or exchange those resources without applicable permit, and establishes criminal and civil penalties for any such violation.

Archaeological and Historic Preservation Act This act was formerly known as the Reservoir Salvage Act of 1960, followed by the Moss-Bennet Act (Archaeological Recovery Act). The act can be found under 16 USC 469, and is intended to prevent irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data involving activities in connection with any Federal construction project or federally-licensed project, activity, or

program through the recovery, protection, and preservation of such data, including preliminary survey or other investigation as needed.

Native American Graves Protection and Repatriation Act
Native American burials are also protected by Federal law. The Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 USC 3001-3013) protects Native American burial sites and controls the removal of human remains, funerary objects, sacred objects, and items of cultural patrimony on Federal and tribal lands.

American Indian Religious Freedom Act The American Indian Religious Freedom Act (42 USC Section 1996) states that it is the policy of the United States to "protect and preserve for American Indians their inherent right of freedom to exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites." The provisions of American Indian Religious Freedom Act guarantee access to traditional sites on Federal lands and noninterference with religious practices. Consultation under American Indian Religious Freedom Act with American Indian groups can simultaneously satisfy the requirements of NEPA as well.

National Recreation Trail Act
The National Recreation Trail Act of 1968 (Public Law 90-543) authorized creation of a national trail system composed of National Recreation Trails, National Scenic Trails, and National Historic Trails. While National Scenic Trails and National Historic Trails may only be designated by an act of Congress, National Recreation Trails may be designated by the Secretary of the Interior or the Secretary of Agriculture to recognize exemplary trails of local and regional significance (American Trails 2013).

National Wild and Scenic Rivers Act
The National Wild and Scenic Rivers Act of 1968, as amended (Public Law 90-542; 16 USC 1271–1287), established the NWSRS. This system identifies distinguished rivers of the nation that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The National Wild and Scenic Rivers Act preserves the free-flowing condition of designated rivers and protects their local environments. Section 5(d)(1) of the act

requires Federal agencies to consider potential national wild, scenic, and recreational river areas when planning for the use and development of water and related land resources. Wild, scenic, and recreational river areas are defined as follows:

- *"Wild" river areas* are rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

- *"Scenic" river areas* are rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible by roads in places.

- *"Recreational" river areas* are rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Designation as a National Wild and Scenic River explicitly prohibits the Federal government from licensing or permitting new hydroelectric dams or major diversions on these rivers. Federal agencies are also prohibited from assisting any water resource projects that may directly affect the resources for which the river was designated. Public lands within a corridor averaging one-quarter mile on both sides of the rivers are managed to protect resources designated as outstandingly remarkable for their scenic, recreational, historical/cultural, fish, wildlife, ecological, geological, or hydrologic value.

National Wildlife Refuge Complex Comprehensive Conservation Plans

The USFWS San Luis NWR Complex includes the San Luis NWR, Merced NWR, San Joaquin River NWR, and Grasslands WMA. These refuges are comprised of wetlands, grasslands, riparian habitats, and agricultural fields. The management goals and objectives for each refuge are set forth in 15-year CCPs prepared by USFWS pursuant to the National Wildlife Refuge System Improvement Act of October 1997. CCP goals that are applicable to botanical and wetland resources are as follows.

- Conserve and protect the natural diversity of migratory birds, resident wildlife, fish, and plants through

restoration and management of riparian, upland, and wetland habitats on refuge lands.

- Contribute to the recovery of threatened/endangered species, as well as the protection of populations of special-status wildlife and plant species and their habitats.

Occupational Safety and Health Act

The U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), is responsible at the Federal level for ensuring worker safety. OSHA sets Federal standards for implementing workplace training, exposure limits, and safety procedures for the handling of hazardous substances (as well as other hazards). OSHA also establishes criteria by which each state can implement its own health and safety program.

Paleontological Resources Preservation Act of 2009

The Paleontological Resources Preservation Act (PRPA) is part of the Omnibus Public Land Management Act of 2009 (Public Law 111-011, Title VI Subtitle D). This act directs the Secretary of the Interior or the Secretary of Agriculture to manage and protect paleontological resources on Federal land using scientific principles, and to develop plans for inventorying, monitoring, and deriving the scientific and educational use of such resources. The PRPA affirms the authority for many of the policies the Federal land managing agencies already have in place for the management of paleontological resources such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locality data. The statute establishes criminal and civil penalties for fossil theft and vandalism on Federal lands. The PRPA also includes provisions allowing for casual or hobby collecting of common invertebrate and plant fossils without a permit on Federal lands managed by BLM and the USFS, under certain conditions.

Recovery Plan for Upland Species of the San Joaquin Valley, California

This plan focuses on 34 species of plants and animals that occur in the San Joaquin Valley and that are either federally listed as threatened or endangered or are candidates for Federal listing or species of concern. The ultimate goal of the recovery plan is to delist the 11 endangered and threatened species addressed in the plan and ensure the long-term conservation of the other 23 species. The plan provides for both an ecosystem approach and a community-level strategy.

While not regulatory in nature, the recovery plan needs to be taken into consideration when analyzing potential impacts on upland natural community habitats in the San Joaquin Valley to ensure that projects do not prevent or impair the plan's future long-term implementation success. It is also used by USFWS to determine recommendations and requirements during endangered species consultation for these species.

Resource Conservation and Recovery Act

At the Federal level, the principal agency regulating the generation, transport, and disposal of hazardous substances is the EPA, under the authority of the RCRA. The RCRA established an all-encompassing Federal regulatory program for hazardous substances that is administered by EPA. Under the RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. The RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984, which specifically prohibits the use of certain techniques to dispose of various hazardous substances. The Federal Emergency Planning and Community Right to Know Act of 1986 imposes hazardous-materials planning requirements to help protect local communities in the event of accidental release of hazardous substances. EPA has delegated much of the RCRA requirements to the California Department of Toxic Substances Control (DTSC). Storage of explosives and blasting agents is regulated by the Bureau of Alcohol, Tobacco and Firearms (27 CFR Part 55, Commerce in Explosives).

Safe Drinking Water Act

The Safe Drinking Water Act mandates that EPA establish regulations to protect human health from contaminants in drinking water. This law authorizes EPA to develop national standards for drinking water and to create a joint Federal/state/tribal system to ensure compliance with these standards. The law also directs EPA to protect underground sources of drinking water by controlling the underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its Safe Drinking Water Act authority. EPA and authorized states and tribes enforce the primary drinking water standards, which are contaminant-specific concentration limits that apply to certain public supplies of drinking water. The primary standards consist of two elements: goals for maximum contaminant levels, which are nonenforceable health-based goals; and maximum contaminant levels, which

are enforceable limits set as close to the maximum contaminant level goals as possible, considering the cost and feasibility of attainment.

San Joaquin River Restoration Settlement Act

This act authorized and directed the Secretary of the Interior to implement the terms and conditions of the Settlement in cooperation with the State.

U.S. Army Corps of Engineers – Reservoir Regulation for Flood Control at Friant Dam and Millerton Lake

Friant Dam and Millerton Lake are operated for flood control in accordance with rules and regulations prescribed by the CFR Title 33, Part 208, and Report on Reservoir Regulation for Flood Control, Friant Dam and Millerton Lake, San Joaquin River, California (USACE 1955). The regulations set limitations on storage space in Millerton Lake and flow releases from Friant Dam for flood control. These limitations impact generation potential for the FPA, Orange Cove ID, and Madera-Chowchilla Water and Power Authority.

Water Right Decision 1641

D-1641 and Water Right Order 2001-05 contain the current water right requirements to implement the 1995 WQCP. D-1641 incorporates water right settlement agreements between Reclamation and DWR and certain water users in the Delta and upstream watersheds regarding contributions of flows to meet water quality objectives. However, Reclamation and/or DWR have the responsibility to meet water quality objectives in the Delta. D-1641 also authorizes the CVP and SWP to use JPODs in the south Delta, and recognizes the CALFED Operations Coordination Group process for operational flexibility in applying or relaxing certain protective standards. The additional exports allowed under the JPODs could result in additional degradation of water quality for water users in the south and central Delta, including CCWD. The JPODs also could impact water levels in the south Delta and endangered fish species.

In February 2006, State Water Board issued notice to Reclamation and DWR that each agency is responsible for meeting water quality objectives in the interior south Delta, as described in D-1641. The State Water Board order requires Reclamation and DWR to comply with a detailed plan and time schedule to ensure compliance with their respective permit and license requirements for meeting interior south Delta salinity objectives by July 1, 2009. The State Water Board order also

revised the previously issued (July 1, 2005) *Water Quality Response Plan* (State Water Board 2005) approval governing Reclamation's and DWR's use of each other's respective points of diversion in the south Delta. Additionally, the order specifies that JPOD operations are authorized pursuant to the 1995 WQCP, and that Reclamation and DWR may conduct JPODs, provided that both agencies are in compliance with all conditions of their respective water right permits and licenses at the time the JPODs would occur. As previously mentioned, ongoing legal challenges may result in changes in CVP and SWP operational constraints.

Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

The 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (State Water Board 1995) established water quality control measures that contribute to protecting beneficial uses in the Delta. The 1995 WQCP identified (1) beneficial uses of the Delta to be protected, (2) water quality objectives for the reasonable protection of beneficial uses, and (3) a program of implementation for achieving the water quality objectives.

The 1995 WQCP was developed as part of the December 15, 1994, Bay-Delta Accord, which committed the CVP and SWP to new Delta habitat objectives. Since these new beneficial objectives and water quality standards were more protective than those of the previous D-1485, the new objectives were adopted by amendment in 1995 through a Water Right Order for operation of the CVP and SWP. One key feature of the 1995 WQCP was the estuarine habitat ("X2") objectives for Suisun Bay and the west Delta. X2 represents the geographic location of the 2 ppt near-bottom salinity isohaline in the Delta, which is measured in distance upstream from the Golden Gate Bridge in Suisun Bay. The X2 objective required specific daily or 14-day surface EC criteria, or 3-day averaged outflow requirements to be met for a certain number of days each month, February through June. These requirements were designed to provide improved shallow water habitat for fish species in spring. Because of the relationship between seawater intrusion and interior Delta water quality, the X2 criterion also improved water quality at Delta drinking water intakes. Other new elements of the 1995 WQCP included I:E ratios intended to reduce entrainment of fish at the export pumps, Delta Cross Channel gate closures, and San Joaquin River EC and flow standards.

Following review of the 1995 WQCP, workshops, and public comment period, the State Water Board amended the 1995 WQCP with only minor changes and adopted the 2006 WQCP (State Water Board 2006). No changes were made to the beneficial uses, and water quality objective implementation dates were updated. The 2006 WQCP also included several directives and recommendations for water quality control planning activities to address emerging issues related to pelagic organism decline, climate change, Delta and Central Valley salinity, and San Joaquin River flows (State Water Board 2006).

State

California Environmental Quality Act

Prompted by the passage of NEPA in 1969, CEQA was signed into law in 1970 as California's counterpart to NEPA. CEQA requires State and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. The objectives of CEQA are to do all of the following:

- Disclose to decision makers and the public the significant environmental effects of proposed activities
- Identify ways to avoid or reduce environmental damage
- Prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures
- Disclose to the public the reasons for agency approval of projects with significant environmental effects
- Foster interagency coordination in the review of projects
- Enhance public participation in the planning process

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621 et seq.), was originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act, and renamed in 1994. This act is intended to reduce the risk to life and property from surface fault ruptures during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active

faults, and strictly regulates construction in the corridors along active faults (earthquake fault zones).

Assembly Bill 32, California Global Warming Solutions Act of 2006

Signed in September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions statewide. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that went into effect in 2012. ARB was charged with implementing AB 32. In December 2008, ARB adopted its Climate Change "Scoping Plan", which describes the strategies California will implement to achieve the mandated reductions. The Scoping Plan does not include specific GHG reduction requirements for local governments. ARB is in the process of updating the Scoping Plan and expects to complete that process during 2014. The Discussion Draft of the updated Scoping Plan was released in October 2013, and final is to be adopted at the end of May 2014.

Assembly Bill 3030, Groundwater Management Act

The Groundwater Management Act (Assembly Bill (AB) 3030) is found in CWC Sections 10750–10756 and provides a systematic procedure for an existing local agency to develop a GMP. AB 3030 gives the local agency the authority to develop a GMP in groundwater basins defined in DWR Bulletin 118 and to raise revenue to pay for facilities to manage the basin (extraction, recharge, conveyance, quality [DWR 1975]). AB 3030 consists of 12 technical components, but others may be identified in the GMP. An AB 3030 plan can be developed after a public hearing, and adoption of a resolution of intention to adopt a GMP. According to DWR (2003), GMPs have been adopted for several Friant Division contractors, including Arvin-Edison WSD, Chowchilla WD, Fresno ID, Gravelly Ford WD, Lower Tule River ID, Orange Cove ID, Porterville ID, Saucelito ID, Stone Corral ID, Shafter-Wasco ID, Terra Bella ID, and Tulare ID. GMPs have also been developed for a number of counties, cities, and other private districts in the San Joaquin Valley Groundwater Basin. Only AB 3030 GMPs acknowledged on DWR's Web site are listed in Chapter 13, "Hydrology – Groundwater."

CALFED Environmental Justice Statement

CALFED states that potential impacts of water management changes may accrue to rural communities and that public health and economic impacts may accrue to minorities and disadvantaged people throughout the Delta and vicinity as a result of water quality program actions (CALFED 2007). Specifically, CALFED identifies three overall guiding principles regarding environmental justice.

California Accidental Release Prevention Program

The goal of the California Accidental Release Prevention Program is to reduce the likelihood and severity of consequences of extremely hazardous materials releases. Any business that handles regulated substances (chemicals that pose a major threat to public health and safety or the environment because they are highly toxic; flammable; or explosive, including ammonia, chlorine gas, hydrogen, nitric acid, and propane) is required to prepare a risk management plan. A risk management plan describes current and past practices and releases, what the impact of releases may be, and what the business does or plans to do to prevent releases and minimize their impact if they occur.

California Building Standards Code

California's minimum standards for the design and construction of buildings, associated facilities, and equipment are given in the CCR, including standards dependent on local geology and soils. Many of the applicable standards are found in CCR Title 24, also known as the CBSC. Other standards applicable to buildings are given in CCR Titles 8, 19, 21, and 25. Design and construction must satisfy CCR requirements.

California Cave Protection Act

Section 594-625c of the California Penal Code establishes that performing certain acts that damage cave features or result in disturbance or removal of resources is a misdemeanor.

California Clean Air Act

The California Clean Air Act (CCAA), which was adopted in 1988, required ARB to establish California ambient air quality standards, and requires nonattainment areas to achieve and maintain the State ambient air quality standards by the earliest practicable date. The act specifies that local air districts should particularly focus on reducing emissions from transportation and areawide sources, and authorizes districts to regulate indirect sources. Among ARB's other responsibilities are to oversee local air district compliance with California and

Federal laws; approve local air quality plans; submit SIPs to EPA; monitor air quality; determine and update area designations and maps; and set emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

California Department of Education

The Department of Education enacted regulations that require minimum distances between a new school and the edge of a transmission line right-of-way. The setback distances are 100 feet from the edge of the transmission line right-of-way for 50- to 133- kV lines, 150 feet from the edge of the transmission line ROW for 220- to 230-kV lines, and 350 feet from the edge of the transmission line right-of-way for 500- to 550-kV lines. These distances were not based on specific biological evidence, but on the fact that electromagnetic fields from power lines decline to near-background levels at those distances.

California Department of Transportation

Caltrans manages interregional transportation, including management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulating the use of State roadways. SR 99, SR 145, and SR 41, which are located near the primary study area, fall under Caltrans' jurisdiction.

Caltrans prepares various planning documents for its transportation facilities throughout the state. The goals established for specific highways are documented in a transportation concept report (TCR). A TCR is a system planning document and tool that also includes an analysis of a transportation corridor. It establishes a 20-year transportation planning concept that is consistent with Caltrans' goals as set forth in the District System Management Plan. A TCR also establishes the future concept of LOS for segments along the route and broadly identifies the nature and extent of the improvements needed to attain a particular LOS. A deficiency (need for improvement) is triggered when the actual LOS falls below the concept LOS. Operating conditions for each corridor are projected for 10- and 20-year horizons. Beyond the 20-year planning period, a TCR identifies the Ultimate Transportation Corridor to ensure that adequate right-of-way is preserved for future transportation facility projects.

The *State Route 99 Transportation Concept Report* (Caltrans 2003) contains the 20-year improvement concept for SR 99. The concept presented for the section between the south

junction of SR 99 with SR 41 and north junction of SR 99 with SR 41 within Fresno County is an eight-lane freeway. The concept presented for the section between just north of Avenue 13 and the junction of SR 99 with SR 145 in Madera County is a six-lane freeway. The concept LOS is D for both of these segments.

