Chapter 21.0 Recreation

This chapter describes the environmental and regulatory settings of recreation, as well as environmental consequences and mitigation measures, as they pertain to implementation of the Settlement. The discussion of recreation existing conditions and the potential impacts of the program alternatives on recreation encompasses the San Joaquin River upstream from Friant Dam, and the San Joaquin River from Friant Dam to the Delta. Implementation of the Settlement is not anticipated to cause impacts to recreation outside of these areas; therefore, the Delta and CVP/SWP water service areas were eliminated from detailed environmental analysis.

21.1 Environmental Setting

This section describes the physical environment and recreational opportunities in the study area that could be affected by implementation of the Settlement.

The study area contains 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 recreational opportunities exist on private lands, including fishing, hunting, and other activities.

The Restoration Area has a much more limited range of recreational opportunities compared with the larger study area; however, many of the available opportunities are unique to the immediate river vicinity.

21.1.1 San Joaquin River Upstream from Friant Dam

Millerton Lake, the centerpiece of the Millerton Lake SRA, is more than 15 miles long (Figure 21-1). It was formed by placement of Friant Dam across the San Joaquin River in 1944. The lake has a surface area of approximately 4,900 acres, and approximately 44 miles of shoreline in the SRA at the lake's maximum elevation (580.6 feet above msl (elevation 580.6)) ("gross pool"). The SRA encompasses approximately 10,500 acres in total (State Parks 2006) and is one of the most popular recreation areas in the San Joaquin Valley, with typically 300,000 to 500,000 visits annually (State Parks 2007a, 2007b). The rapidly growing City of Fresno, with a 2000 census population of 430,000, is located approximately 20 miles to the southwest (U.S. Census Bureau 2007).

Motorboating, sailing, waterskiing, jetskiing, swimming, and tournament and recreational fishing are the primary water-based recreation activities. Shoreline activities include fishing, picnicking, hiking, biking, horseback riding, camping, and nature watching (State Parks 2007a). An archery-only turkey hunt held in April and May is the only hunting allowed in the Millerton Lake SRA (Fresno Bee 2007). During winter, the lake also has special boat tours to view the San Joaquin Valley's largest population of bald eagles (Fresno Bee 2007).

Public access is widely available at Millerton Lake. Most recreational facilities for the SRA are located on the gently sloping southern and northern shores of the lower portion of the lake, where they are closest to population centers. Facilities include boat ramps, picnic areas, drive-in and walk-in campgrounds, a marina, and trails. A few, more isolated facilities are at the upstream portion of the lake, including boat-in camping areas.

Seasonally, the reservoir fluctuates substantially under normal operations. The annual maximum water level typically occurs in May or June and is close to the gross pool elevation of 581 during most years. The reservoir is typically drawn down from 75 to 100 feet annually, with the minimum annual elevation occurring in October or November, before the reservoir begins to refill with the onset of winter rains. The boat ramps on the lake were designed to accommodate approximately 110 feet of fluctuation in surface elevation (Reclamation and State Parks 2008).

Figure 21-2 illustrates the minimum elevation at which the primary public boat ramps on Millerton Lake are usable in relation to the mean end-of-month pool level. The 4-month spring and summer period between late April and late August is when most boating activity occurs on the lake. Figure 21-2 highlights that the primary boat ramp at Grange Grove (actually consisting of three linked ramps used at progressively lower pool levels) is usable down to a pool elevation of 500 feet, which corresponds to the mean pool level at the end of August. The lowest of these ramps typically closes by late summer of the driest years. Smaller ramps at Crow's Nest and McKenzie Point, also on the south shore, are usable down to an additional 13 feet and 28 feet of drawdown, respectively. A ramp on the north shore that primarily serves an adjacent campground, is available from the maximum pool elevation to 110 feet below maximum pool elevation.

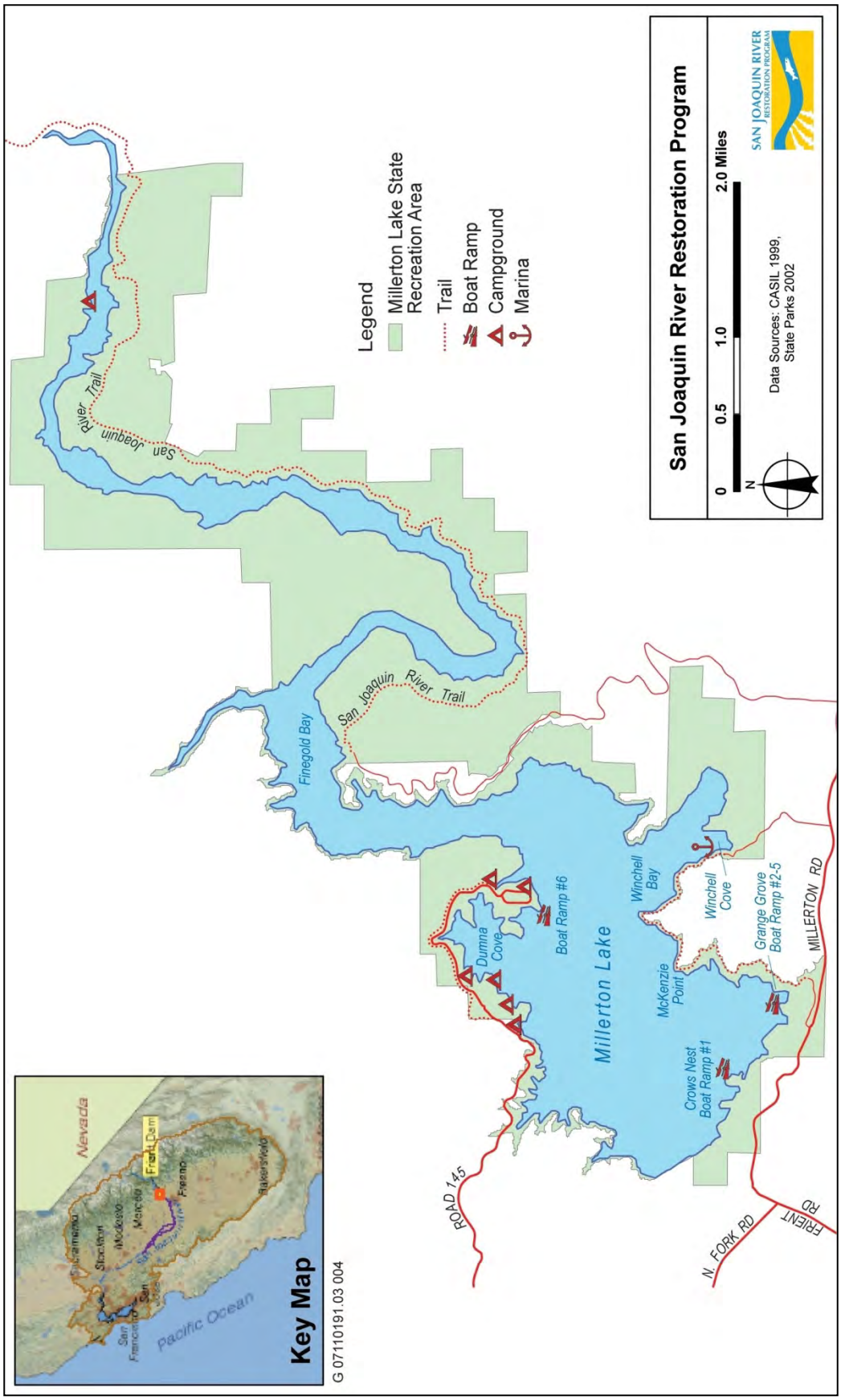
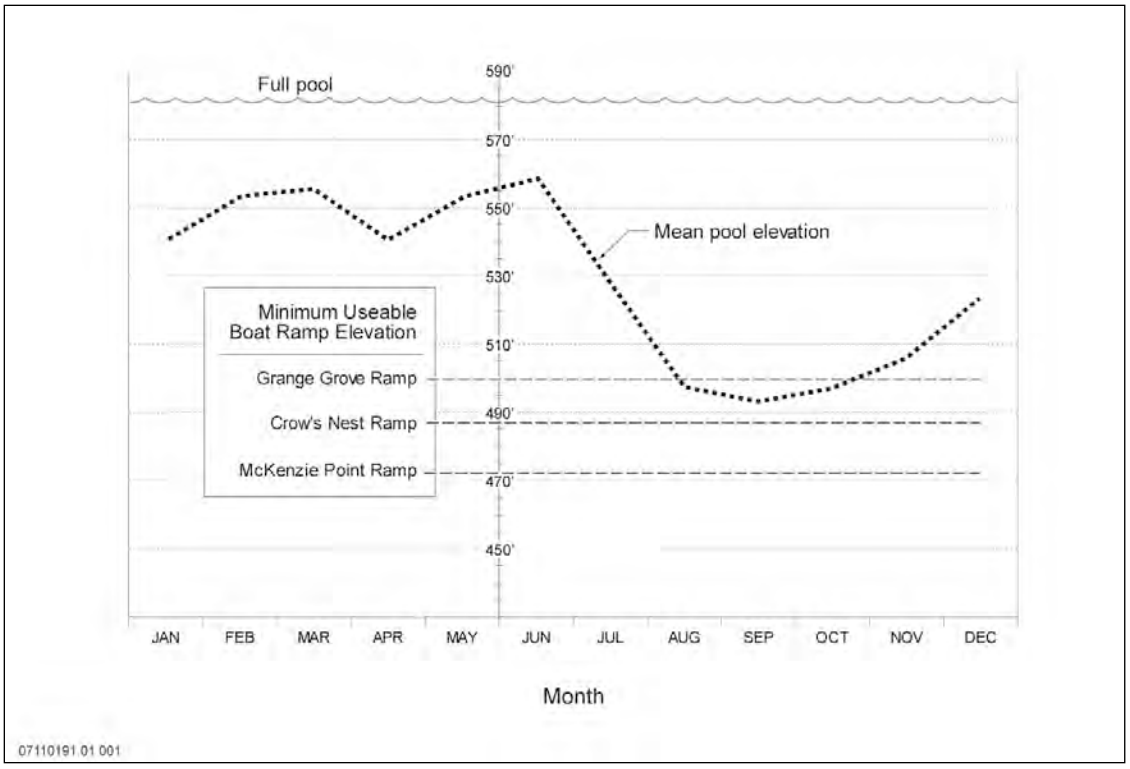


Figure 21-1.
Recreation Facilities at Millerton Lake



Sources: Mean pool elevation - CalSim model run for Millerton Lake elevations under existing storage conditions); minimum useable elevation of ramps - URS Corporation, Reclamation and State Parks 2005

Figure 21-2.
Millerton Lake Mean End-of-Month Pool Elevation Versus Minimum Useable Elevations of Boat Ramps

The San Joaquin River Trail runs along the east side of the reservoir for more than 12 miles upstream (Figure 21-1). This regional backcountry trail connects to trails in the upstream San Joaquin River Gorge Management Area (SJRGMA), administered by the BLM. When the trail is completed, it will extend eastward into the Sierra Nevada (State Parks 2003a). The SJRGMA provides several additional trails used by hikers, mountain bikers, and equestrians; primitive camping facilities; interpretive displays; and river access for boaters and anglers.

Whitewater rafting and kayaking is available in the gorge, based on upstream reservoir operations and releases from a hydroelectric powerhouse (American Whitewater Association 2007a). There are no recreational developments or public access on the several tributaries to the San Joaquin River that flow into Millerton Lake.

21.1.2 San Joaquin River from Friant Dam to Merced River

The Restoration Area is located within the San Joaquin Valley. As previously noted, the Restoration Area has a more limited range of recreational opportunities when compared to the larger study area. The following discussion addresses recreation opportunities located in the greater San Joaquin Valley in the vicinity of the Restoration Area, followed by a description of opportunities, uses, and facilities located in each designated river reach.

As described in the following sections, public access is widely available throughout the upper half of Reach 1 of the San Joaquin River, which is served by numerous parks in the developing San Joaquin River Parkway. Public access is sparse along most areas of the river downstream from the parkway, with the exception of access provided by a county park at the Mendota Pool and Federal and State wildlife areas 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 where they cross the river channel.

Recreation Opportunities in the San Joaquin Valley

The San Joaquin Valley in the vicinity of the Restoration Area has relatively few developed recreation opportunities, with the exception of the San Joaquin River Parkway, in Reach 1. The San Joaquin River Parkway is a mosaic of parks, trails, and ecological reserves located along the San Joaquin River between Friant Dam and Highway 145 managed by the SJRPCT, a non-profit entity, and several local and state partner agencies (Figure 21-3).

The lands in the vicinity of the Restoration Area 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, as shown in Figure 21-4. Some of these are directly adjacent to the San Joaquin River within the Restoration Area, while others are some distance away from the river, but within the San Joaquin Valley. Several of the Federal refuges and State wildlife management areas and Great Valley Grasslands State Park are part of the 160,000-acre Grasslands Ecological Area, which represents the largest remaining contiguous block of wetlands in California (National Audubon Society 2008a).

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 in the San Joaquin Valley, is located in the Restoration Area. The San Luis NWR contains a mixture of managed seasonal and permanent wetlands, riparian habitat associated with the San Joaquin 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. The NWR offers auto tour routes. Foot traffic is permitted on the auto tour routes and on trails in the NWR. Fishing, by rod and reel only, is also permitted (USFWS 2006). 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 21-4 shows refuges in the vicinity of the Restoration Area.

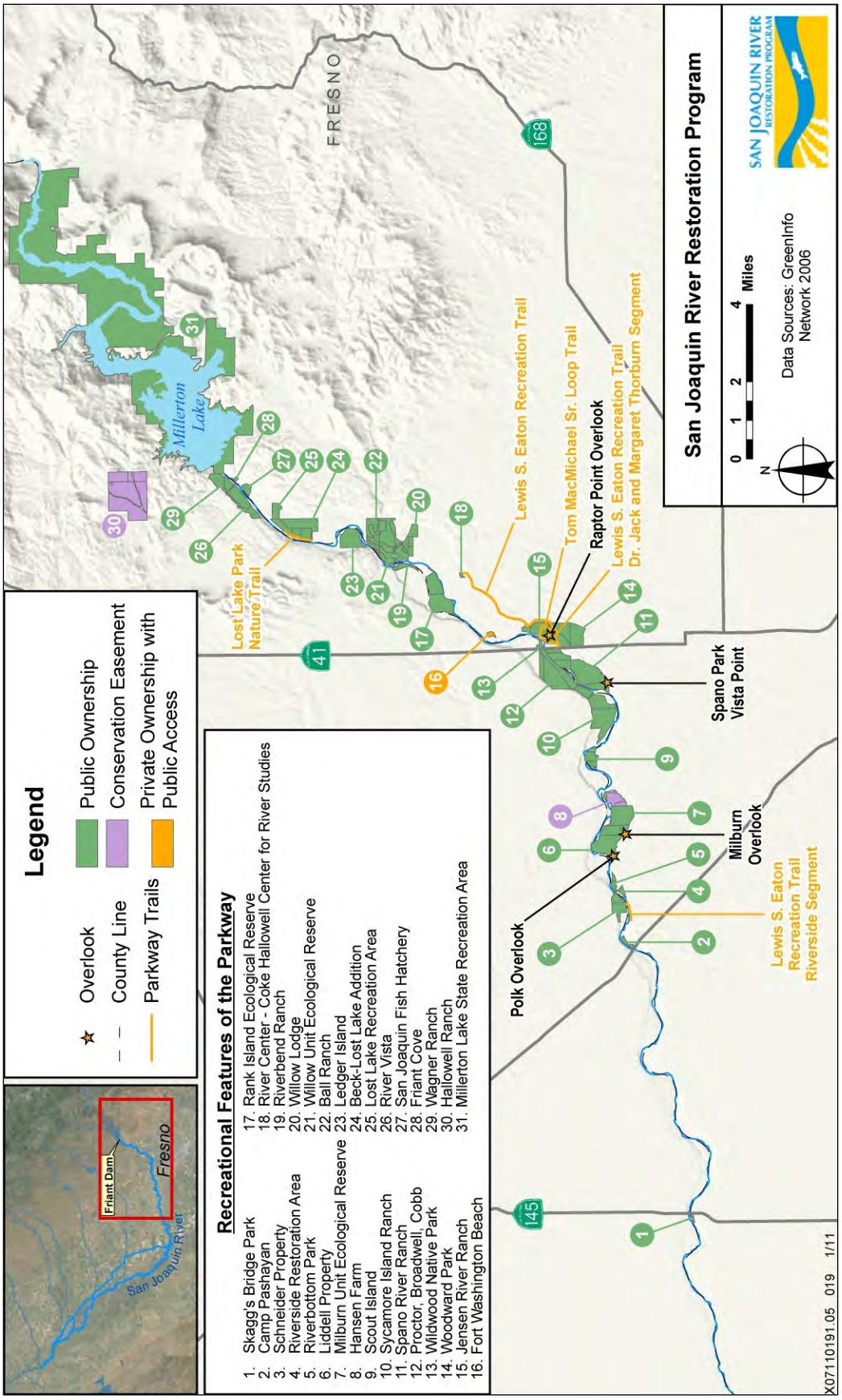


Figure 21-3.
San Joaquin River Parkway and Surrounding Areas

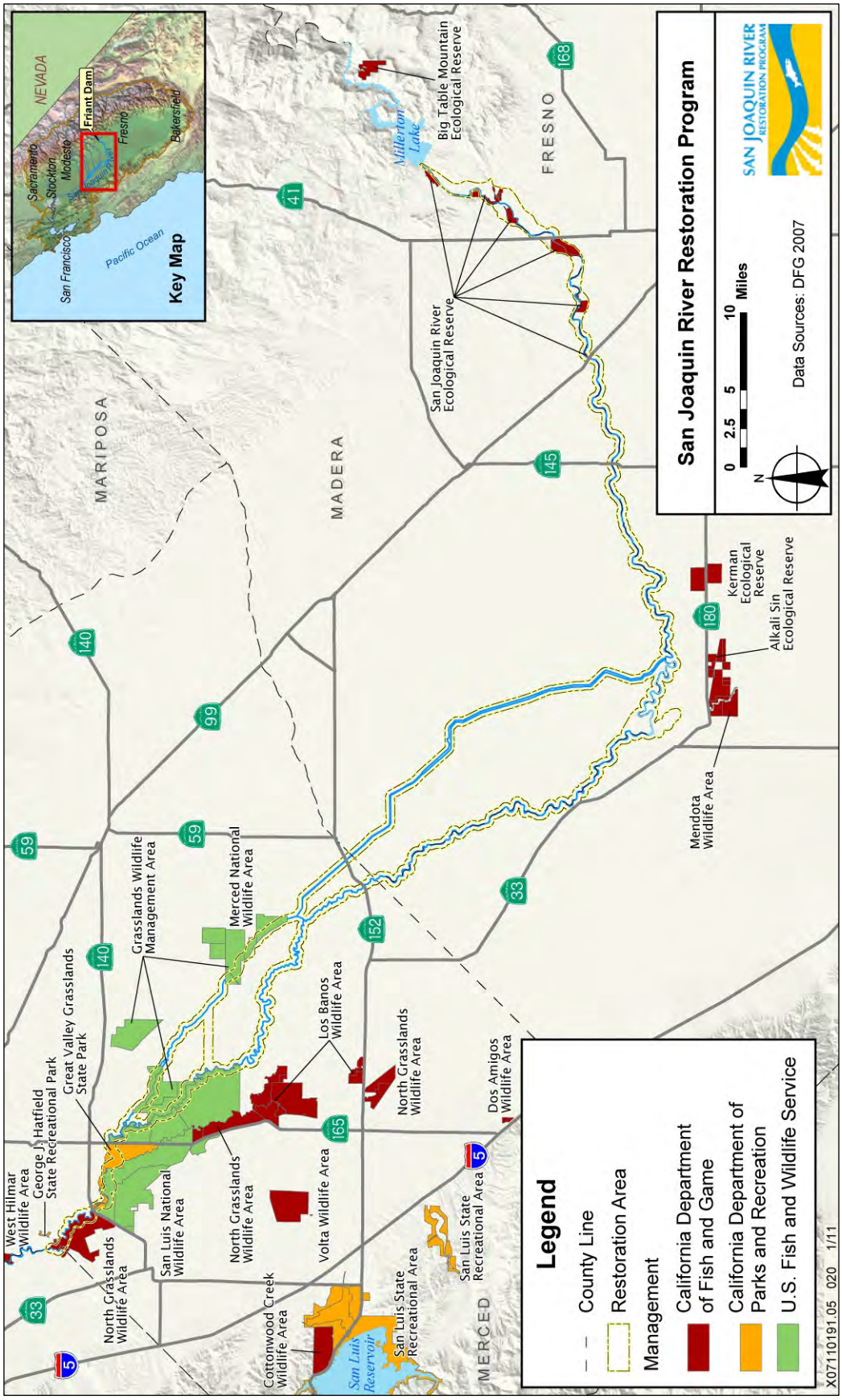


Figure 21-4.
Land Preserves in the Vicinity of the Restoration Area

The California DFG administers several wildlife areas in the San Joaquin Valley in the vicinity of the Restoration Area. The Mendota Wildlife Area, located a few miles south of the San Joaquin River and the City of Mendota in Fresno County, consists of nearly 12,000 acres of managed impoundments and wetland and upland habitat, providing opportunities for bird watching and waterfowl hunting. Four wildlife areas are located west of the San Joaquin River, in Merced County: the 6,000-acre Los Banos Wildlife Area, 2,800-acre Volta Wildlife Area, 7,000-acre North Grasslands Wildlife Area, and 115-acre Dos Amigos Wildlife Area. These wildlife areas support opportunities for wildlife viewing, and for hunting, fishing, boating, and camping in designated areas, and receive a total of 30,000 to 50,000 visits annually (Grasslands Water District 2001). Wildlife viewing and hunting opportunities are also available at the boat-in only West Hilmar Wildlife Area, located on the Stanislaus/Merced County border. Additional wildlife areas, including the San Luis Reservoir Wildlife Area and Cottonwood Creek Wildlife Area, are located at the west edge of the valley near San Luis Reservoir and the O'Neill Forebay. These areas encompass several thousand acres that support opportunities for wildlife and wildflower viewing, and hunting (DFG 2007).

California State Parks provide camping, boating, and day use facilities in the San Luis Reservoir SRA, which surrounds the 12,700-acre San Luis Reservoir and adjacent O'Neill Forebay. Pacheco State Park (Figure 21-4), located on the west side of the reservoir, provides numerous trails.

Lone Willow Slough, an Audubon Society-designated Important Bird Area east of Firebaugh, provides bird-watching opportunities from alongside several public roads but is located on private property (National Audubon Society 2008b).

The City of Fresno manages more than 50 city and regional parks, offering such amenities as baseball and softball fields, basketball courts, football and soccer fields, dog parks, picnic areas, swimming pools, tennis and volleyball courts, and golf courses. Its more prominent recreational facilities include the 300-acre Woodward Regional Park, which is located in Reach 1 and is described below; the 159-acre Roeding Regional Park; the 110-acre Regional Sports Complex; and Camp Fresno and Camp Fresno Junior at Dinkey Creek (City of Fresno 2008).

The 12-mile reach of the Kings River below Pine Flat Dam, about 15 to 20 miles east of Fresno, provides boating and cold-water fishing opportunities. The 12-mile stretch of river below the lake, in particular, offers good access to boaters and anglers with four developed and two undeveloped parks on the river operated by Fresno County (Kings River Conservation District 2009). Catchable-sized rainbow trout are stocked year-round just below Pine Flat Dam, at the upstream end of about a 5-mile reach of the river managed as a put-and-take trout fishery (open year-round with a five-trout limit). The 7-mile reach below this upper reach is planted with subcatchable-sized trout during winter, and is managed as a catch-and-release fishery (open year-round, but no trout may be kept).

Recreational Uses on San Joaquin River

Water from the San Joaquin River is heavily managed and is extensively distributed to benefit a variety of users, including water districts, irrigation districts, municipal and industrial users, water storage districts, and municipal utility districts. Recreation is possible in the river and adjacent to the river in some areas. However, with such extensive modification of the river's flows, some reaches are dry at most times, and only limited recreation opportunities are available. The following text briefly describes recreation uses occurring within the five project reaches of the San Joaquin River located downstream from Millerton Lake.

Recreational activities within the San Joaquin River portion of the Restoration Area include fishing, boating, nature interpretation and education, trail use, camping, hunting, picnicking, and wildlife viewing/nature observation. Fishing and boating are activities that are most directly flow-dependent, with the availability and quality of these activities closely tied to the frequency, timing, and volume of river flows. The other activities mentioned above are flow-independent but are often associated with boating and fishing, and may be enhanced by more frequent river flows.

Most of the recreation use on the river within the Restoration Area occurs in Reach 1 because this reach provides publicly accessible lands, public river access, and several developed facilities. Reach 2 is almost entirely dry except during high flow events, and Reaches 2 and 3 contain few public lands and have little public river access. The exceptions are the Mendota Pool, at the downstream end of Reach 2, which contains water year-round and is accessible to the public via a county park, and a gravel boat ramp and small city park on the upstream portion of Reach 3. Other use of the river or riverbed in these reaches is assumed to be by adjacent private landowners and possibly other local residents, and may include fishing, hunting, and off-highway vehicle use. Reach 4 (also generally dry) and Reach 5 include public lands that offer hunting and fishing opportunities.

Fishing Use. Fishing occurs primarily in Reaches 1 and 5, which have year-round flow, and the portion of Salt Slough located in the San Luis NWR (USFWS 2010). Reach 1 is planted throughout the year with rainbow trout from DFG's San Joaquin Hatchery located downstream from Friant Dam and is fished year-round, primarily by local anglers (Shaffer 2005). Public fishing access exists along the river in Reach 1 (Table 21-1), and fishing occurs in the adjacent Lost Lake, a borrow pit created during the construction of Friant Dam (City of Fresno 2007a), and other similar pits created by gravel mining. Most of the native fish species that were present in the San Joaquin River before construction of the dam are now uncommon, rare, or extinct and have been largely replaced by warm-water nonnative fish species, such as sunfish, crappie, bluegill, striped bass, largemouth bass, smallmouth bass, and catfish. Salmon have been extirpated from the mainstem San Joaquin River primarily because of a lack of continuous flow in the San Joaquin River upstream from the Merced River (FWUA and NRDC 2003).

Boating Use. A range of boating opportunities is possible in Reach 1 (SJRPCT 2010a). The river, side channels, and old mining lakes provide flat-water boating opportunities. The *San Joaquin River Parkway Master Plan* (SJRC 2000) describes the river as a public "canoe trail" for nonmotorized boating. The river has minimal riffles and a few small rapids at Lost Lake Park (American Whitewater Association 2007a) but is generally slow enough that constant paddling is required (SJRC 2000). According to American Whitewater, the river from Friant Dam to Skaggs Bridge Park is "the safest introduction to river paddling in the Fresno area" during summer low flows and "the closest whitewater to Fresno" during high flows. Some boating hazards are present and include riparian vegetation that overhangs the river and mining causeways and culverts (American Whitewater Association 2007a).

Interpretation and Education. Most of the interpretation and education activities and facilities occur in Reaches 1 and 4. Activities such as field trips, guided hikes, workshops, storytelling, canoe tours, and other programs are available. Guided canoe trips are offered by the SJRPCT and by the San Joaquin River Watershed Institute (SJRPCT 2010a, SJRPCT 2010b). Several camps are provided by the SJRPCT at Scout Island, and offer environmental education, water activities, arts and crafts, canoeing, and theater presentations (SJRPCT 2008). The San Joaquin Watershed Institute also offers environmental education activities and programs at Scout Island, including basic and guided canoeing (SJRPCT 2010b). The Coke Hallowell Center for River Studies provides exhibits, programs, activities, gardens, a restored 1890s ranch house, an orchard, and a vineyard. Additionally, the San Luis NWR in Reach 4 offers two auto tours with interpretive stops, one of which skirts the river.

Trail Use. Trail use is limited to Reaches 1 and 4. The San Joaquin River Parkway features the 5-mile-long Lewis S. Eaton trail, used for hiking, bicycling, and horseback riding, and several other shorter trails intended for river access or nature observation. In Reach 4, trails are located in the San Luis NWR and include 0.75-mile and 1-mile loop trails through marshes, providing wildlife observation opportunities (USFWS 2010).

Camping. There are few camping opportunities on the river between Friant Dam and the Merced River; all are located in Reach 1. Campsites are available at two public parks and one private facility on the river within the reach.

Picnicking. Picnicking is a common activity throughout Reach 1, with most public areas along the river in this reach providing picnic facilities (Table 21-1). Reaches 2 through 5 have no formal picnic facilities, with the exception of those at a city park on Mendota Pool.

Table 21-1.
Existing Parks and Public Lands in the San Joaquin River Parkway – Reach 1

Recreation Facility/ Park Unit	Owner[1]	Area (acres)	Primary Recreation Opportunities					
			Fishing	Boat Access to River	Outdoor Education	Trails/Trail Access	Camping	Picnicking
Camp Pashayan	DFG, SJRPCT	32	X	X		X		X
Coke Hallowell Center for River Studies	SJRPCT	20			X	X		
Fort Washington Beach	Private	NA	X	X			X	X
Friant Cove	SJRC	6	X	X				X
Jensen River Ranch	SJRC	167				X		X
Lost Lake Park	Fresno County, DFG	305	X	X	X	X	X	X
San Joaquin River Ecological Reserve	DFG	800[2]			X			
Scout Island	Fresno County	85		X	X		X	
Sycamore Island Ranch	SJRCT	350	X	X		X		X
Wildwood Native Park	SJRCT	22	X	X		X		
Willow Lodge (Willow Unit of Ecological Reserve)	DFG	88			X	X		
Woodward Regional Park	City of Fresno	300				X		X

Notes:

[1] Management of several of the parks is by an entity other than the owner, in some cases with the park owner. The SJRC owns and manages 2,541 acres in total, much of which is managed for conservation and future low-impact recreation. In addition, on land owned by the Conservancy, Islewood Golf Course is operated by a private entity. In addition to the properties providing the recreation opportunities in the table, DFG also owns and operates the San Joaquin Hatchery, below Friant Dam, where the public can view and feed trout in the hatchery raceways.

[2] The ecological reserve is composed of several widely dispersed units in the parkway, which in total equal 800 acres; access is by special permit only (DFG 2007).

Key:
DFG = California Department of Fish and Game
NA = not applicable
SJRPCT = SJRPCT

Wildlife Viewing and Nature Observation. Wildlife viewing and nature observation occur throughout the Restoration Area, although mainly in Reaches 1, 4, and 5, where public access to the river and adjacent lands exists. There are many opportunities to see wildlife and appreciate nature, from viewing fish at the San Joaquin Hatchery to observing sandhill cranes in the San Luis NWR.

Hunting. Waterfowl and pheasant hunting is allowed in Reaches 4 and 5 in the San Luis NWR, with appropriate permits. Many hunting blinds (including two- and three-person blinds) are present throughout the refuge. Typical game species include waterfowl

(e.g., ducks, geese, American coots), shorebirds (e.g., common snipe, common moorhens), and pheasants (USFWS 2010).

Recreation Facilities by Reach

The following text describes recreation facilities located in each project river reach. The facilities are described in each reach starting at the upstream end of the reach and continuing downstream. Nearly all existing recreation opportunities associated with the river are located in Reach 1. They consist of formal developed and constructed recreation facilities and services as well as user defined opportunities, such as foot trails to access fishing sites and concentrated use areas. Formal and informal recreational uses of the different reaches include hiking, fishing, bird-watching, canoeing/kayaking, and gold panning, from the shore. Boating and fishing occur throughout the year along the river, except in Reach 2 and portions of Reach 4 because of lack of flows.

Reach 1. Most of the recreation facilities in Reach 1 are associated with the San Joaquin River Parkway, which is undergoing continual development under the management of the SJRC. The conservancy was created in the early 1990s by the State Legislature to implement the San Joaquin River Parkway Master Plan and facilitate development of the parkway (SJRC 2009). The parkway planning area extends along 23 miles of the river, from Friant Dam to SR 99. There are approximately one dozen developed and undeveloped park units in the parkway, owned and managed by several public and private entities. Table 21-1 shows information about each of these parks. Figure 21-3 depicts the locations of the parks and undeveloped parklands in the parkway.

Lost Lake Park is a Fresno County park 273 acres in size and sited along an approximately 1.8-mile reach of the river, close to the upstream end of the parkway near Friant. Facilities in the park include a campground, picnic areas, sports fields, and a non-powered car-top boat launch. A portion of the park is managed under a long-term lease from the California Wildlife Conservation Board and DFG (Fresno County 2008b).

Sycamore Island Park is owned by the State of California but administered by the SJRC as a park unit of the San Joaquin River Parkway, with day-to-day operation by a private contractor. Visitors pay a fee for access to the park, which includes about six large ponds (former gravel pits), some with boat ramps for small boats and all accessible to bank anglers. The ponds were stocked with warm-water sportfish such as largemouth bass, sunfish, and catfish in years past and now have self-sustaining populations of these warm-water fish (Sycamore Island Park 2009, SJRPCT 2009). There are a number of other large gravel pit ponds adjacent to Sycamore Island Park and elsewhere near the river in Reach 1, but outside of Lost Lake in Lost Lake Park; none are known to provide public fishing opportunities.

Trails are located at several locations within the parkway, including at Lost Lake Park, Willow Lodge, Jensen River Ranch, Woodward Regional Park (Lewis S. Eaton Trail to Coke Hallowell Center for River Studies), Wildwood Native Park, Sycamore Island Ranch, and Camp Pashayan (Table 21-1). The Lewis S. Eaton Trail spans 5 miles along the south edge of the parkway and provides bluff-top views of the San Joaquin River for hikers, bicyclists, and equestrians. The trail begins at Woodward Regional Park, skirts the

Jensen River Ranch property, and terminates at the Coke Hallowell Center for River Studies. It is anticipated to be expanded to a 22-mile trail that would extend the entire length of the parkway, from Friant Dam to SR 99 (SJRPCT 2010a, Fresno County Office of Tourism 2007). Generally, the other trails are shorter and intended for river access or nature observation. Trails meeting the standards for accessibility under the Americans with Disabilities Act are available at Wildwood Native Park and Willow Lodge near Fresno (City of Fresno 2007a, 2007b, 2007c; SJRC 2008).

Many other improvements, acquisitions, and developments are planned for the parkway, including habitat enhancement and public access improvements at Jensen River Ranch; development of Riverbottom Park (a City of Fresno park) with a canoe launch area, restrooms, and a loop trail; development of a master plan for Ball Ranch, a 358-acre SJRC property; and development of a 10-mile trail between the Coke Hallowell Center for River Studies and Ball Ranch; and acquisition of several additional properties (SJRC 2008).

Boating put-in and take-out facilities are located at several locations along the 23 miles of the parkway (SJRPCT 2010a) (Table 21-1) and at Skaggs Bridge Park, several miles downstream. Canoe rentals are available at two locations in the parkway.

Several educational and interpretive facilities are located within the parkway, including Scout Island, a multipurpose outdoor education site, the Coke Hallowell Center for River Studies, and several nature trails. Wildlife viewing facilities in the parkway consist mainly of nature trails and an observation deck at Willow Lodge.

Skaggs Bridge Park is a Fresno County park located approximately 9 miles downstream from the lower end of the parkway, on the south bank of the river at SR 145 (Madera Avenue). This 17-acre park is used for picnicking, day use, and fishing, and offers picnic units and playground area (Fresno County 2009).

Reach 2. The lands along Reach 2 are primarily privately owned agricultural lands. The only public recreational facility in the vicinity of Reach 2 is the 85-acre Mendota Pool Park, managed by the City of Mendota, which provides a launch ramp, picnic area, and playground, about one-half mile south of Mendota Dam (City of Mendota 2007).

Reach 3. Like Reach 2, the lands along Reach 3 are primarily privately owned agricultural lands. An unpaved boat ramp on the river bank at the upstream end of the reach just below Mendota Dam provides access to Reach 3 for small boats, and the reach has been described as being especially suited for canoes and touring kayaks (American Whitewater 2007a). Fishing is permitted atop Mendota Dam (American Whitewater 2007a).

The City of Firebaugh manages two parks, Dunkle Park, also known as the City Park, and Maldonado Park. Dunkle Park, about 9 miles downstream from Mendota Dam, provides a gazebo near the river and informal river access for anglers and boaters (American Whitewater 2007a). An unnamed grassy area adjacent to Dunkle Park is also managed

and available for recreational activities. Basketball, softball, and soccer fields and a skateboard park are planned for Maldonado Park (City of Firebaugh 2007).

Reach 4. The San Luis NWR, which is bisected by the San Joaquin River, has the only recreational facilities in Reach 4 (Figure 21-4). Three of the six contiguous units of the refuge border on the lower portion of Reach 4 within the Restoration Area: the San Luis, East Bear Creek, and West Bear Creek Units. The Merced NWR is several miles east of the river on the Eastside Bypass (Figure 21-4). The two co-managed refuges, totaling more than 36,000 acres, are managed primarily for migratory and wintering bird habitat. An indigenous tule elk herd is located in the San Luis refuge, and both refuges host many endangered, threatened, and sensitive species, including sandhill cranes and vernal pool species. The Grasslands WMA, surrounding the San Luis and Merced refuges, consists of private land protected by conservation easements; there are no public access or recreation facilities.

There are two auto tour routes in the San Luis NWR: one for viewing waterfowl and one for viewing tule elk. Stops with interpretive information and wildlife observation platforms are provided along the routes. Hikers are also allowed on the auto tour routes, and hiking is encouraged along Salt Slough Road. There are two hiking trails and an additional spur trail to the river and a historical site. The Salt Slough Fishing Area is available for fishing during daylight hours; one fishing site is reserved for persons with disabilities. Several hunting blinds are available in the refuge for waterfowl and pheasant hunting (USFWS 2010).

Reach 5. Downstream from the Bear Creek confluence is the 2,800-acre Great Valley Grasslands State Park (Figure 21-4), situated between two units of the San Luis NWR. This State Park includes one of the few intact examples of native grasslands on the floor of the Central Valley (National Audubon Society 2010). Although the State Park is undeveloped, people visit the park to view springtime wildflowers and wildlife, and to fish (State Parks 2008a).

A portion of the West Bear Creek Unit of San Luis NWR, to the east of Great Valley Grasslands State Park, and the Kesterson Unit to the west are also on Reach 5. The 3,900-acre West Bear Creek Unit contains a wildlife observation tour route, a designated hunting area surrounding several ponds, and foot trails. The Kesterson Unit has 10,621 acres of seasonal and permanent wetlands, riparian habitat, native grasslands, and vernal pools. Mud Slough also bisects the unit. Waterfowl hunting is a primary use of the unit. The unit is also used for wildlife viewing (USFWS 2010).

21.1.3 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, 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, 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 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 one location at a favored location for viewing geese and other waterbirds (USFWS 2006).

The West Hilmar Wildlife Area, on the west bank of the river a few miles downstream of 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, and hiking on short trails. McConnell SRA also offers family and group camping.

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.

21.1.4 Sacramento–San Joaquin 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.

21.1.5 Outdoor Recreation Activity Participation and Demand

As described above, most recreation activity within the Restoration Area occurs within the San Joaquin River Parkway. Use of the parkway is heaviest in summer and consists primarily of canoeing, picnicking, hiking, jogging, bicycling, fishing, camping, and bird watching. A user survey estimated that the parkway received more than 200,000 visits in 2000, mostly trail users, and found that most visitors (more than 90 percent) were from Fresno County. The same survey indicated that Lost Lake Park, at the upper end of the parkway, received about 30,000 visits, and that the primary activity of 60 percent of the visitors was fishing (Houser and North 2001).

No specific recreation use data are available for the few locations within the Restoration Area downstream from Reach 1 where recreation access exists.

The results of State-wide surveys of outdoor recreation participants in California indicate that several activities that may be enhanced by the implementation of the program alternatives rank high in popularity and/or unmet demand. As shown in Table 21-2, wildlife viewing is among the most popular outdoor recreation activities, with approximately three-fourths of residents participating in 2002, and it was among the activities with the highest level of latent (unmet) demand. Nearly half of California residents reported swimming in lakes or rivers, and it ranked in the top third in latent demand. Freshwater fishing was not as popular as wildlife viewing or swimming, with approximately one-third of residents participating, but it ranked nearly as high as wildlife viewing in unmet demand. Less than one-quarter of residents participate in canoeing or kayaking and related paddle sports, but there has been an upward trend in participation and these activities rank in the top quarter in latent demand (State Parks 1998, 2003b).

Table 21-2.
Statewide Participation in and Latent Demand for the Primary Recreation Activities Pursued Within the Restoration Area

Recreation Activity	Participation (Percent)	Participation Rank (out of 55)[1]	Latent Demand Rank (out of 55)
Wildlife viewing, bird watching, viewing natural scenery	76	8	4
Swimming in lakes, rivers and/or streams	47	13	18
Fishing in freshwater	34	19	6
Paddle sports (kayaking, canoeing, etc.)	23	27	13

Source: State Parks 2003b

Note:
[1] 55 recreation activities were identified in the survey.

21.2 Regulatory Setting

This section describes the Federal, State, regional, and local regulatory setting related to recreation.

21.2.1 Federal

The following section provides Federal plans pertaining to recreation in the study area.

Millerton Lake State Recreation Area Joint Resource Management Plan and General Plan

Reclamation owns Millerton Lake and most of the lands around it, San Luis NWR, and the areas around O'Neil Forebay. The Millerton Lake SRA is managed by State Parks through an agreement with Reclamation. Reclamation and State Parks are developing a joint resource management plan and general plan (Reclamation and State Parks 2008) that will offer 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 will cover recreational opportunities that are compatible with surrounding resources, and uses proposed in the plan will be compatible with Reclamation's requirement to operate the reservoir for water delivery. A public draft of the plan was released in June 2008 and a final plan is anticipated for 2009.

Federal Wildlife Refuges

Management goals and objectives for the Federal wildlife refuges in the San Luis NWR Complex include providing compatible education/interpretation and recreational programs, which may include wildlife observation, photography, fishing, and hunting (USFWS 2010). This goal is addressed, within the context of priority wildlife habitat goals, in several national, regional, complex-wide, and refuge-specific management plans, as described in the recently completed *San Joaquin River NWR Comprehensive Conservation Plan* (USFWS 2006). The San Luis NWR has noted high demand for recreational and educational activities and programs, and has identified interpretive and recreational expansion opportunities (tour routes, visitor center, walking trail, public hunting, and environmental education) in the West Bear Creek unit of the refuge (USFWS 2010).

21.2.2 State of California

The State plan discussed below pertains to recreation resources in the study area.

Millerton Lake State Recreation Area General Plan

The *Millerton Lake SRA General Plan* was completed in 1979 (State Parks 1979) and amended in 1983 (State Parks 1983). As noted above, a joint resource management plan and general plan being developed by Reclamation and State Parks will supersede this plan when it is completed. The existing plan has three main sections: the resource element, the land/water use and facilities element, and the operation element. Each provides analysis and recommendations related to recreation resources, needs, allowable use levels, and operations by State Parks and private entities. The plan has specific recommendations for zoning and dispersal of different types of uses around the lake and plans for facility development in the two primary shoreline development areas, referred

to as the South Shore and North Shore areas. The 1983 amendment primarily addressed a revised analysis of long-range boating facility development, providing for additional public boat launching and marina development at the existing marina location and a new location, within potential natural resource and other constraints.

21.2.3 Regional and Local

The following regional plans relate to recreation in the study area.

Fresno County General Plan

The *Fresno County General Plan* (Fresno County 2000) includes sections on parks and recreation and on recreational trails. These sections focus on designating land for recreation and promoting the development of recreational facilities and a trail system. General plan policies applicable to this project include policies encouraging agencies providing recreational facilities to maintain and improve, if possible, their current levels of service (Policy OS-H.5); to plan for further development of the Friant-Millerton area as a recreation corridor (Policy OS-H.9); to support the *San Joaquin River Parkway Master Plan* (Policy OS-H.11); and to improve existing recreation areas and facilities along the San Joaquin River in conjunction with the SJRC, particularly Lost Lake and Skagg's Bridge regional parks (Policy OS-H.12).

Three trails on the *Fresno County Conceptual Recreation Trail List* (Policy OS-I.10) may be included in the Restoration Area: the Millerton Trail, San Joaquin Bluff Trail, and San Joaquin River Trail. The Millerton and San Joaquin Bluff trails would primarily follow the bluffs along the south side of the San Joaquin River Parkway. A portion of the San Joaquin River Trail already exists, following the shoreline along the narrow upstream half of Millerton Lake and extending into adjacent BLM lands. Fresno County and other agencies are cooperating on eastward extension of the trail (San Joaquin River Trail Council 2007).

Madera County General Plan

The Madera County General Plan (Madera County 1995) identifies goals and policies related to public recreation and parks, private recreational facilities and opportunities, and recreational trails. General plan policies applicable to this project include policies encouraging the county to support development of the San Joaquin River Parkway (Policy 4.A.3) and encouraging agencies providing recreation facilities to maintain and improve, if possible, their current levels of service (Policy 4.A.7).

Merced County General Plan

Merced County began a 3-year process to update its general plan in 2006 (Merced County 2007). The previous plan included information on recreation and a goal, objective, and related policies to ensure that recreational lands are available for local and regional needs (Merced County 2000).

City of Fresno General Plan

The City of Fresno's 2025 *Fresno General Plan* (City of Fresno 2002) identifies many objectives and policies related to recreation. 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). Several objectives and policies are provided in the general plan regarding the Master Parks Plan, related primarily to city parks, including the provision of parklands, park design and location, and services and programs, and financing and management of the parks and recreation system.

The general plan also identifies many objectives and policies related to the *San Joaquin River Parkway Master Plan* (SJRC 2000) (described in the following section) that are intended to provide city support for development of the parkway. These objectives and policies focus on the following:

- 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

The following specific general plan policies are applicable to the program alternatives:

- **Policy F-10-c** – The city will advocate that recreational activities and use levels be monitored and managed by responsible agencies to ensure that facilities and the river environs can handle demands imposed by recreational uses.
- **Policy F-13-a** – Proposed recreational uses and areas shall, where desirable and feasible, capitalize on opportunities associated with the reclamation of existing and future sand and gravel operations. Active, intensive recreational uses may be located in reclaimed mineral extraction sites in those areas that are not designated for wildlife habitat restoration.
- **Policy F-17-a** – It shall be recognized that the river itself serves as a public "canoe trail" for nonmotorized boating.

San Joaquin River Parkway Master Plan

In the early 1990s, the SJRC was created by the State Legislature to develop and manage the San Joaquin River Parkway (California Public Resources Code, Sections 32510–32520). Development of the parkway had begun a few years earlier under the guidance of a local nonprofit organization, and the Parkway Task Force established by the Legislature. This legislation, named the SJRC Enabling Act, directed the conservancy to develop and implement a *San Joaquin River Parkway Master Plan* that addresses the entire 22-mile river corridor between Friant Dam and SR 99. The SJRC is governed by a 15-member board largely composed of public officials and other citizens from Fresno and Madera counties, with the remaining members drawn from State natural resource agencies.

The *San Joaquin River Parkway Master Plan* (SJRC 2000) is the guiding document for developing the parkway. The plan aims to protect and restore the natural resource values of the river corridor and provide public use of the river without harming these values. The plan provides guidance on wildlife corridors, natural reserves, fisheries, and a monitoring program. The plan also provides guidance covering four major topic areas, or elements: natural resources, recreation, mineral resources, and plan implementation.

The natural resource element identifies goals and objectives, as well as general policies, design policies, special policies related to flood management, and policies related to natural resource programs. Master plan natural resource policies applicable to this project include prohibiting motorized vessels (e.g., motorboats, jet boats, jet skis) from accessing the river from Friant Dam to SR 99 between November and July to protect the heron rookery and bald eagle wintering use of the river.

The recreation element describes the concept of recreation in the parkway as meeting the Fresno-Madera region recreation demand while preserving the river's natural resources and respecting private property rights. Some of the main features of the recreation element are concentrating additional recreation facilities near existing facilities; locating only river-dependent uses on the river (e.g., fishing, canoeing, and nature observation); providing one continuous, linking multipurpose trail; providing additional canoe and equestrian facilities; and providing appropriate buffers between recreation and wildlife habitat areas. Recreation area goals and objectives are also stated in the recreation element, along with policies regarding recreation area siting, traffic, parking, circulation, public transit, recreation facility construction, park operation, flood management, and recreation design. The recreation element also describes management of the parkway and lists proposed recreation components.

The last two elements in the master plan, those relating to mineral resources and plan implementation, identify goals, objectives, and policies related to minerals, land acquisition, buffer areas and adjacent land uses, agriculture, and commercial activities. Land acquisition objectives include the acquisition of undisturbed or fragile land suitable for use as a wildlife corridor or nature reserve and, secondarily, acquisition of previously disturbed land for restoration or for recreation areas.

The master plan includes an objective to acquire and manage riverside lands, protect and restore riparian and riverine habitat, and facilitate development of the parkway. The plan states that approximately 2,900 acres of land in the parkway may be sought in the future for acquisition by the SJRC for public use as recreation areas, trail corridors, or other natural reserves (some of this acreage has been acquired since adoption of the plan in 2000).

21.3 Environmental Consequences and Mitigation Measures

The purpose of this section is to provide information about the environmental consequences of the program alternatives on recreation resources and uses. This section describes the methodology, criteria for determining significance of effects, and environmental consequences and mitigation measures associated with effects of each of the program alternatives. Implementing the action alternatives would affect recreation through changes to reservoir elevations at Millerton Lake; reestablishment or changes in flows in the reaches of the San Joaquin River within the Restoration Area; and changes in sport fish populations and wildlife habitat in the Restoration Area and downstream. The conclusions of Chapter 5.0, "Biology – Fisheries," and Chapter 6.0, "Biology – Vegetation and Wildlife," have been considered in the recreation analysis in this section. For example, benefits to fisheries would improve recreation opportunities for anglers, and benefits to wildlife habitat would improve recreation opportunities for birdwatchers.

The program alternatives evaluated in this chapter are described in detail in Chapter 2.0, "Description of Alternatives," and summarized in Table 21-3. The potential impacts to recreation and associated mitigation measures are summarized in Table 21-4.

Table 21-3.
Actions Included Under Action Alternatives

Level of NEPA/CEQA Compliance	Actions[1]		Action Alternative					
			A1	A2	B1	B2	C1	C2
Project-Level	Reoperate Friant Dam and downstream flow control structures to route Interim and Restoration flows		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows in the Restoration Area		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows at existing CVP and SWP facilities in the Delta		✓	✓	✓	✓	✓	✓
Program-Level	Common Restoration actions[2]		✓	✓	✓	✓	✓	✓
	Actions in Reach 4B1 to provide at least:	475 cfs capacity	✓	✓	✓	✓	✓	✓
		4,500 cfs capacity with integrated floodplain habitat		✓		✓		✓
	Recapture Interim and Restoration flows on the San Joaquin River downstream from the Merced River at:	Existing facilities on the San Joaquin River			✓	✓	✓	✓
		New pumping infrastructure on the San Joaquin River					✓	✓
	Recirculation of recaptured Interim and Restoration flows		✓	✓	✓	✓	✓	✓

Notes:

[1] All alternatives also include the Physical Monitoring and Management Plan and the Conservation Strategy, which include both project- and program-level actions intended to guide implementation of the Settlement.

[2] Common Restoration actions are physical actions to achieve the Restoration Goal that are common to all action alternatives and are addressed at a program level of detail.

Key:
CEQA = California Environmental Quality Act
cfs = cubic feet per second
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
NEPA = National Environmental Policy Act
PEIS/R = Program Environmental Impact Statement/Report
SWP = State Water Project

Table 21-4.
Summary of Impacts and Mitigation Measures – Recreation

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Recreation: Program-Level				
REC-1: Increased Use of Facilities at Millerton Lake State Recreation Area and Demand for Recreation Opportunities at Millerton Lake and Vicinity	No-Action	LTS	--	LTS
	A1	No Impact	--	No Impact
	A2	No Impact	--	No Impact
	B1	No Impact	--	No Impact
	B2	No Impact	--	No Impact
	C1	No Impact	--	No Impact
	C2	No Impact	--	No Impact
REC-2: Increased Use of Recreation Facilities and Demand for Recreation Opportunities in the Restoration Area	No-Action	LTS	--	LTS
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
REC-3: Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities in the Restoration Area	No-Action	LTS	--	LTS
	A1	LTS	--	LTS
	A2	PS	REC-3: Restore Recreation Access and Facilities Affected by Construction, Operation, and Maintenance from Settlement Actions in the San Luis Unit of the San Luis National Wildlife Refuge	LTS
	B1	LTS	--	LTS
	B2	PS	REC-3: Restore Recreation Access and Facilities Affected by Construction, Operation, and Maintenance from Settlement Actions in the San Luis Unit of the San Luis National Wildlife Refuge	LTS
	C1	LTS	--	LTS
	C2	PS	REC-3: Restore Recreation Access and Facilities Affected by Construction, Operation, and Maintenance from Settlement Actions in the San Luis Unit of the San Luis National Wildlife Refuge	LTS

Table 21-4.
Summary of Impacts and Mitigation Measures – Recreation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Recreation: Program-Level (contd.)				
REC-4: Effects of Reintroducing Salmon to the Restoration Area on Reach 1 Angling Opportunities	No-Action	No Impact	--	No Impact
	A1	PS	REC-4: Enhance Fishing Access and Fish Populations on the Kings River below Pine Flat Dam	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
REC-5: Effects on Reach 1 Warm-Water Angling Opportunities from Program Actions within the Restoration Area	No-Action	No Impact	--	No Impact
	A1	PS	REC-5: Enhance Warm-Water Fishing Access and Fish Populations in the Vicinity of the San Joaquin River below Friant Dam	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
REC-6: Effects on Wildlife-Based Recreation Opportunities from Enhanced Wildlife Habitat Conditions Caused by Program Actions Within the Restoration Area	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial
REC-7: Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities on the San Joaquin River Between Merced River and the Delta	No-Action	No Impact	--	No Impact
	A1	No Impact	--	No Impact
	A2	No Impact	--	No Impact
	B1	No Impact	--	No Impact
	B2	No Impact	--	No Impact
	C1	LTS	--	LTS
	C2	LTS	--	LTS

Table 21-4.
Summary of Impacts and Mitigation Measures – Recreation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Recreation: Program-Level (contd.)				
REC-8: Effects of Reintroducing Salmon to the San Joaquin River Between Friant Dam and the Merced River on Angling Opportunities Downstream	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial
Recreation: Project-Level				
REC-9: Effects on Recreation Opportunities from Earlier Seasonal Drawdown of Millerton Lake Related to Timing of Release of Interim and Restoration Flows	No-Action	No Impact	--	No Impact
	A1	PS	REC-9: Extend Millerton Lake Boat Ramps or Construct a New Low-water Ramp to Allow Boat Launching at the Lower Pool Elevations that May Result from Interim and Restoration Flows during Dry and Critical-High Years	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
REC-10: Effects on Recreation Facilities from Increased Flow in the Restoration Area	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
REC-11: Effects on Swimming or Wading and Fishing Opportunities from Increased Flow in the Restoration Area	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS

Table 21-4.
Summary of Impacts and Mitigation Measures – Recreation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Recreation: Project-Level (contd.)				
REC-12: Effects on Boating Opportunities from Increased Flow in the Restoration Area	No-Action	No Impact	--	No Impact
	A1	Significant	REC-12: Develop and Implement Recreation Outreach Program	LTS
	A2	Significant		LTS
	B1	Significant		LTS
	B2	Significant		LTS
	C1	Significant		LTS
	C2	Significant		LTS
REC-13: Effects on Wildlife-Based Recreation Opportunities from Enhanced Wildlife Habitat Conditions Related to Increased Flow in the Restoration Area	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial
REC-14: Effects on Warm-Water Fishing Opportunities from Enhanced Fish Populations Related to Increased Flow in the Restoration Area	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial
REC-15: Effects on Warm-Water Fishing Opportunities from Increased Flow in the San Joaquin River from the Merced River to the Delta	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial

Table 21-4.
Summary of Impacts and Mitigation Measures – Recreation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Recreation: Project-Level (contd.)				
REC-16:Effects on Warm-Water and Cold-Water Fishing Opportunities from Increased Flow into the Sacramento-San Joaquin Delta	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial

Key:
-- = not applicable
LTS = less than significant
PS = potentially significant

21.3.1 Impact Assessment Methodology

This impact assessment is based on quantitative data regarding changes to recreation conditions that could occur under the program alternatives within the five geographic areas that compose the study area. CalSim simulations were used to describe potential changes in pool elevations at Millerton Lake. Data describing changes in San Joaquin River flows within the Restoration Area were also used to assess impacts. The assessment is also based on previous studies describing potential changes in inundated area and vegetation conditions on the San Joaquin River within the Restoration Area. Other studies consulted described potential changes in fish populations in the San Joaquin River within the Restoration Area and downstream, and in the Delta. The focus of the assessment was interpreting these data to estimate the effects of the changes in recreation conditions on recreation opportunities.

21.3.2 Significance Criteria

The thresholds of significance for impacts to recreation 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. Based on these criteria, impacts on recreation would be significant if implementing an alternative would do any of the following:

- Have a substantial adverse effect, either directly or indirectly, through modifications to the recreation setting, or the availability or quality of recreational facilities, services, or recreational opportunities

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated

- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment

21.3.3 Program-Level Impacts and Mitigation Measures

This section provides a program-level evaluation of direct and indirect effects of the program alternatives on recreation resources. Restoration actions could affect recreation resources directly (e.g., by providing or enhancing the sport fishery through reintroducing salmon to the river). Water recapture actions could affect recreation directly through construction and operation of new infrastructure to increase pumping capacity on the lower San Joaquin River where recreation facilities or substantial recreation activity are present. They could also result in indirect effects (e.g., by improving wildlife habitat, thus enhancing wildlife viewing opportunities, through creation or enhancement of floodplain and side-channel habitat for fish).

The evaluation of program-level effects on recreational resources and facilities considered the potential effects of recapture of Interim and Restoration flows using existing facilities on the San Joaquin River between the Merced River and the Delta (Alternatives B1, B2, C1, and C2) and using new infrastructure to increase pumping capacity in this segment of the river (Alternatives C1 and C2).

No-Action Alternative

The No-Action Alternative accounts for expected increases in recreation demand associated with projected population growth within the study area during the SJRRP 30-year planning time frame. Under the No-Action Alternative, the Settlement would not be implemented and associated effects to recreation opportunities would not occur.

Flood system improvements are currently underway or will be initiated under the USACE policy on levee vegetation, which calls for removing vegetation from levees, as necessary, to maintain levee integrity and flood-fighting access (USACE 2007). These actions are included in the No-Action Alternative. This national policy could have indirect adverse effects on recreation in the study area by reducing the quality of visual resources and possibly reducing wildlife habitat and, thus, wildlife viewing opportunities. However, how the policy will be implemented in the study area is not yet known. Discussions are continuing between USACE, other Federal agencies, and State, regional, and local agencies in California with responsibilities for levee maintenance, and may result in local variances to the national policy allowing less vegetation removal (CVFPB 2009). At this time, any estimates of potential effects on recreation resources related to this policy would be too speculative for meaningful consideration.