The *State Route 145 Transportation Concept Report* (Caltrans 2006) contains the 20-year improvement concept for SR 145. The concept presented for the section between Road 400 and SR 41 within Madera County is a four-lane conventional highway. The concept LOS is D for this segment.

No TCR is available for SR 41. An LOS standard of D is applied to SR 41 within Fresno and Madera counties because this approach maintains consistency with concept LOS standards found within the TCRs for SR 99 and SR 145.

Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended" (Caltrans 2012b). In addition, Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the *2014 California Vehicle Code* (State of California 2014). Requests for such special permits require the completion of an application for a transportation permit.

California Endangered Species Act

Pursuant to the CESA, a permit from CDFW is required for projects that could result in the take of a plant or animal species that is State-listed as threatened or endangered. Under the CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include "harming" or "harassing," as the Federal ESA definition does. As a result, the threshold for take is higher under the CESA than under the ESA (i.e., habitat modification is not necessarily considered take under the CESA).

Sections 3503 and 3503.5 of the California Fish and Game Code state that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, or to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Destruction of active nests caused by removal of vegetation in which the nests are located is a typical violation of these codes. Violation of

Section 3503.5 could also include failure of active raptor nests that results from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

California Environmental Protection Agency Intra-Agency Environmental Justice Strategy

Pursuant to PRC Sections 71110–71113, Cal/EPA has developed the intra-agency (agency-wide) strategy to identify and address gaps in existing programs, policies, and activities that may impede the achievement of environmental justice. The strategy is the overarching environmental justice vision document, and it sets forth the Cal/EPA's environmental justice vision, mission, core values, goals, and objectives. The goals of the intra-agency strategy include (Cal/EPA 2004):

- Ensuring meaningful public participation and promoting community capacity-building to allow communities to effectively participate in environmental decision-making processes

- Integrating environmental justice into the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies

- Improving research and data collection to promote and address environmental justice related to the health and environment of communities of color and low-income populations

- Ensuring effective cross-media coordination and accountability in addressing environmental justice issues

California Fish and Game Code

Fully Protected Species Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species. CDFW is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. CDFW has informed non-Federal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

Protection of Birds Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or

needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., eagles, hawks, owls, and falcons), including their nests or eggs. Section 3513 provides for adoption of MBTA provisions. It states that it is unlawful to take or possess any migratory nongame bird, as designated in the MBTA, or any part of such migratory nongame bird. These State codes offer no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame, migratory birds. Typical violations include destruction of active raptor nests resulting from removal of vegetation in which the nests are located. Violation of Sections 3503.5 and 3513 could also include disturbance of nesting pairs that results in failure of an active raptor nest.

Section 1602, Streambed Alteration All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. Federal projects do not require a Section 1602 permit from CDFW, however, close coordination with CDFW is recommended so that measures are in place to minimize impacts that could harm State protect resources. Additionally, for some projects, a Section 1602 permit application is an effective way for Federal agencies to comply with requirements under FWCA and/or CVPIA.

Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW:

> *…substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.*

A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife.

Sections 1900–1913 Sections 1900–1913 of the California Fish and Game Code codify the Native Plant Protection Act, which is intended to preserve, protect, and enhance endangered or rare native plants in the State. The act directs CDFW to establish criteria for determining which native plants are rare or endangered. Under Section 1901, a species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. Under the act, the Fish and Game Commission may adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

The California Native Plant Society (CNPS) has developed and maintains lists of plants of special concern in California, as described above under "Special-Status Species." CNPS-listed species have no formal legal protection, but the values and importance of these lists are widely recognized. Plants listed on CNPS Lists 1A, 1B, and 2 meet the definitions of Section 1901 of the California Fish and Game Code and may qualify for State listing. Therefore, for purposes of this analysis, they are considered rare plants pursuant to Section 15380 of CEQA.

California Government Code Section 65040.12

For the purposes of the Section 65040.12, environmental justice is defined as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." Section 65040.12 requires the Office of Planning and Research to take the following actions:

- Consult with the Secretaries of Cal/EPA, the California Natural Resources Agency (formerly, the California Resources Agency), and the Business, Transportation and Housing Agency, the Working Group on Environmental Justice established pursuant to Section 72002 of the PRC, any other appropriate State agencies, and all other interested members of the public and private sectors in the State.

- Coordinate the office's efforts and share information regarding environmental justice programs with the Council on Environmental Quality, the EPA, the General Accounting Office, the Office of Management and Budget, and other Federal agencies.

- Review and evaluate any information from Federal agencies that is obtained as a result of their respective regulatory activities under Federal EO 12898, and from the Working Group on Environmental Justice established pursuant to Section 72002 of the PRC.

Section 65040.12 also requires the Office of Planning and Research to establish guidelines for addressing environmental justice issues in city and county general plans, including planning methods for the equitable distribution of public facilities and services, industrial land uses, and the promotion of more livable communities.

California Harbors and Navigation Code

The California Harbors and Navigation Code details the jurisdiction of the California Department of Boating and Waterways, which is focused on the development of public access to waterways, the safety of vessels and boating facilities, and on-the-water safety.

California Release Response Plans and Inventory Law of 1985

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires preparation of hazardous materials business plans and disclosure of hazardous materials inventories. A business plan includes an inventory of hazardous materials handled, facility floor plans showing where hazardous materials are stored, an emergency response plan, and provisions for employee training in safety and emergency response procedures (California Health and Safety Code, Division 20, Chapter 6.95, Article 1). Statewide, DTSC has primary regulatory responsibility for managing hazardous materials, with delegation of authority to local jurisdictions that enter into agreements with the State. Local agencies administer these laws and regulations.

California Land Conservation Act of 1965 (Williamson Act)

The California Land Conservation Act of 1965, commonly known as the Williamson Act, is the principal method for encouraging preservation of agricultural lands in California. The Williamson Act enables local governments to enter into contracts with private landowners that restrict specific parcels of land to agricultural or related open-space use for 10 years. In return, landowners receive property tax assessments that are based on farming and open space uses rather than full market value. Local governments receive an annual subvention

(subsidy) of forgone property tax revenues from the State via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish "agricultural preserves" consisting of lands devoted to agricultural uses and other compatible uses. When establishing such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land use for at least 10 years. In return, the landowner is guaranteed a relatively stable tax base, founded on the value of the land for agricultural/open space use only and unaffected by its development potential.

Cancelling a Williamson Act contract requires the landowner to undergo an extensive review and approval process and pay fees of up to 12.5 percent of the property value. The local jurisdiction approving the cancellation must find that the cancellation is consistent with the purpose of the California Land Conservation Act or is in the public interest. Several subfindings must be made to support either finding, as defined in Section 51282 of the California Government Code.

California Multi-Hazard Mitigation Plan

Cal EMA issued the *2010 State of California Multi-Hazard Mitigation Plan* (Cal EMA 2010) in October 2010. The Federal Disaster Mitigation Act required all State emergency services agencies to issue such plans by November 1, 2004, for the states to receive Federal grant funds for disaster assistance and mitigation under the Stafford Act (44 CFR 201.4).

California Native Plant Protection Act

In addition to the CESA, the California Native Plant Protection Act provides protection to endangered and rare plant species, subspecies, and varieties of wild native plants in California. The definitions of "endangered" and "rare" in the California Native Plant Protection Act closely parallel the CESA definitions of "endangered" and "threatened" plant species.

California Native Plant Society Species Designations

The CNPS is a statewide nonprofit organization that seeks to increase understanding of California's native flora and to preserve this rich resource for future generations. The organization has developed and maintains lists of vascular plants of special concern in California. Species listed by the CNPS have no formal legal protection, but the values and importance of these lists are widely recognized, as described above.

California Occupational Safety and Health Administration

California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations in California. Cal/OSHA regulations pertaining to the use of hazardous materials in the workplace (Title 8 of the CCR) include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and preparation of emergency action and fire prevention plans.

California Public Resources Code, Section 5096 et seq.

The California Public Resources Code contains several sections relevant to the alternative plans. Some examples include PRC Section 5096.225 (the California Park and Recreational Facilities Act of 1984), PRC Section 5094 (the Federal Water Project Recreation Act), and the CWA.

PRC Section 5097.5 prohibits excavation or removal of any "vertebrate paleontological site, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands and specifies that State agencies may undertake surveys, excavations, or other operations as necessary on publicly owned lands to preserve or record paleontological resources." Public lands are defined to include lands owned by or under the jurisdiction of the State or any city, county, district, authority, or public corporation, or any agency thereof. Section 5097.5 states that any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands is a misdemeanor.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) was established in 1911, with additional responsibility and name changes in 1912 and 1946. The CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. CPUC maintains several O&M standards to which hydroelectric power supplies must comply. General Order No. 167, Subsections 8.2 and 15.1.1, requires filing of the Initial Certification of Compliance with the Operation Standards for each generating unit and recertification every other year. General Order No. 167, Subsections 7.2 and 15.1.1, requires filing of the Initial Certification of Compliance with the Maintenance Standards for each generating unit and

recertification every other year. General Order No. 167, Subsections 6.3 and 15.1.1, requires filing of the Hydroelectric Logbook Verified Statement for each generating unit and recertification every other year.

In 1993, the CPUC authorized regulated investor-owned utilities to implement "no and low-cost EMF avoidance measures" in the construction of new and upgraded utility projects. CPUC Decision 06-01-042 in 2006 affirmed and updated the CPUC 1993 decision. To provide low-cost mitigation, the CPUC continues to use the benchmark of 4 percent of transmission and substation project costs for EMF design modifications, and to combine linked transmission and substation projects. In addition, the CPUC adopted rules and policies to improve utility design guidelines for reducing EMF levels near areas of human habitation; these guidelines include use of alternative sites, increased ROW, placement of facilities underground, and similar methods to reduce EMF levels at transmission, distribution, and substation facilities by increasing the distance between people and facilities.

California Natural Resources Agency Environmental Justice Policy

All departments, boards, commissions, conservancies, and special programs of the California Natural Resources Agency, such as DWR, the California Department of Conservation, and CDFW, must consider environmental justice in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require environmental justice consideration may include:

- Adopting regulations
- Enforcing environmental laws or regulations
- Making discretionary decisions or taking actions that affect the environment
- Providing funding for activities affecting the environment

The California Natural Resources Agency defines "environmental justice" in a manner consistent with the State as "the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." The agency states that its

environmental justice policy is that the fair treatment of all people shall be considered during the planning, decision making, development, and implementation of its programs. The California Natural Resources Agency intends for its policy "to ensure that the public, including minority and low-income populations, are informed of opportunities to participate in the development and implementation of all Natural Resources Agency programs, policies and activities, and that they are not discriminated against, treated unfairly, or caused to experience disproportionately high and adverse human health or environmental effects from environmental decisions" (California Natural Resources Agency 2013).

California Scenic Highway Program

California's Scenic Highway Program was created by the California Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, Sections 260–263.

When a city or county nominates an eligible scenic highway for official designation, it must identify and define the scenic corridor of the highway. Scenic corridors consist of land that is visible from the highway right-of-way and are composed primarily of scenic and natural features. Topography, vegetation, viewing distance, and/or jurisdictional lines determine the corridor boundaries. The city or county must also adopt ordinances, zoning, and/or planning policies to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes. These regulations provide a concise strategy for maintaining the scenic character of the corridor. These ordinances and/or policies make up the Corridor Protection Program.

There are few designated State scenic highways within the area surrounding the primary and extended study areas. Several eligible highways in the region have not yet been designated. SR 168 is eligible for designation; however, as discussed in the National Forest Scenic Byways Program section, travelers cannot see the primary or extended study area while on this road. Only one of the scenic byways (I-5/I-580 Westside Freeway) would potentially be within the viewshed of Reaches 1 through 5 of the San Joaquin River in the extended study area. No other officially designated or eligible State scenic highways are located near the primary or extended study area.

California State Lands Commission Environmental Justice Policy

The California State Lands Commission (CSLC) developed an Environmental Justice Policy to ensure equity and fairness in its own processes and procedures, and in October 2002, it adopted an amended policy. The policy ensures that "environmental justice is an essential consideration in its processes, decisions and programs and that all people who live in California have a meaningful way to participate in these activities." The CSLC implements the policy, in part, by identifying and communicating with relevant populations that could be adversely and disproportionately affected by CSLC projects or programs, and by ensuring that a range of reasonable alternatives is identified to minimize or eliminate environmental impacts affecting such populations. This discussion is provided in this Draft EIS consistent with and in furtherance of the CSLC's Environmental Justice Policy. Under the agency's adopted environmental justice policy, CSLC's staff is required to report back to the CSLC on how environmental justice is integrated into its programs, processes, and activities (CSLC 2010).

California Surface Mining and Reclamation Act

The California Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Section 2710 et seq.) addresses surface mining. Among the activities subject to SMARA are the mining of minerals, gravel, and borrow material. SMARA requires mitigation to reduce adverse impacts on public health, property, and the environment. Because Temperance Flat RM 274 Reservoir would require borrow material for construction from sites not previously permitted, Reclamation must comply with SMARA. SMARA applies to an individual or entity that would disturb more than 1 acre or remove more than 1,000 cubic yards of material through surface mining activities, including the excavation of borrow pits for soil material. SMARA is implemented through permitting ordinances developed by local government "lead agencies" that provide the regulatory setting under which local mining and reclamation activities are conducted. The State Mining and Geology Board reviews the local ordinances to ensure that they meet the procedures established by SMARA.

The Office of Mine Reclamation (under the DOC) provides assistance to cities, counties, state agencies and mine operators for reclamation planning, and strives to reclaim mined lands to a beneficial end-use through implementing SMARA.

California Water Rights

A water right is a legally granted and protected right to take possession of water and put it to beneficial use. As authorized by the California Water Code, the State Water Board allocates surface water rights and permits the diversion and use of water throughout the state. Through its Division of Water Rights, the State Water Board issues permits to divert water for new appropriations, change existing water rights, or store water for a certain length of time. The State Water Board attaches conditions to these permits to ensure that the water user prevents waste, conserves water, does not infringe on the rights of others, and puts the State's water resources to the most beneficial use in the best interest of the public.

Central Valley Flood Control Act of 2008

In 2007, the Governor signed five interrelated bills (flood legislation) aimed at addressing the problems of flood protection and liability and helping to direct use of the voter approved bond funds provided by 2006 Propositions 1E and 84. These included Senate Bill (SB) 5 and 17, and AB 5, 70, and 156. A sixth bill passed in 2007, AB 162, required additional consideration of flood risk in local land use planning throughout California. These bills, effective January 1, 2008, collectively added or amended sections in the California Government Code, Health and Safety Code, PRC, and CWC. Together, these bills outline a comprehensive approach to improving flood management at the State and local levels, with elements to address both the chance of flooding and the consequences when flooding does occur.

The major piece of the flood legislation is the Central Valley Flood Protection Act of 2008, enacted by SB 5. In June 2012, the Central Valley Flood Protection Board (CVFPB) adopted the Central Valley Flood Protection Plan (CVFPP). The CVFPP establishes a system-wide approach to improving flood management in areas currently receiving some amount of flood protection from existing facilities of the Federal-State flood management system. The flood legislation also establishes the 200-year flood event (flood with a 1-in-200 chance of occurring in any year) as the minimum level of flood protection to be provided in urban and urbanizing areas in the Sacramento-San Joaquin Valley. Work is currently underway on the 2017 CVFPP.

Central Valley Flood Protection Board Encroachment Permit

Under CCR Title 23, the Central Valley Flood Protection Board (formerly called the State of California Reclamation Board) issues encroachment permits to maintain the integrity and safety of flood control project levees and floodways that were constructed according to the flood control plans adopted by the board or the California Legislature.

Criteria Air Pollutants

The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards. The CCAA requires that all local air districts in the state endeavor to achieve and maintain California ambient air quality standards by the earliest practical date. The act specifies that local air districts should particularly focus on reducing emissions from transportation and areawide sources, and authorizes districts to regulate indirect sources. Among ARB's other responsibilities are to oversee local air district compliance with California and Federal laws; approve local air quality plans; submit SIPs to EPA; monitor air quality; determine and update area designations and maps; and set emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Emergency Response to Hazardous Materials Incidents

California has developed an emergency response plan to coordinate emergency services provided by Federal, State, and local governments and private agencies. Response to hazardous material incidents is one part of this plan. The plan is managed by the California Emergency Management Agency, which coordinates the responses of other agencies, including the Cal/EPA, California Highway Patrol, CDFW, and the Central Valley Water Board.

Executive Order S-3-05

EO S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea level. To combat those concerns, the EO established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050. This EO is binding only on state agencies, and has no force of law for local governments; however, the signing of S-3-05 sent a clear signal

to the California Legislature about the framework and content for legislation to reduce GHG emissions.