Similarly, the potential effects of a possible 1-foot rise in sea level on recreation resources in the study area are uncertain. Although some effects could occur on the portion of the lower San Joaquin River subject to tidal influence, the effects would most

likely be focused on the Delta area and might include flooding of subsided islands and their resulting conversion to wetlands or open water. However, the potential effect would be reduced if some island levees were breached intentionally as part of restoration plans that have been considered (PPIC 2008) or if they were breached by earthquake or other natural forces before sea level rise could have an effect. Also, potential actions at San Francisco Bay in response to sea level rise, such as erection of new levees, could increase or lessen the effects of sea level rise on the Delta (PPIC 2008). Lastly, Delta levees may be raised or strengthened to withstand sea level rise, which also could reduce or eliminate potential effects. Therefore, any estimates of potential effects on recreation resources of a 1-foot sea level rise in the Delta would be too speculative for meaningful consideration.

San Joaquin River Upstream from Friant Dam. The No-Action Alternative may affect recreation in Millerton Lake through increased use of recreation facilities and demand for recreation opportunities, as described below.

Impact REC-1 (No-Action Alternative): ***Increased Use of Facilities at Millerton Lake State Recreation Area and Demand for Recreation Opportunities at Millerton Lake and Vicinity – Program-Level.*** Demand for recreation facilities and opportunities at Millerton Lake and vicinity is expected to increase under the No-Action Alternative. This increased demand would be addressed by Reclamation and State Parks and within the management goals and objectives of the Millerton Lake Joint Resource Management Plan and General Plan, currently under development. This impact would be **less than significant**.

The populations of Fresno and Madera counties, which are presumably the source of most visitors to the Millerton Lake SRA, are projected to increase by 78 percent and 119 percent, respectively, above 2000 levels by 2030 (DOF 2007). This population growth, in combination with other factors, would increase demand for recreation opportunities in the Millerton Lake SRA. The Millerton Lake Draft Resource Management Plan and General Plan (RMP/GP) EIS/EIR (Reclamation and State Parks 2008) predicts that boating activity on Millerton Lake will grow more than 60 percent by 2020. The final, adopted RMP/GP would provide guidance for managing the reservoir to increase recreation opportunities in response to increased demand. Also, some of the regional demand for water-based and water-enhanced recreation would continue to be met by nearby Pine Flat Lake, a similarly sized reservoir that provides comparable recreation opportunities. Other reservoirs in the region would also have a continued role in meeting this demand. Therefore, this impact would be less than significant.

San Joaquin River from Friant Dam to Merced River. The No-Action Alternative may affect recreation in the Restoration Area through increased use of recreation facilities and demand for recreation opportunities, as described below.

Impact REC-2 (No-Action Alternative): ***Increased Use of Recreation Facilities and Demand for Recreation Opportunities in the Restoration Area – Program-Level.*** Demand for recreation facilities and opportunities on the San Joaquin River, particularly along Reach 1, is expected to increase under the No-Action Alternative. This increased demand would be addressed primarily by the SJRC, the SJRPCT, and other parkway

landowners and management partners, and within the management goals and objectives of the San Joaquin River Parkway Master Plan. This impact would be **less than significant**.

Most recreation activity on the San Joaquin River between Friant Dam and the Merced River occurs along Reach 1. The San Joaquin River Parkway along Reach 1A is particularly active. By 2020, the population of the city of Fresno, which is the source of most visitors to the parkway (Houser and North 2001), is projected to increase by 22 percent above 2008 levels (City of Fresno 2008). In addition, rapid urban growth is occurring on the city's northeast side, near the parkway. This population growth and urban expansion will increase demand for recreation opportunities in the parkway. The San Joaquin River Parkway Master Plan (SJRC 2000) provides guidance for managing the parkway to increase recreation opportunities in response to increased demand. Acquisition and development of recreation facilities on parkway parcels is in progress and will continue, with the goal of increasing public lands in the parkway from 3,500 acres to 6,000 acres. This ongoing parkway development will meet a substantial portion of increased recreation demand.

Substantial population growth is also projected for Madera and Merced counties (bordered by Reaches 2 through 5) (DOF 2007). However, little recreation activity occurs along those reaches because some reaches lack flows, and reaches with perennial flows lack access. Unlike Reach 1, along Reaches 2 through 5 only a few small communities are close to the river. Under the No-Action Alternative, flow conditions would not change, and little or no expansion of recreation access or facilities would be expected to occur. Communities close to the river, such as the cities of Mendota and Firebaugh on Reaches 2 and 3, respectively, could choose to expand access and facilities, but no substantial changes are likely without changes in flow conditions. Therefore, recreation demand in Reaches 2 through 5 is not likely to increase substantially.

For the reasons described above, this impact would be less than significant.

San Joaquin River from Merced River to the Delta. The No-Action Alternative may affect recreation along the San Joaquin River from Merced River to the Delta through the implementation of reasonably foreseeable future projects related to water conveyance and storage, and fisheries management, as described below.

Impact REC-3 (No-Action Alternative): ***Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities in the Restoration Area – Program-Level.*** Under the No-Action Alternative, no new projects or facilities would be constructed in the Restoration Area, and the reasonably foreseeable future projects included in the No-Action Alternative appear to have little potential for effects on recreation resources. This impact would be **less than significant**.

Most of the reasonably foreseeable future projects included in the No-Action Alternative are narrowly focused projects related to water conveyance and storage within the San Joaquin Valley, with few or no associated recreation resources. Therefore, these projects

have little or no potential to affect recreation resources. For these reasons, this impact would be less than significant.

Impact REC-3 (No-Action Alternative): ***Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities on the San Joaquin River Between the Merced River and the Delta – Program-Level.*** Under the No-Action Alternative, no new projects or facilities would be constructed on the San Joaquin River between the Merced River and the Delta, and most of the reasonably foreseeable future projects included in the No-Action Alternative appear to have little potential for effects on recreation resources. One project could have indirect beneficial effects on recreation. This impact would be **less than significant**.

Most of the reasonably foreseeable future projects included in the No-Action Alternative are narrowly focused projects related to water conveyance and storage within the San Joaquin Valley or Delta water supply intakes, with few or no associated recreation resources. Therefore, these projects have little or no potential to affect recreation resources.

The San Joaquin River Agreement and VAMP, an experimental water quality and fisheries management project focused on the lower San Joaquin River and southern Delta, includes among its primary goals the protection and increase of salmon populations (San Joaquin River Group Authority 2009) (while VAMP expires in 2011, the No-Action Alternative includes the continued operation of VAMP or a program with similar conditions as described in Chapter 2.0, "Description of Alternatives"). If the goal of these programs to increase salmon populations is achieved and salmon populations available to anglers are substantially increased, this could have indirect beneficial effects on recreation by enhancing angling. However, a substantial increase in fish populations is not certain to occur; thus, the potential beneficial effects cannot be assumed.

For these reasons, this impact would be less than significant.

Alternatives A1 and B1

Under Alternatives A1 and B1, demand for recreation facilities and opportunities on the San Joaquin River would increase along the San Joaquin River, between Friant Dam and the Delta, in response to program-level restoration actions.

San Joaquin River Upstream from Friant Dam. The following section describes the potential impacts along the San Joaquin River Upstream from Friant Dam.

Impact REC-1 (Alternatives A1 and B1): ***Increased Use of Facilities at Millerton Lake State Recreation Area and Demand for Recreation Opportunities at Millerton Lake and Vicinity – Program-Level.*** The potential restoration, water management, and water recapture actions would not result in any direct or indirect enhancement to recreation facilities or opportunities at Millerton Lake SRA. Therefore, there would be no increase in use or demand for recreation opportunities related to these actions. **No impact** would occur.

San Joaquin River from Friant Dam to Merced River. The following section describes the potential impacts within the Restoration Area.

Impact REC-2 (Alternatives A1 and B1): ***Increased Use of Recreation Facilities and Demand for Recreation Opportunities in the Restoration Area – Program-Level.*** Demand for recreation facilities and opportunities along the San Joaquin River is expected to increase in response to potential restoration actions. Along Reach 1, this increased demand would be addressed primarily by the San Joaquin River Parkway landowners and management partners, and within the management goals and objectives of the San Joaquin River Parkway Master Plan. Along downstream reaches, this increased demand could be addressed primarily by local government agencies, with the cooperation of Federal and State resources management agencies and nongovernmental organizations interested in enhancing recreation opportunities. Many plans and mechanisms exist to facilitate recreation development in response to the expected increased demand. This impact would be **less than significant**.

Most recreation activity on the San Joaquin River between Friant Dam and the Merced River occurs along Reach 1. The San Joaquin River Parkway along Reach 1A is particularly active. Potential restoration actions, such as modification of floodplain and side channel habitat, would enhance some recreation opportunities and increase demand for recreation opportunities in the parkway. The San Joaquin River Parkway Master Plan (SJRC 2000) provides guidance for managing the parkway to increase recreation opportunities in response to increased demand. Acquisition and development of recreation facilities on parkway parcels is in progress and would continue, with the goal of increasing public lands in the parkway from 3,500 acres to 6,000 acres. This ongoing parkway development would meet a substantial portion of increased recreation demand, and within the management goals and objectives of the San Joaquin River Parkway Master Plan.

Potential restoration actions, such as modification of floodplain and side channel habitat, also would enhance recreation opportunities and increase demand for recreation access and facilities downstream from Reach 1. Unlike Reach 1, along Reaches 2 through 5, only a few small communities are close to the river. The cities of Mendota and Firebaugh, along Reaches 2 and 3, respectively, could choose to expand access and facilities within their jurisdictions in response to increased recreation demand. Existing informal use areas, particularly at road crossings, would continue to provide access for recreation and could be enhanced and formalized to better serve the expected increased numbers of people drawn to the restored river.

New facilities and improvements to informal access points, such as parking areas and restrooms, would most likely be developed as demand increases via coordinated efforts between municipal and county government entities, Federal and State agencies, and nongovernmental organizations. Plans and mechanisms for future enhancement of recreation access and facilities on the river already exist. For example, local governments frequently apply for Federal and State assistance to meet recreation facility needs, tapping into the Land and Water Conservation Fund, which provides matching grants to states and through states to local units of government, for acquiring and developing

public outdoor recreation sites and facilities (NPS 2008). The California Department of Boating and Waterways (DBW) provides grants and design assistance for boating facility development (DBW 2009). State Parks, in the Central Valley Vision Draft Implementation Plan, expresses the intention to cooperate in planning for restoration of the San Joaquin River, and states the intention of creating a new unit to address recreation opportunities. As part of the Central Valley Vision process, State Parks has prioritized development of recreation opportunities along rivers and has initiated a feasibility study to identify and prioritize opportunities and potential acquisition sites on the San Joaquin River and tributaries (State Parks 2008b). The nonprofit organization Revive the San Joaquin has among its five organizational goals "to encourage river recreation activities compatible with protection of wildlife" (Revive the San Joaquin 2009) and could be expected to be a partner in recreation access enhancement.

Given the existence of plans and mechanisms for recreational facility funding and development on the San Joaquin River by governmental and nongovernmental organizations, as described above, this impact would be less than significant.

Impact REC-3 (Alternatives A1 and B1): ***Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities on the San Joaquin River Between Friant Dam and the Merced River – Program-Level.*** Although a large number of major restoration actions are proposed as part of Alternatives A1 and B1, these actions would not have a substantial effect on existing recreation opportunities. This impact would be **less than significant**.

The major restoration actions proposed as part of Alternatives A1 and B1 include new projects and facilities that have the potential to impact recreation opportunities on the San Joaquin River between Friant Dam and the Merced River. These include construction of the Mendota Pool Bypass, modification of Reaches 2B and 4B to convey restoration flows, modification of several control structures, and modification of bypasses for fish passage. (Filling and/or isolating gravel pits in Reach 1 is also among the new projects or facilities proposed as part of Alternatives A1 and B1; and the effect of this action on recreation is addressed under Impact REC-5.) However, recreation facilities and use are minimal to nonexistent throughout Reaches 2 through 5 and the bypasses, and although recreational use would increase throughout all reaches under Alternatives A1 and B1, none of these new projects or facilities would be constructed in the vicinity of existing recreation facilities or use areas, which would experience the heaviest recreational increases. Therefore, these actions would not have a substantial effect on existing recreation opportunities.

For these reasons, this impact would be less than significant.

Impact REC-4 (Alternatives A1 and B1): ***Effects of Reintroducing Salmon to the Restoration Area on Reach 1 Angling Opportunities – Program Level.*** A restoration action stipulated by the Settlement is the reintroduction of Chinook salmon in the San Joaquin River between Friant Dam and the Merced River. The reintroduction of these fish would result in the cessation of stocking of rainbow trout by DFG in Reach 1. It is also likely that new fishing restrictions could be implemented in Reach 1 and possibly in

downstream reaches to prevent disturbance or destruction of salmon redds, accidental taking of salmon by anglers, and poaching of salmon. This impact would be **potentially significant**.

Within the Restoration Area, only Reach 1A currently has a cold-water game fish population, the result of regularly scheduled stocking of rainbow trout in the reach by DFG. The fish are planted in the reach during both winter and summer, providing a popular and accessible trout fishing opportunity. A survey completed in 2000 indicated that the primary activity of 60 percent of the visitors to Lost Lake Park, on the upper end of Reach 1, was fishing (Houser and North 2001). Although the survey did not identify anglers by type (i.e., cold-water vs. warm-water), and game fish other than trout are present in the river and in the park, most of these anglers, who were estimated to number nearly 18,000 per year, are presumed to have been trout anglers.

The California Fish and Game Commission (CFGC) has developed a set of policies relating to management of salmon in the State, one of which states: “Domesticated or nonnative fish species will not be planted, or fisheries based on them will not be developed or maintained, in drainages of salmon waters, where, in the opinion of the Department, they may adversely affect native salmon populations by competing with, preying upon, or hybridizing with them. Exceptions to this policy may be made for stocking drainages that are not part of a salmon restoration or recovery program” (CFCG 2009). Under this policy, the stocking of rainbow trout in Reach 1 would cease after salmon are reintroduced. As a result, the several thousand trout anglers who are believed to take advantage of the stocked trout fishery on Reach 1 would be displaced.

Trout fishing opportunities would remain available on the nearby Kings River below Pine Flat Lake, where DFG also plants hatchery fish. Catchable-size rainbow trout are stocked year-round just below Pine Flat Dam, at the upstream end of about a 5-mile reach of the river managed as a put-and-take trout fishery (open year-round with a five trout limit). The 7-mile reach below this upper reach is planted with subcatchable-size trout during winter, and is managed as a catch-and-release fishery (open year-round, but no trout may be kept). Both reaches of the Kings River offers good access to anglers with four developed and two undeveloped parks on the river operated by Fresno County (Kings River Conservation District 2009). In addition, since 1999, DFG has been engaged in the Kings River Fisheries Management Program, a cooperative effort with local agencies that has implemented a variety of enhancement projects to benefit fish populations (Kings River Conservation District 2009). Also, the Kings River Conservancy is implementing projects on the river to improve access and expand public parks (Fresno Bee 2009). These fisheries and recreation access improvements suggest that the capacity exists at the Kings River to absorb trout angling activity that would be displaced from Reach 1. However, the Kings River may not be as convenient for some anglers, particularly those who reside in north or northeast Fresno and adjacent areas, in close proximity to Reach 1.

In addition to the loss of the stocked trout fishery on Reach 1, DFG may elect to impose new restrictions on fishing on Reach 1, or to close some sections of the reach where salmon life history stages could be impacted by fishing activity. Of particular concern would be the potential for wading anglers and others to disturb or destroy redds. Also,

anglers may catch salmon without targeting them, and salmon in holding habitat may be vulnerable to poaching.

Because some trout anglers who may shift their angling activity to the Kings River would be required to travel a substantially greater distance to fish, and because additional restriction may be placed on other types of fishing within Reach 1 to protect salmon, this impact on angling opportunities would be potentially significant.

Mitigation Measure REC-4 (Alternatives A1 and B1): *Enhance Fishing Access and Fish Populations on the Kings River below Pine Flat Dam – Program Level.* The project proponent would mitigate trout fishing opportunities lost on the San Joaquin River below Friant Dam because of Settlement actions by enhancing public fishing access and trout populations on the Kings River below Pine Flat Dam. Specific actions to enhance fishing access would be developed in cooperation with the Kings River Conservancy and State and local agencies participating in ongoing park and river access construction and enhancement projects. Example projects include construction of the Kings River Access Park or similar facilities to provide anglers and others with amenities such as nonmotorized boat launches, parking areas, restrooms, information kiosks, and picnic tables. In addition, specific actions to enhance trout populations could be developed in cooperation with the Kings River Water Association, Kings River Conservation District, and DFG in support of the Kings River Fisheries Management Program Framework Agreement and Fisheries Management Program. Specific actions to enhance trout populations may include fish habitat enhancement projects in the river, fish stocking, and fish population monitoring. Actions could also include hatchery production of catchable trout, particularly if the San Joaquin Hatchery reduces trout production as a result of producing salmon in support of implementing the Settlement.

This impact would be **less than significant** with mitigation.

Impact REC-5 (Alternatives A1 and B1): *Effects on Reach 1 Warm-Water Angling Opportunities from Program Actions within the Restoration Area – Program-Level.* Potential restoration actions in Reach 1 include filling and/or isolating gravel pits near the river channel to reduce juvenile salmon mortality. Depending on the action taken at specific gravel pits (isolation or filling), and whether those pits where actions are taken provide publicly accessible warm-water fishing opportunities, these restoration actions could reduce warm-water fishing opportunities. Therefore, this impact would be **potentially significant**.

Gravel mining has left many pits, some connected to the river, within the historical floodplain of Reach 1. Several of these gravel mining pits at Sycamore Island Park were stocked with warm-water sportfish such as largemouth bass, sunfish, and catfish in years past and now have self-sustaining fish populations (Sycamore Island Park 2009, SJRPCT 2009). There are a number of other large gravel pit ponds adjacent to Sycamore Island Park and elsewhere near the river in Reach 1, but outside of Lost Lake in Lost Lake Park near Friant; none are known to provide public fishing opportunities. The Lost Lake Park Master Plan calls for creation of a new warm-water fishing lake in the east portion of the park, which could compensate for some warm-water fishing opportunities lost elsewhere

in Reach 1 (Fresno County 2008b). Fishing for bass and other warm-water sportfish is also available at Millerton Lake and other lakes and sloughs in the region.

Filling in of publicly accessible ponds would eliminate the fishing opportunities the ponds provide. Isolating ponds from the river may have adverse effects on fishing opportunities in the ponds if infiltration or other inflow is not sufficient to maintain water levels and adequate water temperatures or water quality to support the existing warm-water fish populations. Fish populations may decline or may be eliminated over the longer-term if conditions for fish deteriorate.

At this time, it is not possible to determine more precisely what the impacts of filling or isolation of ponds could be since it is not known which or how many ponds would be targeted for these actions, which ponds or how many would be filled rather than isolated from the river, and whether targeted ponds would include publicly accessible ponds at Sycamore Island or elsewhere. However, because there is the potential for substantial impacts on the warm-water fishery at Sycamore Island Park, this impact would be potentially significant.

Mitigation Measure REC-5 (Alternatives A1 and B1): ***Enhance Warm-Water Fishing Access and Fish Populations in the Vicinity of the San Joaquin River below Friant Dam – Program Level***. The project proponent would mitigate warm-water fishing opportunities that may be lost as a result of filling or isolating gravel pit ponds in the floodplain of Reach 1 of the San Joaquin River by enhancing remaining warm-water fishing opportunities or creating new opportunities in the vicinity. Specific actions to enhance warm-water fishing opportunities would be developed in cooperation with the SJRC, the SJRPCT, DFG, Fresno County, and other agencies participating in management of the San Joaquin River Parkway. Enhancement actions could include improvements to facilities such as Sycamore Island Park (owned by the SJRC and operated by a concessionaire) and Woodward Park (owned and operated by the City of Fresno) where warm-water fishing opportunities exist and will remain. Creation of new opportunities could occur through development of new ponds in the vicinity of the parkway but in locations that would not create potential conflicts with Settlement goals. A potential location for development of a new pond is Fresno County's Lost Lake Park, close to Friant Dam, where a recent Master Plan update has proposed creation of a new pond. The number and extent of mitigation actions necessary would depend on the amount of publicly accessible warm-water fishing access lost as a result of Settlement actions.

This impact would be **less than significant** with mitigation.

Impact REC-6 (Alternatives A1 and B1): ***Effects on Wildlife-Based Recreation Opportunities from Enhanced Wildlife Habitat Conditions Caused by Program Actions Within the Restoration Area – Program-Level.*** Potential restoration actions within the Restoration Area include management of floodplain and side channel habitat to support fish rearing and migration. The enhancement of wildlife habitat that would result from improved floodplain and side channel fish habitat would enhance conditions for

wildlife-based recreation, such as bird-watching. Therefore, this impact would be **less than significant** and **beneficial**.

In some reaches of the Restoration Area, most of the river is lined with nearly continuous, medium- to high-density riparian forest and scrub. This condition exists in most of Reaches 1, 3, 4B2, and 5 (EDAW 2008) and provides habitat for a variety of wildlife, in particular, birds. Birders are familiar with bird-watching opportunities along these reaches and in the vicinity. The Fresno Audubon Society leads bird-watching outings at Lost Lake Park in Reach 1 (Fresno Audubon Society 2009), recognized as a bird-watching "hot spot" (Birder's World Magazine 2007). The National Audubon Society has identified the entire Grasslands Ecological Area surrounding Reaches 4 and 5 as an Important Bird Area (National Audubon Society 2008a), which serves to highlight the area for bird-watching opportunities, including those provided by the riparian bird community along the river. A substantial portion of the visitation to Federal and State wildlife areas and refuges adjacent to Reaches 4B2 and 5 is composed of nonhunting wildlife-based recreation, particularly bird-watching (Grasslands Water District 2001).

Alternatives A1 and B1 include managing floodplain and side channel habitat, among potential restoration actions that could be implemented. Specifically, potential restoration actions of this type include managing invasive vegetation, creating or enhancing additional floodplain habitat, and creating or enhancing side channels. Although all these actions would be implemented in consideration of the needs of fisheries, the actions also could enhance bird and other wildlife habitat.

The improved floodplain and side channel habitat that could result from potential restoration actions (as well as from reoperating Friant Dam, as discussed under "Project-Level Impacts and Mitigation Measures," Impact REC-12 below) would enhance wildlife viewing opportunities, particularly bird-watching. These opportunities could complement the potential expansion of boating opportunities (also discussed below), which would increase access to the areas where habitat enhancement would occur. Restrictions could be placed on public access to restored floodplain and side channel habitat to protect the species intended to benefit from the restoration actions; however, wildlife viewing from boats navigating the main channel and within parks and wildlife refuges without access restrictions on and near the river would still be enhanced. Therefore, this impact would be less than significant and beneficial.

San Joaquin River from Merced River to the Delta. The following section describes potential impacts along the San Joaquin River from Merced River to the Delta.

Impact REC-7 (Alternatives A1 and B1): ***Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities on the San Joaquin River Between Merced River and the Delta – Program-Level.*** Under Alternatives A1 and B1, no new projects or facilities would be constructed on the San Joaquin River between the Merced River and the Delta in the vicinity of existing recreation facilities or use areas. There would be **no impact**.

Impact REC-8 (Alternatives A1 and B1): ***Effects of Reintroducing Salmon to the San Joaquin River Between Friant Dam and the Merced River on Angling Opportunities Downstream – Program-Level.*** Alternatives A1 and B1 include reintroducing Chinook salmon between Friant Dam and the Merced River. Because the reintroduction of this highly valued game fish population in that area would result in a greater number of migrating salmon in the river between the Merced River and the Delta, it would result in enhanced fishing opportunities in that area as well. Therefore, this impact would be **less than significant** and **beneficial**.

Historically, the San Joaquin River contained a large Chinook salmon population that supported sportfishing. Small runs of fall-run Chinook salmon remain in major tributaries to the lower San Joaquin River (i.e., the Merced, Tuolumne, and Stanislaus rivers) and contribute to popular sport fisheries in those rivers (McBain and Trush 2002). Those fish pass through the San Joaquin River between the Merced River and the Delta during their migrations to and from the Delta and Pacific Ocean. With the reintroduction of fall-run Chinook salmon to the San Joaquin River between Friant Dam and the Merced River, as stipulated by the Settlement, additional migratory salmon would be present between the Merced River and the Delta. This increased salmon population could result in enhanced fishing opportunities between the Merced River and the Delta. Therefore, this impact would be less than significant and beneficial.

Alternatives A2 and B2

Program-level impacts under Alternatives A2 and B2 would be the same as those described under Alternatives A1 and B1, except in Reach 4B1. Additional impacts would occur under Alternatives A2 and B2 associated with the construction, operation, and maintenance of levees in Reach 4B1 to convey at least 4,500 cfs, as described below.

Impact REC-3 (Alternatives A2 and B2): ***Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities on the San Joaquin River Between Friant Dam and the Merced River – Program-Level.*** All action alternatives contain common restoration actions; therefore, impacts would be similar to Impact REC-3 (Alternatives A1 and B1). Under Alternatives A2 and B2, however, restoration actions along Reaches 2 through 5 include improving Reach 4B1 to convey at least 4,500 cfs. New levees would be constructed along both sides of Reach 4B1. Construction, operation, and maintenance of these new levees could have substantial adverse effects on recreation access and facilities in one unit of the San Luis National Wildlife Refuge. This impact would be **potentially significant**.

Restoration actions in the Restoration Area include improvement of Reach 4B1 to convey at least 4,500 cfs. New levees would be constructed along both sides of Reach 4B1 to permit the river to safely convey that flow. Approximately 2 miles of the west bank of the downstream-most portion of the river in Reach 4B1 are within the San Luis Unit of the San Luis National Wildlife Refuge. The primary recreation activity at the San Luis Unit is wildlife observation. Recreation facilities in the vicinity of the levee construction area include a wildlife observation driving tour route, which is a 12-mile gravel loop road that runs in part on top of the existing river levee in Reach 4B1. Adjacent to the levee at the southeast corner of the San Luis Unit is the Sousa Marsh, which is encircled by two short

trail loops that provide access to an elevated wildlife viewing platform. A gravel parking area provides vehicle access to the trails and marsh.

Construction of a new levee on the west side of Reach 4B1 would presumably cause closure of the 2-mile levee-top portion of the tour route during construction. The remaining 10 miles of the loop road would be expected to remain available for use, although the route could not function as a loop during the partial closure. Also, it appears likely that at least some portion of the Sousa Marsh and associated trails, and potentially the parking area and wildlife viewing platform, would be directly affected by construction, and access to other portions could be affected. The Winton Marsh and trail, 0.5 mile to the west, presumably would not be affected.

Impacts on recreation activities in the San Luis Unit could be reduced by avoiding construction during late fall, winter, and early spring, when migratory waterfowl and other birds are present in the greatest numbers and therefore recreation use is highest. The affected portion of the loop tour route would need to be re-created on the new levee. Replacement of any portions of the Sousa Marsh trails directly affected by levee construction also would be necessary. This impact would be potentially significant.

Mitigation Measure REC-3 (Alternatives A2 and B2): ***Restore Recreation Access and Facilities Affected by Construction, Operation, and Maintenance from Settlement Actions in the San Luis Unit of the San Luis National Wildlife Refuge – Program-Level.*** The project proponent would mitigate effects of any actions implemented under the Settlement on recreation access and facilities in the San Luis Unit of the San Luis National Wildlife Refuge by either (1) redeveloping affected facilities, or (2) relocating affected facilities. Specific actions to redevelop or relocate facilities in the San Luis Unit of the San Luis NWR would be developed by the project proponent in coordination with USFWS. These improvements could include, but are not limited to, the following:

- Redevelopment of the affected portion of the gravel loop road automobile tour route on top of the newly constructed levee
- Redevelopment of affected portions of walking trails around the adjacent Sousa Marsh
- Creation of trails at new locations to replace affected portions of the Sousa Marsh trail system
- Redevelopment or relocation of the parking area for the Sousa Marsh trail system
- Redevelopment or relocation of the existing wildlife viewing platform

This impact would be **less than significant** with mitigation.

Alternative C1

Program-level impacts under Alternative C1 would be the same as those described for Alternatives A1 and B1. Additional impacts would occur under Alternative C1 associated with the construction of new infrastructure to increase pumping capacity on the San Joaquin River downstream from the Merced River confluence, as described below.

Impact REC-7 (Alternative C1): ***Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities on the San Joaquin River Between Merced River and the Delta – Program-Level.*** Under Alternative C1, new infrastructure to increase pumping capacity would be constructed on the lower San Joaquin River. The specific location and construction details of this new or expanded facility have not been determined; therefore, the potential recreation impacts are not known. However, given the general type of facility and its expected modest footprint on the riverbank, the extent of river miles available for recreation, the low number of recreation facilities and limited public lands on the lower river, and the generally low intensity of recreation activity, substantial impacts are not likely to occur. This impact would be **less than significant**.

Under Alternative C1, new infrastructure to increase pumping capacity with a capacity of up to 1,000 cfs would be constructed on the San Joaquin River below the Merced River confluence for the direct recapture of Interim and Restoration flows and conveyance of recaptured flows to Friant Division. The facility would be constructed at some location between the Merced River and the Delta and would occupy a relatively small area of land (probably less than 10 acres) on the riverbank. Given that more than 40 miles of the San Joaquin River are available for locating this facility between the Merced River and the Delta, the direct impact relative to this large area would be minor. In addition, because there are only two developed recreation facilities on the lower river, the Las Palmas Fishing Access and Laird Park, both operated by Stanislaus County, many options would likely exist to avoid directly or indirectly affecting recreation facilities by not locating new infrastructure in the vicinity of the parks. Other public lands on the lower San Joaquin River are limited to an undeveloped boat-access-only State wildlife area and a largely undeveloped Federal wildlife refuge area, which also likely could be avoided to minimize the potential for recreation impacts. It is assumed that a fish screen protected by a log boom or similar structure to exclude debris and boats would be part of the pump's intake design. Although specific data are not available, boating and related recreation activity are thought to be relatively light on most areas of the lower San Joaquin River; therefore, any impacts on boating would likely be minor. For these reasons, the impact would be less than significant.

Alternative C2

Program-level impacts under Alternative C2 on the San Joaquin River upstream from the Merced River confluence would be the same as those described for Alternatives A2 and B2. These impacts would be less than significant with mitigation, as described for Alternatives A2 and B2.

Program-level impacts under Alternative C2 on the San Joaquin River between the Merced River and the Delta would be the same as impacts as described for Alternative C1.

21.3.4 Project-Level Impacts and Mitigation Measures

This section evaluates project-level direct and indirect effects on recreation resources of reoperating Friant Dam. Reoperating Friant Dam could affect recreation resources directly by altering pool levels at Millerton Lake and by affecting recreation facilities on the river and the ability of recreationists to use the river for boating and fishing. Reoperating Friant Dam could affect recreation resources on the San Joaquin River between Friant Dam and the Delta indirectly by changing fish populations and wildlife habitats that support recreation activities and by driving increased demand for recreation access and facilities on the river. No or negligible effects of reoperating Friant Dam on current recreation resources or recreation resources expected to develop within the 30-year planning horizon would occur in the CVP/SWP water service areas. For that reason, this geographic area is not discussed further in this section.

The evaluation of project-level effects on recreational resources and facilities also considered the potential effects resulting from the recapture of Interim and Restoration flows in the Restoration Area and at existing Delta facilities. No changes to recreational resources and facilities were identified due to these actions. Therefore, the effects of these actions on recreational resources are not discussed further, and no future review of these actions is necessary as the Settlement is implemented.

Actions identified in the Physical Monitoring and Management Plan (see Appendix D) as potential immediate actions to address nonattainment of management objects also were evaluated at a project level. Potential immediate actions are related to flow, seepage, capacity, native vegetation, and spawning gravel. Potential immediate actions include acquisition of additional water from willing sellers, reoperation of Friant Dam to reduce flows, site monitoring, preparation of reports documenting monitoring, and the removal of obstructions/debris from channels in the Restoration Area.

Other actions evaluated at a project level would not result in physical changes to recreational resources and facilities. These include reoperation of Mendota Dam, Chowchilla Bypass Bifurcation Structure, Eastside Bypass Bifurcation Structure, Mariposa Bypass Bifurcation Structure, and the Hills Ferry Barrier. The proposed changes to the operation of these structures would have no effect on recreational resources and facilities. Actions to obtain encroachment permits, water transfers, and long-term water rights also would not affect transportation and infrastructure facilities. However, the product of these authorizations (the reoperation of Friant Dam for Interim and Restoration flows in the Restoration Area) would affect recreational resources. Therefore, the effects of Interim and Restoration flows on recreational resources and facilities are discussed further and their significance evaluated.

No-Action Alternative

Under the No-Action Alternative, changes to Millerton Lake pool levels and downstream San Joaquin River flows to the Delta would depend on any future changes in Friant Dam operations that cannot be reasonably determined at this time. Without such changes, there would be little to no change in Millerton Lake pool levels, San Joaquin River flows, and Delta conditions. Therefore, there would be no project-level impacts under the No-Action Alternative.

Alternatives A1 Through C2

Project-level impacts to recreation opportunities would be the same under all action alternatives, and would be associated with reoperating Friant Dam, as described below.

San Joaquin River Upstream from Friant Dam. The following section describes the potential impacts along the San Joaquin River upstream from Friant Dam.

Impact REC-9 (Alternatives A1 through C2): *Effects on Recreation Opportunities from Earlier Seasonal Drawdown of Millerton Lake Related to Timing of Release of Interim and Restoration Flows – Project-Level.* The schedule for Interim and Restoration flows for certain water year types includes spring and early summer flows that are substantially greater than average historic releases during those seasons. Although total releases from Friant Dam would not increase under the action alternatives, the earlier timing of Friant releases from midsummer to spring and early summer could affect Millerton Lake recreation visitors' use or enjoyment of shoreline facilities, and informal shoreline use areas, by reducing pool elevations during the latter part of the primary recreation season. CalSim modeling results indicate that the reduction in Millerton Lake pool elevation would generally be modest, and pool elevations would remain within the acceptable range at most times during the primary recreation season. However, during the mid- or late-summer of the driest years, boat launching capacity on the lake could be reduced or, in the worse case, eliminated. Therefore, without mitigation this impact would be **potentially significant**.

The schedule for Interim and Restoration flows specified in Exhibit B of the Settlement includes flows of 2,500 cfs during the first half of April of Normal-Dry, Normal-Wet, and Wet water years, and 4,000 cfs during the second half of April of Normal-Wet and Wet water years. During Wet water years, Interim and Restoration flow releases of 2,000 cfs would continue through May and June. In comparison, releases from Friant Dam during April have historically been in the range of 1,000 to 2,000 cfs in most years. Peak releases from Friant Dam typically have occurred during June and July and have been in the range of 3,000 to 5,000 cfs. (Spring and summer releases during years with very high inflow to Millerton Lake may exceed 10,000 cfs for extended periods).

Millerton Lake experiences substantial seasonal fluctuation under normal operations. The annual maximum water level typically occurs in May or June and is close to the full pool elevation of 581 feet most years. The reservoir typically is drawn down 75 to 100 feet, with the annual minimum elevation occurring in October or November, before the reservoir begins to refill with the onset of winter rains. In addition to boat ramps and other developed facilities, the North Shore and South Shore areas of the Millerton Lake

SRA offer large areas of shoreline with vehicular and pedestrian access in the fluctuation zone of the reservoir. These areas are used as informal beaches by both land-based and boating visitors and attract many visitors for picnicking and swimming throughout the primary recreation season of late spring through summer.

A potential effect of the Interim and Restoration flow releases from Millerton Lake would be to shorten the period each year when the lake would be within the elevation range that is most conducive to informal shoreline use. This elevation range is approximately 540 to 560 feet (20 to 40 feet below full pool), a pool level that exposes a wide band of shoreline in the North Shore and South Shore use areas. Elevations moderately below 540 feet continue to provide acceptable shoreline use conditions, but at a greater distance from developed picnic facilities providing shelters, tables, grills and shade trees; paved roads and parking; restrooms; and other amenities located above the full-pool elevation.

Lower pool elevations could also reduce boat launching capacity at SRA boat ramps, particularly at elevations below about 500 feet, when the lowest elevation ramp accessed from the primary South Shore recreation areas near Grange Grove becomes unusable. Two other ramps at the South Shore remain useable with about 10 feet and 25 feet of additional drawdown. Pool elevations below about 472 feet would eliminate all boat launching opportunities on Millerton Lake. Interim and Restoration flow releases also could reduce the surface area of the reservoir, thereby reducing the area available for boating.

CalSim simulations indicate that, under the action alternatives, the elevation of Millerton Lake would be, on average, approximately 27 feet lower than under the existing conditions at the end of April, and 17 feet lower at the end of May. In general, these pool elevations would increase the period during which the pool elevation would be in the range most conducive to shoreline use, with the further benefit of increasing the capacity of shoreline use areas compared to the high pool levels under existing conditions. Pool elevations during summer under the action alternatives would be, on average, reduced by less than 10 feet compared with the existing condition, and effects on shoreline use would be minimal. However, because closures of boat ramps during late-summer low-water periods occur under existing conditions, reducing launching capacity, even relatively small reductions in late-summer pool elevations could have a significant impact.

During Wet, Normal-Wet, and Normal-Dry water years (approximately 80 percent of all years, historically), implementing the action alternatives would result in Millerton Lake pool elevations about 20 to 30 feet lower at the end of April and about 15 to 20 feet lower at the end of May (Figures 21-5, 21-6, and 21-7). Pool elevation reductions during summer would be considerably less than the reductions during spring (5 to 7 feet during Wet and Normal-Wet water years and 5 to 15 feet during Normal-Dry water years). In most years, lower pool elevations would have the beneficial effects described above in relation to facilitating shoreline use.

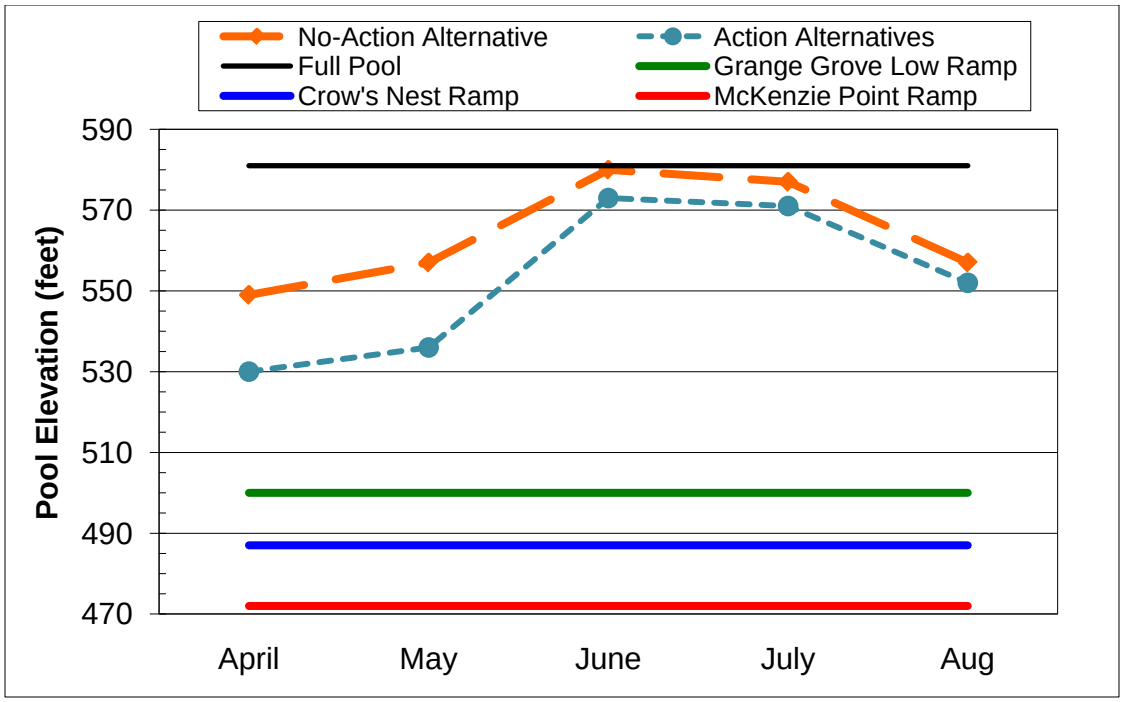


Figure 21-5.
Wet Year Millerton Lake Mean End-of-Month Pool Elevation vs. Toe Elevation of Boat Ramps

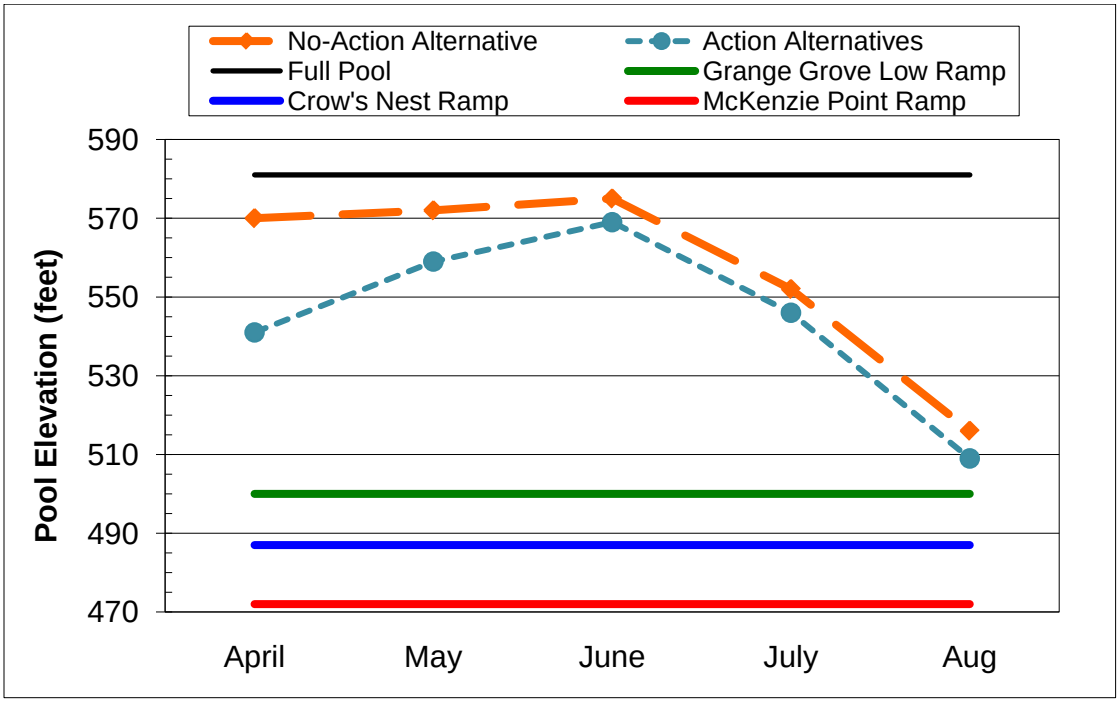


Figure 21-6.
Normal-Wet Year Millerton Lake Mean End-of-Month Pool Elevation vs. Toe Elevation of Boat Ramps

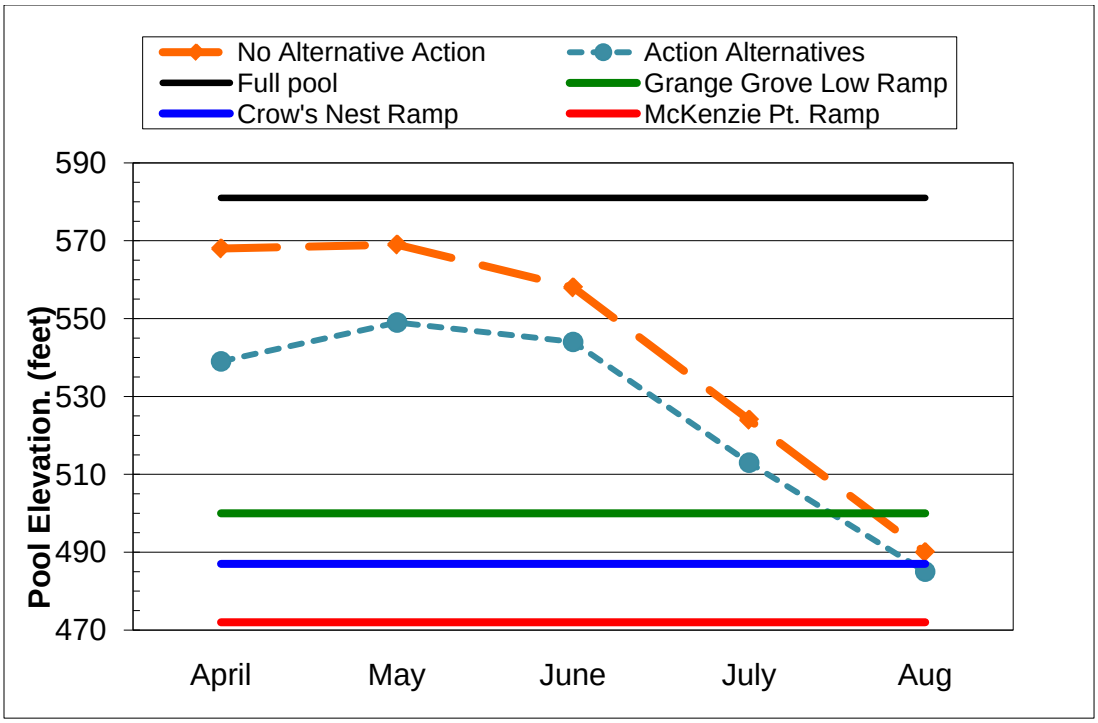


Figure 21-7.
Normal Dry Year Millerton Lake Mean End-of-Month Pool Elevation vs. Toe Elevation of Boat Ramps

The reduced pool elevations also would result in an approximately 320- to 735-acre reduction in the reservoir surface area (7 to15 percent) during spring of Wet, Normal-Wet, and Normal-Dry water years. However, the effect on boating would be limited because it would occur mostly before the summer peak boating season, and the surface area of the lake would remain fairly high (above 3,800 acres). Surface area reductions during summer would be considerably less than the reductions during spring during Wet and Normal-Wet water years (120 to 180 acres, or 3 to 5 percent) and during Normal-Dry water years (125 to 365 acres, or 5 to 8 percent).

During Dry water years (approximately 15 percent of years, historically), implementing the action alternatives would result in pool elevations approximately 20 to 25 feet lower than under the existing conditions at the end of April and the end of May, and approximately 15 feet lower at the end of June and end of July (Figure 21-8). However, during most Dry years, the pool elevation would still approach or exceed the lower end of the range most conducive to informal shoreline recreation use for at least a portion of spring and early summer. The reduced pool elevations during July and August could have the effect of closing the primary launch ramp near Grange Grove several weeks earlier in summer and increasing the likelihood that the ramp at Crow's Nest would close before the end of summer, which would reduce launching capacity. The average pool elevation at the end of August would be reduced by only 5 feet, and the lowest-reaching boat ramps, at McKenzie Cove and Meadows, would remain usable through the summer during most Dry years.

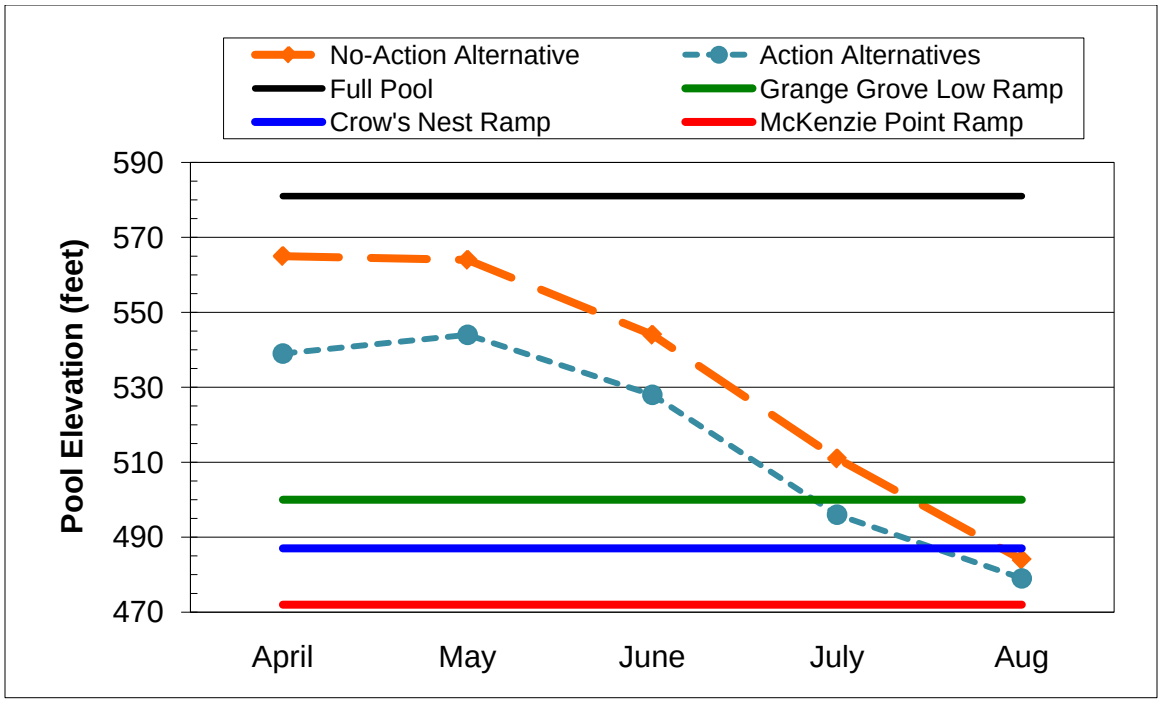


Figure 21-8.
Dry Year Millerton Lake Mean End-of-Month Pool Elevation vs. Toe Elevation of Boat Ramps

During Dry years, the reservoir surface area would be reduced by 360 to 640 acres (10 to 14 percent) between the end of April and the end of July, which would reduce the area available for boating and could increase crowding, particularly during the summer peak boating period. However, boat traffic is typically lessened on the lake by low-water conditions, which would have the effect of lessening potential crowding.

Adverse effects would most likely be greatest during Critical-High water years (less than 5 percent of years, historically), with a 28- to 30-foot reduction in pool elevation at the end of April and the end of May, a 23-foot reduction at the end of June, and a 15-foot reduction at the end of July. This could result in pool elevations well below the range most conducive to shoreline use for the entire peak recreation season. The reduction in pool elevations during June and July could have the effect of closing the primary launch ramp near Grange Grove several weeks earlier in summer and increasing the likelihood that the ramp at Crow's Nest would close well before the end of summer. Perhaps the most substantial effect could occur during August; although the average pool elevation would be reduced by only 6 feet, this could result in a pool elevation below the toe elevations of the two lowest-reaching boat ramps (which are at McKenzie Cove and Meadows) leaving no launching opportunities on the lake (Figure 21-9).

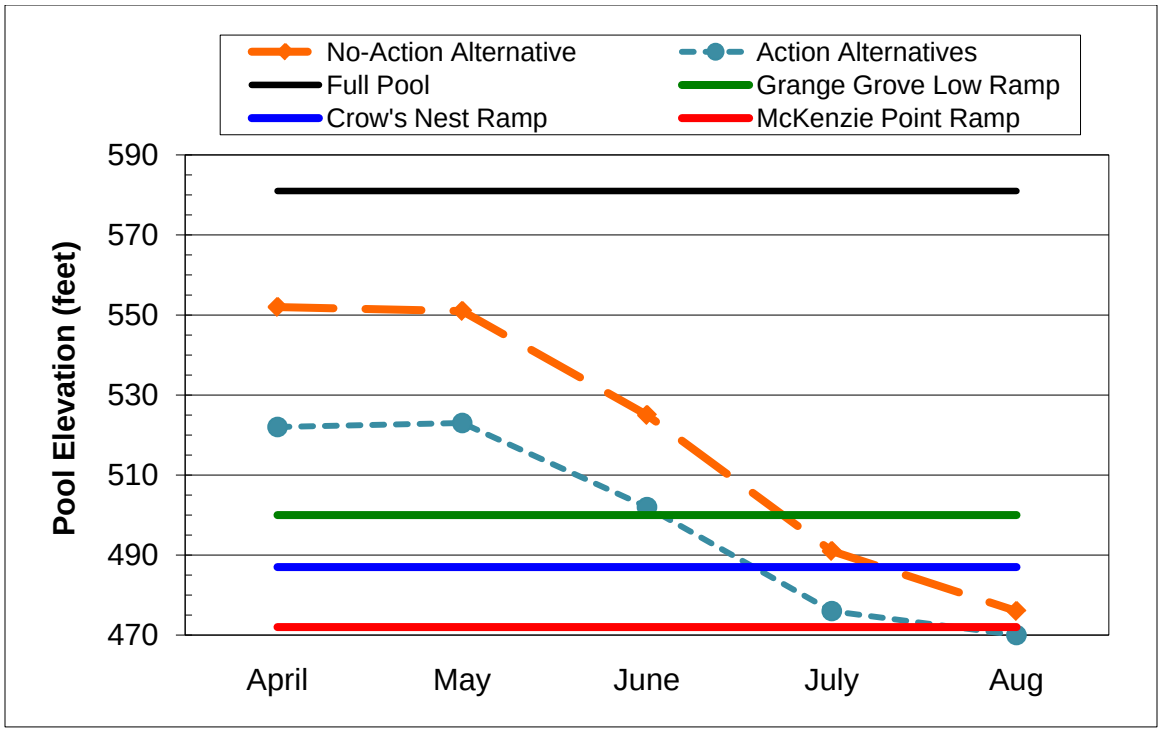


Figure 21-9.
Critical-High Year Millerton Lake Mean End-of-Month Pool Elevation vs. Toe Elevation of Boat Ramps

Also, an approximately 360 to 680 acre (14 to 16 percent) reduction in surface area at the end of May, June, and July could worsen crowding conditions on the water during the summer peak boating period, although as noted above, boat traffic is typically already lessened on the lake by low-water conditions.

No similar effects would occur during Critical-Low water years because flows from the reservoir would not be increased.

Overall, potential beneficial effects, particularly for informal shoreline uses such as picnicking and swimming, could occur most years, while potential adverse effects are likely to occur only during the driest years. Potential adverse effects on shoreline recreation and boating activity on the reservoir related to Interim and Restoration flows from Millerton Lake would be minor and relatively rare. However, potential adverse effects on boat launching during the mid- and late-summer of Dry and Critical-High water years could have substantial effects on launching capacity and the opportunity for boaters to access the lake. Without mitigation, this impact would be potentially significant.

Mitigation Measure REC-9 (Alternatives A1 through C2): ***Extend Millerton Lake Boat Ramps or Construct a New Low-water Ramp to Allow Boat Launching at the Lower Pool Elevations that May Result from Interim and Restoration Flows during Dry and Critical-High Years – Project-Level.*** Reclamation will monitor Millerton Lake

pool elevations and, if pool elevations fall below the toe elevations of the two lowest-reaching boat ramps (which are at McKenzie Cove and Meadows), Reclamation will mitigate by either extending existing low-water launch ramp(s), developing a new ramp, or providing other temporary access to avoid loss of launching capacity and to permit boats to be launched on the lake with an additional 10 to 15 feet of drawdown during mid- and late-summer of Dry and Critical-High water years. Specific actions to modify or relocate facilities in the Millerton Lake SRA will be developed within two years. Implementation would be financed by Reclamation in coordination with DPR.

With mitigation, this impact would be **less than significant**.

San Joaquin River from Friant Dam to Merced River. The following section describes the potential impacts within the Restoration Area.

Impact REC-10 (Alternatives A1 through C2): *Effects on Recreation Facilities from Increased Flow in the Restoration Area – Project-Level.* The schedule for Interim and Restoration Flow releases specified in Exhibit B of the Settlement for certain water-year types includes spring and early summer flows that are substantially greater than historic average flows below Friant Dam during those seasons. 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. Therefore, this impact would be **less than significant**.

Normal baseline flows on Reach 1 of the San Joaquin River are generally less than 300 cfs year-round. The schedule for Interim and Restoration flow releases specified in Exhibit B of the Settlement includes flows as high as 4,000 cfs to be released during the second half of April in Wet and Normal-Wet water years. These 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. High flows can deposit sediment or gravel transported from the riverbed onto parklands, and facilities can be damaged by scouring or by debris carried by the high flows. However, 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. For example, flows exceeded 4,000 cfs nearly all of April through June 2006 and exceeded 7,000 cfs during most of that period. The maximum mean daily flow occurring during that period was nearly 10,000 cfs (CDEC 2009).

Lost Lake Park, located just below Friant Dam, was damaged by flooding in January 1997 (Fresno County 2008a), when estimated flows exceeded 30,000 cfs. However, the park continued to function after more moderate floods in both 2005 and 2006, when flows did not exceed 10,000 cfs. Also, the recommended alternative developed in the current Lost Lake Master Plan process includes actions to move roads and buildings out of the 100-year floodplain in the park and to redirect flood flows through the park (Fresno County 2008b). Other parks in Reach 1A, such as Woodward Park, Scout Island,

and Camp Pashayan, also withstood the 2005 and 2006 high flows. In each of these cases, park operations were likely affected only until the water receded and postflood cleanup was accomplished.

Finally, the San Joaquin River Parkway Master Plan (SJRC 2000) has established policies to design and site structures and amenities associated with recreation uses in the parkway so that they do not obstruct flood flows or become dislodged during flood events. Because the existing parks have withstood flows that far exceeded the maximum scheduled Interim and Restoration flows and because future parkway development is subject to flood damage avoidance policies, significant adverse effects on riverside recreation facilities from scheduled Interim and Restoration flows are not likely. Therefore, this impact would be less than significant.

Impact REC-11 (Alternatives A1 through C2): *Effects on Swimming or Wading and Fishing Opportunities from Increased Flow in the Restoration Area – Project-Level.* The schedule for Interim and Restoration flow releases would substantially increase flows at times during spring and summer in most year types. These increased flows would adversely affect the ability of recreationists to swim, wade, or fish in the river (primarily in Reach 1). However, the scheduled high flows would generally occur for a limited period each year during spring, and other river-based swimming, wading, and fishing opportunities (e.g., from the bank or a boat or while wading) would be available in the vicinity. Therefore, this impact would be **less than significant**.

Normal baseline flows in Reach 1 of the San Joaquin River are generally less than 300 cfs year-round. The schedule for Interim and Restoration flow releases specified in Exhibit B of the Settlement includes flows of 1,500 cfs during the second half of March of all but Critical-Low water years; flows of 2,500 cfs during the first half of April of Normal-Dry, Normal-Wet, and Wet water years; and flows of 4,000 cfs during the second half of April during Wet and Normal-Wet water years. During Wet water years only, flows of 2,000 cfs would continue through May and June.

Flows of 1,500 cfs and above would make swimming at Reach 1 sites undesirable and potentially more hazardous compared to swimming during baseline flows of 300 cfs or less. However, the potential adverse effects on swimming would be limited during all but Wet years because the increased flow would occur only during March and April, before warm summer temperatures attract people to the river to swim. Even during Wet years, high flows would not occur during July and August, when the highest average daily air temperatures occur in the Fresno area and swimming activity is likely to be greatest.

Visitors to Reach 1 also would find it more difficult or impossible to fish on the riverbank or by boat during these scheduled flow releases. However, evaluation of areas inundated by Interim and Restoration flows indicates that flows above 2,000 cfs potentially would provide new fishing opportunities in side channels and other river margin areas that do not receive flows under baseline conditions (EDAW 2008). Trout fishing opportunities would remain available on the nearby Kings River below Pine Flat Lake, where DFG also plants hatchery fish. Lastly, the Lost Lake Park Master Plan calls for creation of a

new warm-water fishing lake in the east portion of the park, away from high flows (Fresno County 2008b).