Farmland Security Zones

FSZs, also known as Super Williamson Act lands, were authorized by a 1998 amendment to the Williamson Act with the same general intent as Williamson Act contracts. Under FSZ provisions, the landowner agrees to keep land that is threatened by development in agricultural use for at least 20 years; in return, the landowner receives the benefits of lower property tax bills, parcel tax exemptions, annexation exemptions, and exemptions from school use. Accordingly, FSZs increase both the duration and the protection of Williamson Act status. An FSZ must be located in an agricultural preserve (an area designated as eligible for a Williamson Act contract). Agricultural landowners in FSZs must enter into contracts with counties for a minimum term of 20 years that are also renewed automatically each year, and are ensured an additional 35 percent tax benefit over and above the standard Williamson Act contract (DOC 2010). The FSZ program has been adopted by 25 counties, including Fresno and Madera counties, although not all of those counties have executed contracts.

Government Code Section 65962.5, Cortese List

The provisions of Government Code Section 65962.5 are commonly referred to as the "Cortese List" (after the legislator who authored the legislation that enacted it). The Cortese List is a planning document used by State and local agencies to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5 requires Cal/EPA to develop an updated Cortese List annually at minimum. DTSC is responsible for a portion of the information contained in the Cortese List. Other California State and local government agencies are required to provide additional hazardous material release information for the Cortese List.

Hazardous Materials Transport

The DOT regulates transportation of hazardous materials between states. State agencies with primary responsibility for enforcing Federal and State regulations and responding to hazardous materials transportation emergencies are the CHP and Caltrans. Together, these agencies determine container types used and license hazardous waste haulers for transportation of hazardous waste on public roads.

The DOT Federal Railroad Administration enforces the hazardous materials regulations, which are promulgated by the Pipeline and Hazardous Materials Safety Administration for rail transportation. These regulations include requirements that railroads and other transporters of hazardous materials, including shippers, have and adhere to security plans and train their employees involved in offering, accepting, or transporting hazardous materials on both safety and security matters.

Municipal and Industrial Water Quality Objectives

In the 1978 WQCP, the State Water Board set two objectives that it believed provided reasonable protection for M&I beneficial use of Delta waters from the effects of salinity intrusion. The first objective established a year-round maximum mean daily chloride concentration measured at five Delta intake facilities, including CCWD's Pumping Plant No. 1, of 250 mg/L for the reasonable protection of municipal beneficial use. The second objective established a maximum mean daily chloride concentration of 150 mg/L (measured at either CCWD Pumping Plant No.1 or the San Joaquin River at the Antioch water works intake) for the reasonable protection of industrial beneficial use (specifically, the manufacture of cardboard boxes by Gaylord Container Corporation in Antioch).

Oak Woodlands Conservation Act

The Oak Woodlands Conservation Act, SB 1134 (California Public Resources Code Section 21083.4), requires that a county must determine whether or not a project will result in a significant impact on oak woodlands and, if it is determined that a project may result in a significant impact on oak woodlands, then the county shall require one or more of the following mitigation measures:

- Conserve oak woodlands through the use of conservation easements
- Plant an appropriate number of trees, including maintenance of plantings and replacement of failed plantings
- Contribute funds to the Oak Woodlands Conservation Fund for the purpose of purchasing oak woodlands conservation easements
- Implement other mitigation measures developed by the county

Despite the act's deferral to counties, it is inherent in the act that loss of oak woodlands should be evaluated in environmental documents to determine whether a project may result in a significant impact and if a significant impact would result, that impact should be mitigated.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, "waters of the State" fall under the jurisdiction of the appropriate regional water quality control board (in this case, the Central Valley Water Board). Under the act, the regional water quality control board must prepare and periodically update basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet the regional water quality control board's waste discharge requirements, which may be issued in addition to a water quality certification under Section 401 of the CWA.

Renewables Portfolio Standards

Established in 2002 under SB 1078, California's RPS was accelerated in 2006 under SB 107 by requiring that 20 percent of electricity retail sales be served by renewable energy resources by 2010. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020, and on November 17, 2008, Governor Arnold Schwarzenegger signed EO S-14-08 requiring that "...[a]ll retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020." The following year, EO S-21-09 directed the California Air Resources Board, under its AB 32 authority, to enact regulations to achieve the goal of 33 percent renewables by 2020.

In the ongoing effort to codify the 33 percent by 2020 goal, SB X1-2 was signed by Governor Edmund G. Brown, Jr., in April 2011. This RPS codifies California Air Resources Board's 33 percent Renewable Electricity Standard and applies to all electricity retailers in the State, including POUs, investor-owned utilities, electricity service providers, and community choice aggregators. These entities must adopt the new RPS goals of 20 percent of retails sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020. As of February 2014, these entities were on pace to meet the 20 percent by 2013 requirement; however, due to the large number of

transactions conducted at the end of 2013, reporting was not complete at that time (CPUC 2014).

The addition of significant amounts of intermittent, non-dispatchable renewable resources such as wind and solar to meet the 33 percent RPS makes hydropower more valuable because of its fast-ramping capabilities to allow firming and reliable operation of the electric grid.

Sacramento-San Joaquin Delta Reform Act

In November 2009 the Sacramento-San Joaquin Delta Reform Act was passed. It established state policy of coequal goals for the Delta and created the Delta Stewardship Council as a new, independent state agency that will delineate exactly how to meet these goals through development and implementation of the Delta Plan.

The Council's principal task is to develop and implement the Delta Plan, a legally enforceable document that will include all the actions necessary to ensure the state's coequal goals for the Delta are met (Delta Stewardship Council 2010).

Senate Bill 97, Amendments to CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions

As directed by SB 97, the California Natural Resources Agency adopted Amendments to the CEQA Guidelines in December of 2009 for the mitigation of GHG emissions or the effects of GHG emissions.

Senate Bill 375, Sustainable Communities and Climate Protection Act of 2008

Signed in September 2008, SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires each Metropolitan Planning Organization (MPO) adopt a Sustainable Communities Strategy as part of the MPO's Regional Transportation Plan that sets land use allocation and transportation investments necessary to meet GHG emission reduction targets for the region. ARB provided each affected MPO with reduction targets for GHGs emitted by passenger cars and light trucks for 2020 and 2035. The ARB-issued targets for the San Joaquin Valley jurisdiction are a 5 percent reduction in GHG emissions per capita by 2020 relative to 2005 and a 10 percent reduction by 2035 (ARB 2011).

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (AB 1807 (Statutes of 1983)) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 (Statutes of 1987)). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must be completed before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate best available control technology to minimize emissions.

AB 2588 requires facilities that emit toxic substances above a specified level to do all of the following:

- Prepare a toxic emissions inventory
- Prepare a risk assessment if emissions are significant
- Notify the public of significant risk levels
- Prepare and implement risk reduction measures

Regional and Local

This Draft EIS analyses the alternatives for consistency with the general plan policies of the relevant counties and cities, and resource management plans in the primary study area and throughout the extended study area. These applicable plans are discussed in Section 3.2.9.

Air Quality Attainment Plans

SJVAPCD prepares and submits air quality attainment plans (AQAP) to ARB in compliance with the requirements set forth in the CCAA. ARB incorporates these plans into the SIP and forwards SIP revisions to EPA for approval and publication in the Federal Register. The CCAA also requires that air quality management districts and air pollution control districts conduct a triennial assessment of the extent to which air quality has improved and emissions have been reduced through the use of

control measures. As part of the assessment, the AQAPs must be reviewed and, if necessary, revised to correct deficiencies in progress and to incorporate new data or projections. Because the SJVAB is a nonattainment area for certain pollutants, SJVAPCD is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. These milestone reports include demonstrations that the requirements for the nonattainment area have been met. The AQAPs and reports present comprehensive strategies to reduce emissions of ROGs, NO_X, and PM_{10} from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect-source review program; adoption of local air quality plans; and development of stationary-, mobile-, and indirect-source control measures. Table 28-1 summarizes SJVAPCD's current AQAPs.

Table 28-1. Summary of the San Joaquin Valley Air Pollution Control District's Air Quality Attainment Plans

Pollutant	Plan Title	Date	Status
Ozone	*Extreme Ozone Attainment Demonstration Plan, San Joaquin Valley Air Basin Plan Demonstrating Attainment of Federal 1-Hour Ozone Standards*	October 2004, Amended October 2005	Adopted by SJVAPCD and ARB in October 2004. Clarifications adopted by SJVAPCD in August 2008. Approved by EPA in march 2010.
	8-Hour Ozone Attainment Demonstration Plan for the San Joaquin Valley	June 2007	Adopted by SJVAPCD in April 2007. Approved by ARB on June 14, 2007.
Carbon monoxide (CO)	*2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for the Federal Planning Areas*	July 2004	Adopted by ARB July 2004.
Respirable and fine particulate matter (PM_{10} and $PM_{2.5}$)	*2007 PM_{10} Maintenance Plan and Request for Redesignation*	September 2007	EPA redesignated SJVAB to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan in September 2008.
	2008 $PM_{2.5}$ Plan	April 2008	Adopted by SJVAPCD in April 2008. Submitted to ARB.
	Natural Events Action Plan for High Wind Events in the San Joaquin Valley	February 2006	Adopted by SJVAPCD in February 2006. Submitted to ARB.

Source: ARB 2004; SJVAPCD 2010; SJVAPCD 2006; SJVAPCD 2007;SJVAPCD 2008
Key:
ARB = California Air Resources Board
EPA = U.S. Environmental Protection Agency
NAAQS = National Ambient Air Quality Standards
PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less
SJVAB = San Joaquin Valley Air Basin
SJVAPCD = San Joaquin Valley Air Pollution Control District

California Government Code General Plan Requirement

California Government Code Section 65300 et seq. requires California cities and counties to adopt and implement general plans. A general plan is a comprehensive, long-term strategy document that sets forth the expected location and general type of physical development expected in the city or county preparing the document. The general plan also may consider land outside its boundaries that, in the judgment of the city or county government in the city's or county's judgment, may affect land use activities within its borders. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies goals, objectives, policies, principles, standards, and plan proposals that support a city's or county's vision for the area. The general plan is a long-range document that typically addresses development over a 20-year period.

County Plans

As required by State law, counties in the study area have developed their own general plans. At a minimum, these documents must address the topics of land use, transportation, housing, conservation, open space, noise, and safety. These documents serve as statements of county goals, policies, standards, and implementation programs for the physical development of a county, and include the Fresno County General Plan Policy Document (2000), the Madera County General Plan Policy Document (1995), and the Merced County Year 2000 General Plan (1990).

Fresno County General Plan The following goals and policies from the *Fresno County General Plan* (Fresno County 2000) related to public health and hazards are relevant to the alternatives.

Goal HS-B: To minimize the risk of loss of life, injury, and damage to property and natural resources resulting from fire hazards.

- **Policy HS-B.1** – T he County shall review project proposals to identify potential fire hazards and to evaluate the effectiveness of preventive measures to reduce the risk to life and property.

- **Policy HS-B.2** – The County shall ensure that development in high fire hazard areas is designed and constructed in a manner that minimizes the risk from

fire hazards and meets all applicable State and County fire standards. Special consideration shall be given to the use of fire-resistant construction in the underside of eaves, balconies, unenclosed roofs and floors, and other similar horizontal surfaces in areas of steep slopes.

- **Policy HS-B.3** – The County shall require that development in high fire hazard areas have fire-resistant vegetation, cleared fire breaks separating communities or clusters of structures from native vegetation, or a long-term comprehensive vegetation and fuel management program. Fire hazard reduction measures shall be incorporated into the design of development projects in fire hazard areas.

- **Policy HS-B.5** – The County shall require development to have adequate access for fire and emergency vehicles and equipment.

Goal HS-E: To minimize the exposure of the public to high noise levels and safety hazards through land use controls and policies for property in the vicinity of airports; and to limit urban encroachment around airports to preserve the safety of flight operations and the continued viability of airport facilities.

- **Policy HS-E.2** – The County shall ensure that new development, including public infrastructure projects, does not create safety hazards such as glare from direct or reflective sources, smoke, electrical interference, hazardous chemicals, or fuel storage in violation of adopted safety standards.

Goal HS-F: To minimize the risk of loss of life, injury, serious illness, and damage to property resulting from the use, transport, treatment, and disposal of hazardous materials and hazardous wastes.

- **Policy HS-F.1** – The County shall require that facilities that handle hazardous materials or hazardous wastes be designed, constructed, and operated in accordance with applicable hazardous materials and waste management laws and regulations.

- **Policy HS-F.4** – For redevelopment or infill projects or where past site uses suggest environmental impairment, the County shall require that an investigation be performed to identify the potential for soil or

groundwater contamination. In the event soil or groundwater contamination is identified or could be encountered during site development, the County shall require a plan that identifies potential risks and actions to mitigate those risks before, during, and after construction.

- **Policy HS-F.7** – The County shall ensure that the mining and processing of minerals in the County is conducted in compliance with applicable environmental protection standards.

Madera County General Plan The following goals and policies from the *Madera County General Plan Policy Document* (Madera County 1995) related to public health and hazards are relevant to the alternatives.

Goal 5.I: To encourage commercial mining operations within areas designated for such extraction, where environmental, aesthetic, and adjacent land use compatibility impacts can be adequately mitigated, and to provide for the timely rehabilitation and reuse of mining sites.

- **Policy 5.I.1** – The County shall require new mining operations to be designed to provide a buffer between existing or likely adjacent uses, minimize incompatibility with adjacent uses, and adequately mitigate their environmental and aesthetic impacts. The buffer area shall be zoned Agricultural, Rural, Exclusive-20 Acre or -40 Acre (ARE-20 and ARE-40).

- **Policy 5.I.6** – The County shall require that all mining operations prepare and implement mining plans and reclamation plans that mitigate environmental impacts and incorporate adequate security to guarantee proposed reclamation.

Goal 6.C: To minimize the risk of loss of life, injury, and damage to property and watershed resources from unwanted fires.

- **Policy 6.C.1** – The County shall ensure that development in high-fire-hazard areas is designed and constructed in a manner that minimizes the risk from fire hazards and meets all applicable state and county fire standards.

- **Policy 6.C.4** – The County shall review project proposals to identify potential fire hazards and prevent or mitigate such hazards to acceptable levels of risk.

- **Policy 6.C.5** – The County shall require development to have adequate access for fire and emergency vehicles and equipment.

Goal 6.D: To minimize the risk of loss of life, injury, damage to property, and economic and social dislocations resulting from airport hazards.

- **Policy 6.D.1** – The County shall ensure that development around airports does not create safety hazards such as lights from direct or reflective sources, smoke, electrical interference, hazardous chemicals, or fuel storage in violation of adopted safety standards.

Goal 6.G: To minimize the risk of loss of life, injury, serious illness, damage to property, and economic and social dislocations resulting from the use, transport, treatment, and disposal of hazardous materials and hazardous materials wastes.

- **Policy 6.G.1** – The County shall ensure that the use and disposal of hazardous materials in the county complies with local, state, and federal safety standards.

- **Policy 6.G.2** – The County shall encourage source reduction, recycling, and on-site treatment of hazardous wastes to reduce hazardous waste generation and disposal.

- **Policy 6.G.4** – The County shall review all proposed development projects that manufacture, use, or transport hazardous materials for compliance with the County's *Hazardous Waste Management Plan*.

- **Policy 6.G.5** – The County shall strictly regulate the storage of hazardous materials and wastes.

Fresno County Congestion Management Process

The Fresno Council of Governments (formerly the Council of Fresno County Governments) serves as the CMA of Fresno County. As the county's CMA, it is authorized to set State and Federal funding priorities for transportation improvements affecting the Fresno County Regionally Significant Road

System as contained within the *Fresno County Congestion Management Process* (Council of Fresno County Governments 2009).

The CMP specifies a system of highways and roadways for which traffic LOS standards are established. The CMP system includes all freeways, State highways, and the Regionally Significant Road System. The following roads in the primary study area are included as part of the CMP: SR 99, SR 41, Friant Road, Auberry Road, and Millerton Road. The LOS standard for the roadways within the CMP system is based on the standards set by the jurisdiction the roadway falls under. Caltrans has jurisdiction over SR 99 and SR 41, and Fresno County has jurisdiction over Friant Road (outside Fresno city limits), Auberry Road, and Millerton Road.

Madera County 2011 Regional Transportation Plan

The Madera County Transportation Commission is required to update the Regional Transportation Plan consistent with the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users compliance guidelines to reflect the transportation system through FY 2035. The Regional Transportation Plan ensures that the county's transportation system and implementation policies/programs through FY 2035 will safely and efficiently accommodate future growth within the cities of Chowchilla and Madera and Madera County as envisioned in the Land Use Elements.

The Madera County 2011 Regional Transportation Plan (Madera County Transportation Commission 2010) includes programs and policies for congestion management, transit, bicycles and pedestrians, roadways, freight, and finances. It must be revised at least every 4 years because the county is designated as nonattainment of Federal air quality standards.

The Regional Transportation Plan's primary use is as a regional long-range plan for Federally funded transportation projects. It also serves as a comprehensive, coordinated transportation plan for all the governmental jurisdictions within the region. The jurisdictions with transportation implementation responsibilities under the Regional Transportation Plan are Caltrans, Madera County, and the cities of Chowchilla and Madera.