Because the scheduled Interim and Restoration flows of 1,500 cfs and greater would occur only during March and April in most years, and because similar swimming and fishing would remain available in the vicinity of Reach 1, as well as on the Kings River and at Millerton Lake, significant adverse effects on these activities are not likely. Therefore, this impact would be less than significant.

Impact REC-12 (Alternatives A1 through C2): ***Effects on Boating Opportunities from Increased Flow in the Restoration Area – Project-Level.*** In most year types, implementing the action alternatives could increase flows 120 to 570 cfs in Reach 1 from January through mid-March and from July through December, and cause flows to be even higher at times during April through June in some year types. The increased flows would increase the time that the flows would be in the preferred range for boating in Reach 1, which would enhance the use of the river by boaters. Flows also would be available to enhance or allow boating in Reaches 2 through 5, where little or no boating opportunities now exist. However, high flows making Reach 1, and potentially downstream reaches, unusable for boating would occur for limited periods before May in most years. Therefore, although increased flows would have beneficial effects on boating opportunities throughout the Restoration Area, there would be reduced boating opportunities in Reach 1 from mid-March through April in most years. Therefore, this impact would be **significant**.

Most boating in the Restoration Area occurs in Reaches 1A and 1B, in the vicinity of the San Joaquin River Parkway and downstream to Skaggs Bridge Park. Boat access is provided at several locations along Reach 1A and at Skaggs Bridge Park along Reach 1B. Under baseline conditions, flows are 200 to 300 cfs in Reach 1 during most of the year but during winter are often below 200 cfs and may be below 100 cfs. A flow of 200 cfs is the approximate minimum within the preferred range for boating in Reach 1 (SJRC 2000). Boating is possible at lower flows, but with an increased likelihood that boats would scrape the river bottom and would need to be walked through shallows and over gravel bars and other obstructions. The upper end of the preferred range is more difficult to determine, but for the purposes of this analysis, is assumed to be approximately 1,000 cfs. Boating may be possible above 1,000 cfs but becomes increasingly hazardous and presumably unattractive to most boaters because of the strength of the current and flows moving through brushy and wooded areas (American Whitewater Association 2006). As recently as 2005, spring and early summer flows in the range of 1,000 to 1,500 cfs have occurred in Reach 1. More experienced and skilled swift-water kayakers may be comfortable boating on the river at those flows and, indeed, may be attracted by the increased flows, but most boaters would not be able to safely boat on the river at those flows.

Implementing the action alternatives would provide maximum flows of 350 to 700 cfs in Reach 1 during summer, fall, and winter, and periods of spring, depending on the water-year type. These flows would enhance boating opportunities throughout those periods by providing flows above the minimum or lower levels that are currently available at most

times. In particular, flows that are below the minimum preferred level during May, June, and July of Normal-Dry and Dry years under existing conditions would be increased to be within the preferred range under the action alternatives.

The increased flow also could enhance boating opportunities by extending boatable flows on Reach 1B and into Reach 2A and potentially into downstream reaches. Lack of flows below Gravelly Ford, at the end of Reach 1, currently prevents boating beyond that point. Although some flow would be lost to infiltration, CalSim modeling results indicate that boatable flows resulting from scheduled Interim and Restoration flows would occur on Reach 2A and downstream reaches (see Appendix H, "Modeling"). It is reasonable to expect that the increased flows would result in the desire of boaters to continue their boat outings beyond the most downstream takeout at Skaggs Bridge Park or to launch from that location and boat down Reach 2A beyond Gravelly Ford, possibly to the Chowchilla Bypass Bifurcation Structure, at the end of Reach 2A. However, no public access to retrieve boats from the water is available beyond Skaggs Bridge Park on Reach 1B or anywhere on Reach 2A. Boaters may be able to obtain permission from private landowners along the river to carry boats across their property to vehicles parked along public roads, which are close to the south bank of the river at several locations in Reach 2A. The Chowchilla Bypass Bifurcation Structure would present a barrier to boat traffic, and no provision exists for boat passage or portaging of boats around the structure. Further, access to Reach 2B is minimal, with the exception of at Mendota Pool, at the end of the reach. Therefore, it is not expected that many boaters would attempt to continue boating beyond Reach 2A. However, boat access is available via a boat ramp at the head of Reach 3 and available informally at several bridge crossings on Reaches 4 and 5. Therefore, boating activity is also expected to occur on those reaches.

Implementing the action alternatives could result in river flow increases of 1,370 to 3,850 cfs and maximum average daily flows in the range of 1,500 to 4,000 cfs in Reach 1 during mid-March through June. May and June are likely to be among the most popular months for boating activity because of the onset of warm weather. Also, the SJRPCT conducts guided canoe outings in Reach 1 during those months (SJRPCT 2010c). These high flows, well above the preferred range, would preclude nearly all boating on the river. Therefore, these increased flows could reduce boating opportunities during spring and early summer. This impact would occur only during the second half of March in Critical-Dry and Dry water years, the second half of March and first half of April in Normal-Dry years, and the second half of March through April in Normal-Wet years. Under existing conditions, spring and summer flows during Wet years average 2,300 to 3,500 cfs, too high for boating, and as recently as April through June 2006, flow exceeded 4,000 cfs for nearly the entire 3-month period. Therefore, increased flows during Wet years under the action alternatives would not affect boating on the river.

Potential impacts on boating include several periods of enhanced boating that could occur during fall, early spring, and mid- through late-summer every year and a reduction of boating opportunities that could occur from mid-March through April during all but Wet water years. The Settlement identifies flexible flow periods during spring that allow Restoration Flows to be shifted up to 4 weeks earlier or later than shown in the Exhibit B flow schedules; if this provision resulted in flows of 1,500 to 4,000 cfs earlier in spring,

adverse impacts on boating would be reduced because boating would be less likely to be affected. In addition, boaters who could be displaced from the San Joaquin River because of high spring flows also have available to them similar boating opportunities on the lower Kings River below Pine Flat Lake (American Whitewater Association 2007b), approximately 20 miles east of Fresno. The 12-mile stretch of river below the lake, in particular, offers good access to boaters with four developed and two undeveloped parks on the river operated by Fresno County (Kings River Conservation District 2009). Also, the Kings River Conservancy plans to construct a new nonmotorized boat launch on the river and other park improvements during 2009 (Fresno Bee 2009). It appears that ample capacity exists on the Kings River to absorb what is most likely a low number of spring-time boaters that could be displaced from the San Joaquin River.

Although some local boaters are likely to be familiar with the occurrence of high flows in Reach 1, because of their natural occurrence as described above, the high flows proposed under the action alternatives could pose a hazard to unwary or uninformed boaters. Therefore, although increased flows would have beneficial effects on boating opportunities throughout the Restoration Area, there would be reduced boating opportunities in Reach 1 from mid-March through April in most years. This impact to spring boating in Reach 1 would be significant.

Mitigation Measure REC-12 (Alternatives A1 through C2): ***Develop and Implement Recreation Outreach Program – Project-Level.*** Reclamation will develop and implement a recreation outreach program, and will prepare and implement a recreation outreach plan. The plan will be completed within 1 year of the signing of the Record of Decision. Until such time as the plan is in place, Reclamation will continue to implement the recreation outreach plan developed for the most recent Interim Flows Project.

The purpose of the recreation outreach program will be to inform the recreating public as well as agencies and organizations that serve the recreating public and protect public safety, of changes in river flows that would occur as a result of the Restoration Flows, and of the potential effects associated with those changes, including recreational boating hazards, particularly in Reach 1. The program will also inform the public of similar alternative boating opportunities in the area, such as those available on the lower Kings River below Pine Flat Reservoir.

The outreach program will make use of a variety of methods and media to share information with the recreating public. Communication methods and actions may include:

- Messages posted on the SJRRP Web site and Web sites of agencies and organizations providing recreation access, facilities, and services and public safety services in each reach

- Signage at public and private access points and facilities in each reach

- Verbal messages delivered as part of regular recreation programs offered by agencies and organizations, such as the Public Canoe Program conducted by the SJRPCT

- Signage to advise boaters of hazardous conditions and alternative locations for boating will comply with waterway marker requirements contained in CCR Title 14, Sections 7000 through 7007, under the authority of DBW

- Attendance of a SJRRP representative at selected public events focused on San Joaquin River recreation, or the display and distribution of printed material at such events

Outreach will target both English-speaking and non-English-speaking residents. Additional measures, such as roving contacts and other methods that agencies may suggest, will be used to ensure target audiences that may not be reached by other means, such as young adults and those recreating on the river in undeveloped areas, will be reached.

Central to the outreach program would be coordination with agencies and organizations that provide recreation access, facilities, and services in each reach. Specifically, this would include the following public and nonprofit agencies and organizations: the SJRPCT, SJRC, Fresno County, City of Fresno Parks, After School, Recreation, and Community Service (PARCS) Department, and DFG.

Because boaters, swimmers, and waders may encounter less safe boating, swimming, and wading conditions due to Interim and Restoration flows, and may need assistance or may generate public nuisances (such as open fires) in areas that had not been commonly used or in previously dry river areas that may be less familiar to response agencies, key partners to help protect public safety will also include all emergency rescue, response, and enforcement agencies in all reaches expected to experience expanded recreation activity.

With mitigation, this impact would be **less than significant**.

Impact REC-13 (Alternatives A1 through C2): ***Effects on Wildlife-Based Recreation Opportunities from Enhanced Wildlife Habitat Conditions Related to Increased Flow in the Restoration Area – Project-Level.*** The Interim and Restoration flows could result in a near-continuous, variable-width shoreline band of woody riparian vegetation in some or all reaches. The enhancement of wildlife habitat that would result from expansion of riparian vegetation would in turn enhance conditions for wildlife-based recreation, such as bird watching. Therefore, this impact would be **less than significant** and **beneficial**.

As previously described, in some reaches of the Restoration Area, most of the river is lined with medium- to high-density riparian forest and scrub. This condition exists in most of Reaches 1, 3, 4B2, and 5, and provides habitat for a variety of wildlife, in particular, birds. The perennial baseflow that would occur under the action alternatives in most water years would result in a near-continuous, variable-width shoreline band of woody vegetation in all reaches (EDAW 2008). Therefore, riparian vegetation would

increase, and wildlife habitat would be enhanced in all reaches, but in particular in Reaches 2, 4A, and 4B1, where little riparian vegetation now exists. The improved riparian habitat that could result from Restoration Flows would enhance wildlife viewing opportunities, particularly bird-watching. These opportunities could complement the potential expansion of boating opportunities discussed above, which would increase access to the areas where habitat enhancement would occur. For these reasons, this impact would be less than significant and beneficial.

Impact REC-14 (Alternatives A1 through C2): *Effects on Warm-Water Fishing Opportunities from Enhanced Fish Populations Related to Increased Flow in the Restoration Area – Project-Level.* Interim and Restoration flows are expected to increase warm-water game fish populations in Reaches 2 through 5 where they now exist, and to establish warm-water game fish populations in reaches where they do not now exist. These potential increases in fish populations would enhance fishing opportunities. Therefore, this impact would be **less than significant** and **beneficial**.

Reaches 1, 2A, 3, and 5 in the Restoration Area contain warm-water game fish species (see Appendix K, "Biological Resources – Fisheries"). These species include several varieties of sunfish, crappie, black bass, and catfish. With Restoration Flows, these populations would be expected to increase in reaches where they now exist and to move from upstream reaches into Reaches 2B and 4, where they are now absent. These increases in warm-water fish populations would enhance warm-water sportfishing opportunities in all reaches.

As a result of enhanced and expanded opportunities for warm-water sportfishing on the river in the Restoration Area, this impact would be less than significant and beneficial.

San Joaquin River from Merced River to the Delta. The following section describes potential impacts along the San Joaquin River from Merced River to the Delta.

Impact REC-15 (Alternative A1 through C2): *Effects on Warm-Water Fishing Opportunities from Increased Flow in the San Joaquin River from the Merced River to the Delta – Project-Level.* A variety of warm-water game fish are present in the San Joaquin River between the Merced River and the Delta. Interim and Restoration flows for the upstream Restoration Area would increase flows and improve water quality in the river between the Merced River and the Delta, which would be expected to increase warm-water game fish populations and enhance fishing opportunities. Therefore, this impact would be **less than significant** and **beneficial**.

The San Joaquin River between the Merced River and the Delta supports primarily warm-water game fish. A variety of game fish, such as panfish, black bass, striped bass, sturgeon, and catfish species, are present in the river. Data on fishing activity in this section of the river are not available; however, angler survey data collected by DFG for the San Joaquin River through the Delta indicate that most anglers were fishing for striped bass and catfish; black bass and sturgeon accounted for most of the remainder of the fishing activity (DFG 1999, 2000, 2001, 2002). Anglers expended approximately 250,000 to 330,000 hours each year fishing on that 58-mile section of the river, which is

equivalent to approximately 12 to 16 hours per mile per day. Similar river conditions and game fish populations on the upstream section of river, above the Delta, suggest that similar amounts and types of fishing may occur there.

With Interim and Restoration flows and associated improvements in water quality, warm-water game fish populations would be expected to increase in the San Joaquin River between the Merced River and the Delta. These increases in warm-water fish populations would enhance warm-water sportfishing opportunities. Therefore, this impact would be less than significant and beneficial.

Sacramento-San Joaquin Delta. The following section describes potential impacts in the Delta.

Impact REC-16 (Alternatives A1 through C2): *Effects on Warm-Water and Cold-Water Fishing Opportunities from Increased Flow into the Sacramento-San Joaquin Delta – Project-Level.* A variety of both warm-water and cold-water game fish are present in the Delta, and sportfishing is a major portion of Delta recreation activity. Interim and Restoration flows would increase flows and improve water quality in the San Joaquin River as the river flows into the Delta and in adjacent Delta waterways, such as the Old River and Middle River, which could increase game fish populations and enhance fishing opportunities. Therefore, this impact would be **less than significant** and **beneficial**.

The Delta supports both cold- and warm-water game fish. A variety of game fish, such as panfish, black bass, striped bass, sturgeon, and catfish species, are present in the Delta. Angler survey data collected by DFG for the San Joaquin River through the Delta indicate that most anglers were fishing for striped bass and catfish; black bass and sturgeon accounted for most of the remainder of the fishing activity (DFG 1999, 2000, 2001, 2002). Anglers expended approximately 250,000 to 330,000 hours each year fishing on this 58-mile section of the river, which is equivalent to approximately 12 to 16 hours per mile per day. Delta visitation estimates have indicated that fishing accounts for approximately 16 percent of all Delta recreation use and that fishing is the dominant activity in the south Delta (Plater and Wade 2002), where the San Joaquin River is located and where the greatest effects of Restoration Flows are likely to occur.

With Interim and Restoration flows and associated improvements in water quality, game fish populations would be expected to increase in the Delta, and in the south Delta waterways in particular. It is unknown whether any fish population increases would be large enough to enhance sportfishing opportunities measurably. Nonetheless, it is expected that there would be some increases in fish populations that could enhance sportfishing opportunities. Therefore, this impact would be less than significant and beneficial.

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Chapter 22.0 Socioeconomics

This chapter describes the environmental and regulatory settings of socioeconomics, as well as environmental consequences and mitigation, as they pertain to implementation of the program alternatives. This chapter also addresses population and housing under CEQA, as well as employment. Modification or construction of facilities and release of Interim and Restoration flows could affect socioeconomic conditions along the San Joaquin River upstream from Friant Dam and downstream to the Delta, and in CVP/SWP water service areas. The socioeconomics of the Delta are not expected to be directly, indirectly, or cumulatively affected by implementation of the Settlement. For that reason, the Delta as a separate geographic area is not discussed further in this chapter. Additional detail is provided in Appendix O, "Socioeconomics."

22.1 Environmental Setting

The term "socioeconomic" 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 in turn influence related variables such as provision of community services and utilities, and cost of available housing.

Information contained in this section was obtained from several primary information sources. Population and housing data, which include demographic information related to population, racial and ethnic trends, age, housing, and income, were obtained largely from the U.S. Census Bureau decennial 2000 census survey and 2006 American Community Survey (U.S. Census Bureau 2000, 2006), as well as the California Department of Finance (DOF) (DOF 2007a). Information regarding employment, labor force, and industry characteristics in the three geographic areas was obtained mainly from the California Employment Development Department (EDD) Labor Market Information division (EDD 2007). Information pertaining to government and finance, which includes financial information for each county in the Friant Division, was obtained from the Controller of the State (Controller of the State of California 2008). Recreational information for Millerton Lake SRA was gathered from the California State Parks Web site (State Parks 2007). Lastly, a variety of sources were used to gather information pertaining to agricultural production in the Central Valley, and agricultural water consumption. These sources included annual agricultural reports that are prepared by each county, the USDA, a Water Operations Technical Memorandum (SJRRP 2007), and the *Economic Impact of Reduced Surface Water Deliveries in the Friant Division of the Central Valley Project* (McKusick 2005).

Throughout this section, socioeconomic data are presented for a variety of points in time, ranging from 1999 to 2008. This variation is due exclusively to data availability, with the most complete and comprehensive dataset available at the time of writing presented in

the text. For example, the most comprehensive dataset from the U.S. Census Bureau at a small scale (i.e., census tracts may be from 2000, with economic data referring to 1999), while datasets for a larger scale (e.g., counties) may be from 2006. Other organizations (e.g., DOF), may have more recent data than the U.S. Census Bureau. Years cited should be noted in the following discussions because they may shift depending on the geographic scale and topic area presented.

In this chapter, the CEQ definition of minority populations was applied. CEQ defines a minority population to consist of the following groups: Black/African American; Hispanic, regardless of race; Asian; Native Hawaiian or Other Pacific Islander; and American Indian or Alaska Native. For the purposes of this chapter, "minority" also includes all other nonwhite racial categories, such as "some other race" and "two or more races." The Interagency Federal Working Group on Environmental Justice guidance states that a "minority population" may be present in an area if the minority population percentage in the area of interest is "meaningfully greater" than the minority population in the general population/populace.

CEQ defines low-income populations as those identified with the annual statistical poverty thresholds from the U.S. Census Bureau. The accepted rationale in determining what constitutes a low-income population is when the low-income population percentage in the area of interest is "meaningfully greater" than the low-income population in the general populace.

22.1.1 San Joaquin River Upstream from Friant Dam and from Friant Dam to Merced River

This section describes the current socioeconomic conditions of the three counties Restoration Area and vicinity, including the San Joaquin River upstream from Friant Dam.

Population Trends

As of 2006, the population in the three counties containing Millerton Lake and the Restoration Area (Fresno, Madera, and Merced counties) was approximately 1.1 million people. Fresno County contributed 69.7 percent to the population, with more than half of the residents of the county living in the City of Fresno. Madera County accounts for 11.2 percent of the population, with 36.0 percent living in the City of Madera. Merced County (246,114 people) is the second largest county in the Restoration Area, containing 19.0 percent of the total population, with 30.8 percent residing in the City of Merced. The population of Fresno, Madera, and Merced counties represented 48.0 percent of the total population in the counties of the Friant Division. Table 22-1 shows past, current, and projected population trends for the three-county area of Fresno, Madera, and Merced, as well as counties in the Friant Division and in the State as a whole.

Table 22-1.
Historical, Current, and Projected Population, 1990 Through 2050

Location	Historic/Current Trends						Projected Conditions[1]			
	1990	1995	2000	2006	Percent Change 1990–2000	Percent Change 2000–2006	2010	2030	2050	Percent Change 2006–2050
Fresno County	667,490	748,424	799,407	899,872	19.8	12.6	983,478	1,429,228	1,928,411	114.3
Clovis	50,323	62,389	68,197	89,947	35.5	31.9	—	—	—	NA
Fresno	354,091	401,317	427,224	471,599	20.7	10.4	—	—	—	NA
Reedey	15,791	18,757	20,776	23,348	31.6	12.4	—	—	—	NA
Orange Cove	5,604	6,242	7,722	9,641	37.8	24.9	—	—	—	NA
Kern County	544,981	615,564	661,653	779,490	21.4	17.8	871,728	1,352,627	2,106,024	170.2
Bakersfield	174,978	212,535	246,899	312,087	41.1	26.4	—	—	—	NA
Delano	22,762	32,417	39,499	49,393	73.5	25.1	—	—	—	NA
Wasco	12,412	18,020	21,263	24,303	71.3	14.3	—	—	—	NA
Kings County	101,469	114,825	129,461	148,073	27.6	14.4	164,535	250,516	352,750	138.2
Hanford	30,463	37,362	41,687	48,744	36.8	16.9	—	—	—	NA
Lemoore	13,622	16,080	19,712	23,241	44.7	17.9	—	—	—	NA
Madera County	88,090	108,817	123,109	145,198	39.8	17.9	162,114	273,456	413,569	184.8
Chowchilla	5,930	6,919	14,416	17,145	143.1	18.9	—	—	—	NA
Madera	29,283	36,557	43,370	52,892	48.1	22.0	—	—	—	NA
Merced County	178,403	198,740	210,554	246,114	18.0	16.9	273,935	439,905	652,355	165.1
Atwater	22,282	23,373	22,896	27,176	2.8	18.7	—	—	—	NA
Los Banos	14,519	20,594	25,878	34,053	78.2	31.6	—	—	—	NA
Merced	56,155	60,735	63,991	75,854	14.0	18.5	—	—	—	NA
Tulare County	311,921	347,539	368,021	420,131	18.0	14.2	466,893	742,969	1,026,755	144.4
Porterville	29,521	34,675	39,615	45,170	34.2	14.0	—	—	—	NA
Tulare	33,249	40,062	43,994	51,417	32.3	16.8	—	—	—	NA
Visalia	75,659	87,388	91,891	111,034	21.5	20.8	—	—	—	NA
Lindsay	8,338	9,393	10,297	11,173	23.5	8.5	—	—	—	NA
Friant Division Counties	**1,892,354**	**2,133,909**	**2,292,205**	**2,638,878**	**21.1**	**15.1**	**2,922,683**	**4,488,701**	**6,479,864**	**145.6**
Three-County Area[2]	**933,983**	**1,055,981**	**1,133,070**	**1,291,184**	**21.3**	**14.0**	**1,419,527**	**2,142,589**	**2,994,335**	**131.9**
State of California	**29,758,213**	**31,617,770**	**33,871,648**	**37,195,240**	**6.3**	**9.8**	**39,135,676**	**44,135,923**	**59,507,876**	**60.0**

Sources: DOF 2007a, 2007b; U.S. Census Bureau 1990, 2000, 2006

Notes:
[1] Conditions projected by California Department of Finance in 2007 (2007a and 2007b).
[2] Three-County Area includes Fresno, Madera, and Merced counties

Key:
— = Data unavailable
NA = not applicable

The population grew in these three counties before 2006 and is projected to increase in the future. From 1990 to 2000, the population in the Restoration Area counties increased by 21.3 percent. During this 10-year period, the Madera County population grew at a substantially greater rate than in Merced and Madera counties, with a growth rate of 39.8 percent. Notably, the City of Chowchilla increased in population by 143.0 percent during this 10-year period. Because of Chowchilla's relatively small population, the percent increase was great, while the actual numeric increase (at 8,486 for the 10-year period) was less than other cities in the study area (e.g., Clovis, Fresno, Madera).

Between 2000 and 2006, the total population of Fresno, Madera, and Merced counties increased by 13.95 percent, with Merced and Madera counties growing at a faster rate (17.9 and 16.9 percent respectively) than Fresno County (12.6 percent growth). From 2000 to 2006, the population of nearly all cities (with the exception of Fresno and Reedley) in the three counties containing the Restoration Area increased at a greater rate than Fresno, Madera, and Merced counties at large.

Population growth projections through 2050 indicate that Fresno, Madera, and Merced are projected to grow at a rate more than double the State's rate of growth (60.0 percent), with total population growth in the three counties projected to be 131.9 percent through 2050 (DOF 2007b). Madera County is projected to increase by 184.8 percent from 2006 to 2050, the greatest growth rate in the Restoration Area counties. Although still nearly double the State's projected growth rate, Fresno County is projected to experience the least growth of the three counties through 2050, at 114.3 percent.

Figure 22-1 shows the census tracts located within 0.5 miles of the Restoration Area. As shown in Table 22-2, in the 22 census tracts that make up the Restoration Area, the 2000 population was approximately 107,700 persons. Therefore, only 9.5 percent of the population in the three-county area resided in and near the Restoration Area. The majority of individuals who live in and near the Restoration Area (59.0 percent) live in the City of Fresno.

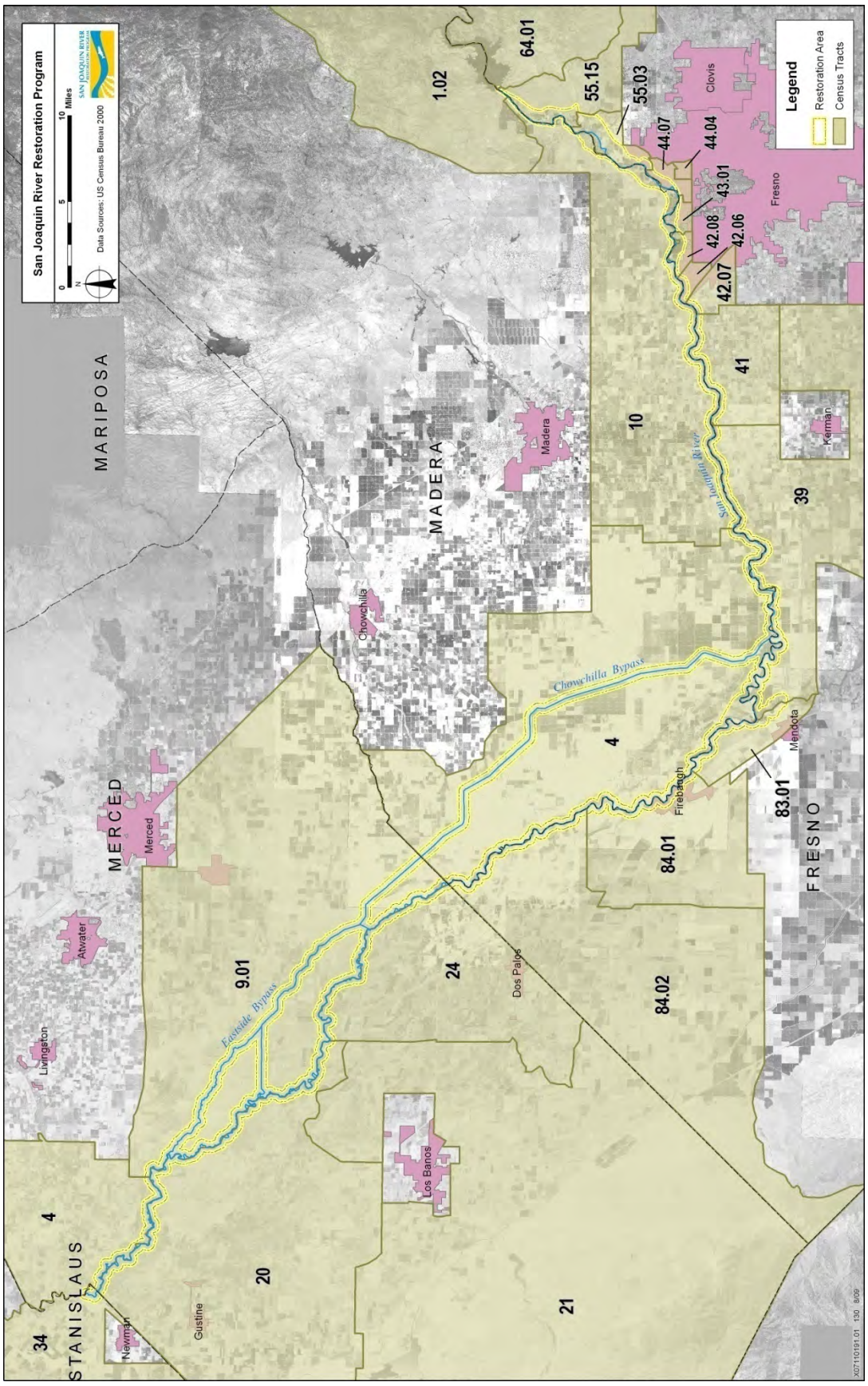


Figure 22-1.
Restoration Area Census Tracts 2000

Table 22-2.
Restoration Area Census Tracts – Populations - 2000

Fresno County		Madera County		Merced County	
County/ Census Tract Number	**2000 Population**	**County/ Census Tract Number**	**2000 Population**	**County/ Census Tract Number**	**2000 Population**
39	5,503	1.02	4,278	4	9,362
41	2,687	4	1,559	9.01	3,453
42.06	4,582	10	6,325	20	7,107
42.07	3,866	—	—	21	3,896
42.08	4,899	—	—	24	8,194
43.01	3,619	—	—	—	—
44.04	3,610	—	—	—	—
44.07	7,388	—	—	—	—
55.03	3,791	—	—	—	—
55.15	1,241	—	—	—	—
64.01	9,101	—	—	—	—
83.01	3,936	—	—	—	—
84.01	7,142	—	—	—	—
84.02	2,192	—	—	—	—
Total	**63,557**	**Total**	**12,162**	**Total**	**32,012**
Restoration Area – Total 2000 Population			**107,731**		

Source: U.S. Census Bureau 2000

Key:
– = not applicable

Race and Ethnicity Trends

In 2006, Merced County had the highest percentage of minorities (64.8 percent) compared to both the Friant Division (61.3 percent) and the State (57.2 percent). Between 2000 and 2006, the minority population in the three-county area had a higher growth rate (20.8 percent) when compared to the State (15.5 percent). Table 22-9 shows the racial and ethnic composition in 2006 of the three-county area compared to the State and the counties of the Friant Division.

Race and ethnicity trends of the population living in and near the Restoration Area in Fresno, Madera, and Merced counties are shown in Appendix O, "Socioeconomics." Table 22-3 summarizes race and ethnicity characteristics for the population residing in and near the Restoration Area for 2000.

As illustrated in Table 22-3, the majority of the population in and near the Restoration Area is considered White (65.2 percent) and a substantial proportion of the population is Hispanic. In addition, 21.4 percent of the total population is characterized as "Some Other" race. The proportion of the population in and near the Restoration Area that is considered a minority is 48.8 percent, which is less than the combined population in the three counties containing the Restoration Area (59.4 percent minority).

Table 22-3.
Restoration Area – Race and Ethnicity – 2000

Race or Ethnic Group	Number	Percentage of Total Population in and Near Restoration Area
Total Population in and Near Restoration Area	107,731	100.0
Race		
White	70,265	65.2
Black or African-American	2,295	2.1
American Indian	1,802	1.7
Asian	4,376	4.1
Native Hawaiian/ Pacific Islander	118	0.11
Some Other Race	23,084	21.4
Two or More Races	5,791	5.4
Ethnicity		
Hispanic[1]	41,589	38.6
Totals		
Total White, Non-Hispanic	55,116	51.2
Total Minority Population[2]	52,615	48.8

Source: U.S. Census Bureau 2000 Census tracts 37, 41, 42.06

Notes:
1 The term "Hispanic" is an ethnic category and can apply to members of any race, including respondents who self-identified as "white." The total numbers of Hispanic residents for each geography are tabulated separately from racial distribution by the U.S. Census Bureau. Hispanic information is taken from U.S. Census Bureau 2000a, Table P8.
2 "Total minority" is the aggregation of all nonwhite racial groups, with the addition of all Hispanics, regardless of race. Total minority information is taken from U.S. Census Bureau 2000, Table P8, with the total for "Not Hispanic or Latino: White alone" subtracted from the total population.

Age Trends

School-age children (aged 5 – 19), adults (19 – 64), and senior citizens (65 and older) represent approximately 27.2, 40.0, and 10.0 percent, respectively, of the total population in the three counties containing the Restoration Area. This age composition is generally similar to the State, with the working age population comprising the majority of the total population. Median ages in the three counties ranged from 29 to 32.7, slightly younger than in the State, where the median age is 33.3. The three counties all represent a slightly younger population than California at large (34.4 years old).

Age distribution in the three counties containing the Restoration Area is shown in Table 22-10. Table 22-4 summarizes 2000 age characteristics for the Restoration Area population. A more detailed breakdown of age trends for each census tract in the Restoration Area is provided in Appendix O, "Socioeconomics." School-age children (aged 5 – 19), adults (19 – 64), and senior citizens (65 and older) represent approximately 26.0, 41.5, and 10.0 percent, respectively, of the total population in the census tracts within and near the Restoration Area.

Table 22-4.
Restoration Area – Age – 2000

Age	Number	Percentage
< 5 Years	8,429	7.8
5–9 Years	9,487	8.8
10–14 Years	9,510	8.8
15–19 Years	9,060	8.4
20–24 Years	6,738	6.3
25–34 Years	14,353	13.3
35–44 Years	16,214	15.1
45–54 Years	14,133	13.1
55–64 Years	8,985	8.3
65–74 Years	6,248	5.8
75–84 Years	3,638	3.4
85+ Years	936	0.9
Total Population	**107,731**	**100.0**

Source: U.S. Census Bureau 2000 Census Tracts 37, 41, 42.06.

Housing Trends

As of 2006, 379,527 total housing units in the three-county area, representing 49.5 percent of the housing units in the counties of the Friant Division, and 3.1 percent of the total number of housing units in the State.

Mirroring the population trends shown in Table 22-1, the largest number of housing units in Fresno, Madera, and Merced counties was in Fresno County. Conversely, Madera County, which had the smallest population, also had the fewest housing units. Madera County also had the highest vacancy rate (10.4 percent). Table 22-5 describes the distribution of housing units in the counties of the Friant Division, including the three-county area.

From 2000 through 2006, the Restoration Area experienced a 12.6 percent increase in the total number of housing units, along with a 20.9 percent increase in the number of vacant housing units, which is greater than the State increase of 7.5 percent. During this 6-year period, Madera and Merced counties had the largest increase in the number of housing units in the Restoration Area (15.7 and 17.3 percent, respectively). Vacant housing units increased 87.8 percent in the Restoration Area. Overall, from 2000 through 2006, the vacancy of housing units in the Restoration Area outpaced the development of housing units.

As shown in Table 22-6, 36,565 total housing units were in and near the Restoration Area in 2000. This represents approximately 9.6 of the total number of housing units in the three-county area, reflecting the population trend described above in Table 22-1.

Table 22-5.
Friant Division Counties and California – Housing Trends – 2000 to 2006

Area	Year and Percent Change	Total Housing Units	Occupied	Vacant
Fresno County	2000	270,767	252,940 (93%)	17,827 (7%)
	2006	299,578	277,256 (93%)	22,322 (7%)
	% Change	10.6%	9.6%	25.2%
Kern County	2000	231,564	208,652 (90%)	22,912 (10%)
	2006	262,651	238,229 (91%)	24,422 (9%)
	% Change	13.4%	14.2%	6.6%
Kings County	2000	36,563	34,418 (94%)	2,145 (6%)
	2006	41,053	39,702 (97%)	1,351 (3%)
	% Change	12.3%	15.4%	-37.0%
Madera County	2000	40,387	36,155 (90%)	4,232 (10%)
	2006	47,671	41,052 (86%)	22,322 (14%)
	% Change	18.0%	13.5%	56.4%
Merced County	2000	68,373	63,815 (93%)	4,558 (7%)
	2006	81,058	72,180 (89%)	8,878 (11%)
	% Change	18.6%	13.1%	94.8%
Tulare County	2000	119,639	110,385 (92%)	9,254 (8%)
	2006	132,244	122,153 (92%)	10,091 (8%)
	% Change	10.5%	10.7%	9.0%
Friant Division Counties	2000	767,293	706,365 (92%)	60,928 (8%)
	2006	864,255	790,572 (91%)	12,755 (9%)
	% Change	7.9%	5.6%	43.8%
Three-County Area (Fresno, Madera, and Merced)	2000	379,527	352,910 (93%)	26,617 (7%)
	2006	428,307	390,488 (91%)	37,819 (9%)
	% Change	12.9%	10.6%	12.1%
California	2000	12,214,549	11,502,870 (94%)	711,679 (6%)
	2006	13,174,781	12,151,227 (92%)	1,023,554 (8%)
	% Change	7.9%	5.6%	43.8%

Sources: U.S. Census Bureau 2000, 2006

Key:
% = percent

Table 22-6.
Restoration Area – Housing – 2000

Housing	Units	Percentage
Occupied	32,591	89.1
Vacant	3,974	10.9
Total Housing Units	36,565	100.0

Source: U.S. Census Bureau 2000

Income Trends

In 1999, annual per capita incomes for the three counties containing the Restoration Area were generally similar for each county, ranging between $14,257 and $15,495 annually. Madera and Merced counties had similar per capita incomes at $14,682 and $14,257, respectively, and Fresno County had the highest at $15,495. Similar to the counties in the Friant Division, this range is substantially lower than the per capita income for the State ($22,711). Overall, the Restoration Area represented a less affluent population than the State in 1999. Table 22-7 shows economic conditions for the three counties containing the Restoration Area (as well as other areas), including per capita income and the number and proportion of individuals living below the poverty level.

In 1999, the City of Clovis in Fresno County represented the highest income city examined in the counties of the Friant Division, recording a per capita income of $18,690. The lowest per capita income was also recorded in Fresno County, in the City of Orange Cove, which had a per capita income of $7,126.

As illustrated in Table 22-7, all three counties containing the Restoration Area had a higher proportion of people living below poverty level at 22.5 percent than the State of California, with 14.2 percent of people below the poverty line in 1999.

A summary of income and poverty status characteristics for the Friant Division, including the three-county area in 1999 is presented in Table 22-8. A more detailed breakdown of the income and poverty characteristics for each census tract in the Restoration Area is provided in Appendix O, “Socioeconomics.” Per capita income range varied widely in the Restoration Area, with a minimum of $11,238 and maximum of $65,448. The proportion of the population living below the poverty level was 16.7 percent.

Table 22-7.
Friant Division Counties and California –
Per Capita Income and Poverty Status – 1999

Area	Per Capita Income	Number of Persons of Poverty Status	Percent of Population Living Below Poverty Level
Friant Division Counties	Not available	487,486	22.1
Fresno County	$15,495	179,085	22.9
Clovis	$18,690	7,160	10.6
Fresno	$15,010	109,703	26.2
Reedley	$12,096	4,832	23.8
Orange Cove	$7,126	3,431	44.5
Kern County	$15,760	130,949	20.7
Bakersfield	$17,678	43,781	18.0
Delano	$11,068	9,566	28.1
Wasco	$14,288	4,126	27.5
Kings County	$15,848	21,307	19.5
Hanford	$17,504	7,059	17.3
Lemoore	$14,876	2,592	13.3
Madera County	$14,682	24,514	21.3
Chowchilla	$11,927	1,450	19.2
Madera	$11,674	13,921	32.5
Merced County	$14,257	45,059	21.6
Atwater	$15,162	4,261	18.7
Los Banos	$15,582	3,094	12.1
Merced	$13,115	17,489	27.8
Tulare County	$14,006	86,572	23.9
Porterville	$12,745	9,921	25.7
Tulare	$13,655	8,954	20.7
Visalia	$18,422	4,126	16.8
Lindsay	$8,230	4,046	39.9
Three-County Area[1]	Not available	248,658	22.5
State of California	$22,711	4,706,130	14.2

Source: U.S. Census Bureau 2000

Note:
[1] Includes Fresno, Madera, and Merced counties.

Table 22-8.
Restoration Area – Income – 1999

Per Capita Income Range	Number of Persons of Poverty Status	Percent of Population Living Below Poverty Level
$11,238–$65,448	14,954	16.7%

Source: U.S. Census Bureau 2000 CensusTtracts 37, 41, 42.06.

Key
% = percent

Labor Force, Employment, and Industry

For a discussion of the labor force, employment, and industry in the three counties of the Restoration Area, see the section below on the Friant Division.

Government and Finance

For a discussion of government finance for the Restoration Area, see the section below on the Friant Division.

Agricultural Water Use and Production

For a discussion of agricultural water use and production for the Restoration Area, see the section below on the Friant Division.

22.1.2 San Joaquin River from Merced River to the Delta

This section describes current socioeconomic conditions in the vicinity of the San Joaquin River from the Merced River confluence to the Delta. The San Joaquin River from the Merced River confluence to the Delta is located in Merced and Stanislaus counties. Socioeconomic conditions in Merced County are described in the section below for the Friant Division. Therefore, this section focuses on socioeconomic conditions within Stanislaus County.

Although this reach of the San Joaquin River is an important subject of discussion for other resource areas, the socioeconomics of this area are not expected to be directly, indirectly, or cumulatively affected in a substantial manner. The effects would be fewer primarily because this area is relatively distant from the Restoration Area (which may experience impacts related to Restoration activities), and the only changes that may occur would be a change in flows and the construction of pumping infrastructure. Nonetheless, socioeconomic conditions in the vicinity of the San Joaquin River from the Merced River to the Delta are summarized below, with some aspects of existing socioeconomic conditions combined.

Population and Housing Trends

The total population in Stanislaus County in 2006 was estimated to be 512,138 people, with approximately 171,281 housing units (U.S. Census Bureau 2006).

Labor Force, Employment, and Industry

In January 2008, EDD reported 235,000 people in the labor force in Stanislaus County. Stanislaus County has experienced a 30.1 percent increase in its labor force since 1990.

For the 18-year period from 1990 to 2008, unemployment rates in Stanislaus County were higher than State trends. In 1990, the unemployment rate in Stanislaus County was 11.9 percent, compared to 7.2 percent in the State at large. In 2008, the unemployment rate in Stanislaus County was 11.1 percent, compared to 5.8 percent in the State at large. The top five industries based on employment are trade, transportation, and utilities; government services; manufacturing; education and healthcare; and leisure and hospitality.

Government and Finance

According to the California State Controller's Office (2008), Stanislaus County had total revenues of $692,474,794 for the 2005 – 2006 FY, which included more than $264 million in State revenue, $128 million in Federal revenue, and $144 million in taxes (including sales and property taxes). County expenditures for the same period were just over $610 million, with the highest dollar amounts going toward public assistance (approximately $214 million) and health care (approximately $107 million). Public ways and facilities accounted for $13.5 million of the total expenditures.

Agricultural Water Use and Production

Agricultural water use and production are not described for Stanislaus County because socioeconomic impacts associated with agricultural water use and production are not anticipated in this area (for a discussion of Merced County, see the section below on the Friant Division).

22.1.3 Friant Division

No effects on socioeconomics in the CVP/SWP water service areas, outside the Friant Division and portions of Kings County, are anticipated under the action alternatives. For this reason, discussion in this section emphasizes socioeconomics in the Friant Division. The Friant Division includes areas in Fresno, Kern, Kings, Madera, Merced, and Tulare counties:

- Fresno is the sixth largest county in land area in the State and is located in the fertile Central Valley. Serving as the economic hub of the Central Valley, it remains the largest inland city in California with a large agriculture-based society.

- Kern County consistently ranks among the top five most-productive agricultural counties in the United States and also is one of the nation's leading petroleum-producing counties. Because of its unique geographical position, Kern County has also become the distribution center for some of the world's largest companies.

- Located in the heavily traveled San Joaquin Valley, Kings County is connected to a vast product distribution network that moves agricultural and other goods to many national and international markets.

- Madera County combines the high, rugged country of the Sierra Nevada and the farmlands of the valley. Most industrial and residential activity is located along State Route 99, a north-south corridor.

- More than half of Merced County's land is an agriculturally rich alluvial plain created by the Chowchilla, Merced, and San Joaquin rivers. Merced is the fifth leading agricultural county in California (Merced CountyAssociation of Governments 2007).

- Tulare County is located in the San Joaquin Valley, near the geographic center of California. Although primarily an agricultural county, almost half of Tulare County's area is devoted to national forests and parks.

Kings County has also been included in discussions of the Friant Division because a Friant Division contractor has a small portion of land in Kings County. Furthermore, because of Kings County's proximity to a large proportion of the Friant Division, there is a potential for Kings County residents to be affected socioeconomically in a manner similar to the rest of the Friant Division.

Population Trends

As mentioned the Friant Division includes areas in six counties: Fresno, Kern, Kings, Madera, Merced, and Tulare. As of 2006, population in the six counties totaled approximately 2.64 million people. Fresno County contributed 34.1 percent of the population of these counties, with more than half of the residents living in the City of Fresno. Kern County is the second-most populated county in the Friant Division, with 29.5 percent of the population, and 40.0 percent residing in Bakersfield. Tulare County accounts for 15.9 percent of the Friant Division population, with 26.0 percent living in Visalia. Madera, Merced, and Kings counties contribute less than 10.0 percent each (5.5, 9.3, and 5.6 percent, respectively). Past, current, and projected population trends for the counties in the Friant Division, as well as population centers in the study area, are shown in Table 22-1.

From 1990 to 2000, the population in the counties of the Friant Division increased by 21.1 percent. During this 10-year period, the Kings County and Madera County populations increased at a substantially greater rate than did the overall population of the Friant Division, supporting growth rates of 27.6 and 39.8 percent, respectively. The population in all cities in King, Kerns, and Tulare counties increased at a rate greater than in the Friant Division, with notable growth occurring in the cities of Bakersfield, Delano, Wasco, Hanford, and Lemoore.

Between 2000 and 2006, the total population of the counties in the Friant Division increased by 15.1 percent, with the population of all six counties growing at approximately the same rate (14.0 to 17.0 percent growth). Kern and Madera counties showed the highest population growth rates, with 17.8 percent and 17.9 percent, respectively. From 2000 to 2006, the population in all cities in Kern, Kings, and Tulare counties increased at a greater rate than in the six-county area, with the exception of Lindsay and Wasco.

Population growth estimates for 2050 indicate that all counties in the Friant Division are projected to grow at a rate more than double the State's rate of growth (60.0 percent). Total population growth for 2050 in the counties of the Friant Division is projected to be

approximately 145.0 percent (DOF 2007a and 2007b). Madera and Kern county populations are projected to increase by 184.8 and 170.2 percent, from 2006 to 2050, respectively, and would comprise the greatest population growth rates among the six counties in the Friant Division. Although still nearly double the State's projected growth rate, Fresno County is projected to experience the least population growth of the six counties through 2050, at approximately 114.0 percent (DOF 2007a and 2007b).

Race and Ethnicity Trends

The six counties are an ethnically diverse part of the State, composed largely of Hispanic populations. In terms of racial diversity, Black/African-American and Asian populations in each county are less than State averages, and all the counties had a higher proportion of White than State averages. Table 22-9 shows the racial and ethnic composition in 2006 of the six counties in the Friant Division compared to the State.

In 2006, Merced County had the highest percentage minority population (64.8 percent) compared to the other counties and the State (57.2 percent). Madera and Tulare counties generally had the highest proportion of White at 77.0 and 74.3 percent, respectively. However, of the total population in Madera and Tulare counties, the Hispanic population accounted for 49.2 and 55.8 percent, respectively. Therefore, many of those who identified themselves as White also identified themselves as Hispanic. Tulare County had the largest share of the Hispanic population at 55.8 percent, compared to the State at 35.9 percent, and six-county area at 48.7 percent (U.S. Census Bureau 2006).

Between 2000 and 2006, the minority population in counties of the Friant Division had a greater growth rate (24.4 percent) compared to the State (15.5 percent). The six counties had a slightly larger American Indian population than the State (ranging from 0.9 to 1.2 percent), and similar to the State, experienced a decrease in American Indian population between 2000 and 2006 (U.S. Census Bureau 2000).

Age Trends

In 2000, school age children (aged 5 – 19), adults (20 – 64) and senior citizens (65 and older) represented approximately 25.0, 41.0, and 9.0 percent of the total population in the counties of the Friant Division, respectively. This composition is similar to the age structure of the State. In 2000, the median ages in the six counties ranged from 29 to 30.7 years old. The six counties each exhibit a younger population than the State at large (34.4 years old) (U.S. Census Bureau 2000, 2006). Table 22-10 shows age trends for the counties of the Friant Division.

Table 22-9.
Friant Division Counties, Three-County Area, and California – Race and Ethnicity – 2006

Race or Ethnicity	Fresno County	Kern County	Kings County	Madera County	Merced County	Tulare County	Friant Division Areas	Three-County Area[1]	California
White	558,271	460,280	103,964	112,675	163,576	312,075	1,710,841	834,522	21,810,156
	62.6%	59.0%	71.1%	77.0%	66.6%	74.3%	65.1%	65.0%	58.8%
Black or African-American	43,431	42,332	10,808	5,231	8,694	6,983	117,479	57,356	2,260,648
	4.9%	5.4%	7.4%	3.6%	3.5%	1.7%	4.5%	4.5%	6.2%
American Indian	10,171	7,529	1,655	1,755	2,165	4,636	27,911	14,091	265,963
	1.1%	1.0%	1.1%	1.2%	0.9%	1.1%	1.1%	1.1%	0.7%
Asian	78,752	32,120	5,480	2,991	17,622	15,104	152,069	99,365	4,483,252
	8.8%	4.1%	3.8%	2.0%	7.2%	3.6%	5.8%	7.7%	12.3%
Native Hawaiian/ Pacific Islander	1,045	1,030	198	0	200	192	2,665	1,245	129,483
	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.1%	0.4%
Some Other Race	165,758	203,375	18,676	17,934	44,734	73,924	524,401	228,426	6,296,602
	18.6%	26.1%	12.8%	12.3%	18.2%	17.6%	19.9%	17.8%	17.3%
Two or More Races	34,328	33,451	5,372	5,759	8,667	6,995	94,572	48,754	1,211,445
	3.9%	4.3%	3.7%	3.9%	3.5%	1.7%	3.6%	3.8%	3.3%
Total Minority	**568,198**	**447,136**	**89,792**	**84,845**	**159,056**	**263,892**	**1,612,919**	**812,099**	**20,857,374**
	63.7%	**57.3%**	**61.4%**	**58.0%**	**64.8%**	**62.9%**	**61.3%**	**63.3%**	**57.2%**
Hispanic	424,678	352,415	69,652	72,042	128,270	234,435	1,281,492	624,990	13,074,155
	47.6%	**45.2%**	**47.7%**	**49.2%**	**52.2%**	**55.8%**	**48.7%**	**48.7%**	**35.9%**
Total Population	**891,756**	**780,117**	**146,153**	**146,345**	**245,658**	**419,909**	**2,629,938**	**1,283,759**	**36,457,549**
	100.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: U.S. Census Bureau 2006
Key: % = percent
Notes: [1] Includes Fresno, Madera, and Merced counties.

Table 22-10.
Summary of Friant Division Counties and California – Age – 2006

Age Cohorts	Fresno County	Kern County	Kings County	Madera County	Merced County	Tulare County	Friant Division Counties	Three-County Area	California
< 5 Years	77,163	65,919	12,028	11,327	21,623	39,135	227,195	110,113	2,672,666
	8.7%	8.5%	8.2%	7.7%	8.8%	9.3%	8.6%	8.6%	7.3%
5-9 Years	71,239	57,919	11,236	9,011	19,846	37,095	206,346	100,096	2,514,639
	8.0%	7.4%	7.7%	6.2%	8.1%	8.8%	7.9%	7.8%	6.9%
10-14 Years	74,143	68,108	10,746	13,237	22,807	35,483	224,524	110,187	2,700,465
	8.3%	8.7%	7.4%	9.1%	9.3%	8.5%	8.5%	8.6%	7.4%
15–19 Years	75,920	63,895	10,569	10,993	22,185	36,796	220,358	109,098	2,738,727
	8.5%	8.2%	7.2%	7.5%	9.0%	8.8%	8.4%	8.5%	7.5%
20–24 Years	74,845	65,605	14,180	12,338	20,389	32,888	220,245	107,572	2,697,878
	8.4%	8.4%	9.7%	8.4%	8.3%	7.8%	8.4%	8.4%	7.4%
25–34 Years	131,575	125,937	26,849	22,847	36,412	62,519	406,139	190,834	5,232,260
	14.8%	16.1%	18.4%	15.6%	14.8%	14.9%	15.4%	14.9%	14.4%
35–44 Years	118,972	108,761	23,871	20,737	33,585	54,265	360,191	173,294	5,525,036
	13.3%	13.9%	16.3%	14.2%	13.7%	12.9%	13.7%	13.5%	15.2%
45–54 Years	108,398	95,770	16,518	18,216	27,569	49,282	315,753	154,183	5,017,599
	12.2%	12.3%	11.3%	12.5%	11.2%	11.7%	12.0%	12.0%	13.8%
55–64 Years	73,468	60,041	9,438	12,903	18,673	33,783	208,306	105,044	3,430,449
	8.2%	7.7%	6.5%	8.8%	7.6%	8.1%	7.9%	8.2%	9.4%
65–74 Years	43,517	37,285	6,117	7,410	12,456	20,105	126,890	63,383	2,002,937
	4.9%	4.8%	4.2%	5.1%	5.1%	4.8%	4.8%	4.9%	5.5%
75–84 Years	30,036	24,477	3,208	4,872	7,332	13,390	83,315	42,240	1,400,449
	3.4%	3.1%	2.2%	3.3%	3.0%	3.2%	3.2%	3.3%	3.8%
85+ Years	12,480	6,400	1,393	2,454	2,781	5,168	30,676	17,715	524,444
	1.4%	0.8%	1.0%	1.7%	1.1%	1.2%	1.2%	1.4%	1.4%
Median Age	29.9	30	30.2	31.9	29.3	28.7	NA	NA	34.4
Total Population	**891,756**	**780,117**	**146,153**	**146,345**	**245,658**	**419,909**	**2,629,938**	**1,283,759**	**36,457,549**
	100.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.00%**	**100.0%**

Source: U.S. Census Bureau 2006

Note:
[1] Includes Fresno, Madera, and Merced counties.

Key:
% = percent
NA = not applicable

Housing Trends

As of 2006, the counties of the Friant Division had a total of 864,255 housing units, representing 6.5 percent of the total number of housing units in the State. Mirroring the population trends shown in Table 22-1, the highest number of housing units in the six counties occurred in Fresno County, which also had the highest population. Conversely, Kings and Madera counties, which had the smallest population, also had the fewest number of housing units. Madera County had the highest housing unit vacancy rate at 10.4 percent, with Kings County having the smallest housing unit vacancy rate of the six counties at 5.87 percent (U.S. Census Bureau 2000, 2006). Table 22-5 shows the distribution of housing units in each of the six counties in the Friant Division and in the State.

From 2000 to 2006, these counties experienced a 12.6 percent increase in the total number of housing units, along with a 20.9 percent increase in the number of vacant housing units, which is greater than the State increase of 7.5 percent.

During this 6-year period, Madera and Merced counties had the greatest increase in the number of housing units in the 6-county area (15.7 and 17.3 percent, respectively). Of this increase in vacant housing units, 87.8 percent of the increase took place in the Restoration Area counties of Fresno, Madera, and Merced. Overall, from 2000 to 2006, the vacancy of housing units in the six-county area outpaced the development of housing units, with the trend occurring to the greatest degree in Fresno, Madera, and Merced counties.

Income Trends

In 1999, annual per capita incomes were generally similar for each county, ranging between $14,006 and $15,848 annually. Kings and Kern counties had the highest annual per capita incomes at $15,848 and $15,760, respectively. This range is substantially lower than the per capita income for the State, which falls at $22,711. Table 22-7 shows per capita income and the number and proportion of individuals living below the poverty level in the Friant Division counties.

The cities in Fresno County had both the highest and lowest per capita income. In 1999, the City of Clovis represented the highest income city, recording a per capita income of $18,690. The lowest per capita income was also recorded in Fresno County, in the City of Orange Cove, with a per capita income of $7,126 (U.S. Census Bureau 2000).

As illustrated in Table 22-7, all of the counties in the Friant Division had a higher proportion of people living below poverty level than the State. Tulare County had the highest proportion of the population living below poverty levels, at 22.5 percent. Orange Cove and Lindsay had higher percentages of their populations living below poverty levels than any other cities in the study area, at 44.5 and 39.9 percent, respectively. In total, the counties of the Friant Division had 22.1 percent of their total population living below the poverty level, which is substantially greater than the trend for the State as a whole.

Labor Force, Employment, and Industry

This section describes the labor force, employment, and industry within the six Friant Division counties: Fresno, Kern, Kings, Madera, Merced, and Tulare.

Labor Force. According to EDD, California had a labor force of 18,244,000 in January 2008. The labor force in the Friant Division counties accounts for 6.6 percent of California's total labor force. In total, the six counties of the Friant Division have a labor force of 1,212,400; this is an increase of 36.6 percent in the 18-year period from 1990 to 2008, as shown in Table 22-11.

Table 22-11.
Friant Division Counties – Historical and Current Labor Force – 1990–2008

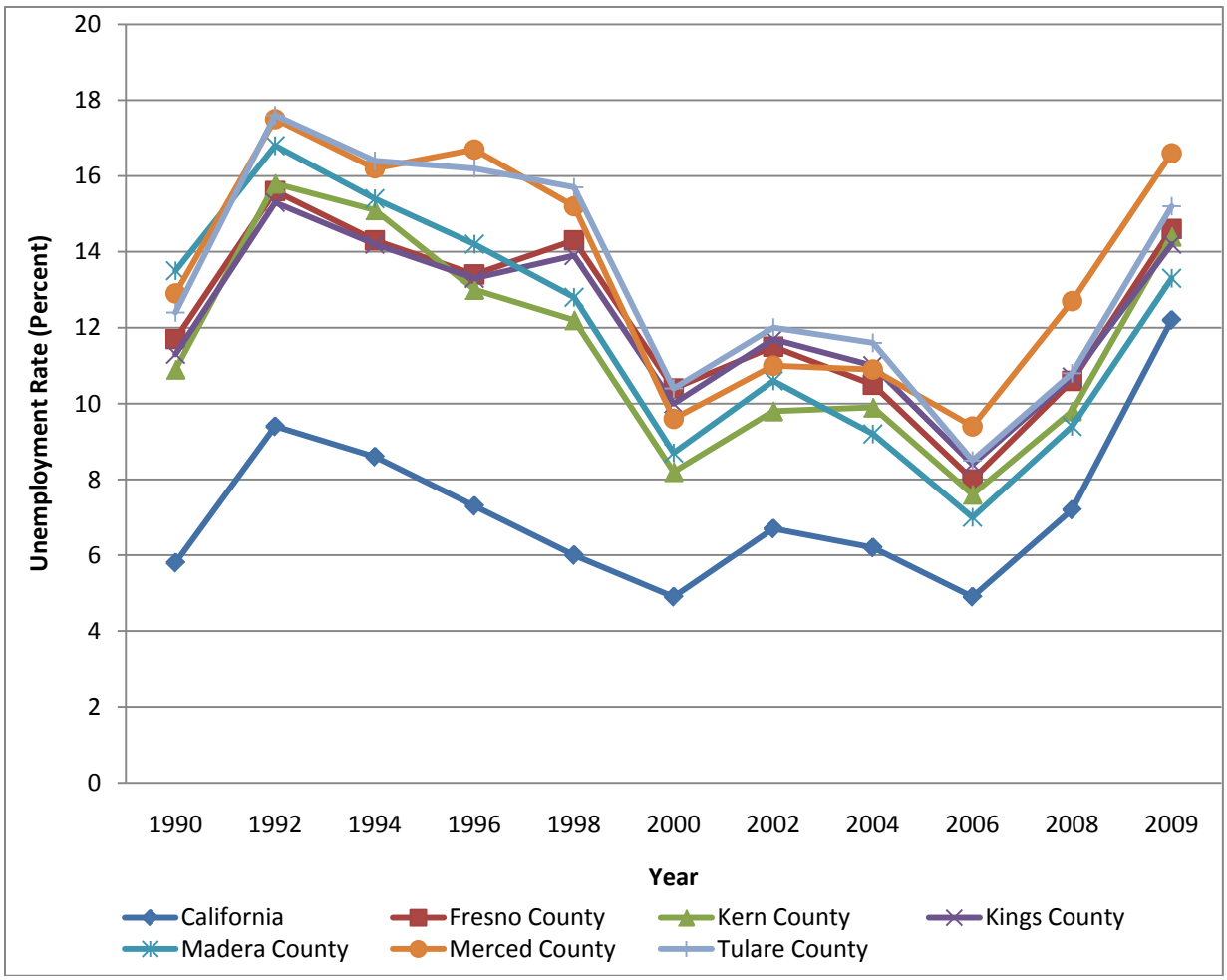
Area	Number of Workers in Labor Force				Percent Change 1990–2008
	1990	2000	2007	2008	
Fresno County	328,900	388,100	428,000	433,800	31.9
Kern County	257,000	293,500	351,900	354,400	37.9
Kings County	37,600	49,200	58,500	58,900	56.7
Madera County	41,600	54,900	64,400	64,800	55.8
Merced County	76,900	90,300	102,100	104,700	36.2
Tulare County	145,800	171,700	195,300	195,800	34.3
Friant Division Counties Total	887,800	1,047,700	1,200,200	1,212,400	36.6
Three-County Area (Fresno, Madera, and Merced) Total	447,400	533,300	594,500	603,300	34.9

Source: EDD 2008a

In January 2008, EDD reported 428,000 people in the labor force in Fresno County, making it the county with the largest labor force in the six-county Friant Division. Fresno County has experienced a 31.9 percent increase in its labor force since 1990. Kern County has the second highest labor force (354,400), which has increased 37.9 percent since 1990. Kings County, which has the smallest labor pool of the six counties, has more than doubled in size since 1990, with 56.6 percent growth. Madera County has a relatively small labor force (at 64,800 workers in 2008), but has more than doubled in size, experiencing growth of 55.8 percent since 1990. Tulare and Merced counties have experienced similar growth since 1990, at 34.3 and 36.1 percent, respectively.