Pacific Forest and Watershed Lands Stewardship Council Land Conservation Plan

In December 2003, the CPUC and PG&E settled a range of issues related to the PG&E bankruptcy. *The Opinion Modifying the Proposed Settlement Agreement of Pacific Gas & Electric Company, PG&E Corporation, and the Commission Staff, and Approving the Modified Settlement Agreement* and the associated *Stipulation Resolving Issues Regarding the Land Conservation Commitment* required that PG&E commit to protecting the lands associated with its hydroelectric system, plus the 655-acre Carrizo Plain in San Luis Obispo County, through conservation easements and donations of lands in fee subject to conservation easements. This land conservation commitment is intended to enhance the existing environmental and economic benefits through the following broad range of beneficial public values:

- Protection of the natural habitat of fish, wildlife and plants
- Preservation of open space
- Protection and creation of outdoor recreational opportunities
- Preservation of sustainable forestry and agricultural uses
- Protection of historic values

The land conservation commitment is implemented through either: (1) PG&E's donation of conservation easements restricting development of the lands so as to protect and preserve their beneficial public values; and/or (2) PG&E's donation of the lands in fee to one or more public entities or qualified nonprofits, whose ownership would be consistent with these conservation objectives. Furthermore, for lands that are donated in fee, those donated parcels would be made subject to conservation easements, except in limited circumstances where appropriate protection can be otherwise provided.

As a result of the CPUC and PG&E settlement, the Pacific Forest and Watershed Lands Stewardship Council was established in 2004 and tasked with preparing a land conservation plan (LCP) to implement PG&E's land conservation commitment. In 2007, the Board adopted the LCP

to provide for the permanent conservation of over 140,000 acres of lands currently owned and managed by PG&E that are primarily in the Sierra Nevada and Cascade Mountain range watersheds. Approximately half of the PG&E properties are generally associated with hydroelectric facilities and operations, and operate under licenses granted by FERC.

Pacific Forest and Watershed Lands Stewardship Council recommends that the land and land uses at Kerckhoff Lake be preserved and enhanced by protecting cultural resources, wildlife habitat, and agricultural uses and enhancing recreational experiences. The following recommended objectives in the LCP are applicable to land use planning and agricultural resources (Pacific Forest and Watershed Lands Stewardship Council 2007).

- **Objective** – Preserve open space to protect natural and cultural resources, viewsheds, and agricultural land uses.

- **Objective** – Preserve and enhance grazing to support associated economic benefits, as well as to protect open space and habitat resources.

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan

The San Joaquin County Multi-Species Habitat Conservation and Open Space Plan, approved and adopted in November 2000, includes compensation measures to offset the effects of development on special-status plant, fish, and wildlife species throughout San Joaquin County (SJCOG 2000), downstream from the Restoration Area, and including portions of the lower San Joaquin River.

San Joaquin Valley Air Pollution Control District

SJVAPCD seeks to improve air quality conditions in the SJVAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of SJVAPCD includes preparing plans and programs for the attainment of ambient air quality standards, adopting and enforcing rules and regulations, and issuing permits for stationary sources. SJVAPCD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, CAAA, and CCAA.

As mentioned above, SJVAPCD adopts rules and regulations. All projects are subject to SJVAPCD rules and regulations in effect at the time of construction. The specific rules discussed below are applicable to the construction of the proposed project.

Fugitive Dust PM10 Prohibitions Fugitive Dust PM_{10} Prohibitions: Rules 8011–8081 are designed to reduce PM_{10} emissions (predominantly dust and dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, and landfill operations. Compliance with Regulation VIII is mandatory, so compliance by Reclamation is assumed in this analysis. Compliance with Regulation VIII contains, but is not limited to, the following actions:

- Pre-water site sufficient to limit visible dust emissions (VDE) to 20 percent opacity.
- Phase work to reduce the amount of disturbed surface area at any one time.
- During active operations, apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity.
- During active operations, construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity.
- During active operations, apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20 percent opacity and meet the conditions of a stabilized unpaved road surface.
- An owner/operator shall limit the speed of vehicles traveling on uncontrolled unpaved access/haul roads within construction sites to a maximum of 15 miles per hour.
- An owner/operator shall post speed limit signs that meet State and Federal Department of Transportation standards at each construction site's uncontrolled unpaved access/haul road entrance. At a minimum, speed limit signs shall also be posted at least every 500

feet and shall be readable in both directions of travel along uncontrolled unpaved access/haul roads.

- When handling bulk materials, apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity.

- When handling bulk material, construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity and with less than 50 percent porosity.

- When storing bulk materials, comply with the conditions for a stabilized surface as listed above.

- When storing bulk materials, cover bulk materials stored outdoors with tarps, plastic, or other suitable material and anchor in such a manner that prevents the cover from being removed by wind action.

- When storing bulk materials construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity and with less than 50 percent porosity. If utilizing fences or wind barriers, apply water or chemical/organic stabilizers/suppressants to limit VDE to 20 percent opacity or use a 3-sided structure with a height at least equal to the height of the storage pile and with less than 50 percent porosity.

- Limit vehicular speed while traveling on the work site sufficient to limit VDE to 20 percent opacity.

- Load all haul trucks such that the freeboard is not less than 6 inches when material is transported across any paved public access road sufficient to limit VDE to 20 percent opacity.

- Apply water to the top of the load sufficient to limit VDE to 20 percent opacity.

- Cover haul trucks with a tarp or other suitable cover.

- Clean the interior of the cargo compartment or cover the cargo compartment before the empty truck leaves the site; and prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate; and load all haul trucks such that the freeboard is not less than 6

inches when material is transported on any paved public access road, and apply water to the top of the load sufficient to limit VDE to 20 percent opacity; or cover haul trucks with a tarp or other suitable cover.

- Owners/operators shall remove all visible carryout and trackout at the end of each workday.

- An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with three or more axles shall take the actions for the prevention and mitigation of carryout and trackout.

- Within urban areas, an owner/operator shall prevent carryout and trackout, or immediately remove carryout and trackout when it extends 50 feet or more from the nearest unpaved surface exit point of a site.

- Within rural areas, construction projects 10 acres or more in size, an owner/operator shall prevent carryout and trackout, or immediately remove carryout and trackout when it extends 50 feet or more from the nearest unpaved surface exit point of a site.

- For sites with paved interior roads, an owner/operator shall prevent and mitigate carryout and trackout.

- Cleanup of carryout and trackout shall be accomplished by manually sweeping and picking-up; or operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit VDE to 20 percent opacity; or operating a PM_{10}-efficient street sweeper that has a pick-up efficiency of at least 80 percent; or flushing with water, if curbs or gutters are not present and where the use of water would not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

- An owner/operator shall submit a Dust Control Plan to the Air Pollution Control Officer (APCO) before the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more

than 2,500 cubic yards per day of bulk materials on at least three days. Construction activities shall not commence until the APCO has approved or conditionally approved the Dust Control Plan. An owner/operator shall provide written notification to the APCO within 10 days before the commencement of earthmoving activities via fax or mail. The requirement to submit a dust control plan shall apply to all such activities conducted for residential and non-residential (e.g., commercial, industrial, or institutional) purposes or conducted by any governmental entity.

If a nonresidential project is 5.0 or more acres in area, a dust control plan must be submitted as specified in Section 6.3.1 of Rule 8021. Therefore, Reclamation is required to submit a dust control plan, and construction activities would not commence until SJVAPCD has approved the plan.

- **Rule 2010—Permits Required** – This rule applies to anyone who plans to or does operate, construct, alter, or replace any source operation that may emit air contaminants or may reduce the emission of air contaminants. The proposed project would be subject to SJVAPCD permitting requirements for stationary sources such as boilers or back-up generators. If SJVAPCD permits are required, permit applications should be submitted as soon as possible to avoid project delays.

- **Rule 2201—New and Modified Stationary Source Review Rule** – This rule applies to all new stationary sources and all modifications of existing stationary sources. They are subject to SJVAPCD permit requirements if, after construction, they emit or may emit one or more affected pollutant.

- **Rule 2550—Federally Mandated Preconstruction Review for Major Sources of Air Toxics** – This rule applies to applications to construct or reconstruct a major air toxics source with Authority to Construct issued on or after June 28, 1998.

- **Rule 3135—Dust Control Plan Fee** – This rule requires applicants to submit a fee in addition to a dust control plan. The purpose of this fee is to recover SJVAPCD's cost for reviewing such plans and conducting compliance inspections.

- **Rule 4002—National Emissions Standards for Hazardous Air Pollutants** – This rule applies to all sources of hazardous air pollution and requires them to comply with the standards, criteria, and requirements set forth therein.

- **Rule 4101—Visible Emissions** – This rule prohibits emissions of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.

- **Rule 4102—Nuisance** – This rule applies to any source operation that emits or may emit air contaminants or other materials. If such emissions create a public nuisance, the owner/operator could be in violation and be subject to enforcement action by SJVAPCD.

- **Rule 4601—Architectural Coatings** – This rule limits volatile organic compounds from architectural coatings by specifying storage, cleanup, and labeling requirements for architectural coatings.

- **Rule 4641—Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations** – This rule applies to the manufacture and use of the aforementioned asphalt types for paving and maintenance operations.

- **Rule 9510—Indirect Source Review (ISR)** – This rule was adopted to reduce the impacts of growth in emissions from all new development in the San Joaquin Valley. The purposes of Rule 9510 are to (1) fulfill SJVAPCD's emissions reduction commitments in the PM_{10} and ozone attainment plans, (2) reduce emissions from development projects through design features and on-site measures, and (3) reduce emissions from development projects through off-site measures.

The application of Rule 9510 depends on the type and size of a development project. The rule would apply to correctional facilities that exceed 9,000 square feet or more upon full buildout. Projects that exceed their respective screening level must file an Air Impact Assessment (AIA) application with SJVAPCD. The AIA lists all the attributes of a project, including on-site mitigation measures, so that SJVAPCD can estimate its emissions and assess the appropriate ISR fee for off-setting project-related emissions.

Rule 9510 requires applicants to provide information that enables SJVAPCD to quantify construction, area-source, and operational NO_X and exhaust PM_{10} emissions. Rule 9510 requires emissions of construction exhaust to be reduced by 20 percent for NO_X and 45 percent for PM_{10} when compared to the statewide fleet average. For operations, emissions of NO_X must be reduced by 33.3 percent and emissions of exhaust PM_{10} must be reduced by 50 percent; the reductions may occur over 10 years. The applicant may reduce both the construction emissions and the operations emissions by implementing on-site measures and/or by paying an off-site fee. However, if the initial calculation shows that emissions would be less than 2 tons per year of NO_X or exhaust PM_{10}, then emission reduction measures are not required.

On-site measures to mitigate construction emissions may include using cleaner fuels, retrofitting equipment on engines and exhaust systems, and using new, low-emissions engine types. Measures to reduce operational emissions include designing buildings for energy efficiency and planning sites to reduce the generation of vehicle trips.

Climate Change Action Plan SJVAPCD's Governing Board adopted its Climate Change Action Plan in 2008, which directed SJVAPCD to develop guidance for land use and permitting agencies to address GHG emissions impacts (SJVAPCD 2009). As part of this process, SJVAPCD published a staff report in December 2009 called *Addressing Greenhouse Gas Emissions Impacts under the California Environmental Quality Act* (SJVAPCD 2009). The guidance relies on the use of performance based standards, otherwise known as BPSs to assess the significance of project-specific GHG emissions on global climate change during the environmental review process, as required by CEQA. Use of BPS is a method of streamlining the CEQA process of determining significance and is not a required emission reduction measure. Projects implementing BPS would be determined to have a less-than-significant cumulative impact. Otherwise, demonstration of a 29 percent reduction in GHG emissions, from business-as-usual, is required to determine that a project would have a less-than-significant cumulative impact. The guidance does not limit a lead agency's authority to establish its own process and guidance for determining significance of project related impacts on global climate change.

Guide for Assessing and Mitigating Air Quality Impacts
In January 2002, SJVAPCD released a revision to a previously adopted guidelines document. The revised Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2002) is an advisory document that provides CEQA lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The guide contains the following applicable components:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact,
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts,
- Methods available to mitigate air quality impacts, and
- Information for use in air quality assessments that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

Other Local Permits and Requirements

Several other local permits and requirements may apply to the Investigation. Fresno and Madera counties and their public works departments will require compliance with local plans and ordinances, such as the county general plan, zoning ordinances, grading plan, and various use permits. Utility easements and various encroachments also may be required.

Local surface water regulations can include water supply master plans, general plans, IRWMPs, habitat and conservation plans, and land-use ordinances, with many of these regulations, including goals, objectives, and policies, pertaining to the primary and extended study areas. Examples of relevant local water supply master plans include Fresno's *Final Urban Water Management Plan* (City of Fresno 2008), Merced's *Urban Water Management Plan* (City of Merced 2011), Modesto's *Joint Urban Water Management Plan 2005 Update* (City of Modesto and Modesto Irrigation District 2007), and Stockton's Water Master Plan (City of Stockton 2008). Local water supply plans typically outline future water supply/demand and provide a framework for supply diversification and conservation.

Several county and city general plans cover lands within or near the study area, including general plans for Fresno (Fresno County 2000), Madera (Madera County 1995), and Merced

(Merced County 1990) counties, and the cities of Fresno (2002), Clovis (1993), Mendota, and Firebaugh. These county and city general plans have goals, objectives, and policies oriented toward the conservation, protection, and enhancement of streams, rivers, wetlands, and riparian areas. Development and land-use ordinance decisions within these counties and cities are considered in view of their consequences to the general plan goals. General plans also have policies toward water supply protection and enhancement, and coordinate closely with their local water supply master plans. General plans are typically administered by local planning commissions or public utilities departments.

IRWMPs are statewide voluntary initiatives to foster regional water management and are intended to "ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy" (DWR 2005). In 2002, the State of California passed SB 1672, the Integrated Regional Water Management Planning Act, to provide bond funds to regional water management work groups statewide. The purpose of IRWM is to comprehensively address water supply, quality, flood, and ecosystem challenges through a collaborative planning and implementation framework of regional partners. Forty-eight regional water management groups now cover almost 90 percent of the State's geographic area. IRWM regions in the Investigation's extended study area include Eastern San Joaquin, Madera County, Merced County, East Stanislaus, Tuolumne-Stanislaus, Westside San Joaquin, Kaweah River Basin, Kern County, Poso Creek, Tule, and Upper Kings Basin.

Local habitat and conservation plans can be county-wide initiatives or can be implemented in response to proposed development. The main objectives of these plans are to protect natural resources, including species and habitat, provide regulatory assurances, as well as enhance coordination and collaboration of development stakeholders.

General policies require partnering with local utilities to provide adequate and cost-effective electricity, as well as identifying and designing areas of future utilities growth. Future electric utility modifications and growth are to be made with minimal impacts to the economy (e.g., agriculture) and residents (e.g., noise and visual impacts).

Compliance with Related Laws, Rules, Regulations, and Executive Orders

With the exception of NEPA (Federal) and CEQA (State) which are presented first, related laws, rules, regulations, and EOs are presented alphabetically.

Federal

National Environmental Policy Act

NEPA requires that an appropriate document be prepared to ensure that Federal agencies accomplish the act's purposes. The CEQ has adopted regulations and other guidance that provide detailed procedures for Federal agencies to follow in implementing NEPA. After this Draft EIS is finalized, Reclamation would use it to comply with Council on Environmental Quality regulations and document NEPA compliance.

Americans with Disabilities Act

The ADA is a comprehensive law prohibiting discrimination against people with disabilities in employment practices, use of public transportation, use of telecommunication facilities, and use of public accommodations. Title II of the ADA applies to government facilities and requires that reasonable modifications be made to services and programs so that they are readily accessible to and usable by people with disabilities. Reclamation would make every reasonable effort to make any new construction or improvement fully compliant with ADA requirements. If it is found to be infeasible to make a new construction or improvement element fully ADA compliant, Reclamation would obtain any required waivers or modifications to the ADA standards.

Bakersfield Resource Management Plan

BLM manages 4,036 acres of land surrounding portions of the proposed Temperance Flat RM 274 Reservoir, designated as the SJRG SRMA, through its 2012 Proposed Bakersfield RMP and Final EIS. The RMP (BLM 2012) contains the following goals and objectives that are relevant to the action alternatives.

Lands and Realty

Goal: Provide lands, interests in land, and authorizations for public and private uses while maintaining and improving resource values and public land administration.

- **Objectives** – The following objectives are intended to accomplish the lands and realty goals:

  - Meet other resource objectives through retention and/or land tenure adjustments

  - Meet public, private, and Federal agency needs for realty-related land use authorizations and land withdrawals, including those authorizations necessary for wind, solar, biomass, and other forms of renewable energy development

  - Increase public access to public lands when consistent with other resource objectives

Paleontological Resources
Goal: Identify, manage, and protect paleontological resources for scientific research, educational purposes, and public use.