In total, the six counties of the Friant Division have a labor force of 1,212,400; this is an increase of 36.6 percent in the 18-year period from 1990 to 2008. Unemployment rates from 1990 to 2008 are reported as annual average. The 2009 unemployment rate is only for August 2009 and reflects the most current available data available as of November 2009.

Employment. Figure 22-2 shows unemployment rate changes from 1990 to 2009 for the Friant Division counties and the State. Since 1990, unemployment rates in all six counties have been consistently and substantially higher than State trends. All the counties and the State were characterized by a peak in unemployment in 1993. The State's unemployment rate also peaked in August 2009 at 12.2 percent. Unemployment rates in the six counties of the Friant Division registered lowest in 2000, mirroring the State trend (the State had the lowest unemployment rate in the time period, at 4.9 percent). After 2000, unemployment rates in the counties and the State increased until 2002, and then began a gradual decrease until 2006.



Source: EDD 2009

Figure 22-2.
Friant Division Counties – Unemployment Rates – 1990 to 2009

EDD reports that the unadjusted unemployment rate for the State was 7.2 percent (annual average). The unemployment rate increased to 12.2 percent in 2009 (August reporting only). Similar to historical trends, unemployment rates in the six-county Friant Division are higher than the State as a whole. In August 2009, the unemployment rate in Kings County was 14.2 percent. Kern County had an unemployment rate of 14.4 percent. The unemployment rate was 15.2 percent in Tulare, and Merced had an unemployment rate of 16.6 percent, the highest rate of all the counties in the Friant Division, and the fourth highest in the State. Fresno County ranked forty-fourth of all California counties, with an unemployment rate of 12.2 percent, and Madera County ranked thirty-fifth, with an unemployment rate of 13.3 percent, the lowest of the three counties.

Table 22-12 summarizes EDD data regarding the top employers by employee class for each county. The only employer in Kings County to fall into the 5,000- to 9,999-employer class size in 2008 was the U.S. Naval Air Station. Multiple employers in Kings County fell into the employee class size of 1,000 to 4,999 employees. The top employer in Kern County was Edwards Air Force Base, with 10,000-plus employees. Kern County also had multiple employers, with 5,000 to 9,999 employees. In Tulare County, EDD reported a variety of employers falling into the employee class size of 1,000 to 4,999 employees. There were no larger employee class size employers in Tulare County. In Fresno County, the Fresno Unified School District employs the largest number of people. In Merced County, multiple employers fall into EDD's employer class size of 1,000 to 4,999 employees, including Merced College, Merced Medical Center, and Foster Farms. Top employers in Madera County include Children's Hospital and a resort and casino.

Table 22-12.
Friant Division Counties – Top Employers – 2008

Employer	Number of Employees
Fresno County	**Employee Class Size**
Fresno Unified School District	5,000–9,999
County of Fresno	5,000–9,999
Community Medical Center	1,000–4,999
City of Fresno	1,000–4,999
Saint Agnes Medical Center	1,000–4,999
Kern County	**Employee Class Size**
Edwards Air Force Base	10,000+
Grimmway Personnel	5,000–9,999
Naval Air Warfare Center	5,000–9,999
U.S. Navy Public Affairs Office	5,000–9,999
Kings County	**Employee Class Size**
U.S. Naval Air Station	5,000–9,999
California State Prison	1,000–4,999
Del Monte Foods	1,000–4,999
Kings County Government Center	1,000–4,999
Tachi Palace Hotel and Casino	1,000–4,999
Madera County	**Employee Class Size**
Children's Hospital	1,000–4,999
Chukanski Gold Resort and Casino	1,000–4,999
D.P. Enterprises	1,000–4,999
Valley State Prison for Women	500–999
Constellation Wines	500–999
Madera Community Hospital	500–999
Zymex Medical Limited Liability Company	500–999
Canandaigua Wineries	500–999
Merced County	**Employee Class Size**
Merced College	1,000–4,999
Merced County Superintendent	1,000–4,999
Mercy Medical Center	1,000–4,999
Foster Farms	1,000–4,999
Atwater School District Office	500–999
Dole Packaged Frozen Foods	500–999
Quebecor (printing)	500–999
Lipton Unilever	500–999
Tulare County	**Employee Class Size**
Alfredo Padilla Labor	1,000–4,999
Kaweah Dental Health Care	1,000–4,999
Porterville Developmental Center	1,000–4,999
Quad Knopf, Inc.	1,000–4,999
Ruiz Foods	1,000–4,999
Valhalla Sales and Marketing	1,000–4,999
Walmart	1,000–4,999

Source: EDD 2008c

Table 22-13 shows the number of establishments for the 6-county area for a 5-year period ending in 2006. An establishment is defined by EDD as an economic unit, such as a farm, mine, factory, or store that produces goods or provides services.

Table 22-13.
Friant Division Counties – Number of Establishments – 2002 Through 2006

Area	2002	2003	2004	2005	2006	Percent Change 2002 Through 2006
Fresno County	27,333	27,655	27,676	27,492	28,056	2.7
Kern County	14,453	14,806	15,014	15,452	16,393	13.4
Kings County	2,966	3,005	3,055	3,042	3,101	4.6
Madera County	3,167	3,315	3,297	3,246	3,298	4.1
Merced County	5,007	5,282	5,294	5,289	5,510	10.1
Tulare County	8,413	8,379	8,161	7,990	8,422	0.1
Friant Division Counties Total	61,339	62,442	62,497	62,511	64,780	5.6
Three-County Area Total	35,507	36,252	36,267	36,027	36,864	3.8

Source: EDD 2007

Fresno County has the greatest number of establishments for the Friant Division counties (28,056 establishments in 2006), and Kern County has the second greatest number of establishments (16,393 establishments in 2006). Kings County had the least number of establishments among the six-county area (3,101 establishments). Kern County had the greatest increase in the number of establishments during the 5-year period at 13.4 percent, and Tulare County experienced the lowest growth at 0.1 percent. Overall, the Friant Division counties had 64,780 establishments in 2006 and experienced a rate of growth of 5.6 percent from 2002 to 2006.

Employment and labor data for the Friant Division counties and cities is shown in Table 22-14. Recent unemployment rates in the Friant Division counties and cities have generally been increasing since 2006. In the six-county area, Fresno County has the largest labor force (at 433,800 in 2008) and Kings County has the smallest labor force (at 58,900 in 2008). Among the cities in the Friant Division counties, the Cities of Fresno and Bakersfield have the largest labor forces (at 228,500 and 150,300, respectively, in 2008). The City of Chowchilla had the smallest labor force in 2008, at 4,000 workers. From 2006 to 2008, Merced County experienced the highest unemployment rates (varying from 9.5 percent to 13.3 percent). The City of Clovis has generally experienced the lowest unemployment rates (varying from 4.2 percent to 5.5 percent). The City of Delano has generally experienced the highest unemployment rates (varying from 20.8 percent to 26.0 percent).

Table 22-14.
Friant Division Counties – Labor Force and Unemployment – 2006 Through 2008

County or City	Labor Force 2006	Unemployment Rate 2006 (%)	Labor Force 2007	Unemployment Rate 2007 (%)	Labor Force 2008	Unemployment Rate 2008 (%)
Fresno County	**417,200**	**8.0**	**428,000**	**8.6**	**433,800**	**10.5**
Clovis	42,200	4.2	43,100	4.5	43,200	5.5
City of Fresno	220,200	7.5	225,800	8.0	228,500	9.8
City of Reedley	10,500	16.4	10,900	17.4	11,300	20.9
Kern County	**341,600**	**7.6**	**351,900**	**8.3**	**354,400**	**9.9**
Bakersfield	146,100	5.2	150,000	5.7	150,300	6.8
Delano	16,000	20.8	16,800	22.4	17,300	26.0
Wasco	7,400	14.4	7,700	15.6	7,800	18.4
Kings County	**55,900**	**8.5**	**58,500**	**8.7**	**58,900**	**11.2**
Hanford	22,200	7.3	23,300	7.5	23,400	9.7
Lemoore	10,400	7.1	10,900	7.3	10,900	9.4
Madera County	**63,800**	**7.0**	**64,400**	**7.6**	**64,800**	**9.4**
Chowchilla	4,000	8.0	4,000	8.7	4,000	10.6
City of Madera	22,200	10.2	22,500	11.0	22,800	13.5
Merced County	**99,500**	**9.5**	**102,100**	**10.1**	**104,700**	**13.3**
Atwater	11,600	9.7	11,900	10.4	12,300	13.6
Los Banos	12,400	10.0	12,800	10.7	13,000	14.0
City of Merced	29,500	9.4	30,200	10.0	31,000	13.2
Tulare County	**190,500**	**8.5**	**195,300**	**9.3**	**195,800**	**11.4**
Porterville	19,800	7.8	20,300	8.5	20,300	10.4
City of Tulare	22,300	7.2	22,800	7.9	22,800	9.7
Visalia	52,600	5.2	53,800	5.7	53,400	7.0
State of California	**17,907,200**	**4.9**	**18,188,100**	**5.4**	**18,247,200**	**6.4**

Source: EDD 2008a
Key:
% = percent

Industry. For the majority of the counties in the Friant Division (Fresno, Kern, Kings, Madera, Merced, and Tulare), the top five industries based on the number of employees are the government sector, trade, transportation, utilities, and farm jobs (Table 22-15). Madera County was the exception, where education and health were the two top employers in the county, preceded by government. For Kern, Kings, Madera, Merced, and Tulare counties, the industry with the least employment was the information sector. For Fresno, natural resources and mining had the least employees.

EDD divides the agricultural industry into different occupational categories. These categories include Agricultural and Food Science Technicians, Agricultural Engineers, Agricultural Inspectors, Agricultural Science Teachers (postsecondary), Agricultural Workers, Compliance Officers, Conservation Scientists, Farm and Home Management Advisors, Farmers and Ranchers, and Farm Workers and Laborers (crop, nursery, and greenhouse).

As shown in Table 22-15, the agricultural industry sector (farm jobs) ranked in the top three industries in all counties in the Friant Division.

In Kings County, the occupational category of Farm Workers and Laborers (crop, nursery, and greenhouse) was projected to grow from 4,260 employed in 2004 to 5,050 employed in 2014, an 18.5 percent change. Kings County data for occupational wages are not available from EDD; the City of Hanford reports a yearly wage of $16,695 for this occupational category. In Kern County, this occupational category is projected to change 16.6 percent from 2004 to 2014. Occupational wage data for this county are unavailable from EDD. The City of Bakersfield reports a yearly occupational wage of $16,521 (EDD 2008b).

Table 22-15.
Friant Division Counties – Employment by Industry Sector – 2008

Industry	Fresno County	Kern County	Kings County	Madera County	Merced County	Tulare County
Construction	19,800 5.7%	17,200 6.2%	Included in mining category	Included in mining category	Included in mining category	Included in mining category
Educational and Health Services	39,200 11.3%	24,600 8.9%	3,700 8.6%	5,800 13.2%	5,500 8.0%	10,900 7.6%
Farm Jobs	44,500 12.8%	37,900 13.7%	7,900 18.3%	9,000 20.5%	10,100 14.8%	30,200 21.2%
Financial Activities	15,000 4.3%	8,900 3.2%	1,100 2.5%	800 1.8%	1,900 2.8%	4,000 2.8%
Government	68,500 19.7%	61,500 2.2%	15,200 35.2%	10,700 24.4%	15,700 23.0%	31,400 22.0%
Information	4,100 1.2%	2,700 1.0%	300 0.7%	500 1.1%	1,300 1.9%	1,000 0.7%
Leisure and Hospitality	27,700 8.0%	20,900 7.5%	2,800 6.5%	2,600 5.9%	4,800 7.0%	8,500 6.0%
Manufacturing	26,600 7.7%	13,600 4.9%	3,700 8.6%	3,200 7.3%	9,000 13.2%	12,000 8.4%

Table 22-15.
Friant Division Counties – Employment by Industry Sector – 2008 (contd.)

Industry	Fresno County	Kern County	Kings County	Madera County	Merced County	Tulare County
Natural Resources and Mining	200 0.1%	9,900 3.6%	1,300 3.0%	2,100 4.8%	2,900 4.2%	7,200 5.0%
Other Services	11,000 3.2%	7,100 2.6%	600 1.4%	800 1.8%	1,400 2.0%	2,900 2.0%
Professional and Business Services	30,100 8.7%	26,100 9.4%	1,100 2.5%	3,000 6.8%	4,200 6.1%	9,900 6.9%
Trade, Transportation and Utilities	60,900 17.5%	46,600 16.8%	5,500 12.7%	5,300 12.2%	11,600 17.0%	24,600 17.3%

Source: EDD 2008b
Key:
% = percent

Fresno County is the only county that projects a decrease for the Farm Workers and Laborers occupational category. EDD estimates that a 10.0 percent drop will occur from 2004 through 2014. Both Kern and Fresno counties project about a -2.0 percent change in the Farmers and Ranchers occupational category, while Kings County projects no change in this category for the same period.

The occupational category of Farm Workers and Laborers (crop, nursery and greenhouse) is expected to grow about 20.0 percent in both Madera and Merced counties between 2004 and 2014. In Fresno County, this occupational category is projected to decline about 10.0 percent from 2004 to 2014. EDD data from 2007 are that the annual mean income for this occupational category was $16,664 in Fresno County, $17,628 in Madera County, and $16,265 in Merced County. The occupational category of Farmers and Ranchers is projected to decline in all three counties: 2.0 percent in Fresno County, 3.5 percent in Madera County, and 4.2 percent in Merced County (EDD 2008b).

For purposes of IMPLAN economic modeling, the Friant Division counties are combined. When taken together, more than $158 billion in goods and services are produced within these counties, including nearly $19 billion from agriculture, forestry, and fishing. Local industry supports almost 1,187,000 jobs and earnings of more than $52 billion. In terms of output, manufacturing is the largest industry, contributing more than $35.3 billion of the six counties' total industry output. Agriculture is the second largest industry in output, but the highest (after government) in terms of employment.

Government and Finance

In rural areas, such as those in the San Joaquin Valley, 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.

Each of the six Friant Division counties maintains one primary urban center, with a limited number of small cities and towns and large amounts of surrounding rural land. Because the counties are largely rural jurisdictions, total revenues and expenditures in most of these counties are relatively low when compared to other jurisdictions in the State. Similarly, expenditures in each jurisdiction are tailored to rural needs more than might be seen in other California jurisdictions. Following are revenues and expenditures for each of the six counties of the Friant Division.

Fresno County. As one of the larger counties in the San Joaquin Valley, Fresno County provides a wide range of services to its almost 800,000 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, as shown in Table 22-16.

Through these various means, Fresno County accumulated nearly $1.15 billion in total revenues in FY 05 – 06. This total represented an increase of 42.9 percent over FY 99 – 00 revenues. In that 7-year period, Fresno County's total revenues steadily increased each year. In FY 05 – 06, the largest source of revenue was Federal and State funding, with more than $774 million. Property taxes represented another large revenue source for Fresno County in FY 05 – 06 (more than $148 million dollars), as shown in Table 22-16.

Table 22-16.
Revenues and Expenditures in Fresno County – Selected Years, 1999 Through 2006

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Revenues (dollars)			
Property Taxes	70,008,544	58,835,312	148,717,818
Other Taxes	29,305,424	33,996,163	48,375,018
Licenses, Permits, Fines, Forfeitures	40,108,026	34,468,307	36,424,723
Federal, State, Other	535,745,102	761,891,324	774,842,183
Total Miscellaneous Revenue	52,034,459	94,378,821	8,581,152
All Other Financing Sources	77,194,383	100,197,604	132,315,536
Total Revenue	**804,395,938**	**1,083,767,531**	**1,149,256,430**
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	59,739,102	48,384,298	72,306,641
Police Protection, Corrections, Fire, Public Protection	186,342,109	244,511,615	274,530,171

Table 22-16.
Revenues and Expenditures in Fresno County – Selected Years, 1999 to 2006 (contd.)

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Expenditures (dollars)			
Transportation	28,578,157	41,230,858	40,987,820
Public Health, Medical Care	143,864,437	161,940,066	194,378,202
Welfare, Social Services, and Other Public Assistance	347,864,271	476,872,141	463,780,252
Total Education and Library Services	13,010,009	21,943,753	23,655,343
Total Recreation Facilities	2,408,099	2,545,501	3,025,932
Costs Associated with Long-Term Debt (principal and interest)	18,482,181	10,328,429	25,349,227
All Other Expenditures	0	0	3,590,000
Total Expenditures	**800,288,365**	**1,007,756,661**	**1,101,603,588**

Sources: Controller of the State of California 2002, 2005, 2008
Key:
FY = Fiscal Year

Revenues generated by Fresno County are used for a range of governmental activities. Similar to total revenues, Fresno County's total expenditures increased steadily between FY 99 – 00 and FY 05 – 06. Expenditures in FY 05 – 06 totaled more than $1.1 billion, compared to only $800 million spent in FY 99 – 00 (a 37.6 percent increase). Total expenditures for Fresno County under several categories are shown in Table 22-16. Welfare, social services, and other public assistance have consistently been the largest expenditure for Fresno County (more than $463 million in FY 05 – 06), but the level of funding decreased between FY 02 – 03 and FY 05 – 06. Police, fire, and other public safety activities represented the second largest expenditure category, with more than $274 million in FY 05 – 06. Education expenses by Fresno County have increased dramatically in the recent past. Between FY 99 – 00 and FY 05 – 06, Fresno County's educational expenses grew 45.0 percent. Overall, total revenues exceeded total expenditures in all years.

Kern County. Expenditures in Kern County are also consistent with trends observed in Fresno County, as shown in Table 22-17. In that 7-year period, Kern County's total revenue grew by 34.7 percent, compared to the 25.8 percent growth Fresno County experienced (Table 22-16). Although the overall revenue trend was up, Kern County did experience a minor dip in FY 02 – 03. Federal and State funding sources made up the largest revenue source in FY 05 – 06, with more than $594 million directed to Kern County. As seen in Fresno County, property taxes represent another significant revenue source (over $234 million in FY 05 – 06).

Table 22-17.
Revenues and Expenditures in Kern County – Selected Years, 1999 Through 2006

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Revenues (dollars)			
Property Taxes	110,870,978	132,675,142	234,204,491
Other Taxes	24,652,525	33,482,614	46,036,642
Licenses, Permits, Fines, Forfeitures	41,619,446	43,800,053	53,000,094
Federal, State, Other	482,443,538	602,864,057	594,747,569
Total Miscellaneous Revenue	27,125,421	31,975,543	11,961,106
All Other Financing Sources	115,233,047	384,006,910	115,227,093
Total Revenue	**801,944,955**	**1,228,804,319**	**1,055,176,995**
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	63,618,072	91,965,796	72,773,538
Police Protection, Corrections, Fire, Public Protection	256,164,881	307,062,202	357,294,744
Transportation	22,346,108	25,861,525	40,913,691
Public Health, Medical Care	86,557,677	99,572,638	119,555,312
Welfare, Social Services, and Other Public Assistance	285,474,079	327,799,940	360,809,135
Total Education and Library Services	7,447,587	10,102,060	8,358,524
Total Recreation Facilities	9,518,927	10,028,244	11,811,555
Costs Associated with Long-Term Debt (principal and interest)	27,681,763	32,179,683	47,814,532
All Other Expenditures	5,256,485	319,944,383	32,349,152
Total Expenditures	**764,065,579**	**1,224,516,471**	**1,051,680,183**

Sources: Controller of the State of California 2002, 2005, 2008
Key:
FY = Fiscal Year

Because of its similar size (more than 661,000 residents), Kern County's total revenues are fairly equivalent to those of Fresno County ($1.15 billion in FY 05 – 06, compared to $1.05 billion), but Kern County experienced substantial overall revenue growth between FY 99 – 00 and FY 05 – 06. The top two expenditures in Kern County in FY 05 – 06 were social service programs ($360 million) and police, fire, and other public safety programs ($357 million). Kern County recently experienced a dramatic increase in transportation expenses, which grew over 45.0 percent between FY 99 – 00 and FY 05 – 06. Overall, total revenues exceeded total expenditures in all years highlighted.

Kings County. As one of the smaller counties in the San Joaquin Valley, Kings County provides a wide range of services to over 129,000 residents. Kings County employs similar funding mechanisms to those used in other San Joaquin Valley counties, including property taxes, Federal and State funding, permit fees, and other sources to meet residents' needs, as shown in Table 22-18.

Table 22-18.
Revenues and Expenditures in Kings County – Selected Years, 1999 Through 2006

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Revenues (dollars)			
Property Taxes	11,135,985	12,418,036	28,769,833
Other Taxes	4,018,930	4,956,148	6,044,209
Licenses, Permits, Fines, Forfeitures	3,772,718	3,612,585	5,282,664
Federal, State, Other	82,774,930	99,242,243	110,843,512
Total Miscellaneous Revenue	7,764,521	4,035,973	3,013,267
All Other Financing Sources	8,404,849	9,696,833	9,139,419
Total Revenue	**117,871,933**	**133,961,818**	**163,092,904**
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	12,878,126	15,514,625	28,697,508
Police Protection, Corrections, Fire, Public Protection	35,335,137	40,976,344	51,513,437
Transportation	8,151,354	4,464,796	6,293,313
Public Health, Medical Care	15,597,139	19,476,234	22,181,048
Welfare, Social Services, and Other Public Assistance	38,508,960	53,373,374	59,497,889
Total Education and Library Services	1,314,648	1,187,061	1,524,903
Total Recreation Facilities	832,959	803,521	1,379,659
Costs Associated with Long-Term Debt (Principal and Interest)	0	0	933,291
All Other Expenditures	0	0	0
Total Expenditures	**112,618,323**	**135,795,955**	**172,021,048**

Sources: Controller of the State of California 2002, 2005, 2008
Key:
FY = Fiscal Year

Kings County accrued over $163 million in total revenues in FY 05 – 06. This total represented an increase of 38.4 percent over FY 99 – 00 revenues. In that 7-year period, Kings County's total revenues steadily increased each year. In FY 05 – 06, the largest source of revenue was Federal and State funding, at more than $110 million. Property taxes represented the second largest revenue source for Kings County in FY 05 – 06 (more than $28 million), as shown in Table 22-18.

Revenues generated by Kings County are also used for a range of governmental activities. Similar to total revenues, Kings County's total expenditures increased steadily between FY 99 – 00 and FY 05 – 06. Expenditures in FY 05 – 06 totaled more than $172 million, compared to only $112 million spent in FY 99 – 00 (a $60 million and 52.7 percent increase). Table 22-18 displays the total expenditures for Kings County in several categories.

Welfare, social services, and other public assistance has also been the largest expenditure for Kings County (more than $59 million in FY 05 – 06), and the level of funding increased between FY 99 – 00 and FY 05 – 06, although it was less dramatic (only 10.3 percent) in more recent years. Police, fire, and other public safety activities represented the second largest expenditure category with more than $51 million in FY 05 – 06. Transportation expenses for Kings County have decreased dramatically in the recent past. Between FY 99 – 00 and FY 05 – 06, Kings County's educational expenses dropped 29.5 percent. Overall, total revenues exceeded total expenditures in all years highlighted.

Madera County. As shown in Table 22-19, expenditures in Madera County are generally consistent with trends observed in Kings County. Because of its similar size (over 123,000 residents), Madera County's total revenues are fairly equivalent to those of Kings County ($181 million in FY 05 – 06, compared to $163 million). Madera County experienced substantial overall revenue growth between 1990 and 2000. In that 10-year period, Madera County's total revenue grew by 80.1 percent (Table 22-19). Federal and State funding sources made up the largest revenue source in FY 05 – 06, with more than $90 million directed to Madera County. As seen in Kings County, property taxes represent another significant revenue source (over $27 million in FY 05 – 06).

The top two expenditures in Madera County in FY 05 – 06 were social service programs ($47 million) and police, fire, and other public safety programs ($39 million). Madera County has experienced a dramatic increase in general/administrative expenses recently, which grew over 72.3 percent between FY 99 – 00 and FY 05 – 06. Madera experienced some variable change in costs associated with long-term debt. In FY 99 – 00, costs were about $130,000, but those costs dropped to less than $90,000 in FY 02 – 03 (a 45.0 percent decrease). But, in FY 05 – 06 long-term debt service costs grew to over $650,000, which was an increase of 86.2 percent since FY 02 – 03, and a nearly 80.0 percent increase since FY 99 – 00. However, total revenues exceeded total expenditures in all years highlighted, and that excess was nearly 10.0 percent of the revenue collected.

Table 22-19.
Revenues and Expenditures in Madera County – Selected Years, 1999 Through 2006

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Revenues (dollars)			
Property Taxes	9,244,948	10,509,573	27,106,983
Other Taxes	6,721,181	7,479,014	11,807,003
Licenses, Permits, Fines, Forfeitures	6,122,109	7,528,462	7,911,441
Federal, State, Other	68,005,824	89,177,792	90,359,816
Total Miscellaneous Revenue	3,021,469	21,355,440	9,310,946
All Other Financing Sources	7,427,487	10,001,158	34,589,714
Total Revenue	**100,543,018**	**146,051,439**	**181,085,903**
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	11,062,669	16,963,850	39,915,130
Police Protection, Corrections, Fire, Public Protection	29,402,832	37,704,862	43,370,167
Transportation	6,153,396	8,161,945	8,778,995
Public Health, Medical Care	14,081,722	18,604,595	19,685,763
Welfare, Social Services, and Other Public Assistance	31,159,469	42,859,502	47,356,238
Total Education and Library Services	1,131,727	1,492,981	2,676,136
Total Recreation Facilities	0	0	0
Costs Associated with Long-Term Debt (principal and interest)	130,686	89,692	650,273
All Other Expenditures	525,593	830,846	947,137
Total Expenditures	**93,648,094**	**126,708,273**	**163,379,839**

Sources: Controller of the State of California 2002, 2005, 2008
Key:
FY = Fiscal Year

Merced County. As a medium-sized county in the San Joaquin Valley, Merced County also provides a wide range of services to its over 210,000 residents. Merced County employs similar funding mechanisms to those used in other San Joaquin Valley counties, including property taxes, Federal and State funding, permit fees, and other sources to meet residents' needs.

Merced County accrued over $351 million in total revenues in FY 05 – 06. This total represented an increase of 56.6 percent over FY 99 – 00 revenues. In that 7-year period, Merced County's total revenues increased each year. In FY 05 – 06, the largest source of revenue was Federal and State funding at more than $241 million. Property taxes represented the second largest revenue source for Merced County in FY 05 – 06 (more than $63 million dollars).

Revenues generated by Merced County are also used for a range of governmental activities. Similar to total revenues, Merced County's total expenditures increased between FY 99 – 00 and FY 05 – 06. However, the increase was slight between FY 02 – 03 and 05 – 06 (just over 1.0 percent), and more dramatic between FY 99 – 00 and FY 02 – 03 (29.5 percent). Expenditures in FY 05 – 06 totaled more than $316 million, compared to only $220 million spent in FY 99 – 00 (a 43.6 percent increase). Table 22-20 displays total expenditures for Merced County in several categories. Welfare, social services, and other public assistance has been the largest expenditure for Merced County

(more than $127 million in FY 05 – 06), and the level of funding increased between FY 99 – 00 and FY 05 – 06, although it was less dramatic (only 7.6 percent) in more recent years. Police, fire, and other public safety activities represented the second largest expenditure category at more than $85 million in FY 05 – 06. Recreation expenses by Merced County have increased dramatically in the recent past. Between FY 99 – 00 and FY 05 – 06, Merced County's recreation expenses increased 47.4 percent. This increase was likely due to the dramatic reduction of funds needed to pay costs associated with long-term debt. In FY 02 – 03, the county was paying over $25 million to debt costs, and in FY 05 – 06 that amount decreased to under $9 million. This represents $14 million in funds that were available for distribution throughout the budget. Overall, total revenues exceeded total expenditures in all years highlighted.

Table 22-20.
Revenues and Expenditures in Merced County – Selected Years, 1999 Through 2006

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Revenues (dollars)			
Property Taxes	21,549,323	26,150,890	63,781,419
Other Taxes	5,656,710	6,955,271	11,311,586
Licenses, Permits, Fines, Forfeitures	15,120,694	13,779,709	22,857,649
Federal, State, Other	159,876,405	225,558,438	214,389,541
Total Miscellaneous Revenue	1,977,142	3,558,322	3,959,255
All Other Financing Sources	19,975,167	38,713,569	34,815,553
Total Revenue	**224,155,441**	**314,716,199**	**351,115,003**
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	21,585,611	36,635,948	35,739,856
Police Protection, Corrections, Fire, Public Protection	54,921,438	69,799,406	85,695,768
Transportation	9,542,799	15,380,353	14,610,014
Public Health, Medical Care	26,271,962	38,762,412	39,936,176
Welfare, Social Services, and Other Public Assistance	99,247,244	117,840,678	127,525,915
Total Education and Library Services	1,465,161	1,764,165	2,048,067
Total Recreation Facilities	1,124,832	1,434,900	2,137,720
Costs Associated with Long-Term Debt (principal and interest)	6,537,729	25,532,377	8,850,565
All Other Expenditures	0	5,984,625	416,000
Total Expenditures	**220,696,776**	**313,134,864**	**316,960,081**

Sources: Controller of the State of California 2002, 2005, 2008
Key:
FY = Fiscal Year

Tulare County. As one of the medium-sized counties in the San Joaquin Valley (although also predominantly rural), Tulare County provides a wide range of services to its more than 368,000 residents. To meet residents' needs, Tulare County employs the same funding mechanisms as its neighboring counties, including property taxes, Federal and State funding, permit fees, and other sources, as shown in Table 22-21.

Table 22-21.
Revenues and Expenditures in Tulare County – Selected Years, 1999 Through 2006

Source	FY 99 – 00	FY 02 – 03	FY 05 – 06
Revenues (dollars)			
Property Taxes	30,221,403	33,437,374	75,836,649
Other Taxes	9,275,679	11,120,182	15,820,724
Licenses, Permits, Fines, Forfeitures	16,041,644	19,306,060	19,880,838
Federal, State, Other	296,529,057	353,662,876	367,567,350
Total Miscellaneous Revenue	26,594,120	11,121,494	17,537,114
All Other Financing Sources	46,034,006	53,246,171	64,155,087
Total Revenue	**424,695,909**	**481,894,157**	**560,797,762**
Expenditures (dollars)			
Legislative and Administrative, Finance, Counsel, and General Expenditures	47,465,694	43,006,598	17,533,887
Police Protection, Corrections, Fire, Public Protection	104,543,765	113,351,454	155,637,321
Transportation	14,192,867	18,484,177	18,409,969
Public Health, Medical Care	70,853,502	92,787,109	104,363,992
Welfare, Social Services, and Other Public Assistance	164,658,004	186,619,428	224,355,894
Total Education and Library Services	3,220,893	2,656,513	3,306,050
Total Recreation Facilities	1,450,444	1,494,794	1,613,699
Costs Associated with Long-Term Debt (principal and interest)	23,136,276	17,397,692	16,601,128
All Other Expenditures	0	4,576,864	10,067,315
Total Expenditures	**429,521,445**	**480,374,629**	**551,889,255**

Sources: Controller of the State of California 2002, 2005, 2008
Key:
FY = Fiscal Year

Through these various means, Tulare County accumulated over $560 million in total revenues in FY 05 – 06. This total represented an increase of 32.0 percent over FY 99 – 00 revenues. In that 7-year period, Tulare County's total revenues steadily increased each year. In FY 05 – 06, the largest source of revenue was Federal and State funding, with more than $367 million. Property taxes represented the next largest revenue source for Tulare County in FY 05 – 06 (more than $75 million dollars), as shown in Table 22-21.

Revenues generated by Tulare County are used for a range of governmental activities. Similar to total revenues, Tulare County's total expenditures increased steadily between FY 99 – 00 and FY 05 – 06. Expenditures in FY 05 – 06 totaled more than $551 million, compared to only $429 million spent in FY 99 – 00 (a 28.5 percent increase). Table 22-21 displays total expenditures for Tulare County in several categories. Welfare, social services, and other public assistance has consistently been the largest expenditure for Tulare County (more than $224 million in FY 05 – 06), and the level of funding increased between FY 02 – 03 and FY 05 – 06. Police, fire, and other public safety activities represented the second largest expenditure category, with more than $155 million in FY 05 – 06. General/administrative expenses by Tulare County have decreased dramatically in the recent past. Between FY 99 – 00 and FY 05 – 06, Tulare County's general/administrative expenses dropped over 170.0 percent, but these costs were likely

redistributed to more specified expenditures because overall expenditures grew over the period. Overall, total revenues exceeded total expenditures in all years highlighted.

Agricultural Water Use and Production

Existing agricultural water use and production is discussed below for the Friant Division. Information about agricultural water use and production for the three counties located within the Restoration Area (Fresno, Madera, and Merced) are included in the Friant Division discussion.

CVP/SWP Water Service Areas. As discussed in Chapter 13.0, "Hydrology – Surface Water Supplies and Facilities Operations," main features of the Friant Division of the CVP include Millerton Lake, Friant Dam, the Friant-Kern Canal, and the Madera Canal. The Friant Division supplies water to agricultural and M&I uses through the Friant-Kern and Madera canals.

The Friant Division supports conjunctive water management in an area that was subject to groundwater overdraft before construction of Friant Dam. Reclamation employs a two-class system of water allocation that capitalizes on wetter years. Class 1 contracts are based on a firm water supply, and are generally assigned to agricultural and M&I water users who have limited access to good quality groundwater. The first 800 TAF of annual water supply are delivered under Class 1 contracts.

Class 2 water is a supplemental supply provided after Class 1 contracts are fulfilled. These deliveries are for agricultural use or for groundwater recharge, and are typically delivered to areas that experience groundwater overdraft. Class 2 contractors typically have access to good quality groundwater supplies and can use groundwater during periods of surface water deficiency. Many Class 2 contractors are in areas with high groundwater recharge capability, and they operate dedicated groundwater recharge facilities.

As can be seen in Table 22-22 and Figure 22-3, from 1965 through 2006, Friant Division deliveries have averaged 1,336,404 acre-feet of water annually, including 93 percent of Class 1 and 42 percent of Class 2 contract amounts. Between 1965 and 2006, the full 800 TAF Class 1 contract was delivered in 21 of 32 years (66 percent).

Table 22-22.
Friant Division Water Deliveries – 1965 Through 2006

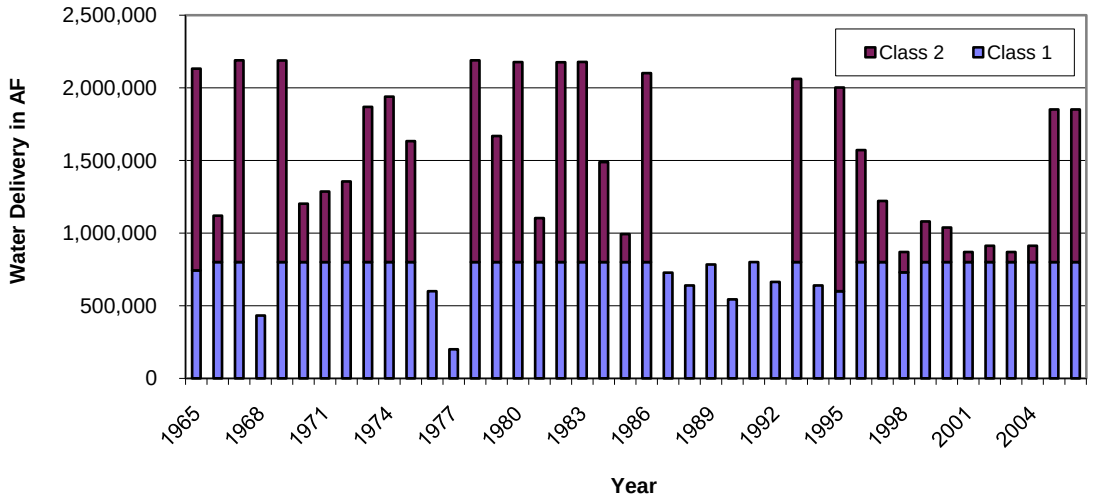
Contract Year	Project Water Availability						Average Delivery of Contracted Amount (%)
	Class 1 (acre-feet)	%	Class 2 (acre-feet)	%	Note	Total (acre-feet)	
1965	743,000	100	1,388,800	99		2,131,800	97
1966	800,000	100	319,424	23		1,119,424	51
1967	800,000	100	1,388,800	99		2,188,800	99
1968	432,000	54	0	0		432,000	20
1969	800,000	100	1,388,300	99		2,188,300	99
1970	800,000	100	402,607	29		1,202,607	55
1971	800,000	100	485,905	35		1,285,905	58
1972	800,000	100	555,320	40		1,355,320	62
1973	800,000	100	1,068,991	76		1,868,991	85
1974	800,000	100	1,138,816	81		1,938,816	88
1975	800,000	100	833,280	59		1,633,280	74
1976	600,000	75	0	0		600,000	27
1977	200,000	25	0	0		200,000	9
1978	800,000	100	1,388,800	99		2,188,800	99
1979	800,000	100	868,115	62		1,668,115	76
1980	800,000	100	1,377,212	98		2,177,212	99
1981	800,000	100	302,987	22		1,102,987	50
1982	800,000	100	1,376,288	98		2,176,288	99
1983	800,000	100	1,378,084	98		2,178,084	99
1984	800,000	100	689,042	49		1,489,042	68
1985	800,000	100	192,966	14		992,966	45
1986	800,000	100	1,301,079	93		2,101,079	95
1987	728,000	91	0	0		728,000	33
1988	640,000	80	0	0		640,000	29
1989	784,000	98	0	0		784,000	36
1990	544,000	68	0	0		544,000	25
1991	800,000	100	0	0		800,000	36
1992	664,000	83	0	0		664,000	30
1993	800,000	100	1,261,327	90		2,061,327	94
1994	640,000	80	0	0		640,000	29
1995	600,000	75	1,401,475	100		2,001,475	91
1996	800,000	100	770,811	55		1,570,811	71
1997	800,000	100	420,443	30	[1]	1,220,443	55
1998	729,787	91	140,148	10	[2]	869,935	40
1999	800,000	100	280,295	20	[3]	1,080,295	49

Table 22-22.
Friant Division Water Deliveries – 1965 Through 2006 (contd.)

Contract Year	Project Water Availability						Average Delivery of Contracted Amount (%)
	Class 1 (acre-feet)	%	Class 2 (acre-feet)	%	Note	Total (acre-feet)	
2000	800,000	100	238,251	17	[3]	1,038,251	47
2001	800,000	100	70,074	5	[3]	870,074	40
2002	800,000	100	112,118	8		912,118	41
2003	800,000	100	70,074	5		870,074	40
2004	800,000	100	112,118	8		912,118	41
2005	800,000	100	1,051,106*	75	[4]	1,851,106	92
2006	800,000	100	1,051,106*	75	[4]	1,851,106	92
Average	745,352	93	591,051	42		1,336,404	61

Notes:
[1] 1997 – "Early Season" water not included in Class 2 declaration. Class 2 declaration represents available Class 2 supplies remaining as of June 1, 1997.
[2] 1998 – "Early Season" water not included in Class 2 declaration. Class 2 declaration represents available Class 2 supplies remaining as of July 1, 1998. The Class 1 water supply ultimately provided for a voluntary reduction by water contractors.
[3] 1999 Forward – Early season water not included in Class 2 declaration.
[4] Class 2 water in uncontrolled season, 75% allocation assumed per Reclamation.
* Class 2 water in 2005 and 2006 was "uncontrolled," indicating that Class 2 contractors could obtain unlimited (and unmeasured) deliveries in the early runoff season. Amount shown is an estimate of contract amount actually delivered.

Key:
% = percent



Key: AF = acre-feet

Figure 22-3.
Friant Division Water Deliveries – 1965 Through 2006

As would be expected, Class 2 deliveries are highly variable, with the full contract amount of 1,401,475 acre-feet rarely delivered. Relatively large deliveries were made during the 1970s into the early 1980s, with a few exceptions, but from 1987 through 1992, and again in 1994, no Class 2 water was available for delivery. For the 32-year period considered, Class 2 deliveries averaged 591,061 acre-feet.

During 2005 and 2006, Class 2 water was delivered as an "uncontrolled season," meaning that Class 2 water contractors could take an unlimited amount during the runoff season. For these years, Reclamation estimates 75 percent of the contract amount of Class 2 water was delivered (Reclamation, Salazar, pers. comm. 2008).

Table 22-23 shows the allocation of water deliveries by 28 Friant Division contractors, including both agricultural and M&I contractors. The table shows the full contracted amount for each contractor for both Class 1 and Class 2 deliveries by total amount and by percentage. Table 22-23 also shows the modeled average delivery, based on historical delivery information from 1922 through 2004. Finally, the table shows estimated deliveries for each contractor based on overall percentage of deliveries made, distributed proportionally.

Table 22-23.
Deliveries and Reductions to Deliveries by Agricultural Contractor

Contractor	Full Contract (acre-feet)				Average Delivery (1922 – 2004) (acre-feet)		2005 (acre-feet)		2006 (acre-feet)	
	Class 1	% of Total Class 1	Class 2	% of Total Class 2	Class 1	Class 2	Class 1	Class 2*	Class 1	Class 2*
Friant-Kern Canal Agricultural Water										
Arvin-Edison WSD	40,000	5.0	311,675	22.2	37,700	87,295	40,000	233,756	40,000	233,756
Delano-Earlimart ID	108,800	13.6	74,500	5.3	102,545	20,866	108,800	55,875	108,800	55,875
Exeter ID	11,500	1.4	19,000	1.4	10,839	5,322	11,500	14,250	11,500	14,250
Fresno ID	0	0.0	75,000	5.4	0	21,006	0	56,250	0	56,250
Garfield WD	3,500	0.4	0	0.0	3,299	0	3,500	0	3,500	0
International WD	1,200	0.2	0	0.0	1,131	0	1,200	0	1,200	0
Ivanhoe ID	7,700	1.0	7,900	0.6	7,257	2,213	7,700	5,925	7,700	5,925
Lewis Creek WD	1,450	0.2	0	0.0	1,367	0	1,450	0	1,450	0
Lindmore ID	33,000	4.1	22,000	1.6	31,103	6,162	33,000	16,500	33,000	16,500
Lindsay-Strathmore ID	27,500	3.4	0	0.0	25,919	0	27,500	0	27,500	0
Lower Tule River ID	61,200	7.7	238,000	17.0	57,681	66,660	61,200	178,500	61,200	178,500
Orange Cove ID	39,200	4.9	0	0	36,946	0	39,200	0	39,200	0
Porterville ID	16,000	2.0	30,000	2.1	15,080	8,403	16,000	22,500	16,000	22,500
Saucelito ID	21,200	2.7	32,800	2.3	19,981	9,187	21,200	24,600	21,200	24,600
Shafter-Wasco ID	50,000	6.3	39,600	2.8	47,125	11,091	50,000	29,700	50,000	29,700
Southern San Joaquin MUD	97,000	12.1	50,000	3.6	91,423	14,004	97,000	37,500	97,000	37,500
Stone Corral ID	10,000	1.3	0	0.0	9,425	0	10,000	0	10,000	0
Tea Pot Dome WD	7,500	0.9	0	0.0	7,069	0	7,500	0	7,500	0
Terra Bella ID	29,000	3.6	0	0.0	27,333	0	29,000	0	29,000	0
Tulare ID	30,000	3.8	141,000	10.1	28,275	39,492	30,000	105,750	30,000	105,750
Madera Canal Agricultural										
Chowchilla WD	55,000	6.9	160,000	11.4	51,838	44,813	55,000	120,000	55,000	120,000
Madera ID	85,000	10.6	186,000	13.3	80,113	52,096	85,000	139,500	85,000	139,500

Table 22-23.
Deliveries and Reductions to Deliveries by Agricultural Contractor (contd.)

Contractor	Full Contract (acre-feet)				Average Delivery (1922 – 2004) (acre-feet)		2005 (acre-feet)		2006 (acre-feet)	
	Class 1	% of Total Class 1	Class 2	% of Total Class 2	Class 1	Class 2	Class 1	Class 2*	Class 1	Class 2*
San Joaquin River Agricultural										
Gravelly Ford WD	0	0.0	14,000	1.0	0	3,921	0	10,500	0	10,500
City of Fresno	60,000	7.5	0	0.0	56,550	0	60,000	0	60,000	0
City of Orange Cove	1,400	0.2	0	0.0	1,320	0	1,400	0	1,400	0
City of Lindsay	2,500	0.3	0	0.0	2,356	0	2,500	0	2,500	0
Fresno County Waterworks District No. 18	150	0.0	0	0.0	141	0	150	0	150	0
Madera County	200	0.0	0	0.0	189	0	200	0	200	0
Total	**800,000**	**100.0**	**1,401,475**	**100.0**	**754,005**	**392,531**	**800,000**	**1,051,106**	**800,000**	**1,051,106**

Source: Reclamation 2010a, 2010b
Notes: * Uncontrolled season, 75% allocation assumed per Reclamation. A more detailed version of this table can be found in Appendix O, "Socioeconomics."

Key:
% = percent
ID – Irrigation District
MUD = Municipal Utility District
WD = Water District
WSD – Water Service District

Agricultural contractors receiving more than 10.0 percent of the total contracted Class 1 water supplies include Delano-Earlimart ID (13.6 percent), Southern San Joaquin MUD (12.1 percent), and Madera ID (10.6 percent). M&I contractors, the largest of which is the City of Fresno, are contracted for approximately 8.0 percent of all Class 1 water.

Class 1 contracts in the Friant Division amount to 800 TAF. The less reliable Class 2 contracts total 1,401,475 acre-feet if fully served, and not all Friant Division contractors have Class 2 contracts. The agricultural contractor with the highest proportion of Class 2 water is Arvin-Edison WSD, with 22.2 percent. Only the Fresno ID and Gravelly Ford WD have no Class 1 contracts, and receive their Friant Division water exclusively from Class 2 contracts.

Agricultural Water Use in Friant Division. The Friant Division supports conjunctive water management in an area that was subject to groundwater overdraft before construction of Friant Dam. Reclamation employs a two-class system of water allocation, as described in Chapter 13, "Hydrology – Surface Water Supplies and Facilities Operations."

The San Joaquin Valley is one of the world's most productive agricultural areas, with 8 million acres of land producing more than 250 agricultural products. The Friant Division includes 28 member districts spread among 5 counties. Four of the districts (Chowchilla, Delano-Earlimart, Madera, and Orange Cove) each straddle more than one county. In total, the Friant Division includes over 1 million acres of land in parts of Fresno, Kern, Kings, Madera, Merced, and Tulare counties.

Friant Division water contractors produce crops with an annual value of more than $3.3 billion (McKusick 2005). Employment figures from the U.S. Census in 2000 suggest that a large proportion of those in the labor force in some communities in the Friant Division are part of this large farming industry. Table 22-24 presents employment information for a selection of communities associated with the Friant Division. While these data are not complete, they do suggest the primary importance of agriculture in the local economy, with substantial proportions of persons in the labor force falling in the "Farming, Forestry, and Hunting" category. For example, just over one-third of all people in the labor force in Earlimart are employed in this sector.

Table 22-24.
Employment Estimates for Selected Friant Division Communities – 2000

Community	Total Number of Workers in Labor Force	Workers in Farming, Forestry, and Hunting	
		Number of Workers	Percentage of Labor Force
Earlimart	2,376	803	33.8
Exeter	3,908	274	7.0
Ivanhoe	1,779	349	19.6
Lindsay	3,911	917	23.4
Orange Cove	2,943	882	30.0
Porterville	16,153	1,585	9.8
Strathmore	954	168	17.6
Terra Bella	1,379	401	29.1

Source: U.S. Census Bureau 2000

The primary consumptive use of Friant Division water is for agricultural crop production, and this supply of Friant Division water has enabled Friant Division water users to reduce local groundwater pumping. This document presents agricultural information by county because of the lack of comprehensive detailed information at the district level. That would allow the relationship between water deliveries and agriculture production over time to be discussed. While some information exists about agricultural production in each of the districts, the data are largely anecdotal and not consistent in the manner in which they were collected and reported. Crop reporting is not mandatory at the district level, and generally does not align with county level data prepared by each county's agricultural commissioner. Some efforts have been made in the past to document crop production, but they have met only limited success. In recent years, DWR conducted digital mapping based on computer photo interpretation as a means of identifying crops in areas that included some Friant Division member water districts. However, the time series for available data in the geographic region of interest is limited.

The most consistent and generally reliable sources of agricultural production in the region containing the Friant Division are the annual *County Agricultural Commissioner's Reports*. These reports are prepared in coordination with the California Agricultural Statistical Service and National Agricultural Statistics Service, and data collection methods follow generally accepted procedures. Crop and livestock production and value information is reported using county-level data (see Table 22-25).

Table 22-25.
Agricultural Production Values – 2000 to 2006

Year	Average Value in 2006 Constant Dollars ($ millions)					
	Fresno County	Kern County	Kings County	Madera County	Merced County	Tulare County
2000	4,002.29	2,585.61	1,036.17	875.94	1,801.22	3,590.09
2001	3,662.04	2,567.62	1,084.25	740.84	1,939.73	3,977.87
2002	3,827.59	2,898.21	1,147.30	872.28	1,939.48	3,586.61
2003	4,440.42	2,714.51	1,245.72	832.97	2,101.71	3,609.80
2004	4,604.21	3,064.91	1,378.96	1,141.89	2,456.39	4,308.79
2005	4,423.21	3,351.76	1,452.48	1,140.69	2,428.58	4,412.67
2006	4,385.81	2,988.28	1,289.19	1,032.50	2,247.46	3,765.43

Source: National Agricultural Statistics Service 2007

Note:
A more detailed version of this table can be found in Appendix O, "Socioeconomics."

The following discussion presents details of agricultural production in each of the six counties containing the Friant Division. The profile describes the dominant commodities and sources of revenue to the agricultural sector for each county. Essentially, all of the crop-based commodities rely on irrigation water, most of which is provided by the Friant Division. Other important agricultural sectors in the region, including livestock, dairy, and poultry products, do not use irrigation water directly, but are indirectly affected by water availability in terms of pasture and growing feedstock. The relationship of agricultural production and water availability to the Friant Division is addressed briefly after the county profiles.

According to the 2002 Agricultural Census, Fresno County had the most valuable agricultural sector with over $4.8 billion in production, followed by Tulare and Kern counties, each with agricultural production valued at over $3 billion (USDA 2002). While non-Friant Division water is also used in these counties, agricultural acreage for counties in the region analyzed reveals that approximately 10.0 percent of all agriculture production results from Friant Division water contractor activities.

Appendix O, "Socioeconomics," provides values for the main agricultural products between 2000 and 2006 for the six counties in the Friant Division. A wide variety of agricultural products are divided into 11 overarching categories: apiary, aquaculture, field crops, fruits, industrial and wood, livestock and poultry, livestock and poultry products, nursey, seed crops, tree nuts, and vegetables. As shown in Table 22-25, the value of agriculture in Fresno County, as expressed in 2006 constant dollars, has ranged from $3.7 billion to $4.6 billion. The average value of Fresno County's agricultural sector is approximately $4.2 billion annually, which is the highest among the six counties in the Friant Division.

According to the Fresno County agricultural report for 2006, grapes were the leading contributor to agricultural revenue at over $562 million, followed by almonds and tomatoes with values of $494.5 million and $402 million, respectively. As of 2002, there 6,281 farms totaled 1,928,865 acres. Of the total acreage farmed, 1,098,941 acres (57.0

percent) were irrigated (USDA 2002). Of the Friant Division agricultural water contractors, the Fresno Irrigation District, Garfield Water District, International Water District, and Orange Cove Irrigation District are in Fresno County.

Agricultural resources account for 85.0 percent of land uses in Kern County (Kern County 2004). Appendix O, "Socioeconomics," provides the total value for crops in Kern County for 2000 through 2006, including an average of the 7 years displayed. Of the 11 main categories, the main agricultural products for Kern County are fruits, tree nuts, and field crops, which account for 66.0 percent of the total average value in the county. Seed crops have the least value in Kern County, although apiary and industrial/wood products are also relatively small sectors in the total agriculture of the county. The value of agriculture in the county, as expressed in 2006 constant dollars, has ranged from $2.6 billion to $3.4 billion. Years with the highest values include 2005, 2004, and 2006. The average value of Kern County's agricultural sector is approximately $2.9 billion a year.

According to the Kern County agricultural report for 2006, almonds were the leading contributor to agricultural revenue at over $494 million, followed by grapes and milk with values of $492 million and $400 million, respectively. As of 2002, 2,147 farms totaled 2,731,341 acres. Of the total acreage farmed, 811,672 acres (30.0 percent) were irrigated (USDA 2002). Of the Friant Division agricultural water contractors, the Arvin-Edison Water Service District, Delano-Earlimart Irrigation District, Shafter-Wasco Irrigation District, and Southern San Joaquin Municipal Utility District are in Kern County.

Kings County ranks ninth among California counties in agricultural production and ranks first in the production of cotton seed. Appendix O, "Socioeconomics," provides the total value for crops in Kings County for 2000 through 2006, including an average of the 7 years displayed. Of the 11 main categories, the main agricultural products for Kings County are livestock and poultry products, field crops, and livestock and poultry. These three categories account for approximately 76.0 percent of the total average value in the county. Nurseries and aquaculture are absent in Kings County, and industrial and wood products have the least average value for the county. The value of agriculture in the county, as expressed in 2006 constant dollars, has ranged from $1.5 billion to $1.0 billion. The years with the highest values include 2005, 2004, and 2006. The average value of Kings County's agricultural sector is approximately $1.2 billion a year.

According to the Kings County agricultural report from 2006, milk was the leading contributor to agricultural revenue at over $409 million, followed by cotton and cattle, with approximate values of $217 million and $143 million, respectively. As of 2002, 1,154 farms totaled 645,598 acres. Of the total acreage farmed, 407,031 acres (63.0 percent) were irrigated (USDA 2002). There are no Friant Division agricultural water contractors in Kings County.

Madera County's agricultural productivity ranks thirteenth in the State. Table 22-25 shows the total value for crops in Madera County for 2000 through 2006. Of the 11 main categories, the main agricultural products for Madera County are tree nuts, fruits, and livestock/poultry products as shown in Appendix O, "Socioeconomics." These three

categories account for 73.0 percent of the total average value in the county. Seed crops and aquaculture are absent in Madera County, and industrial and wood products have the least average value for the county, followed closely by apiary products.

The value of agriculture in the county, as expressed in 2006 constant dollars, has ranged from $1.1 billion to $740 million. The years with the highest values include 2004, 2005, and 2006. The average value of Madera County's agricultural sector is approximately $948 million a year, which is the least of the counties presented.

According to the Madera County agricultural report for 2006, almonds, nuts, and hulls were valued at approximately $225 million, followed by grapes and milk, which were valued at $173 and $169 million, respectively. According to the 2002 agricultural census, 1,780 farms in Madera County totaled 682,486 acres. Of the total acreage farmed, 317,241 acres (46.0 percent) were irrigated. Of the Friant Division agricultural water contractors, only Chowchilla WD, Madera ID, and Gravelly Ford WD are located in Madera County.

More than 90 different agricultural products are grown in Merced County, making it one of the most agriculturally diverse areas in the nation. Appendix O, "Socioeconomics," provides the total value for agricultural products in Merced County for 2000 through 2006, including an average of the 7 years displayed. Of the 11 main categories, the main agricultural products for Merced County are livestock/poultry products, livestock and poultry, field crops, and tree nuts. These four categories account for approximately 83.0 percent of the total average value in Merced County. In contrast to other counties, all 11 categories are present in Merced County, although seed crops, aquaculture, and industrial/wood products have the least average value for the county. The value of agriculture in the county, as expressed in 2006 constant dollars, has ranged from $2.5 billion to $1.8 billion. The years with the highest values include 2004, 2005, and 2006. The average value of Merced County's agricultural sector is approximately $2.1 billion a year.

According to the Merced County annual report on agriculture from 2006, milk was the leading contributor to agricultural revenue at over $621 million, followed by chicken and almonds. Other economically important agricultural sectors in Merced County include cattle and tomatoes, valued at approximately $243 million and $113 million, respectively. As of 2002, 2,964 farms totaled 1,006,127 acres. Of the total acreage farmed, 518,538 acres (52.0 percent) were irrigated (USDA 2002). Of the Friant Division agricultural water contractors, only Chowchilla WD is in Merced County.

Tulare County is one of the most productive agricultural counties in the United States, and according to review of county crop reports, was the most productive county in the region, at over $3.8 billion. Appendix O, "Socioeconomics," provides the total value for agricultural products in Tulare County for 2000 through 2006, including an average of the 7 years displayed. Of the 11 main categories, the main agricultural products for Tulare County are fruits, livestock and poultry products, and livestock and poultry. These three categories account for approximately 82.0 percent of the total average value in the county. Industrial and wood products have the least average value for the county, with no

value in 2006. Seed crops and apiary products also have low average values compared with other crops in the county. The value of agriculture in Tulare County, as expressed in 2006 constant dollars, has ranged from $4.4 billion to $3.6 billion. Years with the highest values include 2005, 2004, and 2001. The average value of Tulare County's agriculture sector is approximately $3.9 billion.