- **Decision** – Implement measures to protect paleontological resources from inadvertent damage or destruction through:

  - Avoidance

  - Fencing

  - Stabilization

  - Collection or excavation and deposit in a museum repository

  - Interpretation or

  - Administrative closure

- **Decision** – Ensure that site-specific NEPA analyses (which may include a field inventory and fossil specimen recovery) implement the Potential Fossil Yield Class as a standard part of review for all surface-disturbing projects throughout the Decision Area.

- **Decision** – Minimize or prevent human-caused damage to paleontological resources through educational and interpretive outreach programs focusing use on common invertebrate and plant fossils.

Visual Resources
Goal: Public lands demonstrate a range of visual resource values that allow for development and provide opportunities for scenic appreciation.

Objectives

- Use visual resource management classes for all public lands within the decision area to preserve and enhance scenic quality for present and future generations.

- Maintain and/or enhance the scenic quality of the public lands.

- Use visual resource management classes for all public lands within the decision area to preserve and enhance scenic quality for present and future generations.

- SJRG SRMA: All actions must conform to VRM classes as follows:

    - Class I – Pa'San RMZ

    - Class II – Wu Ki'Oh RMZ

Class IV – Tahoot RMZ.While the SJRG SRMA has been inventoried as VRM Class III, BLM will manage it under the objectives for these three VRM classes. The objectives for VRM Class designations are defined by BLM (2012) as follows:

- Class I – preserves the landscape character.

- Class II – retains the existing landscape character.

- Class IV – provides for management activities that require major modifications of the landscape character.

Wild and Scenic Rivers
Goal: River segments suitable for inclusion in the NWSRS would be free-flowing in nature, meet water quality standards, and continue to possess outstandingly remarkable ORVs that make them eligible.

Objectives: Determine suitable river segments for inclusion in the NWSRS. Manage those suitable river segments to maintain their free-flowing nature, water quality, ORVs, and tentative classification, pending congressional action or for the duration of the RMP.

Decisions

- Determine the following river segments as suitable and recommended for congressional designation in the NWSRS, for the classifications identified: the Lower Kern (Recreational), Chimney Creek (Wild/Recreational), North Fork of the Kaweah (Scenic), and San Joaquin River Segment 1 (Wild/Scenic).

- Establish a corridor extending 0.25 mile from each edge suitable river segment, in which the following interim protective management guidelines would apply:

    - Approve no actions altering the free-flowing nature of the suitable segment through impoundments, diversions, channeling, or riprapping.

    - Approve no actions that would measurably diminish the stream segment's identified outstandingly remarkable value(s).

    - Approve no actions that would modify the setting or level of development of the suitable river segment to a degree that would change its identified classification.

Under Alternative B (proposed plan) (BLM 2012), the Bakersfield RMP recommends the following actions:

- Designate the Millerton Lake Cave System as a significant cave resource, in accordance with the Federal Cave Resources Protection Act based on its "important significant cave resources including geological formations, resources of known cultural importance, biotic resources, and the potential for resource-based recreation" (BLM 2012).

- Designate 6,490 acres as the SJRG SRMA, established with a "community" market strategy for local communities, nearby rural areas, and the population centers of Fresno-Clovis and Madera.

- Establish three RMZs within the SJRG SRMA, each with recreation objectives, management actions, and allowable use decisions:

- **Pa'san RMZ** – Targeted recreation activities in the RMZ would include hiking, mountain biking, and horseback riding. Recreation management objectives are to provide opportunities for visitors to engage in a remote isolated recreation experience. This RMZ is managed to provide opportunities for community residents and regional visitors who use the area seasonally to engage in sustainable, primarily primitive day-use opportunities and gain appreciation of the natural setting of the San Joaquin River corridor through self-discovery and exploration. Efforts to maintain, improve, and expand a network of recreation trails in this zone are recommended.

- **Tahoot RMZ** – Targeted recreation activities in the RMZ would include interpretation, environmental education, and camping. Recreation management objectives are to provide opportunities for community residents and visitors to engage in sustainable personal discovery, interpretive programs, and educational opportunities, while protecting critical resources. Management activities include the following:

    - "Maintain, improve, and expand a network of recreational facilities including trails, campgrounds, parking areas, visitor contact locations and outdoor classrooms; establishing standard and expanded amenity fees as appropriate."

    - "Ensure that management balances the preservation of natural and cultural resources with the opportunity to provide for public recreation, interpretation, and education about the natural and cultural heritage of the area."

    - "Provide nature-based educational opportunities locally and regionally to include outdoor classroom and interpretation of natural and cultural resources" (BLM 2012).

- **Wu Ki'oh RMZ** – Targeted recreation activities include fishing, water play, gold panning, and kayaking. Recreation management objectives are to provide opportunities for community residents and

regional visitors to engage in sustainable, primarily primitive day-use opportunities and gain appreciation of the natural setting of the San Joaquin River through self-discovery and exploration. Management recommendations include restricting recreational gold prospecting activities to gold panning and sluicing within 25 feet of the current water level of the river, as well as prohibiting dry washing and disturbance to the river bank vegetation.

Bald and Golden Eagle Protection Act

USFWS has proposed new permit regulations to authorize the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally when the take to be authorized is associated with otherwise lawful activities (72 *Federal Register* 31141–31155, June 5, 2007). With delisting of the bald eagle in 2007, the Bald and Golden Eagle Protection Act is the primary law that protects bald eagles and golden eagles. As discussed in Chapter 7, "Biological Resources – Wildlife," each of the action alternatives would have a significant and unavoidable impact on bald eagle and golden eagle. Therefore, Reclamation would consult with USFWS to implement the reasonable and prudent alternative and conservation measures to reduce impacts on bald eagle and golden eagle.

Business Plan for the San Joaquin River Gorge Special Recreation Management Area

The *Business Plan for the San Joaquin River Gorge Special Recreation Management Area* (BLM 2010a) provides information on recreation use levels and expected changes, as well as future management direction for the area. BLM expects interpretation and education program demand to increase up to 12,500 students and also expects recreation use to dramatically increase with completion of the San Joaquin River Trail corridor.

According to the management plan, existing interpretation and education facilities will be retained except for the residential structure next to the RV site east of the visitor center, which will be removed and replaced with a new storage building. Current management will be continued to preserve a variety of recreation opportunities, and the Madera County portion of the SJRG SRMA will continue to be managed as a primitive nonmotorized area.

BLM will continue pursuing land acquisition efforts to complete the San Joaquin River Trail corridor and provide public trail access to the Patterson Bend lands. BLM will coordinate with the Millerton Lake SRA to construct and maintain trail connections and may construct a loop trail opportunity for the Wuh-ki'o Trail. BLM has already completed improved trail access near Kerckhoff No. 2 Powerhouse in the western portion of the SJRG SRMA for fishing and river access via a river access trail east and west of the locked gate by the powerhouse.

Clean Water Act

Section 401 Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. The Federal government delegates water pollution control authority under Section 401 of the CWA to the states. Refer to the Porter-Cologne Water Quality Control Act discussion below.

Section 404 A Section 404(b)(1) alternatives information package would be prepared for the action alternatives and submitted to the USACE and the EPA. In addition, Reclamation would obtain a Section 404 permit before filling any waters of the United States. USACE would issue a record of decision that addresses pertinent consideration and implementation requirements. Section 404 also requires that the Least Environmentally Damaging Practicable Alternative be identified and implemented by an authorized Federal agency.

Executive Order 11988, Flood Hazard Policy

As discussed in Chapter 12, "Hydrology – Flood Management," all of the action alternatives would have an impact on floodplains in the primary study area. Implementing any of the action alternatives would also reduce flood flow events in the extended study area along the lower San Joaquin River. None of the action alternatives would increase flood flows, and feasible mitigation would be implemented to compensate for the impact of altered flow on riparian and wetland communities.

Executive Order 11990, Protection of Wetlands

As discussed in Chapter 6, "Biological Resources – Botanical and Wetlands," a wetland delineation has been prepared for the primary study area, and a USACE Section 404 permit would be obtained before construction begins. Reclamation would avoid

and minimize impacts to the extent feasible and compensate for any losses. Implementing any of the action alternatives would result in significant and unavoidable impacts on wetlands.

Executive Order 12898, Environmental Justice Policy

As discussed in Chapter 10, "Environmental Justice," EO 12898 requires that Federal agencies identify and address, when appropriate, "disproportionately high and adverse health or environmental impacts of its projects, policies, and activities on minority populations and low-income populations.…" The EO also established an Interagency Working Group that would establish guidelines on criteria for identifying environmental justice populations and strategies to deal with environmental justice issues.

Reclamation would comply with EO 12898 because implementing any of the action alternatives would affect the entire population of the primary study area equally regardless of race, ethnicity, or income level. Implementing any of the action alternatives would increase employment and income opportunities from construction-, operation-, and recreation-related activities and would likely benefit minority and low-income populations in the primary study area and adjacent areas. Minority and low-income populations residing in regions of the extended study area that receive CVP and SWP water supplies would also benefit from increased water supply reliability, which would be achieved with implementation of any of the action alternatives.

Executive Order 13007, Indian Sacred Sites and Memorandum of April 29, 1994, Executive Memorandum

As discussed in Chapter 9, "Cultural Resources," EO 13007 defines a sacred site as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

Executive Order 13007 pertains only to Federally recognized tribes and Federally managed lands. For groups that are not formally recognized, sacred areas may be listed in the Sacred Lands files of the California Native American Heritage Commission. This commission has reviewed its files and identified sacred lands within the study area. Their locations

are confidential. Tribal consultation for the Investigation is ongoing.

Executive Order 13112, National Invasive Species Management Plan

A weed management plan, which would be prepared as part of the Investigation, would identify methods for managing the spread of invasive plant species. Because the details of the weed management plan were not finalized at the time of this writing, this Draft EIS identifies preparation and implementation of a weed management plan as a mitigation measure. Developing and implementing the weed management plan as a mitigation measure demonstrates compliance with EO 13112. Reclamation would demonstrate continued compliance with this EO by implementing the methods described in the weed management plan.

Farmland Protection Policy Act

As a Federal agency preparing environmental compliance documents, Reclamation has included in its analysis a farmland assessment designed to minimize adverse impacts on Prime and Unique Farmlands and provide for mitigation as appropriate. Chapter 17, "Land Use Planning and Agricultural Resources," evaluates potential impacts of the action alternatives on Important Farmland.

Federal Clean Air Act

As discussed in Chapter 4, "Air Quality and Greenhouse Gas Emissions," implementing the Investigation would not result in long-term impacts on air quality. Because the impacts of the action alternatives on air quality have been evaluated and short-term impacts have been mitigated to the extent possible, implementing any of the action alternatives would comply with the Federal Clean Air Act. For specific projects, Federal agencies must coordinate with the appropriate air quality management district and EPA. This coordination determines whether the project conforms to the CAA and the state implementation plan. The primary study area, and much of the extended study area, is located within the SJVAB. SJVAPCD implements programs and regulations required by the CAA.

Federal Endangered Species Act

Reclamation has coordinated with the USFWS and NMFS regarding potential project impacts on federally listed species. The potential impacts of the Investigation on endangered and threatened species are described in Chapter 5, "Biological Resources – Fisheries and Aquatic Ecosystems;" Chapter 6,

"Biological Resources – Botanical and Wetlands;" and Chapter 7, "Biological Resources – Wildlife." Reclamation would prepare the appropriate biological assessments to address potential impacts on federally listed species and would consult with USFWS and NMFS regarding impacts of the project.

Section 9 of the ESA prohibits the take of Federally listed species. "Take" is defined under the ESA, in part, as killing, harming, or harassing. Under Federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by significantly impairing essential behavioral patterns – breeding, feeding, or sheltering.

Section 7 of the ESA outlines procedures for Federal interagency cooperation to conserve Federally listed species and designated critical habitat. Section 7(a)(2) requires Federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. NMFS also ensures that projects will not adversely affect essential fish habitat, as defined in the 1996 Sustainable Fisheries Act (Public Law 104-297). The goal is to stop or reverse the continued loss of fish habitats by protecting, conserving, and enhancing habitat.

Federal Energy Regulatory Commission

Changes to hydroelectric facilities on the San Joaquin River, including instream flow releases and modifications to licensed structures, would necessitate a license amendment from the FERC. Reclamation would support PG&E in any application to the FERC for necessary license amendments before implementing any of the action alternatives.

Federal Land Policy and Management Act

As discussed in Chapter 1, "Introduction," BLM is a cooperating agency during preparation of this Draft EIS. As described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," the Federal Land Policy Management Act directs BLM to manage public lands under the principles of multiple use and sustained yield. Under the Federal Land Policy and Management Act, the use and occupancy of public lands requires authorization by a land management agency, typically under the auspices of a special-use permit. As the principal land management agency for the San Joaquin River Gorge Special Recreation Management Area, BLM may need to use the final EIS to

support issuance of authorizations to various parties under the Federal Land Policy and Management Act.

Federal Transit Administration

This Draft EIS evaluates potential groundborne-vibration impacts on sensitive receptors, including maximum acceptable vibration standard of 80 VdB. The analysis in this Draft EIS applied the human disturbance threshold of 0.1 inch/second PPV, which is more stringent than the FTA's maximum acceptable vibration standard of 80 VdB. Some construction activities associated with the action alternatives could result in groundborne vibrations exceeding 0.1 inch/second PPV. However, sensitive receptors would need to be within 130 feet of the activities to be affected, and no sensitive receptors would be within this distance. Reclamation has demonstrated consistency with this policy by evaluating the construction activities that would generate the maximum possible groundborne vibration at the highest sensitive uses.

Federal Water Project Recreation Act

Compliance with the Federal Water Project Recreation Act is achieved by documenting the consideration of recreation opportunities in USACE reports and NEPA documents. The act requires that Federal agencies with authority to approve water projects include recreation development as a condition of approving permits. Recreation development must be considered along with any navigation, flood control, reclamation, hydroelectric, or multipurpose water resource project. Within this Draft EIS, Reclamation has taken into consideration and addressed outdoor recreation and fish and wildlife enhancement in the primary and extended study areas.

Fish and Wildlife Coordination Act

Compliance with the FWCA involves assessing the impacts of the action alternatives on preservation, conservation, and enhancement of fish and wildlife habitat and preparing a FWCA report. Reclamation would be required to include recommendations for preserving affected habitats, mitigating their loss, and enhancing such habitats in its documentation of compliance. Documentation of compliance with the FWCA is a separate analysis of habitats of concern to USFWS, NMFS, and the CDFW, and does not replace the analysis required by Section 7 of the Federal Endangered Species Act. Reclamation would consider and incorporate the recommended measures where feasible.

The Fish and Wildlife Coordination Act Report for the Investigation will be included as an appendix to the Final EIS.

Indian Trust Assets

When adverse impacts on ITAs cannot be avoided, appropriate mitigation or compensation would be provided. ITAs consist of lands that have been deeded to tribes or on which tribes have a historical legal claim. However, no such lands are located within the primary study area. Thus, the Investigation would have no impact on ITAs. Because ITAs have been evaluated and the Investigation would have no impact on these resources, the Investigation would not conflict with any ITAs.

Lease of Power Privilege

A lease of power privilege (LOPP) is a contractual right given to a non-Federal entity to use a Reclamation facility for electric power generation consistent with Reclamation project purposes. A LOPP project must not impair the efficiency of Reclamation-generated power or water deliveries, jeopardize public safety, or negatively affect any other Reclamation project purposes. A LOPP is used when Reclamation has authority to develop power on any or all features of a Federal project.

The development of non-Federal hydroelectric powerplants on existing Reclamation facilities (e.g., dams or conduits) requires either a LOPP issued by Reclamation or a license issued by the FERC. Permitting authority is mutually exclusive; each Reclamation facility is either within Reclamation's or FERC's permitting jurisdiction. Accordingly, development proceeds through either a LOPP or FERC license – but not both.

Magnuson-Stevens Fishery Conservation and Management Act

Chapter 5, “Biological Resources – Fisheries and Aquatic Ecosystems,” discusses impacts on fisheries and fisheries habitat. Reclamation would coordinate with NMFS to ensure that recommended measures are incorporated into the selected alternative plan to minimize adverse modifications to Essential Fish Habitat.

Migratory Bird Treaty Act

Chapter 7, “Biological Resources – Wildlife,” evaluates potential impacts on migratory bird species and identifies mitigation measures to reduce impacts on birds, nests, and eggs. In addition, Reclamation would implement all feasible measures included in the FWCA report discussed above.

Reclamation would comply with the Migratory Bird Treaty Act by implementing mitigation measures described in this Draft EIS and in the pending FWCA report before and during implementation of any of the action alternatives.

National Historic Preservation Act

Under Section 106 of the National Historic Preservation Act, Federal agencies must consider impacts on eligible resources ("historic properties") from the proposed undertaking in consultation with the California SHPO and other parties. This includes affording the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings. For this project, consultation between Reclamation, BLM, any other applicable Federal agencies, SHPO, and other consulting parties would include consideration of possible options for avoiding, minimizing, or mitigating adverse impacts.