According to the Tulare County annual crop and livestock report from 2006, milk is the leading agricultural product at over $1.1 billion, followed by oranges and cattle at $566 million and $496 million, respectively. As of 2002, 5,738 farms totaled 1,393,456 acres. Of the total acreage farmed, 652,385 acres (59.0 percent) were irrigated (USDA 2002). Of the Friant Division agricultural contractors, Delano-Earlimart Irrigation District, Exeter Irrigation District, Ivanhoe Irrigation District, Lewis Creek Water District, Lindmore Irrigation District, Lindsay-Strathmore Irrigation District, Lower Tule River Irrigation District, Orange Cove Irrigation District, Porterville Irrigation District, Saucelito Irrigation District, Stone Corral Irrigation District, Tea Pot Dome Water District, Terra Bella Irrigation District, and Tulare Irrigation District are in Tulare County.

The primary use of Friant Division water deliveries is for agricultural production. As mentioned above, before creation of Friant Dam and the distribution system currently in place, much of the irrigation in the area was done by pumping groundwater. As detailed in McKusick 2005, the Friant project (including Friant Dam and associated facilities) gave Friant Division water users the opportunity to reduce their groundwater pumping and create, over time, a highly productive agricultural area.

The relationship between water deliveries and agricultural production by district is discussed in this document because of a lack of detailed, comprehensive agricultural data at the district level. Also, the nature of water use in each member district is not annually uniform, with groundwater serving a larger role in some years based on environmental and market forces, and a largely undocumented network of water borrowing and trading occurring among member districts.

Regardless, some historic trends and changes in agricultural production can be broadly identified. For example, historically, crops in the area have been annual and depended largely on the available groundwater per year. With development of the Friant project, however, a more reliable water supply led to more permanent crops, including tree fruits, nuts, and grapes. This reliable water supply also created an opportunity for growers and other farmers to make large capital expenditures to change to and/or expand into crops with higher profit margins, confident that the water necessary for production would be available. Between 1950 and 2004, the annual total value for all crops produced had risen from $1.61 billion (in 2004 dollars) to $3.34 billion (McKusick 2005).

Today, permanent crops in the Friant Division account for a substantial percentage of all the agriculture in the State. Approximately 41.0 percent of the State's citrus, 28.0 percent of the State's grapes, 15.0 percent of the State's tree nuts, and 12.0 percent of the State's tree fruits are grown in the Friant Division (McKusick 2005). Nursery crops are also considered to be economically important, accounting for approximately $234 million

between 1999 and 2003 in Fresno, Kern, Madera, and Tulare counties. However, these nursery crops largely depend on pumped groundwater, even today.

Finally, Friant Division water has also assisted in creating a robust dairy industry in the area; 42.0 percent of the State's $5.2 billion dairy industry is located in Kern, Fresno, Madera, and Tulare counties. Friant Division water supports the dairy industry through lowering feed costs by supporting alfalfa, corn, and small grain production and reducing the need for outside regions to provide feed. Friant Division water also recharges groundwater supplies, which are in turn used to meet the daily 75-gallons-per-cow needed to meet animal drinking and sanitation needs (McKusick 2005).

22.2 Regulatory Setting

The assessment of socioeconomic resources is guided primarily by Federal laws and policies, while State and local laws and policies typically promote economic development and diversity, environmental justice, public health and safety, housing, and other concerns of residents within State and local jurisdictions.

22.2.1 Federal

Major Federal laws and regulations guiding the assessment of socioeconomic resources are summarized below.

Council on Environmental Quality Guidance

The CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508) provide guidance related to social and economic impact assessment by noting that the "human environment" assessed under NEPA is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14). Furthermore, these regulations require agencies to assess "aesthetic, historic, cultural, economic, social, or health" effects, whether direct, indirect, or cumulative (40 CFR 1508.8).

22.2.2 State of California

Most State and local governments have plans and policies intended to protect and expand local and regional economies affecting communities and residents within State and local jurisdictions. Some State and local plans and policies are also intended to promote public health and safety while minimizing conflicts between new development projects of all types; traffic, air, and noise impacts associated with projects; and the social environment within which local residents live and work. State plans and policies also frequently address other social and economic impact topics, including fiscal conditions and related public services that affect local residents' quality of life.

Cal/EPA adopted its own environmental justice policy in 2004. Pursuant to Sections 71110–71113 of the California Public Resources Code, Cal/EPA has developed this policy (or strategy) to provide guidance to its resource boards, departments, and offices. The policy is intended to help meet the State's goal of "achieving fair treatment of people

of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies."

22.3 Environmental Consequences and Mitigation Measures

This section describes the effects that the program alternatives would have on the socioeconomics of each geographic region of the study area, through analyzing the ways in which impacts on the physical environment may affect local and regional economies. The program alternatives evaluated in this chapter are described in detail in Chapter 2.0, "Descriptions of Alternatives," and summarized in Table 22-26. Potential impacts and associated mitigation measures are summarized in Table 22-27.

Table 22-26.
Actions Included Under Action Alternatives

Level of NEPA/CEQA Compliance	Actions[1]		Action Alternative					
			A1	A2	B1	B2	C1	C2
Project-Level	Reoperate Friant Dam and downstream flow control structures to route Interim and Restoration flows		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows in the Restoration Area		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows at existing CVP and SWP facilities in the Delta		✓	✓	✓	✓	✓	✓
Program-Level	Common Restoration actions[2]		✓	✓	✓	✓	✓	✓
	Actions in Reach 4B1 to provide at least:	475 cfs capacity	✓	✓	✓	✓	✓	✓
		4,500 cfs capacity with integrated floodplain habitat		✓		✓		✓
	Recapture Interim and Restoration flows on the San Joaquin River downstream from the Merced River at:	Existing facilities on the San Joaquin River			✓	✓	✓	✓
		New pumping infrastructure on the San Joaquin River					✓	✓
	Recirculation of recaptured Interim and Restoration flows		✓	✓	✓	✓	✓	✓

Notes:
[1] All alternatives also include the Physical Monitoring and Management Plan and the Conservation Strategy, which include both project- and program-level actions intended to guide implementation of the Settlement.
[2] Common Restoration actions are physical actions to achieve the Restoration Goal that are common to all action alternatives and are addressed at a program level of detail.

Key:
CEQA = California Environmental Quality Act
cfs = cubic feet per second
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
NEPA = National Environmental Policy Act
PEIS/R = Program Environmental Impact Statement/Report
SWP = State Water Project

Table 22-27.
Summary of Impacts and Mitigation Measures – Socioeconomics

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Socioeconomics: Program-Level				
SOC-1: Change in Regional Employment Levels	No-Action	No Impact	--	No Impact
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial
SOC-2: Change in Regional Population Levels	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
SOC-3: Change in Regional Housing Demand	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
Socioeconomics:Project-Level				
SOC-4: Change in Regional Employment Levels	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
SOC-5: Change in Regional Population Levels	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS

Table 22-27.
Summary of Impacts and Mitigation Measures – Socioeconomics (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Socioeconomics:Program-Level (contd.)				
SOC-6: Change in Regional Housing Demand	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
SOC-7: Physical Decay in Communities	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS

Key:
-- = not applicable
LTS = less than significant

22.3.1 Impact Assessment Methodology

Changes in regional economic output and employment were analyzed for their respective impacts on population and housing within the four geographic regions of the study area. Estimates of these impacts were derived from the IMPLAN input-output model. The IMPLAN model presents existing economic conditions for the geographic area analyzed and provides an estimate of the direct, indirect, and induced program- and project-level impacts on the regional economy from the action alternatives. The IMPLAN model assumes that activity will occur exclusively within the defined study area, providing economic and employment outputs for only those counties included in the analysis. While the IMPLAN model does assume some level of "leakage" outside the study area based on common ratios of domestic and foreign trade, large-scale in-migration of transient workers from outside the study area (and subsequent spending of payroll outside the study area by these workers) is generally not assumed by the model. Thus, the IMPLAN model results presented here should be interpreted as an approximate upper limit to economic and employment impacts for any one defined study area. The IMPLAN modeling methodology is described further in Appendix H, "Modeling."

Data derived from IMPLAN and presented in this section vary slightly from the data for county-wide and/or regional employment and economic activity presented in Appendix O, "Socioeconomics." The IMPLAN data set is based on a collection of interrelated socioeconomic data, as opposed to a single data set. Output and employment figure, as shown in Table 22-8, were combined for all counties within the modeled geographic region. Combining these figures produced an overall description of the regional economic

base, and regional impacts from the action alternatives that are not specific to individual communities. The magnitude of these regional socioeconomic impacts was analyzed by interpreting the effects they may have on population and housing needs for each geographic area for which the IMPLAN model was run.

Table 22-28.
Friant Division Model: 2007 Economic Base

Industry/Sector	Industry Output ($ millions)	Employment (no. of jobs)	Personal Income ($ millions)
Agriculture, Forestry, Fishing, and Hunting	$23,233.2	199,030	$5,607.0
Mining	$5,920.9	11,700	$1,349.2
Utilities	$4,448.0	4,920	$652.6
Construction	$11,066.2	71,580	$4,239.6
Manufacturing	$35,344.4	71,500	$4,216.8
Wholesale Trade	$5,116.7	32,900	$1,947.0
Retail Trade	$8,458.2	116,280	$3,729.8
Transportation and Warehousing	$4,684.4	32,760	$1,807.7
Information	$3,562.2	10,920	$678.8
Finance and Insurance	$5,738.4	30,000	$1,645.7
Real Estate and Rental	$11,030.3	27,820	$795.2
Professional, Scientific, and Technical Services	$4,887.3	43,050	$2,379.1
Management of Companies	$1,292.9	7,880	$476.8
Administrative and Waste Services	$3,080.6	50,880	$1,468.6
Educational Services	$481.5	9,740	$203.8
Health and Social Services	$8,960.4	105,200	$4,875.5
Arts, Entertainment, and Recreation	$544.9	11,410	$210.5
Accommodation and Food Services	$3,474.1	63,920	$1,154.2
Other Services	$4,003.7	66,610	$1,605.0
Government and Non–North American Industry Classification System	$17,339.7	224,540	$13,920.6
Totals	$162,668.0	1,192,620	$52,963.4

Source: 2007 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications made by Cascade Economics LLC.
Note: Includes Fresno, Kern, Kings, Madera, Merced, and Tulare counties

Relationships between projected employment impacts and the values of population growth and housing need were computed by applying ratios based on existing conditions. An assumption was made that new employment in the region would manifest as similar types of growth within the region. When introduced employment would be unique to an area, this assumption can be problematic. For the action alternatives, however, when impacts would likely relate to construction, agriculture, and recreation (three industries well represented in existing conditions), biases of these type are unlikely to occur.

Construction Impacts

Impacts from increased construction were modeled at the $1 million, $10 million, and $50 million annual expenditure levels. Impacts from decreased agricultural value were

modeled at the $1 million, $10 million, $50 million, and $100 million annual loss levels. The distribution of affected agricultural products was assumed to parallel the 2000–2006 average mix of agricultural uses (based on 2006 constant value) for the counties included in the related geographic region, as presented in Appendix O, "Socioeconomics." In the absence of exact costs, these values were chosen to express a conceivable range of economic impacts likely associated with the program alternatives. The values also suggest the relative impact that an increase/decrease in some sectors may have on other sectors in the same geographic area.

Construction activities for which impacts were analyzed were assumed to occur in the Restoration Area (i.e., between Friant Dam and the Merced River confluence, and generally within 1,500 feet of the centerline of the river). The Restoration Area is located within Fresno, Madera, and Merced counties, and these three counties were combined by the IMPLAN model as the study area for construction-related economic impacts.

Operational Impacts

Regional economic impacts resulting from potential operations were modeled for each alternative in IMPLAN using data from agricultural output estimated by the CalSim and CVPM models. Recreation impacts on the San Joaquin River and Millerton Lake, as presented in Appendix H, "Modeling," and Chapter 21.0, "Recreation," were also taken into consideration in the IMPLAN analysis. Regional agricultural water deliveries from CalSim were used as inputs to CVPM. The gross and net revenue estimated by CVPM were used by IMPLAN to estimate regional economic activity. The intent was to estimate socioeconomic effects from operations that would occur under each action alternative. For the operations impact analysis, an IMPLAN model was developed to evaluate economic activity in the six-county region of the Friant Division. The six counties within the Friant Division are Fresno, Kern, Kings, Madera, Merced, and Tulare counties.

22.3.2 Significance Criteria

The thresholds of significance for impacts 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. Economic and social factors are listed in the definition of effects to consider under NEPA Regulations (40 CFR 1508.8). CEQA does not require an evaluation of socioeconomics explicitly, but does require evaluation of effects on population, employment, and housing. Consequently, significance criteria were established for socioeconomic effects related to population, employment, housing, and urban decay consistent with the State CEQA Guidelines and NEPA.

Implementation of the Settlement has the potential to affect the existing socioeconomic conditions of different geographic regions (i.e., collections of counties) to varying extents. Thus, different criteria for determining significance were assigned for each geographic region analyzed in this chapter based on growth estimates provided by the State (EDD 2007, DOF 2007a, HCD 2008). Annual-average growth projections for employment are based on 2004–2014 or 2006–2016 projections by EDD, depending on the county, and when available; population projections are based on projections for

2000–2010 by the California Department of Finance; and housing projections are based on projections for 1997–2010 by the U.S. Department of Housing and Community Development.

A significant impact would occur when an alternative would affect the economy of a given geographic region in such a way that a projected growth rate would be exceeded. More specific significance criteria are provided below for construction impacts and operation impacts. The significance criteria listed below were established based on the most recent projections for the various counties within each geographic areas (as identified below). When more than one county occupied a geographic region within the study area, the appropriate data were averaged to arrive at the significance thresholds provided below.

Construction Impacts

Based on the factors described above, for each geographic region within the study area, impacts on socioeconomics would be significant if project construction would do any of the following:

- Cause regional employment to decrease, or cause annual-average regional employment to increase by more than the region-specific rate identified below:
  - **San Joaquin River upstream from Friant Dam.** 0.9 percent.
  - **San Joaquin River from Friant Dam to the Merced River.** 1.0 percent.
  - **San Joaquin River from the Merced River to the Delta.** 1.1 percent.
  - **CVP/SWP water service areas.** 1.1 percent.
- Cause regional population to decrease, or cause annual-average regional population growth to increase by more than the region-specific rate identified below:
  - **San Joaquin River upstream from Friant Dam.** 2.3 percent.
  - **San Joaquin River from Friant Dam to the Merced River.** 2.4 percent.
  - **San Joaquin River from the Merced River to the Delta.** 2.4 percent.
  - **CVP/SWP water service areas.** 2.7 percent.
- Cause regional housing demand to decrease, or cause annual-average regional housing demand to increase by more than the region-specific rate identified below:
  - **San Joaquin River upstream from Friant Dam.** 2.9 percent.
  - **San Joaquin River from Friant Dam to Merced River.** 2.9 percent.
  - **San Joaquin River from Merced River to the Delta.** 3.6 percent.
  - **CVP/SWP water service areas.** 3.2 percent.

- Affect the socioeconomics of the region in such a way as to create blight among the built environment.

The significance criteria listed above were established based on data for the following counties:

- **San Joaquin River upstream from Friant Dam.** Fresno and Madera counties.
- **San Joaquin River from Friant Dam to the Merced River.** Fresno, Madera, and Merced counties.
- **San Joaquin River from the Merced River to the Delta.** Stanislaus County.
- **CVP/SWP water service areas.** Fresno, Kern, Kings, Madera, Merced, and Tulare counties (except that the computation of regional employment data did not include projections for Kern and Tulare counties).

Operational Impacts

Based on the factors described above, for each county within the Friant Division, impacts on socioeconomics would be significant if program operations would do any of the following:

- Cause regional employment to decrease, or increase the annual-average regional unemployment rate in the Friant Division by more than 1.1 percent.
- Cause regional population to decrease, or increase the annual-average regional population in the Friant Division by more than 2.7 percent.
- Cause regional housing demand to decrease, or increase annual-average regional housing demand in the Friant Division by more than 3.2 percent.

22.3.3 Program-Level Impacts and Mitigation Measures

This section provides a program-level evaluation of the direct and indirect effects of program-level actions on socioeconomics. Program-level impacts would largely be associated with construction activities. Construction-related impacts would occur in the Restoration Area under all action alternatives, and along the San Joaquin River between the Merced River and the Delta under Alternatives C1 and C2. These actions could affect socioeconomic conditions during facilities modification or construction or during other Restoration actions, which would occur in the Restoration Area (and along the San Joaquin River between the Merced River and the Delta under Alternatives C1 and C2).

No-Action Alternative

Under the No-Action Alternative, the Settlement would not be implemented, and current trends in socioeconomics would continue.

Impact SOC-1 (No-Action Alternative): *Change in Regional Employment Levels – Program-Level.* Under the No-Action Alternative, current trends in regional employment levels would continue in all counties within the Friant Division and

Restoration Area at rates projected by State, county, and local agencies. There would be **no impact**.

Impact SOC-2 (No-Action Alternative): *Change in Regional Population Levels – Program-Level.* Under the No-Action Alternative, current trends in regional population growth would continue in all counties within the Friant Division and Restoration Area at rates projected by State, county, and local agencies. There would be **no impact**.

Impact SOC-3 (No-Action Alternative): *Change in Regional Housing Demand – Program-Level.* Under the No-Action Alternative, current trends in regional housing demand would continue in all counties within the Friant Division and Restoration Area at rates projected by State, county, and local agencies. There would be **no impact**.

Alternative A1

Program-level impacts under Alternative A1 would include construction impacts in the Restoration Area, but not downstream along the San Joaquin River between the Merced River and the Delta. Construction of Alternative A1 would impact socioeconomic activity in the Restoration Area, as described below.

Socioeconomic impacts associated with operational changes under Alternative A1, including recapture of Interim and Restoration flows, would be associated with project-level actions, and are described in the section on project-level impacts.

Impact SOC-1 (Alternative A1): *Change in Regional Employment Levels – Program-Level.* Increased short-term socioeconomic activity could occur in the counties within the Restoration Area if substantial construction activity occurred quickly under Alternative A1. This increased socioeconomic activity may cause annual-average regional employment to increase by more than 1.0 percent during construction. Lands taken out of agricultural production from Restoration action footprints are considered to have relatively small effects on agricultural production. Therefore, short-term effects on regional employment levels would be beneficial, and long-term effects would be less than significant. This impact would be **less than significant** and **beneficial**.

Increased short-term socioeconomic activity may occur in the counties within the Restoration Area if substantial construction activity occurred quickly under Alternative A1. This increased socioeconomic activity may cause annual-average regional employment to increase by more than 1.0 percent during construction. Unemployment in the area is currently higher than the State average, and would likely remain higher for the foreseeable future. Therefore, increased regional employment from construction activities is not considered to be unplanned growth and is considered to be beneficial. Conversely, the loss of agricultural production from long-term changes in land use from the construction-related "footprint" would likely reduce employment in the long term. The creation of new construction jobs has the potential to far outweigh possible farm labor losses from land conversion due to program-related footprints, but the construction-related effects from farm labor losses from project footprints are long term. Lands taken out of agricultural production from Restoration action footprints are considered to have relatively small effects on agricultural production. Program-level Restoration activities

that could occur in the Restoration Area under the Settlement are wide-ranging; however, the specific timeline for implementing the Restoration actions, the scale of each Restoration action, and the likelihood that multiple Restoration actions would be implemented at the same time and constructed simultaneously is unknown at this time.

Tables 22-29, 22-30, and 22-31 show the direct, indirect, and induced effects that yearly construction expenditures of $1 million, $10 million, and $50 million, respectively, may have on the total output and employment of Fresno, Madera, and Merced counties. "Direct" effects include economic effects directly related to changes in industries. "Indirect" effects include changes in interindustry purchases as industries respond to demands from direct industry changes. "Induced" effects generally include changes in spending from households as incomes change as a result of changes in region-wide industry production. At the construction levels shown in Tables 22-29, 22-30, and 22-31, annual-average regional employment would not increase by more than 1.0 percent.

The ultimate expenditures for restoration activities are not yet known, but may easily exceed $50 million annually. According to estimates based on the IMPLAN input-output model, an increase of annual-average regional employment of more than 1.0 percent would occur if annual construction expenditures for any single year were between approximately $400 and $500 million. It is highly unlikely that annual construction expenditures would reach this level. The size of the resulting increase in regional employment would not likely result in unplanned growth in the region because of the continuing higher-than-average unemployment rates associated with the current recession and expected thereafter. Construction activities would increase employment levels, but most of this employment would replace current construction jobs that have been recently lost. The construction-related effects from implementing the Settlement would be a beneficial effect.

Tables 22-32, 22-33, 22-34, and 22-35 show the direct, indirect, and induced effects that 1-year agricultural losses of $1 million, $10 million, $50 million, and $100 million may have on the total output and employment of Fresno, Madera, and Merced counties. The loss of agricultural lands from production as a result of construction of the proposed program-level Restoration actions would likely decrease agricultural employment in the counties in which the Restoration Area is located. This decrease in employment, however, would average 0.2 percent or less, and also would be offset by operational effects (see discussion of project-level impacts). Therefore, this impact would be less than significant.

In summary, short-term regional employment in the counties within the Restoration Area could increase by more than 1.0 percent based on expenditures from program-level Restoration activities, which is considered to be beneficial. Loss of agricultural lands as a result of constructing Restoration actions, however, would likely decrease regional employment, but not nearly to the degree that construction-related jobs would be created. The effects on regional employment are considered to be beneficial during construction activities and less than significant in the long term after construction-related activities are completed and some currently agricultural lands are taken out of production for Restoration-related construction footprints.

Table 22-29.
Direct Effects of Yearly San Joaquin River Restoration Program Construction Expenditures of $1 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	0.0	0.0	0.0	0.0	32,885.22	0	0.1	0.4	0.4	0.0
Administrative and Waste Services	1,533.03	0.0	0.0	0.0	0.0	0.0	24,137.38	0	0.2	0.1	0.4	0.0
Agriculture, Forestry, Fishing, and Hunting	9,114.38	0.0	0.0	0.0	0.0	0.0	85,708.92	0	0	0	0	0.0
Arts, Entertainment, and Recreation	293.917	0.0	0.0	0.0	0.0	0.0	6,366.16	0	0	0.1	0.1	0.0
Construction	5,431.62	1.0	0.0	0.0	1.0	0.0	35,546.88	7.5	0	0	7.5	0.0
Educational Services	307.641	0.0	0.0	0.0	0.0	0.0	6,492.28	0	0	0.1	0.1	0.0
Finance and Insurance	3,278.68	0.0	0.0	0.0	0.0	0.0	17,400.58	0	0.1	0.1	0.2	0.0
Government	7,210.56	0.0	0.0	0.0	0.0	0.0	102,986.07	0	0	0	0.1	0.0
Health and Social Services	5,276.35	0.0	0.0	0.1	0.1	0.0	58,920.89	0	0	0.6	0.6	0.0
Information	2,124.37	0.0	0.0	0.0	0.0	0.0	6,584.26	0	0	0	0.1	0.0
Management	638.107	0.0	0.0	0.0	0.0	0.0	3,854.59	0	0	0	0	0.0
Manufacturing	17,239.40	0.0	0.1	0.0	0.1	0.0	42,344.29	0	0.2	0.1	0.2	0.0
Mining	75.802	0.0	0.0	0.0	0.0	0.0	306.827	0	0	0	0	0.0
Other	2,147.57	0.0	0.0	0.0	0.0	0.0	35,443.18	0	0.2	0.2	0.4	0.0
Professional, Scientific, and Technical Services	2,474.69	0.0	0.1	0.0	0.1	0.0	23,154.37	0	0.7	0.1	0.8	0.0
Real Estate and Rental	5,773.33	0.0	0.0	0.1	0.1	0.0	16,090.91	0	0.1	0.1	0.2	0.0
Retail Trade	4,162.27	0.0	0.0	0.0	0.1	0.0	58,713.90	0	0.2	0.6	0.8	0.0
Transportation and Warehousing	2,169.23	0.0	0.0	0.0	0.0	0.0	16,077.04	0	0.1	0.1	0.2	0.0
Utilities	2,332.77	0.0	0.0	0.0	0.0	0.0	2,668.91	0	0	0	0	0.0
Wholesale Trade	2,686.37	0.0	0.0	0.0	0.0	0.0	17,716.26	0	0.1	0.1	0.2	0.0
Totals	**76,057.67**	**1.0**	**0.3**	**0.3**	**1.6**	**0.0**	**593,398.90**	**7.5**	**2.1**	**2.8**	**12.4**	**0.0**

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Table 22-30.
Direct Effects of Yearly San Joaquin River Restoration Program Construction Expenditures of $10 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	0.0	0.2	0.2	0.0	32,885.22	0	0.8	3.5	4.3	0.0
Administrative and Waste Services	1,533.03	0.0	0.1	0.1	0.2	0.0	24,137.38	0	2.4	1.1	3.5	0.0
Agriculture, Forestry, Fishing, and Hunting	9,114.38	0.0	0.0	0.1	0.1	0.0	85,708.92	0	0.2	0.3	0.5	0.0
Arts, Entertainment, and Recreation	293.917	0.0	0.0	0.0	0.0	0.0	6,366.16	0	0.1	0.6	0.8	0.0
Construction	5,431.62	9.6	0.0	0.0	9.6	0.2	35,546.88	74.9	0.2	0.2	75.3	0.2
Educational Services	307.641	0.0	0.0	0.0	0.0	0.0	6,492.28	0	0	0.7	0.7	0.0
Finance and Insurance	3,278.68	0.0	0.1	0.3	0.4	0.0	17,400.58	0	0.8	1.4	2.2	0.0
Government	7,210.56	0.0	0.0	0.1	0.1	0.0	102,986.07	0	0.2	0.5	0.7	0.0
Health and Social Services	5,276.35	0.0	0.0	0.5	0.5	0.0	58,920.89	0	0	6	6	0.0
Information	2,124.37	0.0	0.1	0.1	0.2	0.0	6,584.26	0	0.3	0.3	0.6	0.0
Management	638.107	0.0	0.0	0.0	0.1	0.0	3,854.59	0	0.2	0.1	0.4	0.0
Manufacturing	17,239.40	0.0	0.7	0.3	1.0	0.0	42,344.29	0	1.5	0.6	2.1	0.0
Mining	75.802	0.0	0.0	0.0	0.0	0.0	306.827	0	0	0	0	0.0
Other	2,147.57	0.0	0.2	0.1	0.3	0.0	35,443.18	0	1.9	2.3	4.2	0.0
Professional, Scientific, and Technical Services	2,474.69	0.0	0.8	0.1	0.9	0.0	23,154.37	0	7.3	1	8.2	0.0
Real Estate and Rental	5,773.33	0.0	0.2	0.6	0.8	0.0	16,090.91	0	1.1	1.2	2.3	0.0
Retail Trade	4,162.27	0.0	0.1	0.4	0.5	0.0	58,713.90	0	2	5.9	7.9	0.0
Transportation and Warehousing	2,169.23	0.0	0.1	0.1	0.2	0.0	16,077.04	0	1	0.6	1.6	0.0
Utilities	2,332.77	0.0	0.0	0.1	0.1	0.0	2,668.91	0	0.1	0.1	0.1	0.0
Wholesale Trade	2,686.37	0.0	0.2	0.2	0.4	0.0	17,716.26	0	1.4	1	2.4	0.0
Totals	76,057.67	9.6	3.0	3.2	15.8	0.0	593,398.90	74.9	21.5	27.5	123.9	0.0

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Table 22-31.
Direct Effects of Yearly San Joaquin River Restoration Program Construction Expenditures of $50 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	0.2	1.0	1.2	0.1	32,885.22	0	4	17.6	21.5	0.1
Administrative and Waste Services	1,533.03	0.0	0.7	0.3	1.1	0.1	24,137.38	0	12.2	5.4	17.6	0.1
Agriculture, Forestry, Fishing, and Hunting	9,114.38	0.0	0.1	0.3	0.4	0.0	85,708.92	0	0.8	1.7	2.5	0.0
Arts, Entertainment, and Recreation	293.917	0.0	0.0	0.2	0.2	0.1	6,366.16	0	0.6	3.2	3.8	0.1
Construction	5,431.62	47.9	0.1	0.2	48.2	0.9	35,546.88	374.6	1.1	0.8	376.6	1.1
Educational Services	307.641	0.0	0.0	0.2	0.2	0.1	6,492.28	0	0.1	3.6	3.6	0.1
Finance and Insurance	3,278.68	0.0	0.7	1.4	2.1	0.1	17,400.58	0	3.8	7	10.9	0.1
Government	7,210.56	0.0	0.2	0.4	0.6	0.0	102,986.07	0	1.2	2.3	3.5	0.0
Health and Social Services	5,276.35	0.0	0.0	2.6	2.6	0.1	58,920.89	0	0	30.2	30.2	0.1
Information	2,124.37	0.0	0.5	0.5	1.0	0.0	6,584.26	0	1.4	1.7	3.1	0.0
Management	638.107	0.0	0.2	0.1	0.3	0.0	3,854.59	0	1.2	0.6	1.9	0.0
Manufacturing	17,239.40	0.0	3.6	1.4	5.0	0.0	42,344.29	0	7.5	2.9	10.5	0.0
Mining	75.802	0.0	0.0	0.0	0.0	0.0	306.827	0	0.1	0	0.1	0.0
Other	2,147.57	0.0	1.0	0.6	1.6	0.1	35,443.18	0	9.3	11.7	21	0.1
Professional, Scientific, and Technical Services	2,474.69	0.0	3.9	0.5	4.4	0.2	23,154.37	0	36.3	4.8	41.2	0.2
Real Estate and Rental	5,773.33	0.0	1.2	3.0	4.2	0.1	16,090.91	0	5.4	6.2	11.6	0.1
Retail Trade	4,162.27	0.0	0.7	2.0	2.7	0.1	58,713.90	0	10	29.4	39.4	0.1
Transportation and Warehousing	2,169.23	0.0	0.7	0.4	1.1	0.1	16,077.04	0	5	2.9	7.9	0.0
Utilities	2,332.77	0.0	0.2	0.3	0.5	0.0	2,668.91	0	0.3	0.4	0.7	0.0
Wholesale Trade	2,686.37	0.0	1.1	0.8	1.9	0.1	17,716.26	0	7	5.2	12.2	0.1
Totals	76,057.67	47.9	15.2	16.0	79.1	0.1	593,398.90	374.6	107.3	137.6	619.5	0.1

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Table 22-32.
Direct, Indirect, and Induced Effects of 1-Year Agricultural Losses of $1 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	0.0	0.0	0.0	0.0	32,885.22	0	0	-0.2	-0.2	0.0
Administrative and Waste Services	1,533.03	0.0	0.0	0.0	0.0	0.0	24,137.38	0	-0.1	-0.1	-0.1	0.0
Agriculture, Forestry, Fishing, and Hunting	9,114.38	-1.0	-0.2	0.0	-1.2	0.0	85,708.92	-6.7	-4.1	0	-10.8	0.0
Arts, Entertainment, and Recreation	293.917	0.0	0.0	0.0	0.0	0.0	6,366.16	0	0	0	0	0.0
Construction	5,431.62	0.0	0.0	0.0	0.0	0.0	35,546.88	0	-0.1	0	-0.1	0.0
Educational Services	307.641	0.0	0.0	0.0	0.0	0.0	6,492.28	0	0	0	0	0.0
Finance and Insurance	3,278.68	0.0	0.0	0.0	0.0	0.0	17,400.58	0	-0.1	-0.1	-0.2	0.0
Government	7,210.56	0.0	0.0	0.0	0.0	0.0	102,986.07	0	0	0	-0.1	0.0
Health and Social Services	5,276.35	0.0	0.0	0.0	0.0	0.0	58,920.89	0	0	-0.3	-0.3	0.0
Information	2,124.37	0.0	0.0	0.0	0.0	0.0	6,584.26	0	0	0	0	0.0
Management	638.107	0.0	0.0	0.0	0.0	0.0	3,854.59	0	0	0	0	0.0
Manufacturing	17,239.40	0.0	-0.1	0.0	-0.1	0.0	42,344.29	0	-0.1	0	-0.1	0.0
Mining	75.802	0.0	0.0	0.0	0.0	0.0	306.827	0	0	0	0	0.0
Other	2,147.57	0.0	0.0	0.0	0.0	0.0	35,443.18	0	0	-0.1	-0.2	0.0
Professional, Scientific, and Technical Services	2,474.69	0.0	0.0	0.0	0.0	0.0	23,154.37	0	-0.1	-0.1	-0.2	0.0
Real Estate and Rental	5,773.33	0.0	0.0	0.0	-0.1	0.0	16,090.91	0	-0.3	-0.1	-0.3	0.0
Retail Trade	4,162.27	0.0	0.0	0.0	0.0	0.0	58,713.90	0	0	-0.3	-0.3	0.0
Transportation and Warehousing	2,169.23	0.0	0.0	0.0	0.0	0.0	16,077.04	0	-0.1	0	-0.2	0.0
Utilities	2,332.77	0.0	0.0	0.0	0.0	0.0	2,668.91	0	0	0	0	0.0
Wholesale Trade	2,686.37	0.0	0.0	0.0	0.0	0.0	17,716.26	0	-0.2	-0.1	-0.2	0.0
Totals	76,057.67	-1.0	-0.4	-0.2	-1.6	0.0	593,398.90	-6.7	-5.3	-1.5	-13.5	0.0

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Table 22-33.
Direct, Indirect, and Induced Effects of 1-Year Agricultural Losses of $10 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	0.0	-0.1	-0.1	0.0	32,885.22	0	-0.3	-1.9	-2.2	0.0
Administrative and Waste Services	1,533.03	0.0	-0.1	0.0	-0.1	0.0	24,137.38	0	-0.8	-0.6	-1.4	0.0
Agriculture, Forestry, Fishing, and Hunting	9,114.38	-10.0	-1.8	0.0	-11.8	-0.1	85,708.92	-66.9	-40.6	-0.2	-107.7	-0.1
Arts, Entertainment, and Recreation	293.917	0.0	0.0	0.0	0.0	0.0	6,366.16	0	-0.1	-0.3	-0.4	0.0
Construction	5,431.62	0.0	-0.1	0.0	-0.1	0.0	35,546.88	0	-0.6	-0.1	-0.6	0.0
Educational Services	307.641	0.0	0.0	0.0	0.0	0.0	6,492.28	0	-0.1	-0.4	-0.5	0.0
Finance and Insurance	3,278.68	0.0	-0.3	-0.2	-0.4	0.0	17,400.58	0	-1.5	-0.8	-2.2	0.0
Government	7,210.56	0.0	-0.1	0.0	-0.1	0.0	102,986.07	0	-0.5	-0.2	-0.7	0.0
Health and Social Services	5,276.35	0.0	0.0	-0.3	-0.3	0.0	58,920.89	0	0	-3.3	-3.3	0.0
Information	2,124.37	0.0	0.0	-0.1	-0.1	0.0	6,584.26	0	-0.1	-0.2	-0.3	0.0
Management	638.107	0.0	0.0	0.0	0.0	0.0	3,854.59	0	-0.1	-0.1	-0.2	0.0
Manufacturing	17,239.40	0.0	-0.7	-0.1	-0.8	0.0	42,344.29	0	-0.7	-0.3	-1	0.0
Mining	75.802	0.0	0.0	0.0	0.0	0.0	306.827	0	0	0	0	0.0
Other	2,147.57	0.0	0.0	-0.1	-0.1	0.0	35,443.18	0	-0.3	-1.3	-1.5	0.0
Professional, Scientific, and Technical Services	2,474.69	0.0	-0.1	-0.1	-0.2	0.0	23,154.37	0	-1.4	-0.5	-1.9	0.0
Real Estate and Rental	5,773.33	0.0	-0.5	-0.3	-0.8	0.0	16,090.91	0	-2.8	-0.7	-3.4	0.0
Retail Trade	4,162.27	0.0	0.0	-0.2	-0.2	0.0	58,713.90	0	-0.2	-3.2	-3.3	0.0
Transportation and Warehousing	2,169.23	0.0	-0.2	0.0	-0.2	0.0	16,077.04	0	-1.2	-0.3	-1.5	0.0
Utilities	2,332.77	0.0	-0.1	0.0	-0.1	0.0	2,668.91	0	-0.2	0	-0.2	0.0
Wholesale Trade	2,686.37	0.0	-0.2	-0.1	-0.3	0.0	17,716.26	0	-1.6	-0.6	-2.2	0.0
Totals	76,057.67	-10.0	-4.3	-1.7	-16.0	0.0	593,398.90	-66.9	-53	-14.9	-134.8	0.0

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Table 22-34.
Direct, Indirect, and Induced Effects of 1-Year Agricultural Losses of $50 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	-0.1	-0.5	-0.6	0.0	32,885.22	0	-1.6	-9.5	-11.1	0.0
Administrative and Waste Services	1,533.03	0.0	-0.3	-0.2	-0.4	0.0	24,137.38	0	-4.1	-2.9	-7.1	0.0
Agriculture, Forestry, Fishing, and Hunting	9,114.38	-50.0	-9.1	-0.1	-59.2	-0.6	85,708.92	-334	-203.2	-0.9	-538.5	-0.6
Arts, Entertainment, and Recreation	293.917	0.0	0.0	-0.1	-0.1	0.0	6,366.16	0	-0.4	-1.7	-2.1	0.0
Construction	5,431.62	0.0	-0.3	-0.1	-0.4	0.0	35,546.88	0	-2.8	-0.4	-3.2	0.0
Educational Services	307.641	0.0	0.0	-0.1	-0.1	0.0	6,492.28	0	-0.5	-1.9	-2.5	0.0
Finance and Insurance	3,278.68	0.0	-1.4	-0.8	-2.2	-0.1	17,400.58	0	-7.4	-3.8	-11.2	-0.1
Government	7,210.56	0.0	-0.5	-0.2	-0.7	0.0	102,986.07	0	-2.3	-1.2	-3.5	0.0
Health and Social Services	5,276.35	0.0	0.0	-1.4	-1.4	0.0	58,920.89	0	0	-16.3	-16.4	0.0
Information	2,124.37	0.0	-0.1	-0.3	-0.4	0.0	6,584.26	0	-0.5	-0.9	-1.4	0.0
Management	638.107	0.0	-0.1	-0.1	-0.2	0.0	3,854.59	0	-0.7	-0.3	-1	0.0
Manufacturing	17,239.40	0.0	-3.5	-0.7	-4.2	0.0	42,344.29	0	-3.4	-1.6	-5	0.0
Mining	75.802	0.0	0.0	0.0	0.0	0.0	306.827	0	0	0	-0.1	0.0
Other	2,147.57	0.0	-0.1	-0.3	-0.5	0.0	35,443.18	0	-1.4	-6.3	-7.7	0.0
Professional, Scientific, and Technical Services	2,474.69	0.0	-0.7	-0.3	-1.0	0.0	23,154.37	0	-6.9	-2.6	-9.5	0.0
Real Estate and Rental	5,773.33	0.0	-2.4	-1.6	-4.0	-0.1	16,090.91	0	-13.9	-3.4	-17.2	-0.1
Retail Trade	4,162.27	0.0	-0.1	-1.1	-1.1	0.0	58,713.90	0	-0.8	-15.9	-16.6	0.0
Transportation and Warehousing	2,169.23	0.0	-0.9	-0.2	-1.1	0.0	16,077.04	0	-6.1	-1.6	-7.7	0.0
Utilities	2,332.77	0.0	-0.6	-0.1	-0.7	0.0	2,668.91	0	-0.9	-0.2	-1.1	0.0
Wholesale Trade	2,686.37	0.0	-1.2	-0.4	-1.7	-0.1	17,716.26	0	-8.2	-2.8	-11	-0.1
Totals	76,057.67	-50.0	-21.3	-8.7	-80.0	-0.1	593,398.90	-334	-265.2	-74.4	-673.9	-0.1

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Table 22-35.
Direct, Indirect, and Induced Effects of 1-Year Agricultural Losses of $100 Million on Total Output and Employment of Fresno, Madera, and Merced Counties

Industry Sector	Output ($ millions)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Accommodation and Food Services	1,787.59	0.0	-0.2	-1.0	-1.2	-0.1	32,885.22	0	-3.2	-19	-22.2	-0.1
Administrative and Waste Services	1,533.03	0.0	-0.5	-0.4	-0.9	-0.1	24,137.38	0	-8.3	-5.9	-14.1	-0.1
Agriculture, Forestry, Fishing, and Hunting	9,114.38	-100.0	-18.1	-0.3	-118.4	-1.3	85,708.92	-668.7	-406.4	-1.8	-1,076.90	-1.3
Arts, Entertainment, and Recreation	293.917	0.0	0.0	-0.2	-0.2	-0.1	6,366.16	0	-0.8	-3.4	-4.2	-0.1
Construction	5,431.62	0.0	-0.6	-0.2	-0.8	0.0	35,546.88	0	-5.6	-0.9	-6.5	0.0
Educational Services	307.641	0.0	-0.1	-0.2	-0.2	-0.1	6,492.28	0	-1.1	-3.9	-5	-0.1
Finance and Insurance	3,278.68	0.0	-2.8	-1.5	-4.3	-0.1	17,400.58	0	-14.9	-7.6	-22.5	-0.1
Government	7,210.56	0.0	-0.9	-0.4	-1.3	0.0	102,986.07	0	-4.5	-2.5	-7	0.0
Health and Social Services	5,276.35	0.0	0.0	-2.9	-2.9	-0.1	58,920.89	0	0	-32.7	-32.7	-0.1
Information	2,124.37	0.0	-0.3	-0.6	-0.9	0.0	6,584.26	0	-0.9	-1.9	-2.8	0.0
Management	638.107	0.0	-0.2	-0.1	-0.3	-0.1	3,854.59	0	-1.4	-0.7	-2	-0.1
Manufacturing	17,239.40	0.0	-6.9	-1.5	-8.4	0.0	42,344.29	0	-6.8	-3.2	-9.9	0.0
Mining	75.802	0.0	0.0	0.0	-0.1	-0.1	306.827	0	-0.1	0	-0.1	0.0
Other	2,147.57	0.0	-0.3	-0.7	-0.9	0.0	35,443.18	0	-2.8	-12.7	-15.5	0.0
Professional, Scientific, and Technical Services	2,474.69	0.0	-1.4	-0.6	-2.0	-0.1	23,154.37	0	-13.9	-5.2	-19.1	-0.1
Real Estate and Rental	5,773.33	0.0	-4.8	-3.2	-8.0	-0.1	16,090.91	0	-27.7	-6.7	-34.4	-0.2
Retail Trade	4,162.27	0.0	-0.1	-2.2	-2.3	-0.1	58,713.90	0	-1.5	-31.8	-33.3	-0.1
Totals	76,057.67	-100.0	-42.6	-17.3	-160.0	-0.2	593,398.90	-668.7	-530.3	-148.8	-1,347.80	-0.2
Transportation and Warehousing	2,169.23	0.0	-1.7	-0.4	-2.1	-0.1	16,077.04	0	-12.3	-3.1	-15.4	-0.1
Utilities	2,332.77	0.0	-1.2	-0.3	-1.5	-0.1	2,668.91	0	-1.8	-0.4	-2.2	-0.1
Wholesale Trade	2,686.37	0.0	-2.5	-0.8	-3.3	-0.1	17,716.26	0	-16.4	-5.6	-22	-0.1

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

Impact SOC-2 (Alternative A1): *Change in Regional Population Levels – Program-Level.* Increased socioeconomic activity may occur in the counties within the Restoration Area if substantial construction activity occurs quickly under Alternative A1. This increased socioeconomic activity, although short term, may cause the region's population to grow by more than 2.4 percent (as opposed to only 1 percent growth under the No-Action Alternative). The effects on regional population levels would be greater during construction activities than in the long term after construction-related activities were completed and some currently agricultural lands were taken out of production for Restoration-related construction footprints. Therefore, this impact would be **less than significant**.

Increased socioeconomic activity may occur in the counties within the Restoration Area if substantial construction activity occurs quickly under Alternative A1. This increased socioeconomic activity, although short term, may cause the region's population to grow by more than 2.4 percent. According to estimates based on the IMPLAN input-output model, a population increase of more than 2.4 percent would occur if annual construction expenditures for any single year from proposed Restoration actions were near $1 billion. As mentioned above, ultimate expenditures for Restoration activities in the Restoration Area are not yet known. However, construction costs would not approach $1 billion on an annual basis. Consequently, a population increase exceeding 2.4 percent would not occur and would be expected to be approximately less than 1 percent. These economic effects are considered to be beneficial because the labor market will likely remain depressed from the current recession and its aftermath for some time, overlapping with construction of Restoration actions.

Conversely, the loss of agricultural lands from Restoration-related construction footprints may result in job losses, causing a long-term population decrease. The creation of new construction jobs (and corresponding short-term increase in population) has the potential to far outweigh possible farm labor losses (and corresponding long-term decrease in population from land taken out of agricultural production by the footprints of new or modified facilities). The effects on regional population levels would be greater during construction activities than in the long term after construction-related activities were completed and some currently agricultural lands were taken out of production for Restoration-related construction footprints. Therefore, this impact would be less than significant.

As discussed above, potential program-level Restoration activities are wide-ranging; however, the timeline of implementation, the scale of each Restoration action, and the likelihood that multiple Restoration actions would be implemented simultaneously is unknown at this time. According to data from the U.S. Census Bureau (2008), an increase of approximately 30,526 residents in a single year would exceed the significance threshold of 2.4 percent annual growth in the region comprising Fresno, Madera, and Merced counties. Based on current ratios for the total population compared to the employed civilian population, approximately 12,719 total new jobs would have to be created by program-level Restoration actions during construction to create a significant impact.

According to estimates based on the IMPLAN input-output model, a population increase of more than 2.4 percent would occur if annual construction expenditures for any single year from proposed Restoration actions were near $1 billion. As mentioned above, ultimate expenditures for Restoration activities in the Restoration Area are not yet known. However, construction costs would not approach $1 billion on an annual basis. Consequently, a population increase exceeding 2.4 percent would not occur and would be expected to be more on the order of less than 1 percent. These population effects are considered to be less than significant.

As described in Impact SOC-1 above, loss of agricultural lands as a result of construction of the proposed program-level Restoration actions would likely decrease employment in the long term. Direct, indirect, and induced job losses would occur throughout a range of industrial sectors (Tables 22-29 through 22-31). This loss of jobs may cause population in the region to decrease. Based on ratios derived from the U.S. Census Bureau (2008), a $1 million loss in agricultural production would result in approximately 32 fewer residents (0.002 percent population decline); a $100 million loss in agricultural production would result in approximately 3,235 fewer residents (0.3 percent decline).

In summary, increased short-term regional socioeconomic activity resulting from proposed construction of program-level Restoration actions in the Restoration Area could cause the total population of Fresno, Madera, and Merced counties to grow, but by less than 2.4 percent and more likely less than 1 percent. Given the current and expected population levels, this short-term increase during construction would be a less than significant effect. However, job losses caused by loss of agricultural lands as a result of construction of Restoration actions would likely result in a long-term decrease in the region's population. Creation of new construction jobs (and corresponding increase in population) has the potential to far outweigh possible farm labor losses (and corresponding decrease in population) in the short term. In the long term, regional population levels would decrease because of the loss of agricultural land, but this decrease would be small and offset by operational effects on recreation and retail jobs (see discussion of Impact SOC-6). This impact would be less than significant.

Impact SOC-3 (Alternative A1): *Change in Regional Housing Demand – Program-Level.* Increased socioeconomic activity may occur in the counties within the Restoration Area if substantial construction activity for program-level Restoration actions occurs quickly. This increased socioeconomic activity may cause short-term regional housing demand to grow, but less than 1 percent. Conversely, loss of agricultural land as a result of construction of Restoration actions may result in job losses, causing a long-term decrease in housing demand, but these effects are small and are considered to be less than significant. Overall, short- and long-term effects on regional housing demand as a result of construction activities would be **less than significant.**

As discussed above, potential program-level Restoration activities are wide ranging; however, the timeline of implementation, the scale of each Restoration action, and the likelihood that multiple Restoration actions would be constructed simultaneously is unknown at this time. According to data from the U.S. Census Bureau (2008), an increase of approximately 12,377 housing units in a single year would exceed the significance

threshold of 2.9 percent annual growth in the region comprising Fresno, Madera, and Merced counties. Based on current ratios for total housing units compared to the employed civilian population, approximately 15,472 total new jobs would have to be created by program-level Restoration actions to create a significant impact.

According to estimates based on the IMPLAN input-output model, an increase in housing demand of more than 2.9 percent would occur if annual construction expenditures for any single year from proposed Restoration actions were near $1.2 billion. As mentioned above, ultimate expenditures for Restoration activities in the Restoration Area are not yet known but would be well below $1.2 billion per year. Therefore, this impact is considered to be less than significant.

As described in Impact SOC-1 above, loss of agricultural lands as a result of construction of the proposed program-level Restoration actions would likely decrease employment long term. Direct, indirect, and induced losses would occur throughout a range of industrial sectors (see Tables 22-29 through 22-31). This loss of jobs could reduce the demand for housing in the counties within the Restoration Area. Based on ratios derived from the U.S. Census Bureau (2008), a $1 million loss in agricultural production would result in approximately 11 unoccupied housing units; a $100 million loss in agricultural production would result in approximately 1,078 unoccupied housing units. As discussed below under project-level impacts, the increased population and demand for employment and housing as a result of new retail and recreation jobs from operations in the long term should be greater than any drop in demand for housing because of lost farm jobs from the construction and operation of program-level actions. Consequently, the effects on housing are not expected to be substantial and exceed significance thresholds. This impact would be less than significant.

In summary, increased socioeconomic activity resulting from proposed program-level restoration actions in the Restoration Area could cause short-term regional housing demand to grow, but by less than 1 percent. However, job losses caused by loss of agricultural lands as a result of construction of Restoration actions would likely decrease long-term housing demand. In the short-term, creation of new construction jobs (and corresponding increase in housing demand) has the potential to far outweigh possible farm labor losses (and corresponding decrease in housing demand). However, in the long term, construction activities would cease while loss of agricultural lands from construction-related footprints would continue long term. When considering these effects with operational effects, however, the impact on housing would be less than significant.

Alternative A2

Program-level impacts under Alternative A2 would include construction impacts in the Restoration Area, but not downstream along the San Joaquin River between the Merced River and the Delta. However, the significance conclusions for impacts related to construction under Alternatives A1 and A2 would be the same.

Program-level impacts under Alternative A2 would include construction impacts in the Restoration Area, but not downstream along the San Joaquin River between the Merced River and the Delta. Under Alternative A2, program-level socioeconomics impacts

related to construction activities would be similar to, but potentially greater than, those previously described under Alternative A1. Whereas under Alternative A1 improvements would be constructed in Reach 4B1 to achieve flow capacity of at least 475 cfs, under Alternative A2, improvements would be constructed in Reach 4B1 to achieve flow capacity of at least 4,500 cfs, resulting in greater construction-related effects. However, the significance conclusions for impacts related to construction under Alternatives A1 and A2 would be the same.

Socioeconomic impacts associated with operational changes under Alternative A2, including recapture of Interim and Restoration flows, would be associated with project-level actions, and are described in the section on project-level impacts.

Alternative B1

Program-level impacts related to construction under Alternative B1 would be identical to those described under Alternative A1. Alternative B1 would include additional program-level impacts related to changes in operations associated with recapture of Interim and Restoration flows along the San Joaquin River between the Merced River and the Delta using existing facilities. However, the significance conclusions for program-level impacts under Alternative B1 would be the same as under Alternatives A1 and A2.

Socioeconomic impacts associated with operational changes under Alternative B1 would include impacts associated with recapture of Interim and Restoration flows at existing facilities within the Restoration Area and the Delta, as described in the section on project-level impacts. Additional program-level impacts would occur because of recapture of Interim and Restoration flows along the San Joaquin River between the Merced River and the Delta using existing facilities.

According to CVPM results presented in Appendix H, “Modeling,” increased pumping of groundwater would almost completely replace any reductions in surface water supply resulting from implementing Alternative B1. According to the CVPM, gross revenues within the Friant Division would decline by $2.1 million. The annual decline in net revenue for the Friant Division agricultural sector under Alternative B1 would be approximately $25.9 million (a decline of approximately 5 percent).

Table 22-36 shows the impacts that the recapture of Interim and Restoration flows under Alternative B1 may have on annual employment in the Friant Division. The loss of agricultural production from changes in land use is estimated to result in a decline in farm labor employment; however, the increase in retail jobs outweighs the loss in agricultural jobs. Annual-average employment would not noticeably increase and would be less than the planned annual-average Friant Division employment growth of 1.2 percent. The combined result of these effects and effects on other industries would be an estimated net gain of 28 jobs (see Table 22-36). Based on ratios derived from the U.S. Census Bureau (2008), an estimated increase of 28 jobs may result in a population increase of approximately 67 people. This contribution to overall population increase would not cause population growth to be greater than the significance criterion of 2.7 percent. An estimated increase in 28 jobs could result in an increased demand for 35 housing units. This growth in housing demand would not cause the Friant Division’s housing demand to

grow by more than the significance criterion of 3.2 percent. Therefore, the impacts to regional levels of employment and population would be beneficial and greater than Alternative A1. The impact to housing demand would be greater than Alternative A1, but would be less than significant, as for Alternative A1.

Table 22-36.
Alternatives B1 and B2: Annual-Average Regional Economic Impacts on Industry Output and Employment – Friant Division

Industry	Total Industry Output ($)			Employment (number of employees)		
	Existing Base	Friant Division Change, Alts B1 and B2	Percent of Base	Existing Base	Friant Division Change, Alts B1 and B2	Percent of Base
Agriculture, Forestry, Fishing, and Hunting	$23,233,194,000	-$2,606,360	-0.01%	199,030	-19	-0.01%
Mining	$5,920,873,000	-$155,777	0.00%	11,700	0	0.00%
Utilities	$4,447,976,000	-$131,658	0.00%	4,920	0	0.00%
Construction	$11,066,246,000	-$74,555	0.00%	71,580	0	0.00%
Manufacturing	$35,344,381,000	-$837,565	0.00%	71,500	-1	0.00%
Wholesale Trade	$5,116,683,000	-$472,282	-0.01%	32,900	-3	-0.01%
Retail Trade	$8,458,236,000	$3,075,407	0.04%	116,280	67	0.06%
Transportation and Warehousing	$4,684,445,000	-$217,258	0.00%	32,760	-1	0.00%
Information	$3,562,185,000	-$96,501	0.00%	10,920	0	0.00%
Finance and Insurance	$5,738,403,000	-$755,273	-0.01%	30,000	-4	-0.01%
Real Estate and Rental	$11,030,271,000	-$1,843,766	-0.02%	27,820	-2	-0.01%
Professional, Scientific, and Technical Services	$4,887,323,000	-$157,684	0.00%	43,050	-1	0.00%
Management of Companies	$1,292,948,000	$3,800	0.00%	7,880	0	0.00%
Administrative and Waste Services	$3,080,623,000	-$74,487	0.00%	50,880	-1	0.00%
Educational Services	$481,475,000	-$116,008	-0.02%	9,740	-3	-0.03%
Health and Social Services	$8,960,410,000	-$1,774,405	-0.02%	105,200	-22	-0.02%
Arts, Entertainment, and Recreation	$544,882,000	-$101,455	-0.02%	11,410	-2	-0.02%
Accommodation and Food Services	$3,474,102,000	$2,326,755	0.07%	63,920	34	0.05%
Other Services	$4,003,654,000	-$679,440	-0.02%	66,610	-12	-0.02%

Table 22-36.
Alternatives B1 and B2: Annual Regional Economic Impacts on Industry Output and Employment – Friant Division (contd.)

Industry	Total Industry Output ($)			Employment (number of employees)		
	Existing Base	Friant Division Change, Alts B1 and B2	Percent of Base	Existing Base	Friant Division Change, Alts B1 and B2	Percent of Base
Government and Non-North American Industry Classification System	$17,339,661,000	-$166,134	0.00%	224,540	-1	0.00%
Institutions	$0	-$526,119	N/A	0	0	N/A
Totals	**$162,667,971,000**	**-$5,380,765**	**0.00%**	**1,192,640**	**28**	**0.00%**

Source: 2007 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications made by Cascade Economics LLC
Key:
N/A = not applicable

Alternative B2

Program-level impacts related to construction under Alternative B2 would be identical to those described under Alternative A2. Program-level impacts related to changes in operations would be identical to those described under Alternative B1.

Alternative C1

Program-level impacts related to construction under Alternative C1 would include those described for Alternatives A1 and B1, as well as additional impacts along the San Joaquin River downstream from the Merced River confluence infrastructure. Program-level impacts related to operations under Alternative C1 would include those described for Alternatives A1 and B1, as well as additional impacts associated with recapture of Interim and Restoration flows using new pumping infrastructure. However, the significance conclusions for program-level impacts under Alternative C1 would be the same as under Alternatives A1, A2, and B1.

A total of 125 jobs could be created in the counties along the San Joaquin River between the Merced River and the Delta by program-level construction expenditures, but this increase in employment levels would not exceed employment growth estimates. This impact would be beneficial. The direct, indirect, and induced effects of construction on regional output and employment were modeled using IMPLAN. Table 22-37 summarizes the effects of constructing new pumping infrastructure on output and employment in the counties along the San Joaquin River between the Merced River and the Delta, as modeled using IMPLAN software.

Table 22-37.
Effects on Output and Employment of Constructing New Pumping and Conveyance Infrastructure

Industry Sector	Output ($)						Employment (number of employees)					
	Existing	Direct	Indirect	Induced	Total	Percent	Existing	Direct	Indirect	Induced	Total	Percent
Agriculture, Forestry, Fishing, and Hunting	2,529.83	0.0	0.0	0.0	0.1	0.0	17,106.42	0	0.1	0.2	0.3	0.0
Mining	20.525	0.0	0.0	0.0	0.0	0.0	65.101	0	0	0	0	0.0
Utilities	204.344	0.0	0.0	0.0	0.0	0.0	270.64	0	0	0	0.1	0.0
Construction	2,203.24	10.0	0.0	0.0	10.1	0.5	14,309.03	77.5	0.2	0.1	77.8	0.5
Manufacturing	9,601.59	0.0	0.3	0.1	0.4	0.0	22,282.62	0	1	0.5	1.5	0.0
Wholesale Trade	985.012	0.0	0.2	0.1	0.3	0.0	6,594.73	0	1.1	0.8	1.9	0.0
Retail Trade	1,872.20	0.0	0.1	0.4	0.5	0.0	26,584.82	0	2	5.9	7.9	0.0
Transportation and Warehousing	1,242.61	0.0	0.1	0.1	0.2	0.0	9,161.72	0	1	0.6	1.5	0.0
Information	581.036	0.0	0.1	0.1	0.2	0.0	2,462.17	0	0.3	0.4	0.7	0.0
Finance and Insurance	991.552	0.0	0.1	0.2	0.3	0.0	5,375.65	0	0.6	1	1.6	0.0
Real Estate and Rental	2,718.52	0.0	0.2	0.6	0.8	0.0	8,513.00	0	1	1.2	2.3	0.0
Professional, Scientific, and Technical Services	831.427	0.0	0.8	0.1	0.9	0.1	8,441.96	0	7.7	0.8	8.6	0.1
Management	319.486	0.0	0.0	0.0	0.1	0.0	1,800.15	0	0.2	0.1	0.3	0.0
Administrative and Waste Services	634.759	0.0	0.2	0.1	0.2	0.0	9,637.42	0	2.5	1	3.6	0.0
Educational Services	71.798	0.0	0.0	0.0	0.0	0.0	1,707.08	0	0	0.5	0.5	0.0
Health and Social Services	2,393.96	0.0	0.0	0.5	0.5	0.0	23,862.25	0	0	5.7	5.7	0.0
Arts, Entertainment, and Recreation	100.248	0.0	0.0	0.0	0.0	0.0	2,119.10	0	0.1	0.5	0.6	0.0
Accommodation and Food Services	759.459	0.0	0.0	0.2	0.2	0.0	14,400.55	0	0.8	3.5	4.3	0.0
Other	858.575	0.0	0.2	0.1	0.3	0.0	13,230.09	0	2	2.6	4.6	0.0
Government	2,190.33	0.0	0.0	0.1	0.1	0.0	29,336.02	0	0.2	0.4	0.6	0.0
Total	**31,110.51**	**10.0**	**2.5**	**2.9**	**15.3**	**0.0**	**217,260.52**	**77.5**	**21**	**26.1**	**124.5**	**0.1**

Note: “Direct” effects include those economic effects directly related to changes in industries as a result of the action alternatives. “Indirect” effects include changes in interindustry purchases as they respond to demands from direct industry changes. “Induced” effects generally include changes in spending from households as incomes change, resulting from changes in region-wide industry production.