Currently, there is no undertaking authorized by Congress involving the construction of Temperance Flat RM 274 Dam and Reservoir. Federal agencies may conduct nondestructive planning activities without completing Section 106, provided that the actions do not prohibit subsequent consideration of alternatives to avoid, minimize, or mitigate the undertaking's adverse effects on historic properties. This environmental document is in support of a feasibility study. Should the undertaking be authorized, Section 106 would be initiated early in that planning process (36 CFR Section 800. 1(c)).

Under Section 106, these efforts would include the following:

- A complete pedestrian survey and inventory of cultural resources within the APE of the selected alternative
- Ethnographic and ethnohistoric investigations to obtain greater detail regarding areas of importance to Native American tribes and groups
- Evaluations to determine whether cultural resources identified within the APE are eligible for inclusion in the NRHP
- Assessment of potential adverse effects to historic properties and consultation to resolve any identified adverse effects

Cultural resources are evaluated for inclusion in the NRHP based on criteria found at 36 CFR Part 60. Once a resource has been evaluated, the lead Federal agency determines eligibility in consultation with the SHPO and other consulting parties, as applicable. In this process, previous determinations of eligibility may need to be reevaluated because of the passage of time or other factors, and it is important to acknowledge the special expertise of Indian tribes when assessing the eligibility of properties to which they attach ceremonial and cultural significance. It would be possible to evaluate some cultural resources with survey-level data. However, test excavations may be necessary to accurately evaluate many archaeological resources to determine if they are, in fact, historic properties.

The lead Federal agency is required to consider the effects of any potential project on historic properties within the primary study area. The criteria for assessing adverse effects are found in 36 CFR Part 800.5(a)(1), which states that "an adverse effect is found when an undertaking may alter, directly or indirectly, any characteristic of a historic property that qualify the property for inclusion in the National Register…" Examples of adverse effects include physical destruction, alteration, a change in the property's setting, or the introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features (36 CFR Part 800.5(a)(2)).

If SHPO, Reclamation, USFS, other applicable Federal agencies, and the Council (if participating) agree to measures to resolve adverse effects to historic properties, these are formalized in an MOA. Other consulting parties may be invited to sign the MOA. The Section 106 process (36 CFR Part 800.14) is completed once the terms of the MOA have been met. Alternatively, the Federal agencies may elect to enter into a programmatic agreement (PA) that would be developed as an alternative procedure to implement the Section 106 process (36 CFR Part 800.14). In rare cases, if consultation fails to result in agreement on resolving adverse effects, consultation may be terminated pursuant to the process detailed in 36 CFR Part 800.7.

Consultation then continues among Reclamation, SHPO, and other consulting parties on possible options for avoiding, minimizing, or mitigating the adverse effects. This includes notifying the Council when adverse effects are found and inviting the Council to participate. Archaeological data recovery excavation is the most frequent way to resolve or

mitigate adverse effects on historic properties determined eligible under Criterion D. Properties determined eligible under Criteria A through C typically require more varied actions to resolve adverse effects. If SHPO, Reclamation, and the Council (if participating) agree to measures to resolve adverse effects to historic properties, these are formalized in an MOA. Other consulting parties may be invited to sign the MOA. The Section 106 process is completed once the terms of the MOA have been met. In rare cases, if consultation fails to result in agreement on resolving adverse effects, consultation may be terminated pursuant to the process detailed in 36 CFR Part 800.7.

Wild and Scenic Rivers Act

As described in Appendix J of the BLM Bakersfield Proposed RMP, "Wild and Scenic Rivers Suitability Report (2010b)," the 5.4 miles of the San Joaquin River from the Kerckhoff Dam downstream to the Kerckhoff Powerhouse was determined to be eligible and suitable for designation as a Federal Wild and Scenic River based on its free-flowing character and outstandingly remarkable values. With this finding, this section of river must be managed in a manner that protects the outstandingly remarkable values that were identified by BLM.

State

California Clean Air Act

This Draft EIS evaluates the contribution of the action alternatives to any violation of air quality standards and identifies mitigation measures to help achieve consistency with the State implementation plan's attainment goal before implementation of the alternative plan selected.

California Department of Transportation

Caltrans recommends thresholds of 0.2 inch per second peak particle velocity for normal residential buildings and 0.08 inch per second peak particle velocity for old or historically significant structures (Caltrans 2002). These standards are more stringent than the Federal standard established by the Committee of Hearing, Bio Acoustics, and Bio Mechanics, presented above under in the Federal Transit Administration section.

Caltrans is responsible for planning, designing, construction, operating, and maintaining all State-owned roadways in California. The Caltrans Highway Design Manual establishes uniform policies and procedures to carry out Caltrans's

highway design functions. The highway design criteria and policies in the manual provide a guide for applying standards in the design of projects and, rather than implementing enforceable regulations, present information and guidance.

California Environmental Quality Act

As described previously, DWR is the CEQA Lead Agency for the Investigation; however, at the time of release of this Draft EIS, DWR was unable to provide CEQA review. This Draft EIS has been prepared in accordance with CEQA, and information contained in it may be used by DWR and/or other State lead, responsible, and trustee agencies that have regulatory jurisdiction or permit authority over certain aspects of the action alternatives. The appropriate use of this information will be defined by the CEQA Lead Agency.

California Endangered Species Act

Evaluations conducted for State-listed endangered and threatened species have determined that implementing the project would affect several State-listed species. Impacts on those species are discussed in Chapter 5, "Biological Resources – Fisheries and Aquatic Ecosystems;" Chapter 6, "Biological Resources – Botanical and Wetlands;" and Chapter 7, "Biological Resources – Wildlife." Reclamation would prepare appropriate biological assessments to address potential impacts on Federally listed species. The State lead agency, when identified, would consult with CDFW regarding impacts of the project on State-listed species.

California Fish and Game Code

Fully Protected Species This Draft EIS identifies potential actions that could result in take of fully protected species, and Reclamation would work closely with CDFW to evaluate methods to avoid impacts on fully protected species.

Section 1602, Streambed Alteration A CDFW streambed alteration agreement must be obtained for any project that would result in an alteration of a river, stream, or lake. This Draft EIS identifies potential actions of the project that would require the alteration of stream features, subject to Section 1602 of the California Fish and Game Code. This document requires Reclamation or its contractor to secure an approved streambed alteration agreement before performing any actions subject to Section 1602.

Section 5937 This Fish and Game Code requires that the owner of any dam shall allow sufficient water at all times to

pass through a fishway, or in the absence of a fishway, allow sufficient water to pass over, around or through the dam, to keep in good condition any fish that may be planted or exist below the dam.

California Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) was established by the State of California in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the NRCS, under the U.S. Department of Agriculture. The intent of NRCS was to produce agricultural resource maps based on soil quality and land use across the nation. The DOC sponsors the FMMP and also is responsible for establishing agricultural easements, in accordance with PRC Sections 10250–10255.

As part of mapping efforts for nationwide agricultural land use, NRCS developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria. The LIM criteria classify a land's suitability for agricultural production. Suitability includes both the physical and chemical characteristics of soils as well as the actual land use. Important Farmland maps are derived from the NRCS soil survey maps using the LIM criteria and are available by county. Important Farmland is classified by DOC as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Together, Important Farmland and Grazing Land are defined by DOC as "Agricultural Land." These designations are defined as follows (DOC 2011):

- *Prime Farmland* is land that has the best combination of physical and chemical characteristics for crop production, as well as high soil quality, appropriate growing season, and adequate moisture supply to sustained high crop yields.

- *Farmland of Statewide Importance* is land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production. The definition is similar to that for Prime Farmland except that crop production characteristics are considered good, but not the best.

- *Unique Farmland* does not meet the definition of either Prime Farmland or Farmland of Statewide Importance, but it is being used for specific crops of high economic value. This farmland type has a special combination of

soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of specific crops.

- *Farmland of Local Importance* is land of importance to the local economy, as defined by each county's local advisory committee and adopted by its board of supervisors. Farmland of Local Importance either is currently producing or has the capability to produce, but does not meet the definition of Prime Farmland, Farmland of Statewide Importance, or Unique Farmland.

- *Grazing Land* is land with existing vegetation that is suitable for grazing.

Additional categories used in the FMMP mapping system are Urban and Built-Up Lands, which designates land that is used for residential, industrial, commercial, institutional, and public utility structures, and for other developed purposes, and Other Lands, which is defined as lands that do not meet the criteria of the remaining categories and generally include low-density rural developments, vegetative and riparian areas not suitable for livestock grazing, confined-animal agriculture facilities, strip mines, borrow pits, and vacant and nonagricultural land surrounded on all sides by urban development.

California Harbors and Navigation Code

Significant modifications to facilities on Millerton Lake might necessitate coordination with the California Department of Boating and Waterways. Reclamation would coordinate with the agency as necessary.

California General Plan Guidelines

California has developed land-use compatibility guidelines for community-noise environments. The State of California General Plan Guidelines, published by the Governor's Office of Planning and Research (OPR) (OPR 2003), provides guidance for the acceptability of projects within specific community-noise-equivalent Ldn contours. With regard to the Investigation, water recreational uses are considered acceptable in areas where exterior noise levels do not exceed 75 A-weighted decibels community noise equivalent level/Ldn. Water recreational uses are normally unacceptable in areas exceeding 70 A-weighted decibels Ldn and clearly unacceptable in excess of 80 A-weighted decibels Ldn (further description of the these ranges and the Ldn is provided in

Chapter 18, "Noise and Vibration"). The guidelines also present adjustment factors that may be used to arrive at noise-acceptability standards that reflect the particular community's noise-control goals, sensitivity to noise, and assessment of the relative importance of noise issues.

California Land Conservation Act of 1965 (Williamson Act)

In 2011, Fresno County exceeded 1 million acres in Williamson Act contracts (DOC 2013). Williamson Act lands affected by the action alternatives are discussed in Chapter 17, "Land Use Planning and Agricultural Resources." Reclamation would need to terminate any existing Williamson Act contracts for privately owned lands that may be acquired for project purposes.

California Native Plant Protection Act

All action alternatives are evaluated in this Draft EIS for consistency with the California Native Plant Protection Act. Mitigation measures are provided, as necessary, to minimize potential take of listed and special-status plants under this act.

California State Lands Commission

The CSLC has the authority and responsibility to manage and protect the important natural and cultural resources on certain public lands in the state and the public's rights to access these lands. Two distinct types of public lands are under the commission's jurisdiction: sovereign lands and school lands. Sovereign lands encompass approximately 4 million acres. These lands include the beds of California's naturally navigable rivers, lakes, and streams, and the state's tidal and submerged lands along the coastline, extending from the shoreline out to 3 miles offshore. Construction on public lands requires review and by the CSLC and may require a land use lease. The CSLC has no authority over navigable waterways in the primary study area. The CSLC does have jurisdiction along the San Joaquin River downstream from the existing Friant Dam. No construction activities outside of the primary study area are proposed under the action alternatives.

California Surface Mining and Reclamation Act

SMARA requires that a reclamation plan be prepared and that an approved financial assurance be posted for the reclamation of the mined land. Because Temperance Flat RM 274 Dam and Reservoir would require borrow material for construction from sites not previously permitted, Reclamation must comply with SMARA. SMARA applies to an individual or entity that would disturb more than 1 acre or remove more than 1,000 cubic

yards of material through surface mining activities, including the excavation of borrow pits for soil material. SMARA is implemented through permitting ordinances developed by local government "lead agencies" that provide the regulatory setting under which local mining and reclamation activities are conducted. The State Mining and Geology Board reviews the local ordinances to ensure that they meet the procedures established by SMARA.

The Office of Mine Reclamation (under the DOC) provides assistance to cities, counties, state agencies and mine operators for reclamation planning, and strives to reclaim mined lands to a beneficial end-use through implementing SMARA. If borrow material is required from sites not previously permitted under SMARA, Reclamation would obtain either a SMARA permit or an exemption from SMARA for all borrow sites before beginning project construction.

California Water Commission

In November 2009, California enacted a comprehensive water package to improve the state's water supply reliability and restore the Sacramento- San Joaquin River Delta ecosystem. The package included California Proposition 43 (Assembly Bill 1422) which, if approved by voters in 2014, will direct the California Water Commission to develop tools and methods for the quantification of public benefits of water storage projects including CALFED surface storage, groundwater storage, conjunctive use and reservoir reoperation, and local and regional storage.

Central Valley Flood Control Act of 2008

Reclamation has developed the action alternatives in a manner consistent with the Central Valley Flood Control Act, and none of the action alternatives would inhibit development and implementation of the CVFPP.

Delta Stewardship Council

In November 2009 the Sacramento-San Joaquin Delta Reform Act was passed by the California Legislature and signed by Governor Schwarzenegger. It established state policy of coequal goals for the Delta and created the Delta Stewardship Council as a new, independent state agency that will delineate exactly how to meet these goals through development and implementation of the Delta Plan.

The Delta Stewardship Council's principal task is to develop and implement the Delta Plan, a legally enforceable document

that will include all the actions necessary to ensure the state's coequal goals for the Delta are met (Delta Stewardship Council 2010).

Millerton Lake Final Resource Management Plan

The Millerton Lake SRA is managed by State Parks through an agreement with Reclamation, the owner of most of the land in this area. Reclamation and State Parks developed a joint RMP and general plan (Reclamation and State Parks 2010) that offers guidance on how to manage the area as a whole. The purpose of the joint plan is to guide the use, development, and management of the lake and surrounding lands. The plan did not include any goals or objectives related to visual resources. Under the discussion of management actions, the plan states, "It is anticipated that any new facilities would be designed in such a way as to not diminish any visual resources in the park."

Porter-Cologne Water Quality Control Act

Action alternatives with the potential to adversely affect water quality are identified in this Draft EIS. Measures necessary for compliance with the Porter-Cologne Water Quality Control Act would need to be consistent with implementation programs under the water quality control plan for the San Joaquin River basin and with the Central Valley Water Board's waste discharge requirements. Other necessary actions likely would include application for and finalization of NPDES permits and Section 401 water quality certification.

Water Rights

Chapter 14, "Hydrology – Surface Water Supplies and Facilities Operations," describes the diversion rates and quantities and places and purposes of use of Reclamation's permitted water rights applications at Friant Dam.

By letter dated August 7, 2014, State Water Board staff informed Reclamation that Reclamation would have to seek revision of the Fully Appropriated Streams Declaration (State Water Board Order 89-25, Exhibit A) pursuant to Title 23 of the CCR, Section 871, along with submittal of a proposed application for a new water right (see: CWC Section 1202, et seq. and Title 23 of the CCR, Section 650 et seq.) for operation of a proposed project. The proposed application could not be accepted or processed until the State Water Board adopts an order changing the Declaration. This Draft EIS, including the associated modeling results, provides the complete environmental review and demonstration of requisite findings

under the CWC in order for the State Water Board to approve the water right application described above.

Regional and Local

Fresno County General Plan Policy Document, Traffic and Circulation Element

The following goal and policies from the Traffic and Circulation Element of the Fresno County General Plan Policy Document (Fresno County 2000) are relevant to the alternatives.

Goal TR-A: To plan and provide a unified, coordinated, and cost-efficient countywide street and highway system that ensures the safe, orderly, and efficient movement of people and goods.

- **Policy TR-A.1** – The County shall plan and construct County-maintained streets and roads according to the County's Roadway Design Standards. Roadway design standards for County-maintained roads shall be based on the AASHTO standards, and supplemented by Caltrans design standards and by County Public Works Department Standards.

- **Policy TR-A.2** – The County shall plan and design its roadway system in a manner that strives to meet LOS D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county.

  The County may, in programming capacity-increasing projects, allow exceptions to the level of service standards in this policy where it finds that the improvements or other measures required to achieve the LOS policy are unacceptable based on established criteria.

  In no case should the County plan for worse than LOS D on rural County roadways, worse than LOS E on urban roadways within the spheres of influence of the cities of Fresno and Clovis, or in cooperation with Caltrans and the Council of Fresno County Governments, plan for worse than LOS E on State highways in the county.

- **Policy TR-A.7** – The County shall assess fees on new development sufficient to cover the fair share portion of that development's impacts on the local and regional transportation system.

- **Policy TR-A.12** – The County, where appropriate, shall coordinate the multi-modal use of streets and highways to ensure their maximum efficiency and connectivity and shall consider the need for transit, bikeway, and recreational trail facilities when establishing the Ultimate Right-of-way Plan and Precise Plans of streets and highways.

- **Policy TR-A.13** – The County shall develop and maintain a program to construct bikeways and recreation trails in conjunction with roadway projects in accordance with the adopted Regional Bikeways Plan, the adopted Recreation Trails Plan, available dedicated funding for construction and maintenance, and a needs priority system.

Madera County General Plan Policy Document, Traffic and Circulation

The following goals and policies from the Traffic and Circulation Element of the Madera County General Plan Policy Document (Madera County 1995) are relevant to the alternatives.

Goal 2.A: To provide for the long-range planning and development of the county's roadway system, ensure the safe and efficient movement of people and goods, and provide sufficient access to existing and new development.

- **Policy 2.A.2** – Existing and new street roads shall be dedicated, widened, and constructed according to the roadway design and access standards generally defined in Part I of this *Policy Document*.

- **Policy 2.A.8** – The County shall develop and manage its roadway system to maintain a minimum Level of Service D on all State and County Roadways. For planning applications, level of service shall be measured for roadway segments and shall be based on the capacities shown in Table 2.A.8 (Table 28-2 in this Draft EIS). The facility classification in this table shall correspond to Table I-3 and Figure I-1, [in] the *Circulation Plan Diagram*. The County may also

require analysis of specific intersections when intersections are deemed to be critical for specific projects or locations; in those cases, level of service shall be computed according to the planning methodology as documented in *Circular 212, Interim Materials on Highway Capacity*, published by the Transportation Research Board In January 1980.

Table 28-2. Capacities per Hour per Lane for Various Highway Facilities

LOS	Freeways	Two-Lane Rural Highway	Multilane Rural Highway	Expressway	Arterial	Collector
A	700	120	470	720	450	300
B	1,100	240	945	840	525	350
C	1,550	395	1,285	960	600	400
D	1,850	675	1,585	1,080	675	450
E	2,000	1,145	1,800	1,200	750	500

Source: Madera County 1995
Key:
LOS = level of service

Goal 2.D: To provide a safe, comprehensive, and integrated system of facilities for non-motorized transportation to meet the needs of commuters and recreational users.

San Joaquin River Parkway Master Plan

The San Joaquin River Parkway Master Plan (SJRC 2000) is a conceptual, long-range planning document intended to help preserve, enhance, and provide for enjoyment of the natural landscape of the San Joaquin River corridor. As proposed in 1992, the parkway would include the San Joaquin River and approximately 5,900 acres of land on both sides of the river between Friant Dam and the SR 99 crossing, as well as the existing 17-acre Skaggs Bridge Park at the SR 145 crossing. Approximately 1,900 acres of the parkway would be located in Madera County and 4,000 acres in Fresno County.

Portions of the proposed parkway site are managed for recreational or natural resource protection, conservation, and education purposes, although other parts are privately owned and used for other purposes. Approximately 4,650 of the 5,900 acres in the proposed parkway site are private land. Specific goals, objectives, and policies are included in the Natural Resource Element and Recreational Element that promote preservation, restoration, and enhancement of visual resources

through the preservation and enhancement of natural areas and the sensitive design of recreational areas and trails.

San Joaquin Valley Air Pollution Control District Authority to Construct and Permit to Operate

Reclamation would obtain an Authority to Construct permit before building or installing any new emissions unit or modifying any existing emissions unit that requires a permit, if necessary. Reclamation also would obtain a Permit to Operate for emissions from new sources, if needed.

Growth-Inducing Impacts

The purpose of this section is to disclose how any of the action alternatives analyzed in this Draft EIS, if implemented, could induce growth directly or indirectly by removing an obstacle to future growth.

NEPA and CEQA Requirements

The CEQ Regulations require that an EIS analyze direct and indirect impacts of growth-inducing impacts. Direct growth-inducing impacts generally stem from the construction of new housing, businesses, or infrastructure. Indirect impacts are reasonably foreseeable impacts that may occur beyond the immediate timeframe of a proposed action or outside of the immediate vicinity of the action area. These impacts "may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate" (40 CFR 1508.8[b]).

Section 15126.2(d) of the State CEQA Guidelines states that an EIR should discuss:

> *…the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth…. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

Induced growth is considered a significant impact only if it directly (or indirectly) affects the ability of agencies to provide needed public services, or if it can be demonstrated that the

potential growth significantly affects the environment. The goal of this Draft EIS in this regard, therefore, is one of disclosure.

In *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001) 91 Cal.App.4th 342, 367–371 (110 Cal.Rptr.2d 579), the California Court of Appeal, Fourth District, provided clear direction on the standards for disclosure of growth-inducing impacts in an EIR. This direction is also relevant regarding an EIS. Growth-inducing impacts are evaluated for the project alternatives in accordance with the California Court of Appeal finding in *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001):

> *Neither CEQA itself, nor the cases that have interpreted it, require an EIR to anticipate and mitigate the effects of a particular project on growth on other areas. In circumstances such as these, it is sufficient that the final EIR (FEIR) warns interested persons and governing bodies of the probability that additional housing will be needed so that they can take steps to prepare for or address that probability. The FEIR need not forecast the impact that the housing will have on as yet unidentified areas and propose measures to mitigate that impact. That process is best reserved until such time as a particular housing project is proposed.*

Potential Growth Inducing Mechanisms

The following sections describe mechanisms that could be potentially growth inducing and analyze the potentially growth-inducing impacts of the action alternatives. The intent of the discussion is to describe the extent to which implementing an alternative plan—specifically, constructing and operating a water storage facility at RM 274 and related facilities, improving water supply reliability, enhancing water temperature and flow conditions, and reducing flood risk—could increase growth.

Facility Construction and Operation

The analysis of construction-related impacts involves determining whether the relative magnitude of temporary and permanent jobs that would be created by implementing the project would be large enough to require additional housing or

would otherwise spur economic growth in the area surrounding the primary study area.

Although project construction would be confined to the primary study area, it is the immediate area surrounding the primary study area that would potentially experience growth-inducing impacts from construction of the project—in particular, the nearby cities of Clovis and Fresno in Fresno County and the City of Madera in Madera County. These areas would likely contribute goods and services to the construction activities.

Depending on the alternative plan implemented, construction would create up to 1,656 direct, indirect, and induced jobs during the 8 years of planned construction. These new jobs are expected to have a temporary benefit by creating employment opportunities for many unemployed workers and would represent a relatively small increase (less than 2 percent) of the total labor force for Madera and Fresno counties. As discussed in Chapter 23, "Socioeconomics, Population, and Housing," the unemployment and housing vacancies in these two counties are higher than the state average.

Given the availability of existing labor within the total labor force of Fresno and Madera counties, an adequate number of workers would be found within the local area. Therefore, jobs created by implementing any of the action alternatives would be filled largely by the local workforce. Given the availability of housing in the vicinity of Madera, Fresno, and Clovis, even if a portion of workers were to relocate from outside the local area, these workers would be readily accommodated by existing housing; therefore, the influx of these workers during project construction would not induce new housing development. (For more detail, see Chapter 23, "Socioeconomics, Population, and Housing.")

Implementing any of the action alternatives would result in permanent increases in employment within the region as a result of operations and maintenance of the new dam, intake structure, powerhouse, valve house, and permanent access roads. Operations and maintenance would generate an estimated 38 new permanent direct, indirect and induced jobs, which represents a relatively small increase (less than 1 percent) in the total labor force in Fresno and Madera counties. It is expected that most of these new jobs would be filled from within the two counties and would therefore not induce additional growth in the area. Assuming that some or all of the

jobs were specialized and would require workers from outside of the local labor pool, given the availability of housing in the area, these workers would be readily accommodated by existing housing; therefore, the influx of these workers following project construction would not induce substantial new housing development. (For more detail, see Chapter 23, "Socioeconomics, Population, and Housing.")

A substantial increase in recreational use of Millerton Lake and the new Temperance Flat RM 274 Reservoir would occur as a result of stabilizing water storage volume in Millerton Lake and creating Temperance Flat RM 274 Reservoir. This increased recreational use is expected to generate 33–37 additional direct and indirect jobs. Employees needed to fill these long-term jobs are expected to be from the local communities, including the larger metropolitan areas of Fresno, Clovis, and Madera. No new housing is needed for these employees because these new jobs would be filled from residents within the two counties. Implementing any of the action alternatives would not induce additional growth in the area.

Increased Water Supply Reliability

As described in Chapter 1, "Introduction," the action alternatives respond to needs including water supply reliability and operational flexibility. Increasing water supply reliability for CVP contractors and SWP SOD M&I contractors within the extended study area has the potential to induce growth.

The action alternatives vary based on operations (conveyance routing of new water supply, potential water supply beneficiaries, and minimum carryover storage targets) and intake feature configurations (low level or selective level). Chapter 2, "Alternatives," shows the average annual change in water deliveries for each alternative plan when compared to the No Action Alternative.

The improved water supply would benefit existing CVP and SWP water user by increasing the reliability of water supplies. The amount of additional water developed under the action alternatives, and delivered across the various water supply beneficiaries, would not be of a large enough quantity to any one area to induce growth, and the total water delivered would remain within the historical ranges.

Induced Agricultural Growth Changes in the reliability of water deliveries could affect agricultural production within the

Friant Division of the CVP, CVP SOD, and SWP SOD M&I water service areas. As described in Chapter 2, "Alternatives," implementing any of the action alternatives would improve water supply reliability for Friant Division contractors; implementing either of Alternative Plans 2-5 would improve water supply reliability for CVP SOD contractors. To the extent that the lack of sufficient, reliable water supplies poses a constraint to agricultural production, the increased amount of reliable supplies has the potential to support increased agricultural production.

As discussed in Chapter 23, "Socioeconomics, Population, and Housing," improving water supply reliability would result in less frequent idling of crops and increased agricultural production on existing agricultural lands. The additional direct, indirect, and induced agriculture-related income and spending would represent new local economic activity and provide employment opportunities to unemployed workers for the six counties within the Friant Division of the CVP (i.e., Fresno, Kern, Kings, Madera, Merced, and Tulare counties), as well as the four additional counties (Santa Clara, San Benito, San Joaquin, and Stanislaus) that serve the agriculture contractors outside of the Friant Division service area.

Under the action alternatives, new agricultural workers would be needed to support additional crop production in the Friant Division of the CVP and within the CVP SOD service area. The increase in agricultural production would enable existing employees to work for a longer period while also increasing the total number of workers needed during the growing season. Additionally, new indirect and induced job would be generated in the Friant Division of the CVP and CVP SOD service area through purchases from businesses that support the agriculture industry. The new direct, indirect, and induced agricultural related income and spending would represent new local economic activity and provide employment opportunities to many unemployed workers in the supporting counties.

The new direct, indirect and induced jobs in the Friant Division of the CVP would represent a relatively small increase in the total labor force in the six-county region (approximately 1,135,500 workers in 2010), but the employment opportunities created by implementing any of the action alternatives would represent a substantial contribution in counties that have high unemployment rates. Within the six-county area, the 2010 unemployment rates exceeded 16 percent (Table 23-16) and unemployment rates in the state exceeded 12 percent (Table

23-16). These new jobs would be expected to provide permanent employment opportunities to many unemployed workers.

Implementing any of the action alternatives is not anticipated to result in permanent increases in population and housing demand as a result of agriculture-related employment, because workers serving the project are expected to come from within the local or nearby communities. Neither substantial population growth nor an increase in housing demand in the region would be anticipated with creation of these jobs. Even if some of workers were to come from outside of this area, sufficient housing capacity (e.g., rental housing and apartment vacancies) exists in the six-county area to house these workers. Vacancy rates in the six-county region were generally higher than the state average (5.9 percent), ranging from 6.0 percent in Kings County up to 10.5 percent in Kern County (Table 23-13). Furthermore, if some nonlocal agricultural workers were employed, the seasonal nature of the work supports the conclusion that these workers would not typically change residences. Therefore, substantial impacts on population and housing in the six-county region would not be expected.

The expected long-term average annual increase in agricultural deliveries under the action alternatives is relatively small (Table 2-10). The increase would likely substitute for ongoing groundwater pumping and would be distributed across the service areas. Water provided to agriculture would likely be used primarily, if not exclusively, to return idle cropland to production. Although the new workers associated with implementing any of the action alternatives would be expected to come from nearby communities and cities within the serving counties, neither substantial population growth nor an increase in housing demand in the region would be anticipated with creation of these jobs. Therefore, none of the five action alternatives would have a growth-inducing impact attributable to improved water supply reliability for agricultural uses.

Induced M&I Growth To the extent residential development is constrained by water supply, the increased water supply reliability has the potential to remove an obstacle to future residential development. Additional M&I water supply developed under the action alternatives would be distributed across the M&I beneficiaries.

A direct or an indirect connection between changes in the availability of new water for M&I uses resulting from

implementation of any of the action alternatives and changes in growth patterns in particular jurisdictions is speculative. Although the allocations of any additional water made available by implementing the action alternatives to M&I contractors can be known, several of the M&I contractors are water wholesalers who make independent decisions about which local jurisdictions or water purveyors in their service areas would receive additional water. Furthermore, these wholesalers may make allocations that vary over time depending on available supplies and shifting demands among retailers.

Increased reliability of water for M&I is not expected to be sufficient for any one jurisdiction to reduce or eliminate an obstacle to growth. Therefore, implementing any of action alternatives would not result in growth-inducing impacts.

Enhancement of Water Temperature and Flow Conditions

The ability of action alternatives to enhance water temperature and flow conditions on the San Joaquin River downstream from Friant Dam would benefit salmon and other fish. Enhancement of water temperature and flow conditions would not have a direct or an indirect impact on future growth or housing development and, therefore, would not induce additional growth in the area.

Flood Risk Reduction

Implementing any of the action alternatives would be anticipated to provide flood risk reduction benefits to the San Joaquin River basin, but these benefits would not be growth inducing. Incidental flood storage was evaluated as the total storage between Millerton Lake and the Temperance Flat RM 274 Reservoir. The increase of incidental flood storage space by constructing a dam in upstream portion of Millerton Lake at RM 274 would provide Reclamation with greater flexibility with which to implement flood management actions, thereby increasing the storage threshold and reducing the frequency that seasonal heavy-rain events produce flood conditions downstream from Friant Dam.

The benefits of this increase in incidental flood storage and related flood management options would be most evident along the San Joaquin River downstream from Friant Dam where structures in and inhabitants in the floodplain experience the highest risk of impacts from reservoir releases during flood events. The increased flood protection would not change the existing land use or Federal Emergency Management Agency

flood zone designations within the floodplain; therefore, no large-scale or substantial development would be expected to occur. None of the action alternatives involve removing or even reducing obstacles to development; therefore, none would be anticipated to have any indirect impact on growth. (For more detail, see Chapter 14, "Hydrology – Surface Water Supplies and Facilities Operations.")

Identification of the Environmentally Preferred and Environmentally Superior Alternative

CEQ regulations require identification of an environmentally preferable alternative, and the State CEQA Guidelines require identification of an environmentally superior alternative. However, the CEQ guidelines and State CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. The Final EIS will identify a preferred alternative. The selection of the preferred alternative is independent of the identification of the environmentally preferable/superior alternative, although the identification of both will be based on the information presented in this Draft EIS.

Section 1505.2(b) of the CEQ regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a ROD. The CEQ regulations define the environmentally preferable alternative as

> *…the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.*

Similar to NEPA's requirement that an environmentally preferable alternative be identified, Sections 15120 and 15126.6(e)(2) of the State CEQA Guidelines require that an environmentally superior alternative be identified. If the environmentally superior alternative is the "no project" alternative, Section 15126.6(e)(2) requires identification of an

environmentally superior alternative among the action alternatives.

Construction-related impacts would be similar for all of the action alternatives, and the significance determinations for each of the action alternatives generally are the same. Varying magnitudes of impacts generally would be related to the routing and beneficiaries of new water supplies, and enhancements to water temperature and flow conditions in the San Joaquin River downstream from Friant Dam. All of the action alternatives would provide additional opportunities for flood risk reduction, recreation, greater system operational flexibility and long-term average water supply reliability, which would benefit the Friant Division of the CVP, other CVP SOD contractors, and SWP SOD M&I contractors.

Implementing the No Action Alternative would result in one significant and unavoidable impact, whereas the action alternatives would result in several significant and unavoidable impacts. The No Action Alternative would continue to have an impact on agricultural economic activity, jobs, personal spending, and tax revenues in the CVP and SWP service areas. However, the No Action Alternative would not be capable of meeting any of the planning objectives and would not provide several benefits that would be obtained by implementing any of the action alternatives. Therefore, although selecting the No Action Alternative would avoid certain significant and unavoidable impacts of the action alternatives, the No Action Alternative is not considered the environmentally superior alternative because it fails to meet any of the planning objectives defined for the Investigation or provide several benefits associated with the action alternatives.

Because the action alternatives do not have different physical features, would not operate in a substantially different manner, and would not have substantially different environmental impacts, the action alternatives are all considered equally environmentally superior.

This Draft EIS provides a substantive portion of the environmental information necessary for Reclamation to determine the environmentally preferable alternative. However, the public and other agencies reviewing a draft EIS can assist the lead agency in developing and determining environmentally preferable alternatives by providing their views in comments on the draft EIS. Accordingly, and consistent with NEPA requirements, the environmentally

preferable alternative will be identified in the Final EIS and in the ROD. The alternative recommended for implementation, or Recommended Plan in the Final Feasibility Report, may or may not be identified as the environmentally preferable alternative.