An estimated $10 million in annual construction expenditures associated with new pumping infrastructure would create a modest short-term benefit to the regional economy. As shown in Table 22-36, these construction expenditures would likely create approximately $5.3 million in indirect and induced output. Professional services, real estate and rental, retail trade, and health and social services industries would receive the most benefit. The industries likely to receive the largest number of indirect and induced jobs would be professional services, retail trade, and health and social services. This increase in employment would not exceed estimates for employment growth, population growth, or housing demand. These impacts would be less than significant and beneficial.

According to CVPM results presented in Appendix H, "Modeling," increased pumping of groundwater would almost completely replace any reductions in surface water supply resulting from implementing Alternatives C1 and C2. According to the CVPM, gross revenues within the Friant Division would decline by $2.0 million. The annual decline in net revenue for the Friant Division agricultural sector under each action alternative would be approximately $22.2 million (a decline of approximately 4.3 percent).

Table 22-38 shows the impacts that operations under Alternative C1 may have on annual employment in the Friant Division. The loss of agricultural production from changes in land use is estimated to result in a decline in farm labor employment in the Friant Division; however, the increase in retail jobs would outweigh the loss in agricultural jobs. Annual-average employment would not noticeably increase and would be less than the planned annual-average Friant Division employment growth of 1.2 percent. The combined result of these effects and effects on other industries would be an estimated net gain of 45 jobs. Based on ratios derived from the U.S. Census Bureau (2008), an estimated increase of 45 jobs may result in a population increase of approximately 108 people. This contribution to overall population increase would not cause population growth to be greater than the significance criterion of 2.7 percent. An estimated increase in 45 jobs could result in an increased demand for 56 housing units. This growth in housing demand would not cause the Friant Division's housing demand to grow by more than the significance criterion of 3.2 percent. Therefore, the impacts to regional levels of employment and population would be beneficial and greater than under Alternative A1. The impact to housing demand would be greater than under Alternative A1, but would be less than significant, as for Alternative A1.

Table 22-38.
Alternatives C1 and C2: Regional Economic Impacts on Industry Output and Employment – Friant Division

Industry	Total Industry Input ($)			Employment (number of employees)		
	Existing Base	Friant Division Change, Alts C1 and C2	Percent of Base	Existing Base	Friant Division Change, Alts C1 and C2	Percent of Base
Agriculture, Forestry, Fishing, and Hunting	$23,233,194,000	-$2,433,532	-0.01	199,030	-18	-0.01
Mining	$5,920,873,000	-$130,581	0.00	11,700	0	0.00
Utilities	$4,447,976,000	-$99,471	0.00	4,920	0	0.00
Construction	$11,066,246,000	-$54,213	0.00	71,580	0	0.00
Manufacturing	$35,344,381,000	-$676,593	0.00	71,500	-1	0.00
Wholesale Trade	$5,116,683,000	-$384,262	-0.01	32,900	-3	-0.01
Retail Trade	$8,458,236,000	$3,310,655	0.04	116,280	70	0.06
Transportation and Warehousing	$4,684,445,000	-$166,459	0.00	32,760	-1	0.00
Information	$3,562,185,000	-$35,195	0.00	10,920	0	0.00
Finance and Insurance	$5,738,403,000	-$607,051	-0.01	30,000	-3	-0.01
Real Estate and Rental	$11,030,271,000	-$1,496,102	-0.01	27,820	-1	0.00
Professional, Scientific, and Technical Services	$4,887,323,000	-$104,658	0.00	43,050	-1	0.00
Management of Companies	$1,292,948,000	$16,523	0.00%	7,880	0	0.00
Administrative and Waste Services	$3,080,623,000	-$34,797	0.00%	50,880	-1	0.00
Educational Services	$481,475,000	-$96,568	-0.02%	9,740	-2	-0.02
Health and Social Services	$8,960,410,000	-$1,475,882	-0.02%	105,200	-18	-0.02
Arts, Entertainment, and Recreation	$544,882,000	-$82,869	-0.02%	11,410	-2	-0.01
Accommodation and Food Services	$3,474,102,000	$2,435,975	0.07%	63,920	36	0.06
Other Services	$4,003,654,000	-$596,581	-0.01%	66,610	-10	-0.02
Government and Non–North American Industry Classification System	$17,339,661,000	-$117,112	0.00%	224,540	0	0.00
Institutions	$0	-$450,010	N/A	0	0	N/A
Totals	**$162,667,971,000**	**-$3,278,784**	**0.00%**	**1,192,640**	**45**	**0.00**

Source: 2007 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications made by Cascade Economics LLC
Key:
N/A = not applicable

Alternative C2

Within the Restoration Area counties, program-level impacts related to construction under Alternative C2 would be identical to those described under Alternatives A2 and B2. Along the San Joaquin River between the Merced River and the Delta, program-level impacts related to construction of new pumping and conveyance infrastructure under Alternative C2 would be identical to those described under Alternative C1. Program-level impacts related to changes in operations would be identical to those described under Alternative C1.

22.3.4 Project-Level Impacts and Mitigation Measures

This section provides a project-level evaluation of the direct and indirect effects of reoperating Friant Dam on regional socioeconomics, and includes potential effects from recapturing Interim and Restoration flows at existing facilities in the Restoration Area and in the Delta.

Actions identified in the Physical Monitoring and Management Plan (Appendix D) as potential immediate actions to address nonattainment of management objectives also were evaluated at a project level. Potential immediate actions are related to flow, seepage, capacity, native vegetation, and spawning gravel. Potential immediate actions include acquiring additional water from willing sellers, reoperating Friant Dam to reduce flows, site monitoring, preparing reports documenting monitoring, and removing obstructions/debris from channels in the Restoration Area. Monitoring and reporting actions were considered to cause only inconsequential effects on regional socioeconomics and are not discussed further, and no future review of their effects on socioeconomics is necessary as the Settlement is implemented.

Other actions evaluated at a project level include reoperation of Mendota Dam, the Chowchilla Bypass Bifurcation Structure, Eastside Bypass Bifurcation Structure, Mariposa Bypass Bifurcation Structure, and Hills Ferry Barrier. The proposed changes to operation of these structures would have no effect on regional socioeconomics. Actions to obtain encroachment permits, water transfers, and long-term water rights also would not affect regional socioeconomics.

The geographic regions affected and described in this section includes the six counties located within the Friant Division (including Restoration Area counties): Fresno, Kern, Kings, Madera, Merced, and Tulare. No project-level impacts would result outside these areas. Only project-level operational impacts would occur, as described below.

No-Action Alternative

This section describes operational impacts of the No-Action Alternative.

Impact SOC-4 (No-Action Alternative): *Change in Regional Employment Levels – Project-Level.* No project-level effects on regional socioeconomics of the Friant Division, including changes to regional employment trends, would result from the No-Action Alternative. Employment trends would continue in all counties within the Friant Division and the Restoration Area at rates projected by State, county, and local agencies. Therefore, there would be **no impact**.

Regional employment levels could deviate from these projections based on numerous factors, especially on an annual basis, but employment projections remain the best estimate of future conditions under the No-Action Alternative. Compared to existing conditions, which were established in June 2008, regional employment levels in certain communities, such as Fresno and Lindsay, have been substantially affected. However, conditions by 2030, the planning horizon for the No-Action Alternative, could be quite different. Historically, regional employment levels have been closely tied to the overall economy in California, and to a lesser extent, water availability for agricultural production. Cyclic employment trends observed in the past would be expected to continue. There would be no impact.

Impact SOC-5 (No-Action Alternative): *Change in Regional Population Levels – Project-Level.* No project-level effects on the socioeconomics of the Friant Division, including changes to regional population levels, would result from the No-Action Alternative. Population trends would continue in all counties within the Restoration Area at rates projected by State, county, and local agencies. Therefore, there would be **no impact**.

Regional population levels could deviate from these projections based on numerous factors, especially on an annual basis, but population projections remain the best estimate of future conditions under the No-Action Alternative. Compared to existing conditions, which were established in June 2008, some localized decreases in population levels have occurred in certain communities where large migrant farmworker populations exist. Other areas remain largely unaffected by the current recession. However, regional population levels by 2030, the planning horizon for the No-Action Alternative, would not be expected to deviate substantially from projections. Cyclic employment trends observed in the past would be expected to continue. There would be no impact.

Impact SOC-6 (No-Action Alternative): *Change in Regional Housing Demand – Project-Level.* No project-level effects on the socioeconomics of the Friant Division, including changes to regional housing demand, would result from the No-Action Alternative. Trends in housing demand would continue in all counties within the Restoration Area at rates projected by State, county, and local agencies. Housing demands are closely tied to regional employment and population trends, as described for Impacts SOC-4 and SOC-5 above. Therefore, there would be **no impact**.

Impact SOC-7 (No-Action Alternative): *Physical Decay in Communities – Project-Level.* No project-level effects on physical decay in communities, such as physical structures being abandoned because of substantial decreases in regional employment or populations, would occur over time. Therefore, there would be **no impact**.

While some normal physical decay would occur under the No-Action Alternative, this happens frequently in localized areas during economic downturns and has occurred in the Friant Division and Restoration Area during the recent and ongoing recession. This impact is directly related to other socioeconomic effects, such as population and employment, which would also not occur under the No-Action Alternative. As mentioned in impact SOC-6 above, no changes to regional housing demand would result from the

No-Action Alternative because reoperation of Friant Dam would not occur. Trends in housing demand would continue in all counties within the Restoration Area at rates projected by State, county, and local agencies. There would be no impact.

Alternatives A1 through C2

Project-level actions are the same for all action alternatives; therefore, the project-level impacts are the same for Alternatives A1 through C2. Project-level impacts under the action alternatives would occur from reoperation of Friant Dam and recapture of Interim and Restoration flows, as described in Chapter 2.0, "Description of Alternatives."

According to CVPM results presented in Appendix H, "Modeling," increased groundwater pumping would almost completely replace any reductions in surface water supply resulting from implementing project-level actions included in Alternatives A1 through C2. According to the CVPM, gross agricultural revenues within the Friant Division would decline by $1.5 million. The annual decline in net revenue for the Friant Division agricultural sector under project-level actions included in Alternatives A1 through C2 could be up to approximately $27.3 million (a decline of approximately 5 percent). In addition to these estimates, operational effects could also include the reduction of agricultural productivity of some land along the San Joaquin River because of increased soil saturation. These potential effects on agricultural land are discussed in Chapter 16.0, "Land Use and Agricultural Resources," and would be less than the effects on agricultural revenues estimated by CVPM modeling. Although these effects on agricultural land would be substantially reduced by the Physical Monitoring and Management Plan (presented in Appendix D) and by Mitigation Measure LUP-5, some slight reduction in the region's irrigated acreage and agricultural revenues (in addition to indirect and induced output losses) could occur nonetheless.

Reoperation of Friant Dam would also affect M&I water users because it would improve water supply reliability. These benefits would accrue to all regional users, including those within the Friant Division. M&I water users are estimated to receive a benefit of approximately $9.1 to $10.8 million as a result of Alternatives A1 through C2.

Recreational impacts under Alternatives A1 through C2 could result in losses to boating and waterskiing (approximately $1.6 million annually); however, these losses would be reduced by Mitigation Measure REC-9, which would modify boat launch facilities at Millerton Lake. Implementation of any of the action alternatives could also increase recreation revenues from fishing along the San Joaquin River by approximately $210,000 annually.

Impact SOC-4 (Alternatives A1 through C2): *Change in Regional Employment Levels – Project-Level.* Increased socioeconomic activity may occur in the counties within the Friant Division as a result of actions under Alternatives A1 through C2. This increased socioeconomic activity is anticipated to be less than the planned annual-average Friant Division employment growth of 1.2 percent. Table 22-39 shows the impacts that project-level actions under Alternatives A1 through C2 may have on annual employment in the Friant Division. Annual-average Friant Division employment would not noticeably increase. The loss of agricultural production from changes in land use is

estimated to result in a decline in farm labor employment in the Friant Division; however, the increase in retail jobs would outweigh the loss in agricultural jobs. The overall increase in employment is not expected to be substantial. This impact would be **less than significant**.

Table 22-39.
Annual Regional Economic Impacts on Industry Output and Employment – Friant Division Change from Existing Base to Alternatives A1 Through C2

Industry	Total Industry Output			Employment (number of employees)		
	Existing Base	Friant Division Change, Alts A1 through C2	Percent of Base	Existing Base	Friant Division Change, Alts A1 through C2	Percent of Base
Agriculture, Forestry, Fishing, and Hunting	$23,233,194,000	-$2,703,339	-0.01	199,030	-20	-0.01
Mining	$5,920,873,000	-$165,908	0.00	11,700	0	0.00
Utilities	$4,447,976,000	-$144,275	0.00	4,920	0	0.00
Construction	$11,066,246,000	-$82,337	0.00	71,580	0	0.00
Manufacturing	$35,344,381,000	-$900,642	0.00	71,500	-1	0.00
Wholesale Trade	$5,116,683,000	-$505,800	-0.01	32,900	-3	-0.01
Retail Trade	$8,458,236,000	$2,987,280	0.04	116,280	65	0.06
Transportation and Warehousing	$4,684,445,000	-$236,872	-0.01	32,760	-1	0.00
Information	$3,562,185,000	-$119,556	0.00	10,920	-1	0.00
Finance and Insurance	$5,738,403,000	-$811,585	-0.01	30,000	-4	-0.01
Real Estate and Rental	$11,030,271,000	-$1,974,463	-0.02	27,820	-2	-0.01
Professional, Scientific, and Tech Services	$4,887,323,000	-$177,882	0.00	43,050	-1	0.00
Management of Companies	$1,292,948,000	-$1,034	0.00	7,880	0	0.00
Administrative and Waste Services	$3,080,623,000	-$89,517	0.00	50,880	-2	0.00
Educational Services	$481,475,000	-$123,290	-0.03	9,740	-3	-0.03

Table 22-39.
Annual Regional Economic Impacts on Industry Output and Employment – Friant Division Change from Existing Base to Alternatives A1 through C2 (contd.)

Industry	Total Industry Output			Employment (No. of employees)		
	Existing Base	Friant Division Change, Alts A1 through C2	Percent of Base	Existing Base	Friant Division Change, Alts A1 through C2	Percent of Base
Health and Social Services	$8,960,410,000	-$1,886,170	-0.02	105,200	-23	-0.02
Arts, Entertainment, and Recreation	$544,882,000	-$108,413	-0.02	11,410	-2	-0.02
Accommodation and Food Services	$3,474,102,000	$2,285,811	0.07	63,920	33	0.05
Other Services	$4,003,654,000	-$710,525	-0.02	66,610	-13	-0.02
Government and Non-North American Industry Classification System	$17,339,661,000	-$184,978	0.00	224,540	-1	0.00
Institutions	$0	-$554,372	N/A	0	0	N/A
Totals	**$162,667,971,000**	**-$6,207,867**	**0.00**	**1,192,640**	**22**	**0.00**

Source: 2007 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications made by Cascade Economics LLC
Key:
Alts = Alternatives
N/A = not applicable

Impact SOC-5 (Alternatives A1 through C2): *Change in Regional Population Levels – Project-Level.* Increased socioeconomic activity could occur in the counties within the Friant Division because of operations resulting from implementing Alternatives A1 through C2. This increase in socioeconomic activity corresponds to an increase in jobs that would cause population in the region to increase. However, this increased socioeconomic activity would not cause a substantial increase in growth of the region's population. Therefore, this impact would be **less than significant**.

The increase in socioeconomic activity and its effect on jobs and population is the combined result of different effects on several industries, especially agriculture and retail trade. The operation of Alternatives A1 through C2 would result in agricultural job losses, and the effect of these job losses would be to decrease population. Conversely, job gains are projected in the retail trade and accommodation and food services as a result of increased tourism and sporting opportunities. The combined result of these effects and effects on other industries would be an estimated net gain of 22 jobs (see Table 22-39). Based on ratios derived from the U.S. Census Bureau (2008), an estimated increase of 22

jobs may result in a population increase of approximately 53 people. This contribution to overall population increase would not cause population growth to be greater than the significance criterion of 2.7 percent. Operational effects could also include some reduction of the agricultural productivity of land along the San Joaquin River, in addition to effects estimated by IMPLAN modeling, and summarized in Table 22-39. These effects are discussed in Chapter 16.0, "Land Use and Agricultural Resources," and would be smaller than the effects on agricultural employment estimated by IMPLAN modeling. Therefore, overall impact of operational activities on regional population levels would be less than significant.

Impact SOC-6 (Alternatives A1 through C2): *Change in Regional Housing Demand – Project-Level.* Increased socioeconomic activity could occur in the counties within the Friant Division because of operations resulting from implementing Alternatives A1 through C2. These socioeconomic activities correspond to an increase in jobs and population, which could result in additional housing demand within the Friant Division. However, this increased socioeconomic activity would not cause a substantial increase in the region's housing demand. This impact would be **less than significant.**

Impact SOC-7 (Alternatives A1 through C2): *Physical Decay in Communities – Project-Level.* Physical decay in communities as a result of reoperation of Friant Dam would not be substantial, such as physical structures being abandoned from substantial decreases in regional employment or populations. This impact would be **less than significant**.

As stated above, the increase in socioeconomic activity, and its effect on population, employment, and housing, is the combined result of different effects on several industries, especially agriculture and retail trade. The operation of Alternatives A1 through C2 would result in agricultural job losses, which could negatively affect population and housing demand in the region. Conversely, job gains are projected in the retail trade and accommodation and food services as a result of increased tourism and recreation opportunities. The combined result of these effects (and effects on other industries) would be a net gain of 22 jobs (see Table 22-39). This job growth would not change overall population or housing demand that would exceed their respective significance criteria. Only minor project-level effects on physical decay in communities, such as physical structures being abandoned from substantial decreases in regional employment or populations, would occur over time, and these changes are not substantially different than would occur under existing conditions or the No-Action Alternative. This impact would be less than significant.

Chapter 23.0 Transportation and Infrastructure

This chapter describes existing traffic conditions and the various roadway, railroad, and utility crossings in the study area, as well as environmental consequences and mitigation, as they pertain to implementation of the Settlement. The modification or construction of facilities and release of Interim and Restoration flows could affect traffic operations or transportation facilities and other infrastructure along the San Joaquin River from Friant Dam to the Delta. No effects on current traffic operations, existing transportation facilities, or infrastructure during the planning horizon are expected upstream from Friant Dam or downstream in the Delta, or in CVP/SWP water service areas. For that reason, these three geographic areas are not discussed further in this chapter.

For the purpose of describing general conditions within the Restoration Area and along the San Joaquin River from the Merced River to the Delta, roads are classified into the following groups:

- **Freeways** are operated and maintained by Caltrans; these facilities are designed as high-volume, high-speed facilities (65 mph or faster) for intercity and regional traffic. Access to these facilities is limited, and in some cases on- and off-ramps are metered during peak-hour periods to reduce congestion caused by merging cars and trucks.

- **State Routes** typically are four- to six-lane high-speed facilities (65 mph or faster) that have a primary purpose of connecting the local and county transportation system with those outside the region. These roadways are under the jurisdiction of Caltrans.

- **Expressways** typically are four-lane high-speed facilities (55 mph or faster) that have a primary purpose of connecting county areas or cities in a county. Some expressways do not meet respective county standards and are designated for upgrade by their respective local (county) transportation authority.

- **Arterial** roads have the primary purpose of providing connections between major traffic generators to the freeway, expressway, and arterial street system. They can be classified as either urban (i.e., an area that contains a city of 50,000 or more population plus surrounding areas) or rural and are under the authority of the local (county) transportation authority.

- **Collectors** link the local road network to the arterial street system. They are typically two- or four-lane roadways with low to moderate speeds (35 to 40 mph) and are under respective county jurisdictions.

- **Local roads** provide connections between properties and the collector street system. These facilities typically are two-lane undivided roadways and are under the respective county jurisdiction.

23.1 Environmental Setting

This section describes the environmental setting as it pertains to transportation and infrastructure. The San Joaquin River from Friant Dam to the Merced River, and downstream from the Merced River to the Delta, is covered below. Transportation and infrastructure in the remaining portion of the study area (upstream from Friant Dam, in the Delta, and in the CVP/SWP water service areas) would not be affected by implementation of the Settlement and, therefore, are not considered further.

23.1.1 San Joaquin River from Friant Dam to Merced River

Transportation and infrastructure in the Restoration Area are described below.

Road, Railroad, and Utilities Crossings

This section describes the various roadway, railroad, and utility crossings of the San Joaquin River from Friant Dam to the Merced River. Road and railroad crossings were identified using aerial photographs. Each road and railroad crossing is identified with its name, if known, and mapped in Appendix Q, "Transportation and Infrastructure." Where no name was available, the crossing is identified as "unknown crossing." Where it appears that fording has likely occurred at an unknown crossing (i.e., apparent vehicle tracks on either side of the river), it is also labeled as "possible ford." The crossings are described below for each reach.

Utilities were identified by contacting utility or communication providers who maintain and/or use and own utilities crossing the San Joaquin River, and are mapped in Appendix Q, "Transportation and Infrastructure." The following utility or communication companies responded to requests for information: Verizon, Kinder-Morgan, Southern California Edison, Level 3 Communications, American Telephone and Telegraph (AT&T), and PG&E. Sprint Communications, Time Warner Telecom, and MCI Worldcom were contacted but did not respond.

Most communication company facilities are located in road or railroad rights-of-way. PG&E is the primary exception with facilities located throughout the region. Fresno ID and Fresno Metropolitan Flood Control District (FMFCD) have facilities in reaches 1 and 2. PG&E and Fresno ID/FCFMD facilities were identified as follows:

- **PG&E Facilities** – PG&E provided information (in an Environmental Systems Research Institute, Inc. (ESRI) shapefile format) on its gas and electric facilities (transmission and distribution) that cross the San Joaquin River. The following are brief descriptions of PG&E facilities.

- **Underground Gas Transmission Pipelines** – Whenever possible, PG&E has attached gas pipelines to bridges when crossing the river. Specific locations within the Restoration Area are not known at this time.

- **Overhead Electrical Transmission Lines** – According to PG&E, all overhead electrical transmission (typically 70 kilovolt-amperes or greater) line towers appear to be set back away from the San Joaquin River flowline and work areas that were identified for the action alternatives. The crossing electric transmission lines are all overhead. The clearance between the ground surface and the electric lines is governed by General Order 95 and is a minimum of 19 feet for less than 750 volts and 25 feet for 750 volts and higher.

- **Fresno ID/FMFCD Facilities** – Fresno ID spillways were visually located from those locations called out on a current Fresno ID map. All Fresno ID spills identified are downstream of Reach 1A. FMFCD provided locations of facilities that are near or discharge to the river. These occur solely in Reaches 1 and 2, and the locations are shown in Appendix Q, "Transportation and Infrastructure."

The various utility crossings are discussed below by river reach. Generally, the majority of utilities cross the river between Reaches 1 and 4.

Reach 1. Between Friant Dam and the SR 99 Bridge that provides access across the San Joaquin River, several roads parallel the river in Reaches 1A and 1B. Additionally, six bridges (North Fork Road Bridge, Yosemite Freeway (SR 41), West Nees Bridge, and three unnamed bridges) cross the river in these reaches. State routes in this reach are SR 99, SR 41, and SR 145. Traffic on these State routes is generally the heaviest in the area, outside urban areas, because of truck and commuter traffic. The arterial in this reach is North Blackstone Avenue. Traffic is composed of local agricultural trucks and residential commuters. The access road and bridge near Friant Road, Gravel Haul Road, and unnamed roads are two-lane paved or unpaved local roads under the jurisdiction of either Madera County or Fresno County (if they are public and not private roads). Traffic on these roads is composed primarily of agricultural truck traffic and local residential commuters.

Two railroads cross the San Joaquin River in the Restoration Area and they are both located in Reach 1A. The Atchison, Topeka, and Santa Fe (currently owned by Burlington Northern Santa Fe) train bridge is located north of the City of Fresno approximately 1.3 miles due east of SR 99. The Southern Pacific train bridge lies parallel to and on the immediate east side of SR 99.

In Reach 1, three communication lines cross the river: two are AT&T lines and one is Level 3. PG&E owns 13 natural gas pipelines, 156 electrical distribution lines, and 14 electrical transmission lines. Of these, 152 of the electrical distribution lines are overhead, all of the natural gas pipelines are underground, and all of the electrical transmission lines are overhead. The ownership of four electrical distribution lines is unknown. Fresno ID has 11 outfall structures that discharge into the river. Also, six

outlets to the river are owned by FMFCD. Fresno ID owns the Riverside Powell Spillway, Epstein Spillway, and Biola Spillway in this reach.

Reach 2. One bridge (Madera Avenue) provides access across the river along Reach 2A. Several roads parallel the river along this reach, and multiple confining levees protect agricultural land uses in this reach.

Several roads are located adjacent to the river along Reach 2B. San Mateo (which is privately owned) is the sole crossing in Reach 2B. Public local roads under the jurisdiction of Madera County or Fresno County have light local agricultural truck and commuter traffic. With the exception of the City of Mendota, no urbanized traffic areas, major State routes, arterials, or other roads have heavy traffic in this reach.

There are 157 overhead PG&E-owned electrical distribution lines crossing the San Joaquin River in this reach. All of the electrical distribution lines are overhead. In addition, there are two underground gas pipelines owned by PG&E crossing the river. Fresno ID owns the Big Sandridge Spillway and the Herndon Spillway in this reach.

Reach 3. The City of Firebaugh, located between the San Joaquin River and the Helm Canal, is the only urban area along Reach 3. Several roads provide access to or parallel the river, and one bridge (13th Street/Avenue 7½ bridge) provides access across the river in this reach. Roads in this area are generally rural in character except in Firebaugh, where they are urban. There are no State routes along Reach 3, although SR 33 and SR 152 skirt the edges of the reach and provide transportation corridors from Firebaugh to other areas. Public roads that cross the river are considered local roads under either the jurisdiction of Madera County or Fresno County and appear to have light local traffic.

In this reach, AT&T owns one communication line that crosses the river. PG&E owns seven underground gas pipelines, 136 electrical distribution lines, and four underground electrical transmission lines that cross the river in this reach. Of the electrical distribution lines, two are underground, 132 are overhead, and two lines are unknown.

Reach 4. Several roads are located adjacent to or provide access to the river along Reach 4A, and the Brazil Road (SR 152) bridge provides access across the river.

Several roads are located along the Restoration Area of Reach 4B. The primary heavy-traffic roads in Reach 4 are SR 33 (Reach 4A) and SR 152 (Reach 4B). Because there are no urbanized areas in this reach and agricultural production is moderate, traffic levels on arterials, collectors, and local roads are likely to be moderate with local agricultural trucks and commuters. With the exception of the SR 152 bridge, public roads crossing the river are arterials, collectors, or local roads are under the jurisdiction of either Madera County or Fresno County.

PG&E owns two overhead electrical transmission lines and 59 overhead electrical distribution lines that cross the river reach in Reach 4.

Reach 5. Several roads and two bridges (Lander Avenue bridge and the SR 140 bridge) are located along Reach 5 in the Restoration Area. Roads correspond to the local land uses and, thus, appear to have light traffic and be rural in nature. Besides SR 140 and SR 165/Lander Avenue, public roads are mostly collectors and local roads with moderate-to-light traffic under the jurisdiction of Merced County.

PG&E owns five overhead electrical distribution lines in this river reach.

Chowchilla Bypass. Several roads parallel the Chowchilla Bypass, and 15 bridges provide access across it. No urban areas are located along the bypass. Accordingly, with the exception of SR 152, the public roads are primarily arterials, collectors, and local roads under the jurisdiction of Madera County.

There are no available data regarding utility crossings in the Chowchilla Bypass.

Eastside Bypass. Although several access roads parallel the bypass south of the Mariposa Bypass, only two bridges provide access across the bypass. A number of low-flow crossings in this bypass area may be unusable during high-flow conditions, including West El Nido Road, Headquarters Road, Dan McNamara Road, West Sandy Marsh Road, and several unnamed crossings. The roads are collectors and local roads, and appear to have generally light traffic (i.e., fewer than 1,000 trips per day).

There are no available data regarding utility crossings in the Eastside Bypass.

Existing Traffic Conditions

The following sections describe existing traffic conditions in the Restoration Area, including conditions in Fresno, Madera, and Merced counties.

Fresno County General Traffic Conditions. According to the Fresno County *General Plan Background Report* (Fresno County 2000), the county's circulation system consists of a roadway network that is primarily rural in character, with the exception of the urbanized area surrounding the cities of Fresno and Clovis and various smaller communities in the southern and western parts of the county. The most important interregional roadways in the county are I-5, SR 99, and SR 41, which traverse the county from north to south. I-5 is the primary north-south route for interregional and interstate business, freight, tourist, and recreational travel, linking Southern California to Northern California and the Pacific Northwest. On the regional level, SR 99 performs a similar function connecting most of the cities of the San Joaquin Valley to Sacramento and Southern California. Fresno County is linked to Yosemite National Park and the Sierra communities to the north via SR 41, as well as to Kings County and the Central Coast to the south. In addition to I-5, SR 99, and SR 41, Fresno County is served by SRs 33, 43, 63, 145, 168, 180, 198, and 269 (Fresno County 2000).

The county is also served by other major roadways that carry local and regional traffic, connect the cities and communities of Fresno County, and provide farm-to-market routes. These roadways provide critical freight and commercial linkages between production/manufacturing and the larger interregional distribution system.

Madera County General Traffic Conditions. The *Madera County General Plan Background Report* (Madera County 1995) states that the physical constraints on the county's circulation system are the natural and human-made barriers to travel that limit existing and future roadway connections and alignments, and thus constrain the county's access and circulation capability.

Circulation constraints in Madera County vary between the valley region and the foothill/mountain region. In the flat valley of the western county, major circulation elements are the north/south-oriented SR 99 and railroad tracks that also run north/south, parallel to the SR. The State routes and railroad tracks facilitate north/south travel and hinder east/west travel. Access to the north, west, and south of the county is limited by the Chowchilla and San Joaquin rivers. The Fresno River, which runs generally in an east/west direction, also poses a constraint to north/south travel. Numerous creeks and canals also pose minor constraints to travel in the county.

Merced County General Traffic Conditions. The roadway system in Merced County is composed of approximately 30 miles of freeway, 220 miles of State routes, and 1,780 miles of county roads. Both traffic volume and traffic speeds are the principal determinants of travel quality on roadways. The traffic volumes on the major road system in Merced County vary from a high of 75,000 vehicles per day on SR 99 north of Delhi near Turlock to fewer than 1,000 vehicles per day. With a few exceptions, the highest volume roads in Merced County are State routes.

Point of Interest Traffic Counts

To quantitatively describe existing traffic conditions, points of interest were determined by reviewing traffic monitoring locations within 5 miles of the Restoration Area. No relevant traffic points of interest were available for Reach 5, the Eastside Bypass, or the Chowchilla Bypass.

Caltrans annual average daily traffic data are the total volume of counts for the year divided by 365 days. The Caltrans traffic count year is from October 1 through September 30. Data regarding Madera and Fresno counties on State routes, freeways, and local and arterial roads consist of "raw" traffic counts, which are recorded at a particular location on a particular day for a period of 24 hours. These are not adjusted to reflect the day of the week or seasonal variations that could affect observed traffic volumes.

Traffic counts were researched from the following existing data sources, and the most recent data are included in Table 23-1: Caltrans 2006 Traffic and Vehicle Data Systems Unit (all data on California State Highway System), the Madera County Transportation Commission *Traffic Monitoring Program 2007 Traffic Volumes Report* (Madera County Transportation Commission 2007a), the *Council of Fresno County Governments Fresno Regional Traffic Monitoring Report* (1998–2002) (Council of Fresno County Governments 2004), and the *Merced County Association of Governments' Final Environmental Impact Report* for Merced County's *2004 Regional Transportation Plan* (Merced County Association of Governments 2007).

Table 23-1.
Traffic Counts in the Restoration Area, Years 1998 through 2006

POI	Road	Location	Direction	Most Recent Traffic Counts (AADT)	Year
REACH 1					
Reach 1A					
1	Road 206	North of Friant Road	Northbound	1,606	2006
		South of Friant Road	Southbound	2,062	2006
2a	Children's Boulevard	West of SR 41	Eastbound	6,626	2007
			Westbound	6,003	2007
2b	Avenue 12	West of Business Route 41	Eastbound	6,552	2007
			Westbound	7,036	2007
3	Friant	South of Champlain	Northbound	7,643	1999
			Southbound	7,089	1999
4	SR 41	Fresno-Madera County line	Northbound	48,000	2005
			Southbound	31,000	2005
5	Shephard	West of Cedar	Eastbound	4,303	1998
			Westbound	4,120	1998
6	Audubon	East of Friant	Eastbound	4,523	2001
			Westbound	4,863	2001
		West of Friant	Eastbound	5,058	2001
			Westbound	5,172	2001
7	Nees	East of Willow	Eastbound	4,423	2001
			Westbound	4,228	2001
		West of Willow	Eastbound	4,444	2001
			Westbound	4,451	2001
8	Palm	South of Herndon	Northbound	8,112	1999
			Southbound	7,368	1999
9	Alluvial	East of Marks	Westbound	2,767	2002
		West of Marks	Eastbound	879	2001
			Westbound	695	2001
10	Herndon	West of Brawley	Eastbound	14,075	2000
			Westbound	13,974	2000

Table 23-1.
Traffic Counts in the Restoration Area, Years 1998 through 2006 (contd.)

POI	Road	Location	Direction	Most Recent Traffic Counts (AADT)	Year
Reach 1B					
11	SR 99	South of Fresno-Madera County line	Northbound	69,000	2006
		North of Fresno-Madera County line	Southbound	69,000	2007
11b	Avenue 7	West of SR 99 interchange	Westbound	1,060	2007
			Eastbound	816	2007
		East of SR 99 interchange	Westbound	1,855	2007
			Eastbound	1,928	2007
REACH 2					
12	SR 145	South of Madera-Fresno County line	Northbound	7,300	2005
		North of Madera-Fresno County line	Southbound	6,600	2005
13	Belmont	East of San Diego	Eastbound	1,064	2000
			Westbound	1,069	2000
REACH 3					
14	SR 33	South of 15th Street	Northbound	13,300	2006
14b		South of 12th Street	Northbound	13,200	2006
14c		South of 8th Street	Northbound	11,900	2006
15	SR 152	West of Merced-Madera County line	Eastbound	18,000	2006
		East of Merced-Madera County line	Westbound	20,400	2006
REACH 4					
16	SR 165	South of SR 140	Northbound	5,900	2006
		North of SR 140	Southbound	6,900	2006

Sources: Caltrans 2006, Council of Fresno County Governments 2003, Madera County Transportation Commission 2007a, and Merced County Association of Governments 2004
Key:
AADT = Average Annual Daily Traffic
POI = point of interest
SR = State route

23.1.2 San Joaquin River from Merced River to the Delta

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.

23.2 Regulatory Setting

This section discusses the regulatory setting for transportation and infrastructure in the study area.

23.2.1 Federal

Federal statutes specify the procedure the DOT must follow in setting policy regarding the placement of utility facilities within the freeway-rights-of-way that received Federal assistance. These include Federal interstate freeways and U.S. highways, most state routes, and certain local roads. FHWA regulations require each state to develop its own policy regarding the accommodation of utility facilities within freeway-rights-of-way. Once FHWA has approved a state's policy, the state can approve any proposed utility installation without referral to FHWA, unless it does not conform to the federally approved policy.

Federal law does not directly control how states accommodate utilities within freeway rights-of-way. But, in determining whether a right-of-way on a Federally aided freeway should be used for accommodating a utility facility, the Secretary of Transportation must (1) ascertain the effect accommodation of utilities will have on freeway and traffic safety, since no such use may be authorized or permitted that would adversely affect safety; (2) evaluate the direct and indirect environmental and economic effects of any loss of productive agricultural land or any impairment of its productivity that would result from disapproving accommodation of the utility facility; and (3) consider the environmental and economic effects together with any interference with or impairment of the use of the freeway that would result from accommodation of the utility facility (23 USC Section 109[l]). In addition, 23 USC Section 116 requires state transportation agencies to ensure proper maintenance of freeway facilities, which implies adequate control over non-freeway facilities such as utility facilities. Finally, 23 USC Section 123 specifies when Federal funds can be used to pay for the costs of relocating utility facilities in connection with freeway construction projects (McCarthy 2004).

Under the U.S. Department of Transportation, the FRA regulates all aspects of rail freight railroading, including hazardous material transport and passenger rail. FRA issues rules and guidance that aim to improve rail safety. These rules and guidance are continuously updated based on technological improvements and review of incident reports. FRA enforces its regulations through civil penalties. The regulations establish the following:

- Design standards for track, grade crossings, and bridges
- Timing for when track needs replacement to achieve the design standards
- Technologies for tank, box, container, and passenger cars
- Minimum safety standards for different types of cars, such as brake standards and crash worthiness
- Worker safety training including conductor certification

- Hazardous material routing designations and rail operation procedures
- Ongoing accident/incident reporting.

23.2.2 State

Caltrans is one of several departments within the Business, Transportation and Housing Agency. There are a number of programs within the department, one of which is the Right of Way and Asset Management Program. The Right of Way and Asset Management Program, through the district offices, is primarily responsible for acquisition and management of property required for State transportation purposes. Transportation purposes may include roads, mass transit guideways and related facilities, airports, shops, maintenance stations, storage yards, material sites, and any other purpose that may be necessary for Caltrans operations (Caltrans 2008a).

Right of Way and Asset Management Program responsibilities include managing Caltrans' real property for transportation purposes, reducing the costs of operations, and disposing of property no longer needed and monitoring right-of-way activities on Federally assisted local facilities.

An encroachment, as defined in Section 660 of the Streets and Highways Code, can be any tower, pole, pole line, pipe, pipe line, fence, billboard, stand, or building, or any structure or object of any kind or character that is within the right-of-way but not a part of the Caltrans facility. Authority for Caltrans to control encroachments within the State roadway is contained in the Streets and Highways Code starting with Section 660.

Encroachments allow temporary or permanent use of roadway right-of-way by a utility, a public entity, or a private party. Encroachments include all public and private utilities within State rights-of-way, such as: communication, electric power, water, gas, oil, petroleum products, steam, sewer, drainage, irrigation, and similar facilities. Encroachments also include any temporary or permanent break in access or use of the roadway rights-of-way: for grading, excavating, or filling or removing of materials by public agencies, developers, or private individuals (Caltrans 2008b).

Encroachment permits are issued by Caltrans to other agencies or parties that perform construction activities within its right-of-way. Typical projects performed by other agencies or parties that require encroachment permits include roadway improvement construction and utility work. Under an encroachment permit, Caltrans requires the agency or party to implement an appropriate stormwater protection program. Caltrans retains ultimate responsibility for ensuring that the portion of the project within the Caltrans right-of-way is in compliance with Federal, State, and local stormwater protection regulations.

Caltrans specifically has interest in projects that may structurally modify deck slabs (not including raised sidewalks or utility attachments), girders (not including utility attachments), bottom slabs of superstructures, columns and supporting foundations, and abutments and supporting foundations.

23.2.3 Regional and Local

The following regional and local plans pertain to traffic and transportation infrastructure in the study area.

Fresno Council of Governments' Regional Transportation Plan (2007)

The Fresno Council of Governments' Regional Transportation Plan (RTP) is a comprehensive assessment of all forms of transportation available in Fresno County and of needs for travel and goods movement projected into the future until the year 2030. The first RTP was adopted in 1975; this Plan is the sixteenth edition, and is a continuation of a process of intergovernmental cooperation, coordination and long-range planning which has involved the 15 cities within Fresno County, staff from related local public agencies, the Air District, Caltrans, and the public. This process has been accomplished within the framework of the Council of Fresno County Governments, which is the Regional Transportation Planning Agency for the Fresno County area. Updated editions are required every 4 years and are refinements of the original and subsequent plans. Federal and State legislation mandate that long-range transportation planning be done every 4 years for a period of at least 20 years into the future.

Madera County Council of Governments' Regional Transportation Plan (2007)

The previous Madera County RTP was prepared by VRPA Technologies and Madera County Transportation Commission (MCTC) staff and approved by the MCTC Policy Board in July 2004. The MCTC is now required to update the RTP consistent with Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) compliance guidelines to reflect the transportation system through FY 2030. The RTP ensures that the County's transportation system and implementation policies/programs through FY 2030 will safely and efficiently accommodate growth envisioned in the Land Use Elements of the Cities of Chowchilla and Madera, and Madera County.

The 2007 RTP is a planning guide that contains transportation policy and projects for the next 25 years (to FY 2030). The RTP includes programs and policies for congestion management, transit, bicycles and pedestrians, roadways, freight, and finances. The RTP must be revised at least every 4 years, since the County is designated as nonattainment for Federal air quality standards.

The RTP's primary use is as a regional long-range plan for federally funded transportation projects, and it also serves as a comprehensive, coordinated transportation plan for all the governmental jurisdictions within the region. Different jurisdictions have different transportation implementation responsibilities under the RTP. These include Caltrans, Madera County, and the cities of Chowchilla and Madera (Madera County Transportation Commission 2007b).

Merced County Regional Transportation Plan (2007)

The Merced County Association of Governments has developed a Regional Transportation Plan (2007). The RTP specifies the policies, projects, and programs necessary over a 20-plus-year period to maintain, manage, and improve the region's transportation systems. The RTP provides a comprehensive long-range view of

transportation needs and opportunities for Merced County. It establishes goals and objectives for the future system. It identifies the actions necessary to achieve these goals. Finally, it describes a funding strategy and options for implementing the actions.

General Plans, Ordinances, and Design Standards

County General Plans (Fresno, Madera, and Merced) contain goals and policies related to traffic and transportation utilities. County ordinances define the procedures for obtaining permits for encroaching on county road rights-of-way. Utilities installed within county road rights-of-way would be required to be designed and constructed according to the county's design standards.

23.3 Environmental Consequences and Mitigation Measures

The purpose of this section is to provide information about the environmental consequences of the program alternatives on transportation and infrastructure, including traffic circulation patterns, roadway facilities, utility infrastructure from design features, emergency access, parking capacity, and alternative transportation facilities. This section describes the methodology, criteria for determining significance of effects, and environmental consequences and mitigation measures associated with effects of each of the program alternatives. The program alternatives evaluated in this chapter are described in detail in Chapter 2.0, "Descriptions of Alternatives," and summarized in Table 23-2. The potential impacts and associated mitigation measures are summarized in Table 23-3.

Table 23-2.
Actions Included Under Action Alternatives

Level of NEPA/CEQA Compliance	Actions[1]		Action Alternative					
			A1	A2	B1	B2	C1	C2
Project-Level	Reoperate Friant Dam and downstream flow control structures to route Interim and Restoration flows		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows in the Restoration Area		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows at existing CVP and SWP facilities in the Delta		✓	✓	✓	✓	✓	✓
Program-Level	Common Restoration actions[2]		✓	✓	✓	✓	✓	✓
	Actions in Reach 4B1 to provide at least:	475 cfs capacity	✓	✓	✓	✓	✓	✓
		4,500 cfs capacity with integrated floodplain habitat		✓		✓		✓
	Recapture Interim and Restoration flows on the San Joaquin River downstream from the Merced River at:	Existing facilities on the San Joaquin River			✓	✓	✓	✓
		New pumping infrastructure on the San Joaquin River					✓	✓
	Recirculation of recaptured Interim and Restoration flows		✓	✓	✓	✓	✓	✓

Notes:
[1] All alternatives also include the Physical Monitoring and Management Plan and the Conservation Strategy, which include both project- and program-level actions intended to guide implementation of the Settlement.
[2] Common Restoration actions are physical actions to achieve the Restoration Goal that are common to all action alternatives and are addressed at a program level of detail.

Key:
CEQA = California Environmental Quality Act
cfs = cubic feet per second
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
NEPA = National Environmental Policy Act
PEIS/R = Program Environmental Impact Statement/Report
SWP = State Water Project

Table 23-3.
Summary of Impacts and Mitigation Measures – Transportation and Infrastructure

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Transportation and Infrastructure: Program-Level				
TRN-1: Reduced Traffic Circulation and Roadway Capacity	No-Action	LTS	--	LTS
	A1	PS	TRN-1: Minimize Short-term Impacts on Traffic Circulation and Roadway Capacity	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
TRN-2: Creation of a Hazard as a Result of a Design Feature	No-Action	No Impact	--	No Impact
	A1	PS	TRN-2: Avoid Disruption of Subsurface Utility Facilities	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
TRN-3: Reduced Emergency Access	No-Action	No Impact	--	No Impact
	A1	PS	TRN-1: Minimize Short-term Impacts on Traffic Circulation and Roadway Capacity	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
TRN-4: Reduced Bicycle and Pedestrian Circulation	No-Action	No Impact	--	No Impact
	A1	PS	TRN-4: Minimize Impacts on Public Bicycle and Pedestrian Circulation Facilities	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Transportation and Infrastructure: Project-Level				
TRN-5: Reduced Traffic Circulation and Roadway Capacity	No-Action	LTS	--	LTS
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS

Table 23-3.
Summary of Impacts and Mitigation Measures – Transportation and Infrastructure (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Transportation and Infrastructure: Project-Level (contd.)				
TRN-6: Creation of a Hazard as a Result of a Design Feature	No-Action	No Impact	--	No Impact
	A1	No Impact	--	No Impact
	A2	No Impact	--	No Impact
	B1	No Impact	--	No Impact
	B2	No Impact	--	No Impact
	C1	No Impact	--	No Impact
	C2	No Impact	--	No Impact
TRN-7: Inadequate Emergency Access	No-Action	No Impact	--	No Impact
	A1	PS	TRN-7: Implement Vehicular Traffic Detour Planning	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
TRN-8: Reduced Bicycle and Pedestrian Circulation	No-Action	No Impact	--	No Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS

Key:
-- = not applicable
LTS = less than significant
PS = potentially significant
PSU = potentially significant and unavoidable

23.3.1 Impact Assessment Methodology

This analysis considers the range and nature of foreseeable traffic conditions on roadways in relevant portions of the study area and identifies the primary ways that construction and operation of the program alternatives could affect existing traffic conditions and infrastructure. Effects on roadways and utility transmission lines that cross the San Joaquin River are discussed. The locations of bicycle, pedestrian, and equestrian pathways alongside the river are described in Chapter 21, "Recreation," and potential effects on these facilities are evaluated in this chapter.

Available literature, including documents published by Federal, State, county, and city agencies that document traffic conditions and infrastructure, were reviewed for this analysis. The information obtained from these sources (e.g., general plans) was reviewed and summarized to establish existing conditions and to identify potential environmental effects based on the significance criteria presented below.

23.3.2 Significance Criteria

The thresholds of significance for impacts 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. Based on these significance criteria, impacts on traffic operations and transportation infrastructure would be significant 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 (CMP), including but not limited to level of service (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 as a result of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

- Result in inadequate emergency access.

LOS standards are typically used to evaluate long-term (operational) traffic impacts resulting from residential, employment-generating, industrial, and institutional development projects. The implementation of the Settlement is not a residential, employment-generating, industrial, or institutional development project, and long-term operation of any of the action alternatives would generate a minor number of vehicular trips distributed throughout a large area. Therefore, LOS standards were not used in this analysis because they are typically employed to evaluate long-term operational traffic congestion that would result from a proposed action. Instead, this analysis focuses on short-term, construction-related traffic effects and effects of implementing action alternatives on existing roadways.

For the reasons set forth above, the screening method used by the Institute of Transportation Engineers (1989) to assess temporary traffic effects of construction projects was used in lieu of a consistency determination with a CMP or LOS standard. The Institute of Transportation Engineers establishes a significance threshold of 50 truck trips during the morning and afternoon or evening peak hour periods. Therefore, a likely increase of 50 or more new peak-hour truck trips is considered significant for the purposes of this evaluation.

Issues related to air traffic patterns are not discussed further because the action alternatives would not have any effects on air traffic patterns. Implementation of the Settlement would not affect the two railroads in the Restoration Area nor passenger and freight train operations; therefore, issues related to railroads and railroad operations are not discussed further.

23.3.3 Program-Level Impacts and Mitigation Measures

This section provides a program-level evaluation of the direct and indirect effects of program alternatives on traffic operations and transportation facilities and other infrastructure. The action alternatives could affect traffic operations or transportation facilities and other infrastructure during the modification or construction of facilities or during other restoration actions. Settlement actions beyond flow-related effects are not proposed upstream from Friant Dam, in the Delta, or in CVP/SWP water service areas. Therefore, no effects on current traffic operations, existing transportation facilities, or infrastructure during the planning horizon are expected upstream from Friant Dam or downstream in the Delta, or in CVP/SWP water service areas. For that reason, these three geographic areas are not discussed further in this section.

The program-level evaluation of effects on transportation facilities and other infrastructure included consideration of the potential effects of recapture of Interim and Restoration flows using existing facilities on the San Joaquin River between the Merced River and the Delta and using potential new pumping infrastructure in this segment of the river (Alternatives C1 and C2).

No-Action Alternative

For transportation and infrastructure, the No-Action Alternative includes reasonably foreseeable future actions to be implemented in the Delta and San Joaquin Valley regions, as described in Chapter 2.0, "Description of Alternatives."

Impact TRN-1 (No-Action Alternative): *Reduced Traffic Circulation and Roadway Capacity – Program-Level.* None of the reasonably foreseeable future actions included in the No-Action Alternative would cause short-term construction-related traffic circulation or roadway capacity impacts because no construction would occur in the study area. The No-Action Alternative would not generate new vehicle trips in the Restoration Area or along the San Joaquin River between the Merced River and the Delta. As a result, roadways in the Restoration Area and along the San Joaquin River between the Merced River and the Delta would continue to operate as under existing conditions. Long-term changes to traffic levels of service and roadway capacity would be minimized to acceptable levels through implementation of the existing transportation elements, in conjunction with implementation of the land-use elements, of the general plans that guide growth in the counties in the Restoration Area (Fresno County 2000, Madera County 1995, Merced County 1990). Because traffic and roadway levels of service are expected to be maintained relative to growth, the No-Action Alternative would have a less-than-significant effect on reasonably foreseeable traffic. Therefore, implementing the No-Action Alternative along the San Joaquin River between Friant Dam and the Delta would have less-than-significant impacts on traffic circulation and roadway capacities. This impact would be **less than significant**.

Impact TRN-2 (No-Action Alternative): *Creation of a Hazard as a Result of a Design Feature – Program-Level.* Reasonably foreseeable future actions included in the No-Action Alternative would not result in any new roadway designs, changes to existing roadway designs, or ground-disturbing activities in the San Joaquin River between Friant Dam and the Delta. Therefore, impacts related to creation of a hazard as a result of a design feature would not occur. There would be **no impact**.

Impact TRN-3 (No-Action Alternative): *Reduced Emergency Access – Program-Level.* Under the No-Action Alternative the ability of local agencies to respond to an emergency would not be impaired. The reasonably foreseeable future projects included in the No-Action Alternative also would not impair the ability of local agencies to respond to an emergency in the Restoration Area or along the San Joaquin River between the Merced River and the Delta. Therefore, emergency access in the Restoration Area or along the San Joaquin River between the Merced River and the Delta would not be reduced. There would be **no impact**.

Impact TRN-4 (No-Action Alternative): *Reduced Bicycle and Pedestrian Circulation – Program-Level.* Implementation of the reasonably foreseeable future projects included in the No-Action Alternative would not include construction or operation activities in the Restoration Area or along the San Joaquin River from the Merced River to the Delta. Therefore, impacts on public bicycle or pedestrian circulation facilities would not occur. There would be **no impact**.

Alternatives A1 and B1

Program-level impacts under Alternatives A1 and B1 would occur in the Restoration Area, as described below.

Impact TRN-1 (Alternatives A1 and B1): *Reduced Traffic Circulation and Roadway Capacity – Program-Level.* Alternatives A1 and B1 could cause short-term construction-related traffic congestion and reduced roadway capacity. Short-term, construction-related impacts on traffic circulation would occur in the Restoration Area. Long-term changes in vehicle trips associated with operation and maintenance resulting from implementation of the Settlement would not be substantial. Short-term construction-related impacts would be proportional to the intensity and timing of implementation of the actions. This impact would be **potentially significant**.

Traffic circulation and roadway capacities would be affected by construction-related actions under Alternatives A1 and B1. Truck trips associated with levee construction and construction of the Mendota Pool Bypass would be the primary cause of traffic congestion and delays. Construction workers driving to project sites would cause temporary and short-term increases in the numbers of vehicles in the Restoration Area and adjacent portions of the study area. Temporary road or lane closures may be necessary to implement certain actions. Detours and lane closures could result in traffic delays.

Specific construction equipment, numbers of construction personnel, construction routes, and the time frame needed to implement restoration actions are not currently known. However, truck trips were estimated for a maximum intensity scenario for levee construction along Reach 2B, construction of the Mendota Pool Bypass, and levee construction in Reach 4B occurring simultaneously. Construction of Reach 2B and Mendota Pool Bypass would require an estimated 3,135,600 cubic yards of fill material, while improvements in Reach 4B to achieve flows of 475 cfs would require an estimated 4,292,600 cubic yards of fill material for an estimated total of 7,428,200 cubic yards of fill material (see Appendix H, "Modeling"). Typically, one truck can haul 14 cubic yards per load, and construction would therefore require a total of 530,586 truck trips. For levee and Mendota Pool Bypass construction, an estimated 660 work days and a corresponding 804 truck trips per work day would be needed to construct these projects simultaneously. It was assumed that truck trips would be evenly distributed throughout a 10-hour work day. Therefore, there would be approximately 80 truck trips during the morning and afternoon or evening peak hour periods during construction. This estimated number of truck trips far exceeds the Institute of Transportation Engineers significance threshold of 50 truck trips during the morning and afternoon or evening peak hour periods, and this estimate does not include haul trips that could be generated by the implementation of a number of other concurrent program actions. While the time frame for construction of projects such as levee construction is unknown and may not overlap, construction-related impacts under this maximum intensity scenario would be potentially significant.

Mitigation Measure TRN-1 (Alternatives A1 and B1): *Minimize Short-term Impacts on Traffic Circulation and Roadway Capacity – Program-Level.* To minimize impacts on traffic circulation and roadway capacity, including emergency vehicle access, the project proponent will implement the following measures:

- Require construction contractors to limit truck trips to less than 50 per hour on any affected roadway during the morning and afternoon or evening peak hour periods, if feasible.

- Before construction, prepare a traffic management plan that identifies the number of truck trips, time of day for arrival and departure of trucks, limits on number of truck trips, and traffic circulation control measures. Control measures typically include advertising planned lane closures, warning signage, a flag person to direct traffic flows when needed, and methods for maintaining continued access by emergency vehicles. During project construction, access to existing land uses will be maintained at all times, with detours used as necessary during road closures.

- Submit the traffic management plan to the appropriate county public works, fire, police, and sheriff departments for comments.

- Implement the traffic management plan and feasible recommendations by the appropriate departments.

If truck trips are limited to no more than 50 trips during the morning and afternoon or evening peak hour periods, implementation of this mitigation measure would reduce this impact to a less-than-significant level. Because limiting the number of peak hour truck trips to no more than 50 may not be feasible with respect to the construction schedule for maximum efficiency and public safety, this impact would be **potentially significant and unavoidable**.

Impact TRN-2 (Alternatives A1 and B1): ***Creation of a Hazard as a Result of a Design Feature – Program-Level.*** Although activities under Alternatives A1 and B1 would not result in any new roadway designs, the action alternatives include changes to existing roadway designs and ground-disturbing activities that could affect underground utility infrastructure. Therefore, a hazard could be created in the Restoration Area as a result of a design feature. This impact would be **potentially significant**.

Road crossings in Reach 1 could be modified to provide for fish passage. These crossings could be modified by installing culverts, restructuring the channel, and/or constructing clear span bridges to enable the crossings to be used during Restoration Flows while providing fish passage. Modifying road crossings in Reach 2B and 4B that pose potential barriers to fish passage are discussed as possible actions to address Settlement paragraphs 11(a)(2) and 11(a)(3), respectively. San Mateo Road, which crosses the river in Reach 2B, may cause backwater effects and downstream scour, and may act as a barrier to upstream salmon migration during low flows. Five road crossings are present in Reach 4B1 that could require modification. These include crossings at Washington Road, Turner Island Road, and three unnamed crossings. It is not known if modifications would be required at the Washington Road or Turner Island Road crossings to allow conveyance of at least 475 cfs or provide fish passage. Currently, all three unnamed crossings are configured with culverts that may be insufficient to convey 475 cfs, may be barriers to upstream migrating adult salmon, or both. Project-specific technical studies of these crossings would identify the type of modifications that would be necessary to provide for flow and fish passage. Also, additional modifications or new roads may be required as a result of levee construction or other Settlement actions. All of these modifications would be designed according to current engineering standards, which minimize hazardous designs. Therefore, this impact would be less than significant.

In addition to roadway modifications, Alternatives A1 and B1 would involve substantial ground-disturbing actions in the Restoration Area and adjacent portions of the study area for levee and channel construction and fill extraction at borrow sites. Up to 20 PG&E facilities are known to cross the San Joaquin River in the Restoration Area and other facilities that are not known may occur in the Restoration Area and in borrow areas. Ground-disturbing activities could disrupt service and cause potentially hazardous conditions if a gas main or other pipeline were ruptured. Because of the potential for this hazard, this impact would be potentially significant.

Mitigation Measure TRN-2 (Alternatives A1 and B1): ***Avoid Disruption of Subsurface Utility Facilities – Program-Level.*** To avoid disruption of subsurface utilities from those activities that involve ground disturbance, the project proponent will implement the following measures before construction to the extent feasible:

- Request an underground service alert to determine the location of all underground utility facilities.
- When underground utility facilities are present, coordinate with the owner of a transmission line or pipeline to obtain design specifications of underground facilities.
- Design restoration actions to avoid affecting underground utility facilities.
- If avoiding underground facilities is not feasible, coordinate with the utility owner to shut off and relocate the utilities as necessary.

Implementing this mitigation measure would reduce this impact to a less-than-significant level. This impact would be **less than significant** with mitigation.

Impact TRN-3 (Alternatives A1 and B1): *Reduced Emergency Access – Program-Level.* Under Alternatives A1 and B1, improvement or construction activities could impair the ability of local agencies to respond to an emergency. Therefore, access by emergency vehicles to locations within the Restoration Area could be impeded. This impact would be **potentially significant**.