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Chapter 29
Public Involvement, Consultation, and Coordination

This chapter summarizes completed, ongoing, and anticipated outreach and agency involvement efforts for the Investigation, including activities that satisfy NEPA requirements for public scoping and agency consultation and coordination. Efforts to engage the public, stakeholders, federally recognized tribes, other Native American tribal groups, and public agencies are an important component of the Investigation. Reclamation encourages review of this Draft EIS and will continue to solicit public and agency input on the proposed action.

The Investigation has maintained an active public and agency involvement program that has included a wide range of activities. A public involvement plan was initiated at the beginning of the Investigation that is designed to provide meaningful opportunities for stakeholder and public participation. The plan features four main objectives:

- **Stakeholder Identification** – Identifying and involving individuals, groups, and other entities that have an expressed or implied interest in the Investigation. No individual, group, or entity is to be excluded from the process, which includes complying with Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

- **Project Transparency** – Informing the public, stakeholders, and other interested parties of study results in a timely, unbiased fashion through a variety of methods, including stakeholder and/or public meetings, Web postings, mailings, and other means. This is an important practice to facilitate stakeholder understanding of the process and project.

- **Issues and Concerns Resolution** – Gaining awareness of the issues and concerns of the public, stakeholders, and other interested parties, and responding to these issues in an effective and timely manner.

- **Project Implementation** – Assisting policy-makers in understanding project purposes and benefits, and demonstrating that the project has met all necessary requirements to be implemented.

This Draft EIS, when finalized, is intended to be used by the Federal Lead Agency when considering approval of the proposed action or an alternative to the proposed action. All Cooperating agencies and other Federal, State, and local agencies with permitting or approval authority over any aspect of the proposed action are expected to use the information contained in the Final EIS to meet most, if not all, of their information needs, to make decisions and/or issue permits with respect to the proposed action.

Public Involvement through Project Scoping

Public scoping activities are conducted as part of compliance with both NEPA and CEQA. Scoping allows input from agencies, stakeholders, organizations, and other interested parties to assist in identifying resources to be evaluated, a range of reasonable alternatives to consider, potential beneficial and adverse impacts on the environment, and potential mitigation measures if adverse effects are identified. The scoping process helps with early identification of problems to be studied and also helps to eliminate issues from detailed study that are not critical to the decision at hand. Scoping also provides decision makers with insight on the issues and concerns that the public believes should be considered as part of the feasibility study. Public scoping activities performed for the Investigation NEPA process are described below.

Notice of Intent to Prepare an Environmental Impact Statement

Reclamation and DWR initiated the formal environmental analysis process of the Investigation consistent with NEPA and CEQA in February 2004 with the issuance of a Notice of Intent and Notice of Preparation, respectively. Pursuant to NEPA, the Notice of Intent notified the public of Reclamation's intent to prepare an EIS and provided notice of public scoping meetings. The Notice of Intent was published on February 3, 2004 in the Federal Register (Volume 69, pages 5184-5185). Pursuant to CEQA, an Notice of Preparation was submitted by DWR to the State Clearinghouse on February 6, 2004 and published on

March 22, 2004 in the *State Clearinghouse Newsletter* (February 1 through 15, 2004, page 41).

Public Scoping Meetings

In 2004, Reclamation and DWR convened a set of four public scoping meetings in Sacramento (March 16), Modesto (March 16), Friant (March 17), and Visalia (March 18), California to inform interested groups and individuals about the Investigation and to solicit ideas and comments. A Scoping Report was prepared consistent with Reclamation guidance and in compliance with NEPA requirements, and was released in December 2004 (Reclamation and DWR 2004).

Other Public Outreach

In addition to scoping activities, other public outreach activities have included the following:

- A series of seven workshops held during Phase 1 of the Investigation, which began in 2001. Workshops provided water agencies, counties, Federal and State agencies, water districts, environmental interest groups, and other interested parties the opportunity to hear presentation by the Investigation team, take part in discussions regarding preliminary plan formulation, and provide input about the planning process, analyses, and project documents.

- Ongoing stakeholder briefings that have been organized by Reclamation at the request of agencies and stakeholder groups to present information on study topics of interest. These briefings are used to update stakeholders on completed analyses and evaluations, upcoming efforts and studies, and overall project status and schedule. More than 30 of these briefings have taken place since the scoping process.

- Four project update public meetings held during the initial alternatives and plan formulation phases of the Investigation to discuss topics such as alternatives and geologic drilling activities. Several of the stakeholder briefings referenced were also open to the public.

- Local stakeholder interviews, performed by DWR, regarding regional, cooperative opportunities for groundwater storage and banking.

- Study area tours of Millerton Lake and alternative dam site location(s) given by the Investigation team and organized by local water resources interest groups, such as FWA, California Agricultural Irrigation Association, California Latino Water Coalition, Association of California Water Agencies, State and Federal legislators and staff, and others. During these tours, which occurred up to four times per year, the Investigation team provided updates on the Investigation's status and recent technical findings.

- Public release of major Reclamation studies and reports for the Investigation including: *Phase 1 Investigation Report* (Reclamation and DWR 2003); *Scoping Report* (Reclamation and DWR 2004); *Initial Alternatives Information Report* (Reclamation and DWR 2005); *Plan Formulation Report* (Reclamation and DWR 2008); and *Draft Feasibility Report* (Reclamation 2014).

- Project website for the Investigation (http://www.usbr.gov/mp/sccao/storage).

Consultation and Coordination

Reclamation has consulted various public agencies and organizations during the public outreach process and throughout the progression of the Investigation to obtain feedback. Consultations have assisted Reclamation in determining the scope of the EIS, developing project features and objectives, identifying the range of reasonable alternatives, and defining potential environmental impacts, impact significance, and mitigation measures.

Consultation and Coordination with Agencies

Reclamation conducts ongoing consultation and coordination efforts with agencies, including the active participation of numerous Cooperating agencies pursuant to NEPA. The Cooperating agencies for the Investigation are State Parks; FWA; Madera-Chowchilla Water and Power Authority; San Luis & Delta-Mendota Water Authority; Exchange Contractors; USACE; NMFS; BIA; BLM; USFWS; and EPA. Key elements of these coordination activities are the *Planning Aid Memorandum* and *Coordination Act Report* documents issued by USFWS and documents issued by USACE under CWA Section 404. USFWS submitted a Planning Aid

Memorandum outlining areas of potential concern to Reclamation (2007). In June 2009 and July 2011, USACE provided verification of jurisdictional determination of waters of the United States for the Temperance Flat RM 274 Reservoir Area and Area of Project Features, respectively, in accordance with CWA Section 404.

Cooperating agencies are participating in coordination meetings and have been provided opportunities to comment on Draft EIS sections while under development that are within their jurisdiction, expertise or authority. Agency consultation and involvement has occurred throughout the study to date, both informally and formally, and more than 20 agency coordination meetings have been held between scoping and this Draft EIS.

Consultation and Coordination with Tribal Governments and Native American Representatives

Sixteen groups, including those listed by the NAHC, represent Native American interests in the study area. Several tribes in the vicinity of Millerton Lake and elsewhere in the study area have expressed interest in the Investigation. Since the Investigation's initiation, representatives of the Investigation team have met periodically with Native American tribes to provide updates on progress and to receive input on issues of concern, and to tour the primary study area including potential features of alternatives and general areas of Native American significance.

One of the scoping meetings in March 2004 was held at the Table Mountain Rancheria. Since scoping, the Investigation team has held nine meetings and tours with representatives from various tribes, including Table Mountain Rancheria, North Fork Rancheria, Big Sandy Rancheria, Picayune Rancheria, Cold Springs Rancheria, Tule River Tribe, and the Tachi-Yokut Tribe (Santa Rosa Rancheria). In-person visits were also made to tribal members to collect information. These initial interviews with local Native Americans have provided insight into their perspectives on the primary study area.

Federally recognized tribes are recognized as possessing certain inherent rights of self-government (i.e., tribal sovereignty) and are entitled to receive certain federal benefits, services, and protections because of their special relationship with the United States. At present, there are five federally recognized tribes in the vicinity of the primary study area: Big

Sandy Rancheria, Picayune Rancheria, Table Mountain Rancheria, Cold Springs Rancheria, and North Fork Rancheria.

Formal consultation with the federally recognized tribes has not yet been initiated. As the Investigation proceeds, coordination and consultation will continue with the tribes in accordance with Federal guidance.

Major Topics of Public and Stakeholder Interest

Scoping meetings, agency workshops, agency coordination meetings, and public meetings have included discussion of the potential impacts of construction and operation of potential alternatives. The public, stakeholders, other Federal agencies, and State and local agencies identified several areas of interest and concern at Investigation meetings and workshops. Key topics included impacts on air quality associated with construction activities; impacts to habitat and aquatic and terrestrial wildlife populations; impacts to sites of cultural and religious significance; impacts to PG&E hydropower facilities; inundation of the Millerton Lake Cave system; recreational impacts in the San Joaquin River Gorge; and the potential to induce growth by improving water supply reliability. These topics are discussed in more detail in Chapter 1, "Introduction."

Next Steps in the Environmental Review Process

This Draft EIS will be circulated for public and agency review and comment for 45 days following the date when the EPA publishes the notice of availability of weekly receipt of environmental impact statements in the Federal Register. During the public comment period, Reclamation intends to hold public hearings. Comments provided during the public review period will be addressed in the Final EIS.

A Final EIS will be prepared and circulated in accordance with NEPA requirements and will include responses to all substantial comments. When the Final EIS is complete, Reclamation will publish the document, and the notice of availability will be printed in the Federal Register, which will mark the start of a minimum 30-day waiting period before

Reclamation could issue a ROD to implement a recommended plan/preferred alternative, if authorized by Congress.

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Chapter 30
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This chapter lists the references for sources cited in this Draft EIS. References are presented for each chapter of the Draft EIS.

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Chapter 29, "Public Involvement, Consultation, and Coordination"

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Chapter 31
Distribution of the Draft EIS

This chapter includes locations where the Draft EIS is available for review and provides a list of those Federal, State, and local agencies, as well as Indian Tribes and organizations, that have been identified to receive a copy of this Draft EIS based on proximity to the study area, involvement in the Investigation, and expressed interest during public engagement. A Notice of Availability was published in the Federal Register, indicating where the Draft EIS is available at government buildings, libraries, and online.

Document Availability

The public distribution of this Draft EIS emphasizes the use of electronic media to ensure cost-effective, broad availability to the public and interested parties. The Draft EIS is available for viewing on the Investigation public website at http://www.usbr.gov/mp/sccao/storage/.

The Draft EIS is also available for review at:

U.S. Department of the Interior, Bureau of Reclamation
Library
2800 Cottage Way
Sacramento, California 95825

U.S. Department of the Interior, Bureau of Reclamation, South-Central California Area Office
1243 N Street
Fresno, California 93721-1813

U.S. Department of the Interior, Natural Resources Library
1849 C Street NW, Main Interior Building
Washington, D.C., 20240 23

Fresno Central Library
2420 Mariposa Street
Fresno, California 93721

Fresno County Library, Auberry Branch
33049 Auberry Road
Auberry, California 93602

Tulare County Library, Visalia Branch
200 W Oak Avenue
Visalia, California 93291

Kern County Library, Holloway-Gonzales Branch
506 East Brundage Lane
Bakersfield, California 93307

Los Banos Public Library
1312 South 7th Street
Los Banos, California 93635

Sacramento Public Library
828 I Street
Sacramento, California 95814

Los Angeles Central Library
630 W 5th Street
Los Angeles, California 90071

Distribution List

All individuals, agencies, and organizations listed in this section will be informed of the availability of and locations to obtain the Draft EIS. Parties listed below have received an electronic or hard copy of the main body or entire Draft EIS.

Elected Officials

- U.S. Senators
- U.S. Representatives
- State Senators
- State Assemblymembers

Federal Agencies

- Federal Energy Regulatory Commission
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Agriculture, Natural Resources Conservation Service

- U.S. Department of Energy, Western Area Power Administration
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Department of the Interior, Bureau of Indian Affairs
- U.S. Department of the Interior, Bureau of Land Management
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Environmental Protection Agency
- U.S. Geological Survey

State Agencies

- California Department of Conservation
- California Department of Fish and Wildlife
- California Department of Food and Agriculture
- California Department of Parks and Recreation
- California Department of Public Health
- California Department of Water Resources
- California Natural Resources Agency
- Central Valley Regional Water Quality Control Board
- Delta Protection Commission
- Delta Stewardship Council
- State Water Resources Control Board

Regional and Local Entities

- Arvin-Edison Water Storage District
- Central California Irrigation District
- Chowchilla Red Top Resource Conservation District

- Chowchilla Water District
- City of Clovis
- Columbia Canal Company
- Contra Costa Water District
- East Bay Municipal Utility District
- East Stanislaus Resource Conservation District
- Eastern Madera County Water Oversight Advisory Committee
- Excelsior/Kings River Resource Conservation District
- Exeter Irrigation District/Ivanhoe Irrigation District
- City of Firebaugh
- Firebaugh Canal Water District
- City of Fresno
- Fresno County
- Fresno Irrigation District
- Friant Water Authority
- City of Fowler
- City of Huron
- Kaweah Delta Water Conservation District
- Kern County Water Agency
- Kings County
- Kings River Conservation District
- Lower San Joaquin Levee District
- Madera County
- Madera Irrigation District

- Madera-Chowchilla Water and Power Authority
- City of Mendota
- Metropolitan Water District of Southern California
- Orange Cove Irrigation District
- Porterville Irrigation District
- City of Reedley
- Root Creek Water District
- San Joaquin River Exchange Contractors Water Authority
- San Joaquin River Group Authority
- San Joaquin Valley Air Pollution Control District
- San Luis & Delta-Mendota Water Authority
- San Luis Canal Company
- Saucelito Irrigation District
- Sierra Resources Conservation District
- South Delta Water Agency
- Stone Corral Irrigation District
- Terra Bella Irrigation District
- Tulare County
- Tulare Irrigation District
- West Stanislaus Resource Conservation District
- Westlands Water District
- Westside Resource Conservation District

Tribal Interests

- Big Sandy Rancheria

- North Fork Rancheria
- Cold Springs Rancheria
- Picayune Rancheria of Chukchansi Indians
- Table Mountain Rancheria

Nongovernmental Organizations

- American Bass
- Association of California Water Agencies
- Bakersfield Bass Club
- The Bay Institute
- Butte Environmental Council
- California Bass Federation
- California Farm Bureau Federation
- California Grape & Tree Fruit League
- California Save Our Streams Council
- California Sportfishing Protection Alliance
- California Water Institute
- California Trout
- CVP Water Association
- Environmental Water Caucus
- Finegold Valley Landowners Association
- Fly Fishers for Conservation
- Fresno Bass Club
- Friends of the River
- Kerman Bass Club
- Kings River Bass Club

- Kings River Water Association
- Millerton Area Watershed Coalition
- Mother Lode Bass Anglers
- Natural Heritage Institute
- Natural Resources Defense Council
- Natural Resources Institute
- The Nature Conservancy
- Outdoor Sportsmen's Coalition of California
- Pacific Institute
- Protect Our Water
- Revive the San Joaquin
- San Joaquin Audubon Society
- San Joaquin Paddlers
- San Joaquin Raptor Rescue Center
- San Joaquin River Association
- San Joaquin River Parkway and Conservation Trust
- San Joaquin River Resource Management Coalition
- San Joaquin River Trail Council
- Santura Duck Club
- Sierra Bass Club
- Sierra Club
- Sierra Nevada Alliance
- South Yuba River Citizens League
- Taxpayers for Common Sense

- Trout Unlimited
- Trust for Public Land
- Tulare County Farm Bureau
- Valley Citizens for Water

Chapter 32
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Following is a list of persons who contributed to preparation of this Draft EIS.

This list is consistent with the requirements set forth in NEPA and CEQA (40 CFR 1502.17 and Section 15129 of the State CEQA Guidelines).

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Chapter 33
Index

This index has been prepared consistent with CEQ guidance. The index is a listing of names, places, and topics in alphabetical order, with chapters or page numbers indicating where they are discussed in this Draft EIS. Page numbers are hyphenated to include the relevant chapter number. For example, Chapter 3, page 5, is presented as page 3-5. Multiple pages in a single chapter, for example pages 5 and 7 of Chapter 3, are presented as pages 3-(5, 7). Occasionally, and index term is the subject of an entire chapter; in these cases, the chapter itself is referenced, rather than individual page numbers.

The page numbers presented below were compiled during preparation of the Draft EIS. While every effort has been made to ensure accuracy of the page numbers presented below, these references will not be finalized until the release of the Final EIS.

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CCAA: *see* California Clean Air Act

CCID: *see* Central California Irrigation District

CCWD: *see* Contra Costa Water District

CDFA: *see* California Department of Food and Agriculture

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WNV: *see* West Nile virus

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WPT: *see* western pond turtle

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Y – Not Used

Z – Not Used