Alternatives A1 and B1 would involve construction activities associated with implementing restoration actions that could impede access of emergency vehicles in the Restoration Area because of road closures, lane closures, and detours. Specific construction equipment, numbers of construction personnel, and the time frame needed to implement restoration actions are not currently known. Inadequate emergency access would be short term and would cease after construction is complete. This impact would be potentially significant.

Mitigation Measure TRN-1 (Alternatives A1 and B1): *Minimize Short-term Impacts on Traffic Circulation and Roadway Capacity – Program-Level.* This mitigation measure is identical to Mitigation Measure TRN-1, as previously described for Alternatives A1 and B1.

This impact would be **less than significant** with mitigation.

Impact TRN-4 (Alternatives A1 and B1): *Reduced Bicycle and Pedestrian Circulation – Program-Level.* Under Alternatives A1 and B1, construction activities could result in temporary, short-term, and long-term closures that could interrupt the use of public bicycle or pedestrian facilities. Such facilities could be temporarily relocated or completely removed. This impact would be **potentially significant**.

Alternatives A1 and B1 would involve construction activities along the San Joaquin River between Friant Dam and the Merced River. The locations of public bicycle, pedestrian, and equestrian paths (e.g., the Lewis S. Eaton trail in Reach 1) are described in Chapter 21, “Recreation.” Existing public bicycle or pedestrian circulation facilities in the Restoration Area could be affected by implementation of restoration actions under this alternative. Depending on the location of restoration actions, public bicycle,

pedestrian, and equestrian facilities could require temporary relocation or complete removal of such facilities. Temporary impacts of less than 3 months are considered to be less than significant. However, complete closure of public bicycle, pedestrian, and equestrian paths for greater than 3 months would be considered a potentially significant impact. This impact would be potentially significant.

Mitigation Measure TRN-4 (Alternatives A1 and B1): ***Minimize Impacts on Public Bicycle and Pedestrian Circulation Facilities – Program-Level.*** The project proponent will minimize impacts to public bicycle and pedestrian circulation by avoiding impacts, minimizing closure of paths, and providing for temporary or permanent relocation of the facility to the extent feasible. The appropriate public works department will be consulted to determine the most feasible alignment for facility relocation.

Implementing this mitigation measure would reduce this impact to a less-than-significant level. This impact would be **less than significant** with mitigation.

Alternatives A2 and B2

Under Alternatives A2 and B2, program-level impacts related to traffic operations and transportation infrastructure in the Restoration Area would be similar to, but potentially greater than, those previously described under Alternatives A1 and B1. Implementation of the mitigation measures under Alternatives A1 and B1 would also be required for Alternatives A2 and B2, and would reduce program-level impacts TRN-2, TRN-3, and TRN-4 to a less-than-significant level. TRN-1 would remain potentially significant and unavoidable.

Whereas under Alternatives A1 and B1, improvements would be constructed in Reach 4B to achieve flow capacity of at least 475 cfs, under Alternatives A2 and B2 improvements would be constructed in Reach 4B to achieve flow capacity of at least 4,500 cfs. This nearly 10-fold increase in flow capacity is understood to take significantly more fill material than for increasing flow capacity to 475 cfs. Therefore, these alternatives could also exceed the Institute of Transportation Engineers significance threshold of 50 truck trips during the morning and afternoon or evening peak hour periods. The potentially significant impacts described above under Alternatives A1 and B1 would be similar to but potentially greater than under Alternatives A2 and B2.

Alternative C1

Under Alternative C1, program-level impacts related to traffic operations and transportation infrastructure in the Restoration Area would be the same as those previously described under Alternatives A1 and B1. Under Alternative C1, potential program-level impacts would also occur along the San Joaquin River between the Merced River and the Delta, associated with construction, operation, and maintenance of new pumping and conveyance infrastructure. The impacts and significance conclusions in this area would be similar to those in the Restoration Area. Implementation of the mitigation measures under Alternatives A1 and B1 would also be required for Alternative C1, and would apply to activities along the San Joaquin River between the Merced River and the Delta. Implementation of these mitigation measures would reduce program-level impacts

TRN-2, TRN-3, and TRN-4 to a less-than-significant level. TRN-1 would remain potentially significant and unavoidable.

Alternative C2

Under Alternative C2, program-level impacts related to traffic operations and transportation infrastructure in the Restoration Area would be the same as those previously described under Alternatives A2 and B2. Under Alternative C2, potential program-level impacts would also occur along the San Joaquin River between the Merced River and the Delta, associated with construction, operation, and maintenance of new pumping and conveyance infrastructure. The impacts and significance conclusions in this area would be similar to those in the Restoration Area. Implementation of the mitigation measures described under Alternatives A1 and B1 would also be required for Alternative C2, and would apply to activities along the San Joaquin River between the Merced River and the Delta. Implementation of these mitigation measures would reduce program-level impacts TRN-2, TRN-3, and TRN-4 to a less-than-significant level. TRN-1 would remain potentially significant and unavoidable.

23.3.4 Project-Level Impacts and Mitigation Measures

This section provides a project-level evaluation of the effects of reoperating Friant Dam on traffic operations, transportation, and other infrastructure. The reoperation of Friant Dam would increase water volume and change the timing of water flows in the San Joaquin River, which could affect traffic operations by temporarily closing roadways that cross the river at-grade or affect transportation infrastructure by flooding existing public bicycle or pedestrian trails along the San Joaquin River (e.g., West El Nido Road, Headquarters Road, Dan McNamara Road, and West Sandy Marsh Road). Water surface elevations in Millerton Lake, seasonal timing and volume of water flow entering the Delta, and water deliveries to the CVP/SWP water service areas would be affected by reoperation of Friant Dam; however, effects on traffic operations, transportation, and other infrastructure would not occur in these geographic areas. For that reason, these three geographic areas are not discussed further at the project level.

The project-level evaluation of effects on transportation facilities and other infrastructure included consideration of the potential effects resulting from the recapture of Interim Flows at existing facilities in the Restoration Area and in the Delta, and from the recapture of Restoration Flows using existing Delta facilities. No changes that would occur to transportation facilities or other infrastructure were identified. Therefore, the effects of reoperating Friant Dam on these facilities are not discussed further.

Actions identified in the Physical Monitoring and Management Plan (see Appendix D) as potential immediate actions to address nonattainment of management objectives also were evaluated at a project level. Potential immediate actions related to flow, seepage, capacity, native vegetation, and spawning gravel. Potential immediate actions include acquiring additional water from willing sellers, reoperating Friant Dam to reduce flows, monitoring sites, preparing reports documenting monitoring, and removing obstructions/debris from channels in the Restoration Area. Monitoring and reporting actions would have inconsequential effects on transportation facilities and other infrastructure and are not discussed further.

Other actions evaluated at a project level would not result in physical changes to transportation facilities or other infrastructure. These include reoperation of Mendota Dam, Chowchilla Bypass Bifurcation Structure, Eastside Bypass Bifurcation Structure, Mariposa Bypass Bifurcation Structure, and the Hills Ferry Barrier. The proposed changes to the operation of these structures would have no effect on transportation facilities or other infrastructure. Actions to obtain encroachment permits, water transfers, and long-term water rights also would not affect transportation and infrastructure facilities. However, the product of these authorizations (the reoperation of Friant Dam to release Interim and Restoration flows in the Restoration Area) would affect transportation facilities and other infrastructure. Therefore, the effects of Interim and Restoration flows on these facilities are discussed further and their significance evaluated.

No-Action Alternative

Implementing the No-Action Alternative would have less-than-significant or no project-level impacts, as described below.

Impact TRN-5 (No-Action Alternative): *Reduced Traffic Circulation and Roadway Capacity – Project-Level.* The reasonably foreseeable future projects included in the No-Action Alternative would potentially generate new vehicle trips in these areas, increasing traffic. However, roadways in the Restoration Area and along the San Joaquin River between the Merced River and the Delta would continue to operate similar to existing conditions. Therefore, implementing the No-Action Alternative along the San Joaquin River between Friant Dam and the Delta would result in a less-than-significant impact on traffic circulation and roadway capacity. Therefore, this impact would be **less than significant**.

Impact TRN-6 (No-Action Alternative): *Creation of a Hazard as a Result of a Design Feature – Project-Level.* Under the No-Action Alternative, the volume and timing of water flows in the San Joaquin River between Friant Dam and the Merced River would remain comparable to existing conditions. Therefore, no new hazards to roadways would be created from water flows in the San Joaquin River. Reasonably foreseeable future actions included in the No-Action Alternative would not result in any modified or new roadway or gas pipeline designs in the Restoration Area or along the San Joaquin River between the Merced River and the Delta. Therefore, impacts related to hazards created from a design feature would not occur. There would be **no impact**.

Impact TRN-7 (No-Action Alternative): *Inadequate Emergency Access – Project-Level.* Reasonably foreseeable future actions included in the No-Action Alternative would not result in any temporary, short-term, or long-term impacts on emergency vehicle access in the Restoration Area or along the San Joaquin River between the Merced River and the Delta. Therefore, emergency vehicle access would not be impaired because all roadways in the Restoration Area, including roadways that cross the river at grade, would continue to operate as under existing conditions. There would be **no impact**.

Impact TRN-8 (No-Action Alternative): *Reduced Bicycle and Pedestrian Circulation – Project-Level.* Under the No-Action Alternative, there would be no change in the volume or change the timing of water flows in the San Joaquin River downstream from Friant Dam. Therefore, this alternative would not result in effects on public bicycle or pedestrian circulation facilities related to water flow. Reasonably foreseeable future projects included in the No-Action Alternative also would not affect public bicycle or pedestrian circulation facilities. There would be **no impact**.

Alternatives A1 through C2

Project-level impacts under Alternatives A1 through C2 are described below.

Impact TRN-5 (Alternatives A1 through C2): *Reduced Traffic Circulation and Roadway Capacity – Project-Level.* Reoperation of Friant Dam under Alternatives A1 through C2 would increase water volume and change the timing of water flows in the San Joaquin River between Friant Dam and the Delta. These increased flows would result in additional visitors to the Restoration Area and along the San Joaquin River downstream to the Delta as described in Chapter 21.0, "Recreation." The additional visitors, in turn, would increase traffic. The number of additional trips is not expected to be substantial because the increased flows in the San Joaquin River would change seasonally and would result in trips dispersed throughout the study area. Over the long term, the increased number of trips to recreational areas would be accounted for in the integrated implementation of the local planning agencies' general plan traffic, recreation, and land-use elements. Through the land-use planning process, the combination of population growth, with additional visitors to the study area, would not cause a substantial degradation in levels of service. Therefore, this impact would be **less than significant**.

Impact TRN-6 (Alternatives A1 through C2): *Creation of a Hazard as a Result of a Design Feature – Project-Level.* Project-level actions under Alternatives A1 through C2 would not involve design and construction of new transportation infrastructure or modification of existing infrastructure, implementation of any of the alternatives. Therefore, there would be **no impact**.

Impact TRN-7 (Alternatives A1 through C2): *Inadequate Emergency Access – Project-Level.* Reoperation of Friant Dam under Alternatives A1 through C2 would increase the water volume and change the timing of water flows in the San Joaquin River between Friant Dam and the Delta. Therefore, Alternatives A1 through C2 could impede access to some locations within the study area by emergency vehicles. This impact would be **potentially significant**.

Alternatives A1 through C2 would involve reoperating Friant Dam, which would increase water volume and change the timing of water flows in the San Joaquin River from Friant Dam to the Delta. As a result, roadways in the Restoration Area and along the San Joaquin River between the Merced River and the Delta, specifically roadways that cross the river at grade, could need to be temporarily closed when water volumes and flows reach a designated level. The temporary closure of roadways could impede access by emergency vehicles as well as ingress and egress of vehicles in the event of an emergency. Therefore, this impact would be potentially significant.

Mitigation Measure TRN-7 (Alternatives A1 through C2): *Implement Vehicular Traffic Detour Planning – Project-Level.* Reclamation will prepare a long-term vehicular detour plan for routes that may be inundated as a result of the release of Interim and Restoration flows. Reclamation will complete the vehicular detour plan in accordance with current Caltrans Standard Plans and Specifications within 1 year of the signing of the Record of Decision. The vehicular detour plan will provide convenient and parallel vehicular traffic detours for routes closed because of inundation by Interim and Restoration flows. Until the long-term vehicular detour plan is completed, Reclamation will continue to implement the vehicular detour plan currently in place for the release of Interim Flows.

The detour plan will include an assessment of existing roadway conditions, whether paved or unpaved, and provisions for repair and maintenance if the roadway conditions are substantially degraded from increased use. After the detour route is identified and before flows are released that would overtop existing crossings, the condition of the detour road surface will be assessed and documented in a technical memorandum. The technical memorandum will be submitted to the local agency responsible for maintenance of the road, e.g., county public works department if it is a county road or land owner if the proposed detour is a private road. After the detour is no longer needed, the condition of the road surface will be assessed and documented in a technical memorandum. The technical memorandum will identify substantial changes in the condition of the road surface, such as potholing or rutting. Repair and maintenance actions needed to restore the road surface to pre-detour conditions will be identified in the technical memorandum. The technical memorandum will be submitted to the local maintenance agency. In coordination with the local maintenance agency, the repair and maintenance actions may be conducted by Reclamation or by the local maintenance agency to be proportionately reimbursed by Reclamation.

The detour plan will prioritize paved roads for use as detour routes. If paved roadway detours are not feasible during Interim or Restoration flow road inundation periods, the detour plan will require that VDE from unpaved detour routes will be limited to 20 percent opacity by implementing at least one of the following control measures identified in SJVAPCD regulations regarding stabilizing unpaved roadways:

- Watering
- Uniform layer of washed gravel
- Chemical/organic dust stabilizers/suppressants in accordance with the manufacturer's specifications
- Roadmix
- Paving
- Any other method that can be demonstrated to the satisfaction of the Air Pollution Control Officer that effectively limits VDE to 20 percent opacity and meets the conditions of a stabilized unpaved road.

Implementing this mitigation measure would reduce this impact to a less-than-significant level. This impact would be **less than significant** with mitigation.

Impact TRN-8 (Alternatives A1 through C2): *Reduced Bicycle and Pedestrian Circulation – Project-Level.* The schedule for Interim and Restoration flow releases specified in Exhibit B of the Settlement for certain water-year types includes spring and early summer flows that are substantially greater than historic average flows below Friant Dam during those seasons. Inundation and damage from debris and sediment associated with these increased flows could affect public bicycle or pedestrian circulation facilities along Reach 1, as described in Chapter 21.0, "Recreation." 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, development of public bicycle, pedestrian, and equestrian facilities on the river have generally been designed to withstand periodic flooding and has withstood high flows in recent years without permanent damage. Therefore, this impact would be **less than significant**.

Reoperation of Friant Dam under Alternatives A1 through C2 would increase the water volume and change the timing of water flows in the San Joaquin River between Friant Dam and the Merced River. These 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. High flows can deposit sediment or gravel transported from the riverbed onto parklands, and facilities can be damaged by scouring or by debris carried by the high flows. However, public bicycle, pedestrian, and equestrian 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. For example, flows exceeded 4,000 cfs nearly all of April through June 2006 and exceeded 7,000 cfs during most of that period. The maximum mean daily flow occurring during that period was nearly 10,000 cfs (CDEC 2009).

Because the existing public bicycle, pedestrian, and equestrian facilities have withstood flows that far exceeded the maximum scheduled Interim and Restoration flows and because future parkway development is subject to flood damage avoidance policies, significant adverse effects on riverside recreation facilities from scheduled Interim and Restoration flows are not likely. Therefore, this impact would be less than significant.

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Chapter 24.0 Utilities and Service Systems

This chapter provides an overview of existing utilities and service systems which includes wastewater collection, fire protection services, law enforcement services, emergency services, and solid waste management. This chapter also describes the regulatory setting, environmental consequences, and mitigation measures as they pertain to implementation of the Settlement.

The discussion of utilities and service systems encompasses the Restoration Area and along the San Joaquin River between the Merced River and the Delta. Because no effects to utilities and service systems are expected upstream from Friant Dam, in the Delta, or in the CVP/SWP water service areas due to implementation of the Settlement, these geographic regions are not discussed further in this section.

Many utilities and service systems are covered to some degree in previous chapters. A discussion of surface water supply, distribution facilities, and operations is provided in Chapter 13.0, "Hydrology–Surface Water Supplies and Facilities Operations," and existing electrical, natural gas, and drainage infrastructure is described in Chapter 23.0, "Transportation and Infrastructure." Information on recreational facilities is provided in Chapter 21.0, "Recreation." School services and facilities are not discussed because none of these facilities would be affected, and there would be no need for new or physically altered facilities with implementation of any of the program alternatives.

24.1 Environmental Setting

This section describes the environmental setting of utilities and service systems as it pertains to the implementation of the Settlement.

24.1.1 Wastewater Collection

No wastewater would be produced and there would be no increased demand for wastewater collection systems with implementation of any of the action alternatives. Therefore, the following discussion addresses the existing wastewater collection facilities located where grading activities may occur in associated with implementation of program alternatives.

San Joaquin River from Friant Dam to Merced River

Sanitary sewer systems in Fresno, Madera, and Merced counties generally are provided by cities and special districts, including community service districts, public utility districts, sanitary districts, and sewer maintenance districts. Some agencies provide sewer collection service only and contract with surrounding agencies for wastewater treatment and disposal. Some of the unincorporated areas of Fresno, Madera, and Merced counties

lack sanitary sewer infrastructure, and are serviced by individual or community septic systems. None of the reaches in the Restoration Area is served by a municipal wastewater collection system.

San Joaquin River from Merced River to the Delta

Wastewater collection systems, including sanitary sewer pipelines, leach fields, and septic systems, are likely to occur adjacent to the San Joaquin River system at various locations from the Merced River to the Delta.

24.1.2 Fire Protection Services

This discussion identifies the general characteristics of fire protection facilities and services in the study area (see Chapter 20.0, "Public Health and Hazardous Materials" for a discussion of wildland fire hazards) with the potential to be affected by the program alternatives.

San Joaquin River from Friant Dam to Merced River

The following sections describe fire protection services within the Restoration Area.

Reaches 1 to 3. Fire protection services in Reaches 1 through 3 are provided by the Fresno County Fire District, the City of Fresno Fire Department, and the Madera County Fire Department. The Fresno County Fire Protection 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. The district has 13 fire stations and 48 personnel (Fresno County Fire Protection District 2009).

Fire protection services are provided to the City of Fresno by the City of Fresno Fire Department through a network of 22 fire stations, an airport rescue fire fighting station, 354 career firefighters, 39 apparatus and support vehicles, two personal water crafts, and two aircraft rescue units (Fresno Fire Department 2009).

The Madera County Fire Department provides fire protection services to unincorporated areas of Madera County through a network of 15 fire stations, 19 career fire suppression personnel, 185 paid call firefighters, 11 support personnel, and 50 apparatus and support vehicles. The department is administered, and career suppression personnel are provided, through a contract with the CAL FIRE. Fire Prevention, clerical, and automotive support personnel are county employees. 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 2008).

Reach 4. Fire protection services in Reach 4A are provided by the Fresno County Fire Protection District and the Madera County Fire Department. (See the discussion of these agencies above.) Fire protection services in Reaches 4B1 and 4B2 are provided by the Merced County Fire Department. The Merced County Fire Department provides emergency services to unincorporated areas of the county through a network of 20 fire

stations, 227 paid on-call firefighters and volunteers, and an 80 vehicle fleet. It is administered and suppression personnel are provided, through a contract with CAL FIRE. Support personnel are Merced County employees. The department also provides fire protection to the Cities of Gustine, Dos Palos, and Livingston through mutual aid agreements (Merced County 2007).

Reach 5. Fire protection services in Reach 5 are provided by the Merced County Fire Department. See the discussion of this agency above.

Chowchilla Bypass and Tributaries. Fire protection services in the Chowchilla Bypass area are provided by the Madera County Fire Department and Merced County Fire Department. See the discussion of these agencies above.

Eastside Bypass, Mariposa Bypass, and Tributaries. Fire protection services in the Eastside Bypass, Mariposa Bypass, and tributaries areas are provided by the Merced County Fire Department. See the discussion of this agency above.

San Joaquin River from Merced River to the Delta

Fire protection services in the San Joaquin River system from the Merced River to the Delta are provided by the Stanislaus Consolidated Fire Protection District and the Merced County Fire Department. See the discussion of the Merced County Fire Department above.

24.1.3 Law Enforcement Services

This discussion identifies the general characteristics of law enforcement facilities and services in the study area.

San Joaquin River from Friant Dam to Merced River

The following sections describe law enforcement services within the Restoration Area with the potential to be affected by the program alternatives.

Reach 1. Law enforcement services in Reach 1 are provided by the Fresno County Sheriff's Department, the City of Fresno Police Department, and the Madera 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 (Fresno County Sheriff's Department 2008). The department provides service to four geographic areas and maintains four stations and one substation. 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, Special Weapons and Tactics (SWAT) Unit, Dive Team, and Search and Rescue Unit.

The Fresno Police Department provides law enforcement service to the City of Fresno. The department provides service to five policing districts (northeast, northwest, central, southeast, and southwest) and maintains four stations and one substation. Specialized

members of the police department also serve on additional units, including the SWAT Team, the K-9 Unit, the Explosive Ordinance Disposal Unit, Skywatch, District Crime Suppression Teams, and the Mounted Patrol (Fresno Police Department 2007).

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) and has 116 personnel with 82 sworn law enforcement officers. 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 2008).

Reaches 2 to 4. Law enforcement services in Reaches 2–4 are provided by the Fresno County Sheriff's Department and the Madera County Sheriff's Department. (See the discussion of the Fresno County Sheriff's Department and Madera County Sheriff's Department for Reach 1 above.) Law enforcement services in Reaches 4B1 and 4B2 are provided by the Merced County Sheriff's Department. Law enforcement services in unincorporated areas of Merced County are provided by the Merced County Sheriff's Department. The department maintains stations in Merced, Los Banos, and Delhi, and operates the John Lotorraca Correctional Center in El Nido and Sheriff's Community Law Enforcement Office stations in the communities of Merced, Planada, Santa Nella, Delhi, Hilmar, and Winton. The Merced County Sheriff's Department employs approximately 101 sworn officers and maintains 22 patrol vehicles and four additional unmarked nonpatrol vehicles. Specialized members of the sheriff's department also serve on additional units, including a narcotics task force, an investigation unit, a major-crimes unit, a Federal drug trafficking task force, a SWAT team, and a Sheriff Tactical and Reconnaissance Team (Merced County 2000).

Reach 5. Law enforcement services in Reach 5 are provided by the Merced County Sheriff's Department. See the discussion of this agency above.

Chowchilla Bypass and Tributaries. Law enforcement services in the Chowchilla Bypass area are provided by the Madera County Sheriff's Department and Merced County Sheriff's Department. See the discussion of these agencies above.

Eastside Bypass, Mariposa Bypass, and Tributaries. Law enforcement services in the Eastside Bypass, Mariposa Bypass, and tributaries areas are provided by the Merced County Sheriff's Department. See the discussion of this agency above.

San Joaquin River from Merced River to the Delta

Law enforcement services in the San Joaquin River system from the Merced River to the Delta are provided by the Stanislaus County Sheriff's Department and the Merced County Sheriff's Department. See the discussion of the Merced County Sheriff's Department above.

24.1.4 Emergency Services

This discussion identifies emergency service providers in the study area with the potential to be affected by the program alternatives.

San Joaquin River from Friant Dam to Merced River

Emergency services are provided by the CHP, Fresno County Sheriff's Department, and Madera County Sheriff's Department. The CHP Central Division provides ground and air support for emergencies along the Interstate 5 corridor, State Route 99, and other State highways throughout Fresno, Madera, and Merced counties and the City of Fresno. The CHP Central Division has 15 area offices, six resident posts, two commercial inspection facilities, 667 uniformed officers, and 226 nonuniformed personnel (CHP 2008).

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; U.S. Forest Service (USFS); the State emergency response network run by the California OES; CAL FIRE; CHP; and local fire departments, hospitals, and ambulance services.

The Madera County Sheriff's Department is responsible for coordinating emergency services in Madera County. Large-scale 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.

Emergency services in Reaches 4B1, 4B2, and 5 are provided by the CHP Central Division and the Merced County Fire Department. (See the discussion of the CHP Central Division above.) The Merced County Fire Department coordinates emergency evacuation routes and programs for residents and businesses in Merced County. Large-scale emergency services are handled by the Merced County Fire Department in cooperation with FEMA; USFS; the State emergency response network run by OES; CAL FIRE; the Merced County Health Department; and local fire departments, hospitals, and ambulance services (Merced County 2007).

Chowchilla Bypass and Tributaries. Emergency services in the Chowchilla Bypass area are provided by the CHP Central Division, the Madera County Sheriff's Department, and the Merced County Fire Department. See the discussion of these agencies above.

Eastside Bypass, Mariposa Bypass, and Tributaries. Emergency services in the Eastside Bypass, Mariposa Bypass, and tributary areas are provided by the CHP Central Division and Merced County Fire Department. See the discussion of these agencies above.

San Joaquin River from Merced River to the Delta

Emergency services in the Sacramento River System for the Merced River to the Delta are provided by the CHP Central Division, Merced County Fire Department, and Stanislaus County OES. (See the discussion of these agencies above.)

24.1.5 Solid Waste Management

This discussion identifies the general characteristics of solid waste management facilities in the study area.

San Joaquin River from Friant Dam to Merced River

Solid waste services are provided by the Fresno County Resources Division, the Fresno Solid Waste Management Division, and the Madera County Resource Management Agency.

Solid waste disposal in Fresno County is managed by the Fresno County Resources Division. The county owns and operates the American Avenue Landfill and the Coalinga Landfill. The American Avenue Landfill is defined as a Class II and Class III landfill and accepts nonhazardous and inert solid wastes and asbestos. It is permitted to accept a maximum of 2,200 tons per day (tpd) of solid waste. The site has a permitted 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 (CIWMB 2008a).

The Coalinga Landfill is defined as a Class III landfill and accepts nonhazardous and inert solid wastes. It is permitted to accept a maximum of 200 tpd of solid waste. The site has a permitted capacity of approximately 3.3 million cubic yards and a remaining capacity of 1.9 million cubic yards. The closure date of the Coalinga Landfill is anticipated to be approximately 2029 (CIWMB 2008b).

In an effort to meet the requirements of AB 939, Fresno County banned the disposal of construction and demolition debris at the county-operated American Avenue and Coalinga landfills. 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).

Solid waste disposal in the city of Fresno is managed by the city's Solid Waste Management Division. Solid waste in the city is hauled to the American Avenue Landfill. The recycling of construction and demolition is required for any city-issued building, relocation, or demolition permitted project that generates at least 8 cubic yards of material by volume. All waste must be hauled to a city-approved facility (City of Fresno 2009).

Solid waste disposal in Madera County is managed by the Madera County Resource Management Agency. The county owns and operates the Fairmead Sanitary Landfill (Madera County 2009). Permitted waste types at the Fairmead Sanitary Landfill are Class III nonhazardous solid waste and inert wastes and nonfriable asbestos. 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 2033 (CIWMB 2008c). 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.

Solid waste management in Reaches 4B1, 4B2, and 5 is provided by the Merced County Department of Public Works Solid Waste Division. The Solid Waste Division operates the Highway 59 Landfill, which serves the eastern end of the county, and the Billy Wright Landfill, which serves the western end of the county. Both the Highway 59 Landfill and Billy Wright Landfill are defined as Class III landfills and accept nonhazardous and inert solid wastes and nonfriable asbestos.

The Highway 59 Landfill is permitted to accept a maximum of 1,500 tpd of solid waste. The site has a permitted maximum capacity of approximately 3.0 million cubic yards and a remaining capacity of 2.8 million cubic yards. The closure date of the Highway 59 Landfill is anticipated to be approximately 2030 (CIWMB 2008d). The Highway 59 Landfill inspects all self-haul loads and some commercial haul loads. If it appears that the load has a high percentage of recyclable materials, the load is sent to a sorting pad.

The Billy Wright Landfill is permitted to accept a maximum of 800 tpd of solid waste. The site has a permitted capacity of approximately 3.7 million cubic yards and a remaining capacity of 1.1 million cubic yards. The closure date of the Billy Wright Landfill is anticipated to be approximately 2010 (CIWMB 2008e).

Chowchilla Bypass and Tributaries. Solid waste management in the Chowchilla Bypass area is provided by the Madera County Resource Management Agency and Merced County Department of Public Works Solid Waste Division. See the discussion of these agencies above.

Eastside Bypass, Mariposa Bypass, and Tributaries. Solid waste management in the Eastside Bypass, Mariposa Bypass, and tributaries areas is provided by the Merced County Department of Public Works Solid Waste Division. See the discussion of this agency above.

San Joaquin River from Merced River to the Delta

Solid waste management in the San Joaquin River system from the Merced River to the Delta is provided by the Stanislaus County Solid Waste Management Division and the Merced County Department of Public Works Solid Waste Division. See the discussion of these agencies above.

24.2 Regulatory Setting

This section describes the regulatory setting for utilities and service systems in the study area.

24.2.1 Federal

No Federal plans, policies, regulations, or laws related to utilities and service systems are applicable to the action alternatives.

24.2.2 State of California

The following State law pertains to utilities and service systems as discussed below.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of by transformation and land disposal, the California Legislature passed the California Integrated Waste Management Act (CIWMA) of 1989 (AB 939), effective January 1990. According to the CIWMA, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Each city is required to develop solid waste plans demonstrating integration of the CIWMA plan with the county plan. The plans must promote (in order of priority) source reduction, recycling and composting, and environmentally safe transformation and land disposal.

24.2.3 Regional and Local

As described under "Solid Waste Management," each solid waste management provider with jurisdiction in the study area implements solid waste plans and recycling programs consistent with the requirements of AB 939.

24.3 Environmental Consequences and Mitigation Measures

This section describes the effects that the program alternatives would have on utilities and service systems, including wastewater collection, fire protection services, law enforcement services, emergency services, and solid waste management. The focus of the analysis is on the Restoration Area and the San Joaquin River between the Merced River and the Delta.

The program alternatives evaluated in this chapter are described in detail in Chapter 2.0, "Description of Alternatives," and summarized in Table 24-1. The potential impacts to surface water supplies and facilities operations and associated mitigation measures are summarized in Table 24-2. School services and facilities would not be affected by any of the program alternatives, and new or physically altered facilities would not be needed. Therefore, school services and facilities are not evaluated in this section. Other utilities and service systems that are evaluated to some degree are discussed elsewhere in this document: surface water supply, distribution facilities, and operations (Chapter 13.0, "Hydrology–Surface Water Supplies and Facilities Operations"); existing electrical, natural gas, and drainage infrastructure (Chapter 23.0, "Transportation and Infrastructure"); and recreation facilities (Chapter 21.0, "Recreation").

Table 24-1.
Actions Included Under Action Alternatives

Level of NEPA/CEQA Compliance	Actions[1]		Action Alternative					
			A1	A2	B1	B2	C1	C2
Project-Level	Reoperate Friant Dam and downstream flow control structures to route Interim and Restoration flows		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows in the Restoration Area		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows at existing CVP and SWP facilities in the Delta		✓	✓	✓	✓	✓	✓
Program-Level	Common Restoration actions[2]		✓	✓	✓	✓	✓	✓
	Actions in Reach 4B1 to provide at least:	475 cfs capacity	✓	✓	✓	✓	✓	✓
		4,500 cfs capacity with integrated floodplain habitat		✓		✓		✓
	Recapture Interim and Restoration flows on the San Joaquin River downstream from the Merced River at:	Existing facilities on the San Joaquin River			✓	✓	✓	✓
		New pumping infrastructure on the San Joaquin River					✓	✓
	Recirculation of recaptured Interim and Restoration flows		✓	✓	✓	✓	✓	✓

Notes:
[1] All alternatives also include the Physical Monitoring and Management Plan and the Conservation Strategy, which include both project- and program-level actions intended to guide implementation of the Settlement.
[2] Common Restoration actions are physical actions to achieve the Restoration Goal that are common to all action alternatives and are addressed at a program level of detail.

Key:
CEQA = California Environmental Quality Act
cfs = cubic feet per second
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
NEPA = National Environmental Policy Act
PEIS/R = Program Environmental Impact Statement/Report
SWP = State Water Project

Table 24-2.
Summary of Environmental Consequences and Mitigation Measures – Utilities and Service Systems

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Utilities and Service Systems: Program-Level				
UTL-1: Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities in the Restoration Area	No-Action	PS	–	PS
	A1	LTS	–	LTS
	A2	LTS	–	LTS
	B1	LTS	–	LTS
	B2	LTS	–	LTS
	C1	LTS	–	LTS
	C2	LTS	–	LTS
UTL-2: Potential Reduction in Ability of Facilities in the Restoration Area to Meet Wastewater Treatment Requirements	No-Action	LTS	–	LTS
	A1	PS	UTL-2: Obtain Required Permits for Hatchery Wastewater Discharges and Implement Best Management Practices to Reduce Pollutant Discharges	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
UTL-3: Potential for Insufficient Water Supply and Resources in the Restoration Area	No-Action	PS	–	PS
	A1	Too Speculative for Meaningful Consideration	–	Too Speculative for Meaningful Consideration
	A2	Too Speculative for Meaningful Consideration	–	Too Speculative for Meaningful Consideration
	B1	Too Speculative for Meaningful Consideration	–	Too Speculative for Meaningful Consideration
	B2	Too Speculative for Meaningful Consideration	–	Too Speculative for Meaningful Consideration
	C1	Too Speculative for Meaningful Consideration	–	Too Speculative for Meaningful Consideration
	C2	Too Speculative for Meaningful Consideration	–	Too Speculative for Meaningful Consideration

Table 24-2.
Summary of Environmental Consequences and Mitigation Measures – Utilities and Service Systems (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Utilities and Service Systems: Program-Level (contd.)				
UTL-4: Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity	No-Action	LTS	–	LTS
	A1	PS	UTL-4: Identify Landfills with Adequate Permitted Capacity to Accept Solid Waste Generated by Settlement Activities and Dispose of Waste in Accordance with Applicable Regulations	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
UTL-5: Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services in the Restoration Area	No-Action	LTS	–	LTS
	A1	LTS	–	LTS
	A2	LTS	–	LTS
	B1	LTS	–	LTS
	B2	LTS	–	LTS
	C1	LTS	–	LTS
	C2	LTS	–	LTS
UTL-6: Potential for Insufficient Existing Water Supply and Resources Between the Merced River and the Delta	No-Action	PS	–	PS
	A1	LTS	–	LTS
	A2	LTS	–	LTS
	B1	LTS	–	LTS
	B2	LTS	–	LTS
	C1	LTS	–	LTS
	C2	LTS	–	LTS

Table 24-2.
Summary of Environmental Consequences and Mitigation Measures – Utilities and Service Systems (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Utilities and Service Systems: Program-Level (contd.)				
UTL-7: Potential for Generation of Solid Waste Between the Merced River and the Delta in Excess of Permitted Landfill Capacity	No-Action	LTS	–	LTS
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	LTS	–	LTS
	C2	LTS	–	LTS
UTL-8: Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services Between the Merced River and the Delta	No-Action	LTS	–	LTS
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	LTS	–	LTS
	C2	LTS	–	LTS
Utilities and Service Systems: Project-Level				
UTL-9: Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities in the Restoration Area	No-Action	PS	–	PS
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	No Impact	–	No Impact
	C2	No Impact	–	No Impact
UTL-10: Potential Reduction in Ability of Facilities in the Restoration Area to Meet Wastewater Treatment Requirements	No-Action	LTS	–	LTS
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	No Impact	–	No Impact
	C2	No Impact	–	No Impact

Table 24-2.
Summary of Environmental Consequences and Mitigation Measures – Utilities and Service Systems (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Utilities and Service Systems: Project-Level (contd.)				
UTL-11: Potential for Insufficient Existing Water Supply and Resources in the Restoration Area	No-Action	PS	–	PS
	A1	PSU	–	PSU
	A2	PSU	–	PSU
	B1	PSU	–	PSU
	B2	PSU	–	PSU
	C1	PSU	–	PSU
	C2	PSU	–	PSU
UTL-12: Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity	No-Action	LTS	–	LTS
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	No Impact	–	No Impact
	C2	No Impact	–	No Impact
UTL-13: Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services in the Restoration Area	No-Action	LTS	–	LTS
	A1	LTS	–	LTS
	A2	LTS	–	LTS
	B1	LTS	–	LTS
	B2	LTS	–	LTS
	C1	LTS	–	LTS
	C2	LTS	–	LTS
UTL-14: Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities Between the Merced River and the Delta	No-Action	No Impact	–	No Impact
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	No Impact	–	No Impact
	C2	No Impact	–	No Impact

Table 24-2.
Summary of Environmental Consequences and Mitigation Measures – Utilities and Service Systems (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Utilities and Service Systems: Project-Level (contd.)				
UTL-15: Potential Reduction in Ability of Facilities Between the Merced River and the Delta to Meet Wastewater Treatment Requirements	No-Action	No Impact	–	No Impact
	A1	No Impact	–	No Impact
	A2	No Impact	–	No Impact
	B1	No Impact	–	No Impact
	B2	No Impact	–	No Impact
	C1	No Impact	–	No Impact
	C2	No Impact	–	No Impact
UTL-16: Potential for Insufficient Existing Water Supply and Resources from Recapture of Interim and Restoration Flows Between the Merced River and the Delta	No-Action	No Impact	–	No Impact
	A1	PSU	–	PSU
	A2	PSU	–	PSU
	B1	PSU	–	PSU
	B2	PSU	–	PSU
	C1	PSU	–	PSU
	C2	PSU	–	PSU
UTL-17: Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services Between the Merced River and the Delta	No-Action	No Impact	–	No Impact
	A1	LTS	–	LTS
	A2	LTS	–	LTS
	B1	LTS	–	LTS
	B2	LTS	–	LTS
	C1	LTS	–	LTS
	C2	LTS	–	LTS

Key:
– = not applicable
Delta = Sacramento-San Joaquin Delta
LTS = less than significant
PS = potentially significant
PSU = potentially significant and unavoidable

24.3.1 Impact Assessment Methodology

Impacts on utilities and service systems that would result from implementation of the Settlement were identified by comparing existing service capacities and facilities against future demand associated with implementation of the alternatives. Evaluation of potential impacts on utilities and service systems was based on a review of documents pertaining to the study area:

- The available literature and Web-based information published by Federal, State, county, and municipal agencies, including applicable elements from the general plans of Fresno, Madera, and Merced counties.

- Consultation with appropriate agencies and utility providers.
- Photographs of the study area and surroundings.

The goals, policies, and implementation measures of the respective county general plans applicable to utilities and service systems were also reviewed. No inconsistencies with the alternatives were revealed; therefore, those goals, policies, and measures are not discussed further in this section.

24.3.2 Significance Criteria

The thresholds of significance of impacts 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 the NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The program alternatives under consideration were determined to result in a significant impact related to utilities and service systems if they would do any of the following:

- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Exceed wastewater treatment requirements of the applicable RWQCB.
- Exceed water supplies available to service the project from existing water rights or contracts and resources, such that new or expanded water rights or contracts would be needed.
- Generate waste materials that would exceed the permitted capacity of local landfills or that fail to comply with Federal, State, and local statutes and regulations.
- Result in substantial adverse physical effects associated with the provision of new or altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for public services such as fire protection, law enforcement, or other emergency services.

24.3.3 Program-Level Impacts and Mitigation Measures

This section provides a program-level evaluation of the direct and indirect effects of program alternatives on utilities and service systems. Settlement actions with the potential to affect utilities and service systems would occur in the Restoration Area or along the San Joaquin River between the Merced River and the Delta. The program-level evaluation of effects on utilities and service systems included consideration of the potential effects of recapture of Interim and Restoration flows using existing facilities on the San Joaquin River between the Merced River and the Delta and using a potential new pumping facility in this segment of the river (Alternatives C1 and C2).

No program-level actions are proposed upstream from Friant Dam, in the Delta, or in CVP/SWP water service areas; these areas are only subject to project-level actions involving reoperation of Friant Dam and existing flow-related structures, and water recapture. Consequently, no effects on current utilities and service systems, or conditions during the 30-year planning horizon, are expected upstream from Friant Dam, in the Delta, or in the CVP/SWP water service areas. Therefore, these geographic regions are not discussed further in this section.

No-Action Alternative

Program-level impacts under the No-Action Alternative are described below.

San Joaquin River from Friant Dam to Merced River. Under the No-Action Alternative, effects to utilities and service systems within the Restoration Area would primarily be associated with population growth projected to occur by 2030.

Impact UTL-1 (No-Action Alternative): *Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities in the Restoration Area – Program-Level.* Population increases in Fresno, Madera, and Merced counties projected under the No-Action Alternative would likely result in the need for increased water and wastewater treatment capacity. Therefore, this impact would be **potentially significant**.

Under the No-Action Alternative, no projects would result in the need for new or expanded water or wastewater treatment facilities in the Restoration Area. However, total population growth in the three counties within the study area – Fresno, Madera, and Merced – is projected to be 131.9 percent through 2050 (DOF 2007), and this level of increase would likely result in increased demand for water and wastewater treatment facilities. With regard to wastewater, incorporated areas in the vicinity of the Restoration Area, such as Fresno and Clovis, typically experience wastewater flows at or exceeding existing design capacity (Fresno County 2000a). Based on projected growth, demand for wastewater treatment services could be substantial, likely affecting the ability of some wastewater treatment providers to meet existing commitments. If additional water or wastewater treatment capacity is required to meet existing commitments and serve increased demand, environmental impacts associated with providing new or expanded capacity would be potentially significant.

Impact UTL-2 (No-Action Alternative): *Potential Reduction in Ability of Facilities in the Restoration Area to Meet Wastewater Treatment Requirements – Program-Level.* Population growth in Fresno, Madera, and Merced counties projected under the No-Action Alternative would create new demand for wastewater treatment during the planning horizon. This new demand would likely result in installation and operation in the Restoration Area of new septic systems, new or expanded wastewater treatment facilities, or facility upgrades. These septic systems and wastewater treatment facilities would be designed to meet permit requirements for protection of water quality and the environment. Existing facilities deemed not in compliance with new permit requirements would be subject to a cease-and-desist order or upgrades to qualify for permit renewals. Therefore, this impact would be **less than significant**.

No project under the No-Action Alternative would adversely affect water quality in the Restoration Area such that the inability to meet wastewater treatment requirements would occur. As previously described, the generation of wastewater flows would increase based on projected population growth. In addition, the water quality of these increased wastewater in-flows could differ substantially from existing wastewater treatment design flows as a result of changes in land use.

Wastewater collection and treatment systems in the study area, including the Restoration Area, are owned and operated by cities and special districts. These entities must all obtain permits from the Central Valley RWQCB to discharge treated plant effluent and dispose of biosolids (sludge). Likewise, industries not connected to centralized systems are required to treat their wastewater and obtain individual discharge permits from the RWQCB. Residents in rural areas who are not served by centralized systems use on-site septic systems subject to regulation by the applicable county.

Any new or expanded wastewater collection and treatment systems would be subject to environmental review. These systems would be designed to have adequate capacity to meet permit requirements, such as effluent water quality limits based on the expected volume and quality of the wastewater influent to the facility and the receiving environment. Thus, the ability of these new or expanded facilities to meet the Central Valley RWQCB's wastewater treatment requirements would not be adversely affected.

Existing wastewater treatment facilities regulated by RWQCBs are subject to permit renewals every 5 years, however. Although existing wastewater facilities may have adequate capacity to treat increased flows, they may or may not be designed to provide the level of treatment that would be required under a new permit. Therefore, the potential exists for projected population increases to adversely affect the ability of some existing treatment facilities to meet wastewater treatment requirements set by the Central Valley RWQCB. Nonetheless, these facilities could be subject to a cease-and-desist order or would be required to implement upgrades to comply with new permit requirements.

Any central treatment facilities and on-site wastewater treatment systems would be required to meet permit design and performance requirements. Therefore, this impact would be less than significant.

Impact UTL-3 (No-Action Alternative): ***Potential for Insufficient Water Supply and Resources in the Restoration Area – Program-Level.*** Population increases in Fresno, Madera, and Merced counties projected under the No-Action Alternative would likely increase the demand for water supply in the Restoration Area. Because this region's groundwater resources are expected to remain in a state of overdraft and surface-water supplies have been fully allocated, existing water rights or contracts and resources would be unable to meet new water supply demand. This impact would be **potentially significant**.

Population increases projected under the No-Action Alternative would increase the demand for water supply. In Fresno, Madera, and Merced counties, water supply in the vicinity of the Restoration Area is provided through complex systems of local

groundwater and surface-water management and delivery. The water supply is managed by a combination of public and private water agencies – the project proponents, cities, water and flood control districts, local irrigation districts, and utility companies – that are all governed by Federal and State regulations.

Groundwater resources in this region are generally considered to be in a state of overdraft, and surface-water supplies have been fully allocated (Fresno County 2000b, Madera County 1995, Merced County 2000). Unless water-supply sources are managed to meet overall growth demand, the increased groundwater pumping and installation of new wells would exacerbate current overdraft conditions. Long-term groundwater pumping exacerbating overdraft conditions would be unsustainable in the long-term and would ultimately result in an inability to meet water demands. This impact would be potentially significant.

Impact UTL-4 (No-Action Alternative): ***Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity – Program-Level.*** Population increases in Fresno, Madera, and Merced counties projected under the No-Action Alternative would likely result in increased generation of solid waste within the Restoration Area, as well as surrounding areas. Existing landfills would have adequate capacity to serve this growth. Therefore, additional landfill capacity is unlikely to be required. This impact would be **less than significant**.

Population increases projected under the No-Action Alternative would result in increased generation of solid waste from within the Restoration Area. Adherence to the policies in the general plans of Fresno, Madera, and Merced counties would ensure that adequate services and collection sites are provided to serve new development in unincorporated areas within the Restoration Area and that household hazardous waste is adequately disposed of. Existing landfills have, according to the county general plans, adequate capacity to serve the future projected population growth (Fresno County 2000b, Madera County 1995, Merced County 2000). The additional solid waste generated by new development in both incorporated and unincorporated areas is not anticipated to adversely affect the future solid-waste capacity of the counties' landfill facilities. Therefore, this impact would be less than significant.

Impact UTL-5 (No-Action Alternative): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services in the Restoration Area – Program-Level.*** Emergency services are currently adequate in the Restoration Area. Under the No-Action Alternative, continued adherence to general plan policies governing emergency services and continued funding of such services at adequate levels in the Restoration Area would be expected. Therefore, this impact would be **less than significant**.

Fire protection, law enforcement, and other emergency services are currently provided at acceptable levels in the Restoration Area, for two reasons (Fresno County 2000b, Madera County 1995, Merced County 2000):

- Existing general plan policies require Fresno, Madera, and Merced counties to maintain the capability to effectively respond to emergency incidents. This requirement involves continued coordination with special districts, voluntary organizations, surrounding cities and counties, and Federal and State agencies.

- Implementation of these services and facilities in incorporated areas has been adequately funded.

Under the No-Action Alternative, compliance with these general plan policies would continue, thus helping to ensure that additional fire protection, law enforcement, and other emergency services and personnel would be provided in unincorporated areas before any new development supporting projected population growth could proceed. Furthermore, the counties would remain committed to funding and establishing these services and facilities in incorporated cities to ensure that levels of emergency response services and facilities would remain adequate in the future. Therefore, this impact would be less than significant.

San Joaquin River from Merced River to the Delta. Under the No-Action Alternative, effects to utilities and service systems along the San Joaquin River from the Merced River to the Delta would primarily be associated with population growth projected to occur by 2030.

Impact UTL-6 (No-Action Alternative): ***Potential for Insufficient Existing Water Supply and Resources Between the Merced River and the Delta – Program-Level.*** Population increases in Stanislaus County projected under the No-Action Alternative would likely increase the demand for water supply between the Merced River and the Delta. Because this region's groundwater resources are expected to remain in a state of overdraft and surface-water supplies have been fully allocated, existing water rights or contracts and resources would be unable to meet new water supply demand. This impact would be **potentially significant**.

This impact would be similar to Impact UTL-3 (No-Action Alternative) for the Restoration Area. Population growth and availability of utilities and service systems in Stanislaus County would be similar to the situation that would occur in Fresno, Madera, and Merced counties. This impact would be potentially significant.

Impact UTL-7 (No-Action Alternative): ***Potential for Generation of Solid Waste Between the Merced River and the Delta in Excess of Permitted Landfill Capacity – Program-Level.*** Population increases in Stanislaus County projected under the No-Action Alternative would likely result in increased generation of solid waste along the San Joaquin River between the Merced River and the Delta, as well as surrounding areas. Existing landfills would have adequate capacity to serve this growth. Therefore, additional landfill capacity is unlikely to be required. This impact would be **less than significant**.

This impact would be similar to Impact UTL-4 (No-Action Alternative) for the Restoration Area. The only difference is that the projected population increase, resulting increase in solid-waste generation, and effects on landfill capacity would occur in Stanislaus County rather than in Fresno, Madera, and Merced counties. This impact would be less than significant.

Impact UTL-8 (No-Action Alternative): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services Between the Merced River and the Delta – Program-Level.*** Emergency services are currently provided at acceptable levels along the San Joaquin River between the Merced River and the Delta. Under the No-Action Alternative, continued adherence to general plan policies governing emergency services in unincorporated areas within this geographic area and continued funding of such services at adequate levels would be expected. This impact would be **less than significant**.

This impact would be similar to Impact UTL-5 (No-Action Alternative) for the Restoration Area. The only difference is that the policies of the Stanislaus County General Plan would apply, rather than the policies of the general plans for Fresno, Madera, and Merced counties, and a different county would continue to provide funding for emergency services. This impact would be less than significant.

Alternatives A1 and B1

Program-level impacts to utilities and service systems under Alternatives A1 and B1 would occur in the Restoration Area, as described below.

San Joaquin River from Friant Dam to Merced River. The primary action that could impact utilities and service systems in the Restoration Area under Alternatives A1 and B1 would be constructing and operating a new hatchery, as described below.

Impact UTL-1 (Alternatives A1 and B1): ***Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities in the Restoration Area – Program-Level.*** Construction of new facilities under the action alternatives, such as new levees, levee improvements, and the Mendota Pool Bypass, would not result in the need for new or expanded water or wastewater treatment facilities because these would be short-term construction projects and not development projects that require stable, long-term services. While implementing Interim and Restoration flows would cause water deliveries to some contractors to be reduced, new water sources, if developed by these contractors, would be of comparable quality and facilities to provide any necessary treatment are already in place. Therefore, this impact would be **less than significant**.

Impact UTL-2 (Alternatives A1 and B1): ***Potential Reduction in Ability of Facilities in the Restoration Area to Meet Wastewater Treatment Requirements – Program-Level.*** No actions associated with Alternatives A1 and B1, except operation of a potential new fish hatchery, would generate wastewater that would be regulated by the Central Valley RWQCB. Federal and State agencies control hatchery discharges and have provided guidance for the industry (EPA 2002) to mitigate the impacts of hatchery effluent on

receiving waters. Although a new hatchery would be subject to discharge requirements under the Clean Water Act and could require a discharge permit from the Central Valley RWQCB, exceedences of permit requirements could still occur periodically. This impact would be **potentially significant**.

As previously discussed, the only action that could potentially be a source of wastewater in the Restoration Area would be a new hatchery to reintroduce fish to the San Joaquin River in this area. No other potential actions would generate wastewater that would require treatment in compliance with water quality standards set by the RWQCBs.

The direct discharges of hatcheries are regulated by the EPA under the CWA. NPDES regulations (40 CFR 122.24 and Appendix C to Part 122) specify the applicability of NPDES permit requirements to concentrated aquatic-animal production facilities. To be a concentrated aquatic-animal production facility, the facility must either meet the criteria in 40 CFR Part 122, Appendix C, or be designated on a case-by-case basis (40 CFR 122.24(b)). Fish hatcheries are subject to NPDES permit requirements if they do the following:

- Contain, grow, or hold aquatic coldwater fish in ponds, raceways, or other similar structures that discharge at least 30 days per year, and produce more than 9,090 harvest-weight kilograms (approximately 20,000 pounds) per year

- Feed more than 2,272 kilograms (approximately 5,000 pounds) to fish during the calendar month of maximum feeding

NPDES permits establish site-specific requirements for effluent limits and monitoring requirements.

In California, EPA's regulatory authority under the CWA has been delegated to the State Water Resources Control Board and its nine RWQCBs. A new hatchery with a direct discharge would be required to operate under an NPDES permit issued by the Central Valley RWQCB. This permit would specify appropriate limits on effluent discharges, as well as operations and monitoring criteria for wastewater treatment and discharge requirements. However, fish hatcheries are known to exceed effluent limitations periodically. Therefore, this impact would be potentially significant.

Mitigation Measure UTL-2 (Alternatives A1 and B1): *Obtain Required Permits for Hatchery Wastewater Discharges and Implement Best Management Practices to Reduce Pollutant Discharges – Program-Level.* Before approval and final design and construction of any new hatchery, the project proponents that develop the new or retrofitted hatchery will obtain all required permits for any hatchery discharges from the appropriate agencies, and will comply with those permits.

Implementation of this mitigation measure would reduce this impact to a less than significant level. This impact would be **less than significant** with mitigation.

Impact UTL-3 (Alternatives A1 and B1): ***Potential for Insufficient Existing Water Supply and Resources in the Restoration Area – Program-Level.*** No Settlement actions occurring in the Restoration Area under Alternatives A1 and B1 would require a water supply, except operation of a new fish hatchery. Specific details regarding a new hatchery are unavailable at this time. This impact is too speculative for meaningful consideration. In hatchery operations, sufficient water flow is essential to ensure proper fish respiration and disease control, maintain appropriate water temperatures, and control the quality of hatchery effluent discharged to receiving waters. To operate a hatchery for the purposes of reintroducing fish species to the Restoration Area, either water rights or contracts or additional water resources (e.g., groundwater) could be required to provide an adequate water supply, depending on the hatchery's location, design, and size. However, the specific location and design of a new hatchery are unknown. Therefore, it is uncertain whether new water rights or contracts would be needed or additional water resources would need to be developed, and whether these would result in significant impacts. For these reasons, determining the significance of impacts related to availability of water supply or resources to serve a new fish hatchery is too speculative for meaningful consideration. As a result, this impact is not evaluated further. Any impacts to existing water rights or contracts or water resources associated with a proposed new hatchery would need to be addressed during environmental review of the proposed hatchery. This impact would be **too speculative for meaningful consideration**.

Impact UTL-4 (Alternatives A1 and B1): ***Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity – Program-Level.*** Short-term construction activities associated with Alternatives A1 and B1 would generate solid waste. The volume of solid waste that could be generated is unknown. Therefore, these activities have the potential to adversely affect the permitted capacity of existing landfills. This impact would be **potentially significant**.

Several short-term construction activities associated with Alternatives A1 and B1 could generate solid waste. Installing fish screens, constructing new levees in Reach 2B, installing a fish ladder, modifying road crossings, constructing the Mendota Pool Bypass, and removing in-channel vegetation are examples.

The volume of solid waste that could be generated by short-term construction activities associated with restoration actions is unknown. The potential exists, however, for these activities to result in adverse effects on the permitted capacity of existing landfills. Therefore, this impact would be potentially significant.

Mitigation Measure UTL-4 (Alternatives A1 and B1): ***Identify Landfills with Adequate Permitted Capacity to Accept Solid Waste Generated by Settlement Activities and Dispose of Waste in Accordance with Applicable Regulations – Program-Level.*** To ensure that the permitted capacity of landfills would not be exceeded as a result of disposal of solid waste generated by proposed restoration actions, project proponents of subsequent site-specific projects will implement the following measures before implementing one or more restoration actions:

- Prepare an estimate of solid waste that will be generated by the action(s).
- Maximize the recycling and/or composting of solid waste generated by the action at appropriate locations.
- Identify appropriate recycling and/or disposal locations in accordance with applicable Federal, State, and local regulations pertaining to solid waste.
- Notify the operator of the recycling/disposal location and obtain approval for the type and amount of solid waste that will be generated by the action(s).
- If sufficient capacity is unavailable at the identified location, identify and obtain approval for disposal at another location or multiple locations.

Implementation of this mitigation measure would reduce this impact to **less than significant**.

Impact UTL-5 (Alternatives A1 and B1): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services in the Restoration Area – Program-Level.*** The potential for activities associated with this alternative to affect emergency services in the Restoration Area is low because adequate service is provided in the region, and actions would be conducted in compliance with OSHA standards. Therefore, this impact would be **less than significant**.

Construction and/or other actions in the Restoration Area could affect emergency fire-protection services because they could spark a wildland fire on a project site or adjacent area. The Restoration Area is in a moderate fire hazard zone. Therefore, project proponents of subsequent site-specific projects would be required to develop a fire protection program in accordance with the OSHA's fire protection and prevention standard (29 CFR 1926.150, Subpart F). This fire protection program would be adhered to throughout all project phases. As a result, the potential for construction activities to spark an uncontrollable wildland fire is considered remote (see Chapter 20.0, "Public Health and Hazardous Materials").

Operation of a new fish hatchery could also affect other emergency services by creating a new facility that would require fire and police protection services. Emergency services in the region are provided by the California Highway Patrol, the sheriff's departments of Fresno and Madera counties, and the Merced County Fire Department. Therefore, the potential for such a facility and/or other activities to increase the demand for emergency response facilities is considered remote. Similarly, little likelihood exists that improvements to existing facilities would be required to maintain adequate service during implementation of restoration actions.

For the reasons stated above, this impact would be less than significant.

San Joaquin River from Merced River to the Delta. Construction of program-level actions under Alternatives A1 and B1 could affect utilities and service systems downstream from the Merced River.

Impact UTL-6 (Alternatives A1 and B1): ***Potential for Insufficient Existing Water Supply and Resources Between the Merced River and the Delta – Program-Level.*** No actions under Alternatives A1 and B1 would occur along the San Joaquin River between the Merced River and the Delta. Some construction of program-level actions in the Restoration Area (i.e., channel modifications, levee improvements), however, could temporarily affect flows in downstream reaches. Such temporary changes would be minimal and would not be expected to affect existing diversions along the San Joaquin River between the Merced River and the Delta. This impact would be **less than significant**.

No actions under Alternatives A1 and B1 would occur along the San Joaquin River between the Merced River and the Delta. Some construction of program-level actions in the Restoration Area (i.e. channel modifications, levee improvements), however, could temporarily affect flows in downstream reaches. Such temporary changes would be minimal and would not be expected to affect existing diversions along the San Joaquin River between the Merced River and the Delta. This impact would be less than significant.

Impact UTL-7 (Alternatives A1 and B1): ***Potential for Generation of Solid Waste Between the Merced River and the Delta in Excess of Permitted Landfill Capacity – Program-Level.*** Program-level actions under these alternatives would not affect the amount of solid waste generated along the San Joaquin River between the Merced River and the Delta. Therefore, landfill capacity would not be affected. There would be **no impact**.

Impact UTL-8 (Alternatives A1 and B1): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services Between the Merced River and the Delta – Program-Level.*** Implementing Alternatives A1 and B1 would not affect demand for emergency services or facilities along the San Joaquin River between the Merced River and the Delta. As a result, no new or altered facilities would be needed to accommodate such demand. There would be **no impact**.

Alternatives A2 and B2

Program-level impacts under Alternatives A2 and B2 would be similar to those under Alternatives A1 and B1.

San Joaquin River from Friant Dam to Merced River. Program-level impacts in the Restoration Area related to utilities and service systems that would result from implementation of Alternatives A2 and B2 would be the same as program-level impacts previously described for Alternatives A1 and B1, with one exception. A greater potential for the generation of solid waste would occur under Alternatives A2 and B2, as described below.

Impact UTL-4 (Alternatives A2 and B2): ***Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity – Program-Level.*** As described for Impact UTL-4 (Alternatives A1 and B1), short-term construction activities associated with implementation of the proposed restoration actions would generate solid

waste. Alternatives A2 and B2 include more construction activities than Alternatives A1 and B1. The volume of solid waste generated by Alternatives A2 and B2 would likely be greater than Alternatives A1 and B1. The volume of solid waste that could be generated is unknown. Therefore, the potential for some or all of these activities to adversely affect the permitted capacity of existing landfills would be **potentially significant**.

Mitigation Measure UTL-4 (Alternatives A2 and B2): ***Identify Landfills with Adequate Permitted Capacity to Accept Solid Waste Generated by Settlement Activities and Dispose of Waste in Accordance with Applicable Regulations – Program-Level.*** This mitigation measure is identical to Mitigation Measure UTL-4 (Alternatives A1 and B1).

Implementation of this mitigation measure would reduce this impact to **less than significant**.

Alternative C1

Program-level impacts in the Restoration Area under Alternative C1 would be identical to those under Alternatives A1 and B1. Implementation of the mitigation measures under Alternatives A1 and B1 would also be required under CEQA and if identified in the Record of Decision and would reduce program-level impacts in the Restoration Area to a less-than-significant level.

Impacts in the San Joaquin River from Merced River to the Delta would be associated with (1) the construction of new infrastructure to recapture Interim and Restoration flows, and (2) recapture of Interim and Restoration flows using existing facilities on the San Joaquin River between the Merced River and the Delta, as described below.

Impact UTL-6 (Alternative C1): ***Potential for Insufficient Existing Water Supply and Resources Between the Merced River and the Delta – Program-Level.*** Alternative C1 would involve a change in Reclamation's water rights permits for the new pumping infrastructure to recapture Interim and Restoration flows along the San Joaquin River somewhere between the Merced River and the Delta. Because a change in Reclamation's water rights permits for the new infrastructure would have to be obtained before this facility could begin operation, and all permits must be issued subject to prior water rights and only without injury to other water rights holders, this impact would be **less than significant**.

No restoration or water management actions under this alternative would affect water supply demand. However, this alternative would involve constructing a new infrastructure along the San Joaquin River between the Merced River to the Delta to recapture Interim and Restoration flows. Siting of new infrastructure would be subject to environmental review and implementation of mitigation to minimize potential impacts to the environment, as well as other water rights holders. In addition, a change in Reclamation's water rights permits would be required before this facility could begin operation. Because the facility would be sited and designed to recapture Interim and Restoration flows, and would be operated consistent with the Settlement and any permit

requirements, including being subject to prior water rights and without injury to other water rights holders, this impact would be less than significant.

Impact UTL-7 (Alternative C1): ***Potential for Generation of Solid Waste Between the Merced River and the Delta in Excess of Permitted Landfill Capacity – Program-Level.*** Implementation of new infrastructure to recapture Interim and Restoration flows would generate some short-term construction waste and a small amount of solid waste over the long term. The volume of solid waste that would be generated would be minimal relative to the capacity of existing landfills. Therefore, this impact would be **less than significant**.

Under this alternative no actions would occur in this region of the study area, except construction and operation of new infrastructure to recapture Interim and Restoration flows. This activity would generate some short-term construction waste and a small amount of solid waste during operations. Construction waste and other solid waste from implementation of the new infrastructure would be transported to a landfill. Because the potential for these activities to generate substantial solid waste would be low, the likelihood of this activity adversely affecting permitted capacity of existing landfills would be minimal. Therefore, this impact would be less than significant.

Impact UTL-8 (Alternative C1): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services Between the Merced River and the Delta – Program-Level.*** The potential for activities associated with this alternative to affect emergency services is low because adequate service is provided in the region, and construction of new infrastructure to recapture Interim and Restoration flows would be conducted in compliance with OSHA standards. Therefore, this impact would be **less than significant**.

Construction of new infrastructure to recapture Interim and Restoration flows along the San Joaquin River between the Merced River and the Delta would have the potential to affect emergency fire protection services because they could spark a wildland fire on a project site or adjacent area. As discussed in Chapter 20.0, “Public Health and Hazardous Materials,” because this geographic region is in a moderate fire hazard zone, and development of a fire protection program that would be adhered to throughout all phases of the project would be required in accordance with OSHA’s fire protection and prevention standard (29 CFR 1926.150, Subpart F), the potential for construction of this facility to spark an uncontrollable wildland fire is considered remote. Because emergency services in the region are provided by the Stanislaus Consolidated Fire Protection District, Stanislaus County Sheriff’s Department, Merced County Fire Department, Merced County Sheriff’s Department, CHP Central Division, and the Stanislaus County OES, the potential for construction and operation of this facility to result in an increased demand for emergency response facilities or improvements to existing facilities to maintain adequate service during implementation of restoration actions is considered remote. Therefore, this impact would be less than significant.

Alternative C2

Program-level impacts in the Restoration Area under Alternative C2 would be identical to those under Alternatives A2 and B2. Implementation of the mitigation measures under Alternatives A2 and B2 would also be required and would reduce program-level impacts in the Restoration Area to a less-than-significant level.

Program-level impacts in the San Joaquin River from Merced River to the Delta would be the same as program-level impacts under Alternative C1. These impacts would be less than significant.

24.3.4 Project-Level Impacts and Mitigation Measures

This section provides a project-level evaluation of the direct and indirect effects of the reoperation of Friant Dam on utilities and service systems. Utilities and service systems along the San Joaquin River in the Restoration Area and between the Merced River and the Delta could be affected by changed flow conditions caused by the alteration of water releases from Friant Dam. The project-level evaluation of effects on utilities and service systems includes consideration of potential effects resulting from the recapture of Interim Flows in the Restoration Area and at existing Delta facilities.

No effects on current conditions for utilities and service systems, and conditions anticipated during the 30-year planning horizon, are expected upstream from Friant Dam or in the Delta, or in the CVP/SWP water service areas. Therefore, these geographic regions are not discussed further in this section.

Other actions evaluated at a project level would not result in physical changes to utilities and service systems. These include reoperation of Mendota Dam, Chowchilla Bypass Bifurcation Structure, Eastside Bypass Bifurcation Structure, Mariposa Bypass Bifurcation Structure, and the Hills Ferry Barrier. The proposed changes to the operation of these structures would have no effect on utilities and service systems. Actions to obtain encroachment permits, water transfers, and long-term water rights also would affect utilities and service systems. However, the product of these authorizations (the reoperation of Friant Dam to release Interim and Restoration flows in the Restoration Area) would affect utilities and service systems. Therefore, the effects of Interim and Restoration flows on utilities and service systems are discussed further and their significance evaluated.

Actions identified in the Monitoring and Management Plan for Physical Conditions within the Restoration Area (see Appendix D) as potential immediate actions to address nonattainment of management objectives also were evaluated at a project level. Potential immediate actions are related to flow, seepage, capacity, native vegetation, and spawning gravel. Potential immediate actions include acquisition of additional water from willing sellers, reoperation of Friant Dam to reduce flows, site monitoring, preparation of reports documenting monitoring, and the removal of obstructions/debris from channels in the Restoration Area. Potential immediate actions related to flow management could affect water deliveries to long-term contactors and are discussed further below.

No-Action Alternative

Project-level impacts under the No-Action Alternative would be identical to the program-level impacts previously described. Some of these impacts would be significant.

Alternatives A1 through C2

The potential project-level impacts under Alternatives A1 through C2 would be associated with the release, conveyance, and recapture of Interim and Restoration flows at existing facilities within the Restoration Area and in the Delta.

San Joaquin River from Friant Dam to Merced River. Project-level impacts to utilities and service systems along the San Joaquin River from Friant Dam to the Merced River are described below.

Impact UTL-9 (Alternatives A1 through C2): *Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities in the Restoration Area – Project-Level.* Reoperating Friant Dam would not result in the need for new or expanded water or wastewater treatment facilities. There would be **no impact**.

Impact UTL-10 (Alternatives A1 through C2): *Potential Reduction in Ability of Facilities in the Restoration Area to Meet Wastewater Treatment Requirements – Project-Level.* Reoperating Friant Dam would not substantially affect water quality or generation of wastewater. Existing facilities would continue to be required to meet wastewater treatment requirements established by the Central Valley RWQCB. Interim and Restoration flows would have **no impact**.

Impact UTL-11 (Alternatives A1 through C2): *Potential for Insufficient Existing Water Supply and Resources – Project-Level.* Reoperating Friant Dam would not involve any new development in this part of the San Joaquin River system. However, an overall reduction in water deliveries to Friant Division long-term contractors would result if all Interim and Restoration flows are not recaptured. The impact would be **potentially significant and unavoidable**.

An overall reduction in water deliveries to Friant Division long-term contractors would result if all Interim and Restoration flows are not recaptured. Implementing Alternatives A1 through B2 would change surface water deliveries to Friant Division long-term contractors by releasing a greater amount of water to the San Joaquin River as Interim and Restoration flows, and then recapturing and returning to Friant Division long-term contractors as much of those flows as possible. Other proposed changes to the operation of the Mendota Dam, Chowchilla Bypass Bifurcation Structure, Eastside Bypass Bifurcation Structure, Mariposa Bypass Bifurcation Structure, and the Hills Ferry Barrier would have no physical effect on utilities and service systems. Any actions to implement water transfers and long-term water rights would be done to minimize water supply reductions to Friant Division long-term contractors.

A portion of the historic water supply deliveries could be replaced via recapture of Interim and Restoration flows in the Restoration Area and at existing Delta facilities (Alternatives A1 through C2). Overall reductions in water deliveries to Friant Division long-term contractors have been anticipated under the Settlement, and these contractors have agreed to these potential reductions. Nonetheless, water supply impacts to Friant Division long-term contractors would occur and would be potentially significant.

The Settlement's Water Management Goal is to reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors. Accordingly, the action alternatives include recapture of Interim and Restoration flows at existing facilities in the Restoration Area and Delta. As described in Chapter 12.0, "Hydrology – Groundwater," the potential range of recapture options for Friant Division water ranges from recapture of no water, to recapture of all Interim and Restoration flows. A reduction in surface water supplies would result in increased use of groundwater supplies, thereby increasing overdraft. Reclamation would consider regional groundwater overdraft conditions in evaluating candidate groundwater banking projects developed under Title III of the Act. It is not known if the remaining water supply would be potentially significant. There are no mitigation measures available to reduce the impact and, therefore, the impact would be potentially significant and unavoidable.

Impact UTL-12 (Alternatives A1 through C2): ***Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity – Project-Level.*** Implementing Interim and Restoration flows would not generate any solid waste. Therefore, reoperating Friant Dam would not affect landfill capacity in the Restoration Area. Federal, State, and local statutes and regulations related to solid waste would not apply. There would be **no impact**.

Impact UTL-13 (Alternatives A1 through C2): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services in the Restoration Area – Project-Level.*** Potential increased use of the San Joaquin River in the Restoration Area for recreation as a result of additional instream flows could increase the number of accidents requiring emergency services. This impact would be **less than significant**.

Reoperating Friant Dam could affect emergency rescue services by increasing recreation opportunities along the length of the San Joaquin River in the Restoration Area, and by increasing the period that people would use the river for recreation. As discussed in Chapter 21.0, "Recreation," implementing Interim and Restoration flows would result not only in enhanced flow conditions, but also enhanced wildlife habitat and increased cold-water and warm-water fish populations. These conditions would provide enhanced opportunities for recreation activities, such as boating, sportfishing, and wildlife viewing within some reaches of the Restoration Area. As a result, the number of people using the river for recreation could increase. This increased use could lead to a potential increase in the need for emergency services.

This would not substantially affect emergency services such that new facilities or improvements to existing facilities would need to be constructed. The recreationists attracted to the restored river would be primarily local and regional residents. This represents a relocation of existing recreationists from one place that is served by emergency service providers to another location served by the same emergency providers. The emergency service providers determine staffing levels based on population, and the number of facilities needed is based on the number of staff distributed according to population densities. As discussed in Chapter 27.0, "Other NEPA and CEQA Considerations," neither the Settlement actions nor the reoperation of Friant Dam would induce growth because the local labor pool is expected to serve the demand for construction workers, and increased economic activity resulting from added recreation opportunities would not be of a magnitude that would substantially affect population growth. Because service systems would not be constructed or expanded, none of the alternatives would remove an impediment to growth. Because local land-use agencies would expand emergency services to accommodate planned growth and reoperating Friant Dam would not induce growth in addition to growth that is already planned, emergency services would not be affected to the extent that new facilities or improvements to existing facilities would need to be constructed. For these reasons, reoperation of Friant Dam would have a less-than-significant impact on emergency services.

San Joaquin River from Merced River to the Delta. Project-level impacts to utilities and service systems along the San Joaquin River from Merced River to the Delta are described below.

Impact UTL-14 (Alternatives A1 through C2): *Potential Environmental Effects Associated with Needed Construction or Expansion of Water and Wastewater Treatment Facilities Between the Merced River and the Delta – Project-Level.* Reoperating Friant Dam would not result in the need for new or expanded water or wastewater treatment facilities along the San Joaquin River between the Merced River and the Delta. Water quality, wastewater generation, and water diversions in this region of the study area would not be substantially affected. There would be **no impact**.

Reoperating Friant Dam would not substantially affect water quality or generation of wastewater along the San Joaquin River between the Merced River and the Delta. Therefore, reoperating Friant Dam would not result in the need for new or expanded wastewater treatment facilities in this region of the study area. Reoperating Friant Dam also would not affect the ability of any water rights holders along this part of the San Joaquin River system to divert water. Therefore, implementing Interim and Restoration flows would also not result in the need for new or expanded water treatment facilities.

Impact UTL-15 (Alternatives A1 through C2): *Potential Reduction in Ability of Facilities Between the Merced River and the Delta to Meet Wastewater Treatment Requirements – Project-Level.* Reoperating Friant Dam would not substantially affect water quality or generation of wastewater along the San Joaquin River between the Merced River and the Delta. The existing facilities would continue to be required to meet

wastewater treatment requirements established by the Central Valley RWQCB. There would be **no impact**.

As discussed previously, implementing Interim and Restoration flows as a result of reoperating Friant Dam would not involve generation or reuse of wastewater along the San Joaquin River between the Merced River and the Delta. Water quality in this region of the study area would not change substantially enough to require new or expanded wastewater treatment facilities, or to affect the ability of existing facilities to meet wastewater treatment requirements. Therefore, wastewater treatment requirements applicable in this region of the study area would not likely be exceeded as a result of implementing Interim and Restoration flows.

Impact UTL-16 (Alternatives A1 through C2): ***Potential for Insufficient Existing Water Supply and Resources from Recapture of Interim and Restoration Flows Between the Merced River and the Delta – Project-Level.*** This impact would be the same as Impact UTL-11 (Alternatives A1 through C2). The impact would be **potentially significant and unavoidable**.

Impact UTL-17 (Alternatives A1 through C2): ***Potential Need for New or Altered Facilities to Accommodate Increased Demand for Emergency Services Between the Merced River and the Delta – Project-Level.*** Reoperating Friant Dam could potentially increase use of the San Joaquin River between the Merced River and the Delta for recreation, and thus, could potentially increase demand for emergency services. Because this increase would be small relative to existing conditions, this impact would be **less than significant**.

Reoperating Friant Dam could potentially increase use of the San Joaquin River between the Merced River and the Delta for recreation, and thus, could potentially cause a small increase in demand for emergency services. However, physical conditions in the San Joaquin River that affect recreation would not be substantially altered between the Merced River and the Delta, and thus, the potential increase in recreation and the related increase in demand for emergency services would be small relative to existing demand. Also, because local land-use agencies would expand emergency services to accommodate planned growth and reoperating Friant Dam would not induce growth in addition to growth that is already planned, emergency services would not be affected to the extent that new facilities or improvements to existing facilities would need to be constructed. For these reasons, reoperation of Friant Dam would have a less-than-significant impact on emergency services.

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Chapter 25.0 Visual Resources

This chapter provides an overview of the existing visual resources in the study area in terms of landform (topographic relief) and land cover (vegetation, water, or built environment), and also describes the regulatory setting, environmental consequences, and mitigation measures as they pertain to implementation of the Settlement. Construction activities under the action alternatives would affect visual resources within the Restoration Area and along the San Joaquin River between the Merced River and the Delta. The release and conveyance of Interim and Restoration flows would have additional effects on visual resources upstream from Friant Dam. There would be imperceptible effects on visual resources in the Delta or the CVP/SWP water service areas under the action alternatives from increased flows into the Delta and exporting, storing, and conveying the water through the CVP/SWP systems. Therefore, the Delta and the CVP/SWP water service areas are not discussed further in this chapter.

25.1 Environmental Setting

Visual resources are described below for the San Joaquin River upstream from Friant Dam, the Restoration Area, and the San Joaquin River from Merced River to the Delta. There would be virtually no effect to visual resources in the Delta and in the CVP/SWP water service areas; therefore, these areas are not discussed further. 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.

25.1.1 San Joaquin River System Upstream from Friant Dam

The regional landform upstream from Friant Dam is characterized by relatively steep slopes and ravines, transitioning to rolling foothill terrain in the lower elevations. In the 9-mile reach of the San Joaquin River between Kerckhoff Dam and Millerton Lake, several small, ephemeral streams enter the San Joaquin River. (Ephemeral streams are streams that flow only after snow-melt or rain; they have no base flow.) San Joaquin River flow is diverted at Kerckhoff Dam through tunnels to the PG&E Kerckhoff and Kerckhoff No. 2 powerhouses, situated on the San Joaquin River upstream from Millerton Lake.

Predominant land cover in this portion of the study area ranges from high alpine vegetation near the crest of the Sierra Nevada, through coniferous forest, mixed coniferous forest, oak woodlands and oak savanna, and grasslands in the lower elevations in the vicinity of Millerton Lake. Surface water is present in artificial impoundments, such as Millerton Lake; in small natural lakes and ponds, in rivers, and in tributary streams. The built environment consists of roadways, small communities with low-density development, roadside businesses, diversion dams, powerhouses and associated high-voltage electrical transmission lines, and recreational facilities of the Millerton Lake SRA.

The scenic qualities of vividness, intactness, and unity in the upper reaches of the San Joaquin River watershed are generally high, especially in areas where there is limited built environment to intrude on views. The varied topography and geologic formations of the crest of the Sierra Nevada provide for striking views in the upper watershed. In the lower elevations, nearer to Millerton Lake, the human-built environment becomes more dominant and detracts from views of the natural landscape.

Land cover surrounding Millerton Lake consists of grassland with scattered oak trees. The vividness of views of the lake surrounded by low-lying hills is moderate because of the increasing presence of the built environment. Millerton Lake typically fills during late spring and early summer, when San Joaquin River flows are high because of snowmelt in the upper watershed. During late winter and spring, surrounding hillsides are green and often covered with wildflowers, creating views with moderate to high vividness. Annual water allocations and release schedules are developed with the intent of drawing reservoir storage to minimum levels by the end of September. The intactness of the views is moderate because this drawdown of the water level creates a “bathtub ring” effect that degrades the views of the lake by exposing barren shoreline during late summer and fall. Unity of the views of the lake is moderate because the degraded shoreline and recreational facilities create a sharp contrast to the surrounding natural landscape. The overall visual quality of the Millerton Lake area is moderate.

25.1.2 San Joaquin River from Friant Dam to Merced River

Visual resources of the Restoration Area are described in the following sections.

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 or park lands). 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.

Chowchilla Bypass and Tributaries

Observers in or adjacent to the bypass experience views with low vividness because of the flat terrain and sparse vegetation, which are lacking in distinctive landscape features. The bifurcation structure, levees, and barren ground detract from the intactness of the views. Unity is low because the disparate landscape features do not form a coherent visual pattern. The overall visual quality of the bypass area is low. Visual qualities of the tributaries are similar to those of the bypass, with low vividness, low intactness, and low unity. Overall, visual qualities along these tributaries are low.

Eastside Bypass, Mariposa Bypass, and Tributaries

Observers in or adjacent to the Eastside and Mariposa bypasses experience views with low vividness because of flat terrain and short, uniform vegetation lacking in distinctive landscape features. The intactness of the views is moderate because of the limited number of artificial structures that intrude on the views. Unity is low because the disparate landscape features do not form a coherent visual pattern. The overall visual quality of the bypass area is low. Visual qualities of the Eastside Bypass tributaries, including Deadman, Owens, and Bear creeks, are similar to those of the bypass, with low vividness, low intactness, and low unity. Overall, visual qualities along these tributaries are low.

25.1.3 San Joaquin River from Merced River to the Delta

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.

25.2 Regulatory Setting

This section describes the regulatory setting for visual resources in the study area.

25.2.1 Federal

The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991 and reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. There are 125 such designated byways in 44 states. The Federal Highway Administration promotes the collection as America's Byways®. This program is a voluntary, grassroots program that recognizes and supports outstanding roads. It provides resources to help manage the intrinsic qualities in the broader byway corridor to be treasured and shared.

The National Scenic Byways Program highlights four roads within the San Joaquin Valley: I-5 in the Central Valley parallels the Delta-Mendota Canal and the California Aqueduct, Route 580 offers panoramic views of the San Joaquin Valley to the east and Coast Range to the west, the Sierra Heritage Scenic Byway (Route 168) begins in the town of Clovis and proceeds into the Sierra Nevada, and Pacheco Pass Road (Route 152) ends at its junction with I-5. None of these roads are near the Restoration Area.

25.2.2 State of California

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 (Caltrans 2007).

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.

Numerous officially designated State scenic highways are located in the study area, including I-5 on the west side of the San Joaquin Valley, SR 24 through the Delta, and Interstate 80 in the San Francisco Bay Area. Only one of the scenic byways (I-5/Interstate 580 Westside Freeway) would potentially be within the view shed of Reaches 1 through 5

of the San Joaquin River. All others are in the larger study area, but none within views of the River reaches in the Restoration Area. No officially designated State scenic highways are located in or immediately adjacent to the Restoration Area.

25.2.3 Regional and Local

This section discusses regional and local policies relating to visual resources.

County General Plans

The Fresno County General Plan (Fresno County 2000), the Madera County General Plan Policy Document (Madera County 1995), and the Merced County Year 2000 General Plan (Merced County 2000) primarily address visual issues through policies on land use. "Open Space/Conservation" policies address proper management of lands with high aesthetic value, including maintaining stream corridors in natural condition, preserving regional parks as areas of natural scenic beauty, and maintaining local scenic values along designated State scenic highways.

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 recreation areas and trails.

25.3 Environmental Consequences and Mitigation Measures

The purpose of this section is to describe the direct and indirect effects that the program alternatives would have on visual resources. This section describes the methodology, criteria for determining significance of effects, and environmental consequences and mitigation measures associated with effects of each of the program alternatives. The program alternatives evaluated in this chapter are described in detail in Chapter 2.0, "Description of Alternatives," and summarized in Table 25-1. The potential impacts to visual resources and associated mitigation measures are summarized in Table 25-2.

Table 25-1.
Actions Included Under Action Alternatives

Level of NEPA/CEQA Compliance	Actions[1]		Action Alternative					
			A1	A2	B1	B2	C1	C2
Project-Level	Reoperate Friant Dam and downstream flow control structures to route Interim and Restoration flows		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows in the Restoration Area		✓	✓	✓	✓	✓	✓
	Recapture Interim and Restoration flows at existing CVP and SWP facilities in the Delta		✓	✓	✓	✓	✓	✓
Program-Level	Common Restoration actions[2]		✓	✓	✓	✓	✓	✓
	Actions in Reach 4B1 to provide at least:	475 cfs capacity	✓	✓	✓	✓	✓	✓
		4,500 cfs capacity with integrated floodplain habitat		✓		✓		✓
	Recapture Interim and Restoration flows on the San Joaquin River downstream from the Merced River at:	Existing facilities on the San Joaquin River			✓	✓	✓	✓
		New pumping infrastructure on the San Joaquin River					✓	✓
	Recirculation of recaptured Interim and Restoration flows		✓	✓	✓	✓	✓	✓

Notes:

[1] All alternatives also include the Physical Monitoring and Management Plan and the Conservation Strategy, which include both project- and program-level actions intended to guide implementation of the Settlement.

[2] Common Restoration actions are physical actions to achieve the Restoration Goal that are common to all action alternatives and are addressed at a program level of detail.

Key:
CEQA = California Environmental Quality Act
cfs = cubic feet per second
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
NEPA = National Environmental Policy Act
PEIS/R = Program Environmental Impact Statement/Report
SWP = State Water Project

Table 25-2.
Summary of Impacts and Mitigation Measures – Visual Resources

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Visual Resources: Program-Level				
VIS-1: Temporary and Short-Term Construction-Related Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character	No-Action	No-Impact	--	No-Impact
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
VIS-2: Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character	No-Action	Too Speculative for Meaningful Consideration	--	Too Speculative for Meaningful Consideration
	A1	PS	VIS-2: Screen New Facilities and Minimize Adverse Visual Impacts	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
VIS-3: Substantial Changes in Light or Glare	No-Action	No-Impact	--	No-Impact
	A1	PS	VIS-3: Establish and Require Conformance to Lighting Standards, and Prepare and Implement a Lighting Plan	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Visual Resources: Project-Level				
VIS-4: Effects of Friant Dam Reoperation on Scenic Vistas, Scenic Resources, and Existing Visual Character Upstream from Friant Dam	No-Action	LTS	--	LTS
	A1	LTS	--	LTS
	A2	LTS	--	LTS
	B1	LTS	--	LTS
	B2	LTS	--	LTS
	C1	LTS	--	LTS
	C2	LTS	--	LTS
VIS-5: Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character Downstream from Friant Dam	No-Action	Too Speculative for Meaningful Consideration	--	Too Speculative for Meaningful Consideration
	A1	LTS and Beneficial	--	LTS and Beneficial
	A2	LTS and Beneficial	--	LTS and Beneficial
	B1	LTS and Beneficial	--	LTS and Beneficial
	B2	LTS and Beneficial	--	LTS and Beneficial
	C1	LTS and Beneficial	--	LTS and Beneficial
	C2	LTS and Beneficial	--	LTS and Beneficial

Key:
— = not applicable
LTS = less than significant
PS = potentially significant
PSU = potentially significant and unavoidable

25.3.1 Impact Assessment Methodology

This visual resource assessment is based on the visual resource inventory methodology found in the FHWA's Visual Impact Assessment for Highway Projects, FHWA-HI-88-504 (DOT 1988). This methodology is commonly used for a variety of project types, and is similar to those used by the U.S. Forest Service and BLM.

This assessment is also based on a review of maps, site photographs, and aerial photographs. Analysis of the impacts on visual resources from implementing the program alternatives is based on evaluation of the extent and implications of the visual changes, considering the following factors:

- Specific changes in the visual composition, character, and specifically valued qualities of the affected environment
- Visual context of the affected environment
- Extent to which the affected environment contained places or features that have been designated in plans and policies for protection or special consideration
- Number of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the program- and project-related changes

An assessment of visual quality is subjective, and reasonable disagreement can occur as to whether alterations in the visual character of the study area would be adverse or beneficial. For this analysis, a conservative approach was taken, and the potential for substantial change to the visual character of the study area is generally considered a significant impact.

25.3.2 Significance Criteria

The thresholds of significance for impacts 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 the NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The program alternatives under consideration were determined to result in a significant impact related to visual resources if they would do any of the following:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including but not limited to scenic trees, rock outcroppings, and historic buildings along a State scenic highway
- Substantially degrade the existing visual character or quality of a site and its surroundings
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in an area.

There are no scenic highways in any areas where program- or project-level activities would occur. Therefore, views from scenic highways would not be affected by the program alternatives and will not be discussed further.

25.3.3 Program-Level Impacts and Mitigation Measures

This section provides a program-level evaluation of the direct and indirect effects of program alternatives on visual resources. The action alternatives could affect visual resources during the modification or construction of facilities or during other restoration actions. The evaluation of effects on visual resources at the program level also included consideration of the potential effects of recapture of Interim and Restoration flows using existing facilities on the San Joaquin River between the Merced River and the Delta and using a potential new pumping facility in this segment of the river (Alternatives C1 and C2).

No construction activities associated with Settlement actions are proposed upstream from Friant Dam, in the Delta, or in the CVP/SWP water service areas. For these reasons, these geographic areas are not discussed further in this section.

No-Action Alternative

For visual resources, the No-Action Alternative includes the eleven reasonably foreseeable future actions related to water resource management to be implemented in the Delta and San Joaquin Valley regions described in Chapter 2.0, "Description of Alternatives." The effects of other projects associated with the projected regional population increase and buildout of existing general plans by 2030 are described, and their contributions to 2030 conditions are evaluated for significance, in Chapter 26.0, "Cumulative Effects."

Impact VIS-1 (No-Action Alternative): ***Temporary and Short-Term Construction-Related Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character – Program-Level.*** The reasonably foreseeable, future projects included in the No-Action Alternative would have no associated construction activities in the Restoration Area or along the San Joaquin River between the Merced River and Delta. There would be **no impact**.

There are several public and private views of the Restoration Area and of the San Joaquin River between the Merced River and the Delta, including views from residences, golf courses, and wildlife refuges. However, under the No-Action Alternative, no construction activities associated with the action alternatives would occur, and the reasonably foreseeable, future projects included in the No-Action Alternative have no associated construction activities in the Restoration Area or along the San Joaquin River between the Merced River and Delta. Thus, no impact would occur.

Impact VIS-2 (No-Action Alternative): ***Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character – Program-Level.*** No beneficial changes in visual screening associated with creating and enhancing additional floodplain habitat along the river would occur under the No-Action Alternative. Implementing the USACE policy regarding levee vegetation could result in substantial removal of vegetation that

could affect visual resources under the No-Action Alternative. However, the manner in which the policy would be implemented in the study area is not yet known and, thus, any estimates of potential effects on visual resources related to this policy would be too speculative for meaningful consideration at this time. Thus, this impact is considered to be **too speculative for meaningful consideration**.

Except for implementation of the USACE policy regarding levee vegetation, the reasonably foreseeable, future projects included in the No-Action Alternative would not affect views in the Restoration Area or along the San Joaquin River between the Merced River and Delta. Implementation of the USACE policy regarding levee vegetation could result in substantial removal of vegetation that could affect visual resources. However, the manner in which the policy would be implemented in the study area is not yet known. Discussions are continuing between USACE, other Federal agencies, and State and local agencies in California with responsibilities for levee maintenance, and may result in local variances to the national policy allowing less vegetation removal (CVFPB 2009). At this time, any estimates of potential effects on visual resources related to this policy would be too speculative for meaningful consideration. Because of this uncertainty, this impact would be too speculative for meaningful consideration.

Impact VIS-3 (No-Action Alternative): ***Substantial Changes in Light or Glare – Program-Level.*** There would be no sources of light and glare associated with the No-Action Alternative. Reasonably foreseeable projects also would not cause substantial changes in light or glare in the Restoration Area or along the San Joaquin River from the Merced River to the Delta. There would be **no impact**.

Under the No-Action Alternative, there would be no temporary or permanent sources of light or glare associated with implementation of the reasonably foreseeable projects included in the No-Action Alternative. Thus, no impact would occur.

Alternatives A1 and B1

This section describes program-level impacts that would occur in the different geographic areas under Alternatives A1 and B1.

Impact VIS-1 (Alternatives A1 and B1): ***Temporary and Short-Term Construction-Related Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character – Program-Level.*** Construction-related activities could degrade temporary and short-term views in the Restoration Area; however, these changes would be minimal, and temporary or short-term. This impact would be **less than significant**.

Construction activities associated with implementing Alternatives A1 and B1 could temporarily reduce the aesthetic qualities of views in the Restoration Area by introducing earthmoving equipment and other construction equipment, materials, and work crews into the view shed of residents along the river, workers in nearby farming areas, and recreationists on adjacent golf courses and wildlife refuges. Of these groups, residents and recreationists are considered more sensitive to aesthetic qualities because of the frequency and duration of their views.

Construction may include activities such as placing gravel in the river channel, installing fish screens, filling or isolating gravel pits, constructing a new hatchery, grading related to widening existing levees, removing material from borrow sites, constructing the Mendota Pool Bypass and levees along Reach 2B, and removing in-channel vegetation. The presence and movement of heavy construction equipment and potential construction-related generation of dust could temporarily degrade the existing visual character of the area. Recreationists' views of construction would largely be blocked by intervening vegetation and topography. Agricultural workers would have longer views of construction areas than recreationists because they are present longer but are not considered a sensitive viewer group. In addition, most construction activities would not be easily visible from residences because of intervening distance, topography, and/or vegetation.

For these reasons and because of the temporary and short-term nature of this effect, this impact would be less than significant.

Impact VIS-2 (Alternatives A1 and B1): ***Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character – Program-Level.*** Construction of Alternatives A1 and B1 would change long-term views in the Restoration Area. These impacts could be substantial and adverse. This impact would be **potentially significant**.

Long-term changes to the visual character of this segment of the river could result from implementing the restoration actions. Many of the restoration actions proposed in the Restoration Area would not be visible following construction because the changes would be under water (e.g., supplemented spawning gravel) or because views of the affected areas would be obscured by intervening distance, topography, and/or vegetation. Other restoration actions (e.g., filling or isolating gravel pits, removing in-channel vegetation, and levee modifications) may be completely or partially visible and could adversely affect views in the Restoration Area.

Although most actions either would not be visible or would cause minimal changes that would be consistent with the existing character of the area, several actions could cause more substantial changes in views in the Restoration Area. These actions could result in localized changes in long-term views for residents, recreationists, and farmworkers who have direct views of sites along the river that would be modified. Settlement actions potentially causing substantial, localized changes to long-term views include constructing new facilities (e.g., bridges, fish ladders, or a fish hatchery), removing borrow material, widening floodplains and constructing levee setbacks, and modifying gravel pits. For example, filling or isolating gravel pits could substantially change views in Reach 1. Similarly, construction of a new fish hatchery in this reach could substantially change views because the size and type of the facility could be inconsistent with the visual character of the surrounding area. Although the intactness of the existing views in this reach is low, construction of hatchery facilities could further reduce the visual quality of the area, and thus, could substantially change the visual character of the area.

Adverse visual changes could also result at borrow areas that would be used to supply material for levee modification. Constructing new levees could require over 6 million cubic yards of soil borrow. If a layer of soil only 2 feet deep were removed from borrow sites (to facilitate subsequent reclamation), several square miles (2,000 to 4,000 acres) of land could be affected. The locations of proposed borrow sites have not yet been determined. Proposed borrow operations would lower the elevation of borrow sites.

In addition, some long-term vegetation would be removed in the existing channel of Reach 4B to improve conveyance. The extent of this vegetation removal could vary from negligible to substantial depending on site-specific conditions, but could substantially alter views.

In summary, some actions (e.g., establishing a new fish hatchery, removing large amounts of vegetation, or modifying levees) could result in substantial visual changes. Therefore, this impact would be potentially significant.

Mitigation Measure VIS-2 (Alternatives A1 and B1): ***Screen New Facilities and Minimize Adverse Visual Impacts – Program-Level.*** Project proponents of subsequent site-specific projects will site new facilities as far from any sensitive view sheds. In addition, project proponents of subsequent site-specific projects will provide visual screening to soften views of the facilities. Landscaping could include establishing vegetated berms and/or planting trees, shrubs, ground cover, and floodplain habitat restoration. Effective visual screening with landscaping also could include vegetation that would grow to cover perimeter fences. In addition, new facilities will be sited to minimize land alterations and cut and fill. Any areas disturbed during construction will be replanted with native vegetation.

In addition, natural colors and materials and low reflective materials will be used on all new facilities (e.g., bridges) to the extent feasible that they would appear consistent with the existing character of the area.

Implementing this mitigation measure would reduce this impact; however, it is unknown if this mitigation would reduce this impact to a less-than-significant level. Thus, this impact would be **potentially significant and unavoidable**.

Impact VIS-3 (Alternatives A1 and B1): ***Substantial Changes in Light or Glare – Program-Level.*** Implementing most actions under Alternatives A1 and B1 would not create a new source of substantial light or glare that would affect daytime or nighttime views in the area. However, some new facilities could introduce new sources of light or glare in the Restoration Area. This impact would be **potentially significant**.

Under Alternatives A1 and B1, construction of program-level actions could temporarily change light or glare at some locations. Equipment staging areas and construction areas may be temporarily lit during the construction period if construction work needs to be conducted at night. However, views of the construction areas from nearby residences would be largely obscured by intervening distance, topography, and/or vegetation. In addition, nighttime lighting related to construction would be temporary or short term.

Most of the actions under these alternatives would not introduce any new long-term sources of light or glare. However, it is possible that some new facilities (e.g., fish hatchery) could include lighting, if constructed. Introduction of new sources of lighting could adversely affect daytime or nighttime views.

Because some new sources of lighting could be introduced into the Restoration Area, this impact would be potentially significant.

Mitigation Measure VIS-3 (Alternatives A1 and B1): ***Establish and Require Conformance to Lighting Standards, and Prepare and Implement a Lighting Plan – Program-Level.*** To reduce impacts associated with light and glare, for all project phases, project proponents of subsequent site-specific projects will conform to the following guidelines:

- If construction lighting is needed, contractors will be required to shield lighting and direct lights downward onto the work site.
- Meet the minimum county lighting standards for all project-related lighting. All lighting fixtures will be designed to be consistent with the guidelines contained in the applicable county general plan.
- Shield or screen lighting fixtures to direct the light downward and prevent light spill on adjacent properties.
- Prohibit the use of harsh mercury vapor, low-pressure sodium, or fluorescent bulbs.
- Consider design features, namely directional shielding for all substantial light sources, that will reduce effects of nighttime lighting. In addition, consider the use of automatic shutoffs or motion sensors for lighting features to further reduce excess nighttime light. All nighttime lighting will be shielded to prevent the light from shining off the surface intended to be illuminated.

With mitigation, this impact would be **less than significant**.

Alternatives A2 and B2

Program-level impacts to visual resources under Alternatives A2 and B2 would be similar to program-level impacts under Alternatives A1 and B1. Under Alternatives A2 and B2, actions to increase channel capacity in Reach 4B1 would include constructing 4- to 5-foot-high levees in this reach to provide an average floodplain width between 1,900 and 4,800 feet. The associated borrow operations would lower the elevation of borrow sites over very large areas (up to about 2 square miles), and views of these areas could be adversely affected by borrow activities. Raising levees or setting levees back would result in a substantial change to views. However, widening the floodplain would encourage growth of riparian vegetation that would provide additional visual screening and improve river-side views in this reach over the long term; in addition, raising and widening the levees would occur only in Reach 4B1, which has a low existing visual character that could be improved by additional vegetation growth.

Also, to enable 4,500 cfs of flow through Reach 4B1, the San Joaquin River Headgate Structure and Sand Slough Control Structure would be modified under Alternatives A2 and B2. These modifications would be to existing structures and would be consistent with the existing visual character; therefore, these improvements would not result in substantial adverse changes to views in this area.

At the program level, impact conclusions and mitigation measures for visual resources impacts from Alternatives A2 and B2 are the same as for Alternatives A1 and B1, and depend on site- and action-specific details that are unknown at this time. However, Alternatives A2 and B2 would have greater potential visual resources impacts because of construction of greater channel modifications in Reach 4B1. All action alternatives would have greater potential visual resources impacts than the No-Action Alternative.

Alternative C1

Program-level impacts to visual resources under Alternative C1 would include those program-level impacts described under Alternatives A1 and B1. Construction of new infrastructure to recapture Interim and Restoration flows on the lower San Joaquin River (between the Merced River and the Delta) and a conveyance tie-in to existing water conveyance facilities under Alternative C1 would cause additional construction-related temporary and short-term effects, and potentially long-term changes to visual resources. As with the Restoration Area, viewers along this segment of the river would include residents, recreationists, and farm workers. The overall visual quality in this reach is moderate. The exact location of the proposed new infrastructure, its footprint and height, and the duration of construction are unknown. Therefore, there is the potential for this facility to substantially degrade the visual character of the area, or to affect a scenic vista.

At the program level, impact conclusions and mitigation measures for visual resources impacts from Alternative C1 are the same as for Alternatives A1 and B1, and depend on site- and action-specific details that are unknown at this time. However, Alternative C1 would have greater potential visual resources impacts because of construction of the new infrastructure. All action alternatives would have greater potential visual resources impacts than the No-Action Alternative.

Alternative C2

Program-level impacts to visual resources under Alternative C2 would include those program-level impacts described under Alternatives A2 and B2. Construction of new infrastructure to recapture Interim and Restoration flows on the lower San Joaquin River (between the Merced River and the Delta) and a conveyance tie-in to existing water conveyance facilities under Alternative C2 would cause additional construction-related temporary and short-term effects, and potentially long-term changes to visual resources. As with the Restoration Area, viewers along this segment of the river would include residents, recreationists, and farmworkers. The overall visual quality in this reach is moderate. The exact location of the proposed infrastructure, its footprint and height, and the duration of construction are unknown. Therefore, there is potential for this facility to substantially degrade the visual character of the area, or to affect a scenic vista.

At the program level, impact conclusions and mitigation measures for visual resources impacts from Alternative C2 are the same as for Alternatives A2 and B2, and depend on site- and action-specific details that are unknown at this time. However, Alternative C2 would have the greater potential visual resources impacts because of construction of the new infrastructure. All action alternatives would have greater potential visual resources impacts than the No-Action Alternative.

25.3.4 Project-Level Impacts and Mitigation Measures

This section provides a project-level evaluation of the direct and indirect effects of the reoperation of Friant Dam on visual resources. Reoperating Friant Dam could affect visual resources by altering the timing and extent of drawdown of Millerton Lake. Thus, potential effects are discussed below. No project-level impacts would be associated with construction or with light or glare. In addition, there would be imperceptible effects on visual resources in the Delta or the CVP/SWP water service areas under the action alternatives from increased flows into the Delta and exporting, storing, and conveying the water through the CVP/SWP systems. Therefore, these issues and geographic areas are not discussed further in this project-level analysis.

The evaluation of effects on visual resources considered at a project level included the potential effects resulting from the recapture of Interim and Restoration flows in the Restoration Area and at existing Delta facilities. No changes that would occur to visual resources were identified. Therefore, the effects of these actions on visual resources are not discussed further.

Other actions evaluated at a project level would not result in physical changes to visual resources. These include reoperation of Mendota Dam, Chowchilla Bypass Bifurcation Structure, Eastside Bypass Bifurcation Structure, Mariposa Bypass Bifurcation Structure, and the Hills Ferry Barrier. The proposed changes to the operation of these structures would have no effect on visual resources. Actions to obtain encroachment permits, water transfers, and long-term water rights also would not affect visual resources.

Actions identified in the Monitoring and Management Plan (see Appendix D) as potential immediate actions to address nonattainment of management objectives also were evaluated at a project level. Potential immediate actions are related to flow, seepage, capacity, native vegetation, and spawning gravel. Potential immediate actions include acquiring additional water from willing sellers, reoperating Friant Dam to reduce flows, monitoring, preparing reports documenting monitoring, and removing obstructions/debris from channels in the Restoration Area. Monitoring and reporting actions were considered to cause only inconsequential effects on visual resources and are not discussed further.

No-Action Alternative

This section describes project-level impacts that would occur in the different geographic areas under the No-Action Alternative.

Impact VIS-4 (No-Action Alternative): *Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character Upstream from Friant Dam – Project-Level.* Implementing the No-Action Alternative would not have a substantial adverse effect on any scenic vistas or scenic resources upstream from Friant Dam. This impact would be **less than significant**.

Several scenic viewpoints located around Millerton Lake, including Friant Dam, Crow's Nest, McKenzie Point, the north shore entrance, and Buzzard's Roost, have views of the lake (Reclamation and State Parks 2008). Under the existing conditions, water levels in Millerton Lake fluctuate greatly from summer through winter. Summer water levels in the lake can drop as much as 1 foot per day, and water levels can rise 10 to 15 feet per day in winter and spring following the Sierra Nevada snowmelt (Reclamation and State Parks 2008). Annual water allocations and release schedules are developed with the intent of drawing reservoir storage to minimum levels by the end of September. This temporary drawdown of the water level creates a "bathtub ring" effect that degrades views of the lake by exposing barren shoreline during late summer and fall. Under the No-Action Alternative, operation of Friant Dam would continue as under the existing conditions. Under the No-Action Alternative, there would be a base flow of approximately 200 cfs from Friant Dam to provide flows of 5 cfs at Gravelly Ford, as required under existing contracts. Lake levels would continue to fluctuate seasonally, similar to the existing conditions, and the exposed shoreline of the lake would be visible for a similar duration as under the existing conditions.

Because lake levels would continue to fluctuate in a way similar to the existing conditions, and because there would be no changes in views from any scenic vistas, this impact would be less than significant.

Impact VIS-5 (No-Action Alternative): *Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character Downstream from Friant Dam – Project-Level.* There would be no project-related changes in the visual character under the No-Action Alternative. Between Friant Dam and the Delta, the flow regime of the San Joaquin River would remain similar to the existing conditions, and except for implementation of the USACE policy regarding levee vegetation, reasonably foreseeable projects would not affect visual resources in this segment of the river. Implementing the USACE policy regarding levee vegetation could result in substantial removal of vegetation that could affect visual resources. However, the manner in which the policy would be implemented in the study area is not yet known. Because of this uncertainty, this impact is considered to be **too speculative for meaningful consideration**.

Under the No-Action Alternative, no additional flows would be released to the San Joaquin River in the short term. The reaches of the river that are currently dry would remain dry for the short term, and the wet reaches would continue to receive flows similar to the existing conditions. In addition, no vegetation would be removed in the short term to increase the existing channel capacity.

Except implementation of the USACE policy regarding levee vegetation, the reasonably foreseeable, future projects included in the No-Action Alternative would include no associated construction or vegetation removal activities in the Restoration Area or along the lower San Joaquin River between the Merced River and the Delta. Implementing the USACE policy regarding levee vegetation could result in substantial removal of vegetation that could affect visual resources. However, the manner in which the policy would be implemented in the study area is not yet known. Discussions are continuing between USACE, other Federal agencies, and State and local agencies in California with responsibilities for levee maintenance, and may result in local variances to the national policy allowing less vegetation removal (CVFPB 2009). At this time, any estimates of potential effects on visual resources related to this policy would be too speculative for meaningful consideration. For these reasons, this impact is considered to be too speculative for meaningful consideration.

Alternatives A1 Through C2

Project-level impacts on visual resources would be identical under all the action alternatives (Alternatives A1 through C2) and therefore are discussed together below. No construction-related effects would result from the action alternatives at the project level. Effects would be the result of changes in flow and water surface elevations and the response of vegetation to those changes in water availability.

Impact VIS-4 (Alternatives A1 Through C2): *Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character Upstream from Friant Dam – Project-Level.* Increased water releases from Friant Dam could cause a change in the visual character upstream from Friant Dam. However, these changes would be minimal and would be similar to existing water level fluctuations. This impact would be **less than significant**.

Implementing any of the action alternatives would result in lowering water levels in Millerton Lake because of increased releases to the San Joaquin River. Interim and Restoration flows would be released subject to the existing channel capacity of the San Joaquin River. Exact flow releases are unknown; however, releases would vary based on water year type. The annual maximum water level typically occurs in May or June and is close to the full pool elevation of 581 feet most years. The reservoir typically is drawn down 75 to 100 feet, with the annual minimum elevation occurring in October or November, before the reservoir begins to refill with the onset of winter rains. Under any of the action alternatives, lake levels would be drawn down earlier in spring and may reach the minimum pool elevation earlier in summer. This additional drawdown would result in exposure of the shoreline earlier in the year, and the shoreline would be exposed for a longer duration each year than under current conditions. Exposure of the shoreline around the lake could degrade the visual character of the area; however, large fluctuations in water levels currently occur in the lake, and the additional drawdown would be minimal compared to existing seasonal variations. In addition, the minimum pool elevation is not expected to change as a result of any of the alternatives. Views of the reservoir being drawn down would be consistent with viewers' expectations of the lake in summer.

Because the additional drawdown of Millerton Lake would be minimal compared to existing fluctuations, and would be consistent with viewers' expectations, this impact would be less than significant.

Impact VIS-5 (Alternatives A1 Through C2): ***Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character Downstream from Friant Dam – Project-Level.*** Interim and Restoration flows in the San Joaquin River would change views of some reaches in the Restoration Area; however, these changes would not be adverse. These alternatives would result in beneficial effects, especially in reaches that are typically dry under existing conditions that would receive Interim or Restoration flows. This impact would be **less than significant** and **beneficial.**

Under any of the action alternatives, additional flows would be released down the San Joaquin River. These additional flows would vary seasonally and among water year types, and would be limited to existing channel capacity. Existing flows in the San Joaquin River also differ substantially among river reaches. In particular, some reaches (e.g., Reach 2B upstream from the backwater of Mendota Pool) have little or no flow for most of the year.

In reaches that currently have perennial flow (e.g., Reach 1), the additional flow volume provided by Interim and Restoration flows would increase the water surface elevation. However, because a perennial flow of water and associated riparian vegetation are already visible in these reaches, they would not cause a substantial change in views. These reaches include Reaches 1, 2B2, 3, 4B2, and 5, and the San Joaquin River downstream from the confluence with the Merced River.

Under any of the action alternatives, the primary changes to visual character in this area would be in reaches that are currently dry, or nearly so, for portions of the year that would have flows year-round with implementation of the action alternatives. In reaches that are currently dry or nearly so for portions of the year, views of water flowing down the river would be a beneficial change. These reaches include the lower portion of Reach 2A, and Reaches 2B and 4A.

In addition, in reaches that generally have relatively little or intermittent flow under the existing conditions, the increased, perennial water availability resulting from the Interim and Restoration flows would allow additional vegetation growth to occur. Currently, Reaches 2A, 2B1, and 4A have little riparian vegetation, and substantial increases of riparian vegetation could potentially occur at some locations along these reaches. In reaches that are currently dry, views of additional riparian vegetation would be a beneficial change. However, the extent of vegetation growth would be dependent upon channel maintenance practices required for maintaining flood conveyance capacity; therefore, vegetation may not be allowed to establish or may be limited in these areas. In reaches that currently have water year-round, there would likely be no noticeable change in vegetation along the channel as a result of the project, because water availability in these reaches would not change substantially. Because additional flows in the Restoration Area would result in beneficial changes in views, this impact would be less than significant and beneficial.

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Chapter 26.0 Cumulative Impacts

This chapter provides an analysis of overall cumulative effects of the action alternatives taken together with other past, present, and reasonably foreseeable probable future projects (or actions), as required by NEPA implementing regulations (40, CFR, Section 1508.7) and State CEQA Guidelines (14, CFR, Section 15130). This analysis follows applicable guidance provided by the CEQ in *Considering Cumulative Effects under the National Environmental Policy Act* (1997) and *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (2005). Unless stated otherwise, direct and indirect impacts of implementing the Settlement referenced in this chapter are presented in greater detail in the resource-specific chapters, including Chapter 4.0, "Air Quality," through Chapter 25.0, "Visual Resources."

26.1 Definitions of Cumulative Effects

The CEQ regulations that implement NEPA provisions define cumulative effects 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 non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Individual effects from different activities may add up or interact to cause additional effects not apparent when considering the individual effects one at a time. Additional effects contributed by actions unrelated to the proposed action must be included in the analysis of cumulative 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 in this chapter focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (14 CCR Section 15130(b)) state the following:

> *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.

26.2 Methods and Assumptions

Although NEPA guidelines do not provide specific guidance on how to conduct a cumulative impact analysis, Reclamation identifies associated actions (past, present, or future) that, when viewed with the proposed or alternative actions, may have significant cumulative impacts. Cumulative impacts should not be speculative, but should be based on known long-range plans, regulations, or operating agreements.

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which a project is to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). For this cumulative effects analysis, the list approach and the plan approach have been combined in quantitative and qualitative assessments of cumulative effects to generate the most comprehensive future projections possible. The methodology for each of these assessments is described under "Quantitative Assessments" and "Qualitative Assessments of Other Actions" below.

This analysis does not evaluate cumulative impacts separately between project- and program-level actions. By definition, cumulative impacts must consider SJRRP project- and program-level actions together with other past, present, and reasonably foreseeable probable future actions. Consequently, no distinction is made in this chapter with respect to project- and program-level actions; the cumulative analysis is the same for both.

26.2.1 Quantitative Assessments

Quantitative assessments were made for each of the resource areas for which such an assessment was feasible. Resource areas where quantitative assessments were possible are as follows:

- Surface Water Supply and Facilities Operations,
- Surface Water Quality,
- Flood Management,
- Groundwater,
- Recreation,
- Power and Energy,
- Air Quality,
- Noise, and
- Socioeconomics.

The methodologies for these quantitative assessments are described in Appendix H, "Modeling," and/or in the relevant resource-specific appendices. The appendices also include results of these assessments.

26.2.2 Qualitative Assessment of Other Actions

In addition to the quantitative assessments described previously, effects of past, present, and reasonably foreseeable probable future actions were assessed qualitatively for all resource areas. Existing information on current and historical conditions was used to evaluate the combined effects of past actions on each resource area. For present and reasonably foreseeable probable future actions, a list of related actions was compiled. The combined effects of these past, present, and reasonably foreseeable probable future actions, and of the actions that were evaluated quantitatively, were then evaluated together with those of the program alternatives. The combined effects of past actions and the list of related present and reasonably foreseeable probable future projects are described further below. Table 26-1 provides the list considered for each resource area.

Past and Present Actions

A large number of past and present actions have occurred in the study area. The effects of these past and present actions have strongly influenced existing conditions, and some past actions created "legacies" that are still affecting resources (e.g., pits from gravel/aggregate extraction activities along the San Joaquin River in the Restoration Area). The following are the most important of these past and present actions:

- 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., mining and timber harvest)
- CVP operations and local water development actions

Reasonably Foreseeable Probable Future Actions

Reasonably foreseeable probable future actions are actions that are currently under construction, approved for construction, or in final stages of formal planning.

The reasonably foreseeable probable future actions considered in this cumulative effects analysis are actions located within the study area that have been identified as potentially having an effect on resources that also may be affected by the SJRRP. These actions were identified by compiling and then considering a preliminary list of actions through reviewing available information regarding planned projects (including agency Web sites). Actions were then evaluated for inclusion in the cumulative effects analysis based on three criteria that all must be met to be considered to be reasonably foreseeable:

- The action has an identified sponsor actively pursuing project development, has completed or issued NEPA and/or CEQA compliance documents such as a Draft EIS or EIR, and appears to be "reasonably foreseeable" given other considerations such as site suitability, funding and economic viability, and regulatory limitations.

- Available information defines the action in sufficient detail to allow meaningful analysis.

- The action could affect resources potentially affected by the SJRRP.

Table 26-1.
Reasonably Foreseeable Future Actions Included in Qualitative Analysis of Cumulative Resource Area Effects

Project	Surface Water Supplies and Facilities Operations	Surface Water Quality	Flood Management	Groundwater	Fisheries	Vegetation and Wildlife	Geology and Soils	Paleontological Resources	Cultural Resources	Indian Trust Assets	Land Use Planning and Agricultural Resources	Recreation	Power and Energy	Visual Resources	Utilities and Service Systems	Public Health and Hazardous Materials	Transportation and Infrastructure	Air Quality	Climate Change	Noise	Socioeconomics
CALFED Water Resources Projects																					
CALFED Conveyance Programs																					
Bay-Delta Conservation Plan and Alternative Delta Conveyance Facilities	√	√			√																√
Delta-Mendota Canal/California Aqueduct Intertie		√															√				√
Delta-Mendota Canal Recirculation Project		√															√				√
Lower San Joaquin Flood Improvement Project			√		√												√				
North Delta Flood Control and Ecosystem Restoration Project					√																
South Delta Improvements Program	√	√			√																
Franks Tract Project		√			√								√								
Two Gates Fish Protection Demonstration Project	√	√			√	√	√		√		√	√		√		√	√	√		√	√
CALFED Drinking Water Quality Program																					
Bay Area Water Quality and Supply Reliability Program																					√
North Bay Aqueduct Alternative Intake Project					√																
San Luis Reservoir Low Point Improvement Project		√																			
South Bay Aqueduct Improvement and Enlargement Project																	√				√

Table 26-1.
Reasonably Foreseeable Future Actions Included in Qualitative Analysis of Cumulative Resource Area (contd.)

Project	Surface Water Supplies and Facilities Operations	Surface Water Quality	Flood Management	Groundwater	Fisheries	Vegetation and Wildlife	Geology and Soils	Paleontological Resources	Cultural Resources	Indian Trust Assets	Land Use Planning and Agricultural Resources	Recreation	Power and Energy	Visual Resources	Utilities and Service Systems	Public Health and Hazardous Materials	Transportation and Infrastructure	Air Quality	Climate Change	Noise	Socioeconomics
CALFED Water Resources Projects																					
In-Delta Storage Program (Delta Wetlands Project)		√			√																
Los Vaqueros Reservoir Expansion Project		√											√								
North-of-the-Delta Offstream Storage Investigation (Sites Reservoir)	√				√								√								
Shasta Lake Water Resources Investigation (Shasta Reservoir Enlargement)	√				√								√								
Upper San Joaquin River Basin Storage Investigation	√	√		√	√								√	√							
Other Water Resources Projects																					
California Water Plan																					
Conditional Waiver of Waste Discharge Requirements for Irrigated Lands		√									√										
Conveyance of Refuge Water Supply, South San Joaquin Valley Study Area, Mendota Wildlife Area						√								√		√					
FloodSAFE California			√																		
Folsom Dam Safety and Flood Damage Reduction Project																					
Long-Term CVP and SWP Operations	√	√			√																
Red Bluff Diversion Dam Pumping Plant					√																

Table 26-1.
Reasonably Foreseeable Future Actions Included in Qualitative Analysis of Cumulative Resource Area (contd.)

Project	Surface Water Supplies and Facilities Operations	Surface Water Quality	Flood Management	Groundwater	Fisheries	Vegetation and Wildlife	Geology and Soils	Paleontological Resources	Cultural Resources	Indian Trust Assets	Land Use Planning and Agricultural Resources	Recreation	Power and Energy	Visual Resources	Utilities and Service Systems	Public Health and Hazardous Materials	Transportation and Infrastructure	Air Quality	Climate Change	Noise	Socioeconomics
Other Water Resources Projects (contd.)																					
Sacramento River Water Reliability Study					√								√								
San Joaquin River Salinity Management Plan		√				√															
San Joaquin River Water Quality Improvement Project		√			√	√								√		√					
South Delta Flood Bypass		√	√											√							
Tracy Fish Collection Facility and Tracy Fish Facility Improvement Program					√									√							
Resource Management Plans and Programs																					
Central Valley Joint Venture																					
Central Valley Project Improvement Act		√			√									√							
CALFED Ecosystem Restoration Program					√	√								√		√					
Comprehensive Conservation Management Plans for National Wildlife Refuges						√					√			√		√					
Habitat Management Preservation, and Restoration Plan for Suisun Marsh						√								√		√					
Jensen River Ranch Habitat Enhancement and Public Access Project		√				√								√		√					
Resource Management Plans and Programs (contd.)																					
Lost Lake Park Master Plan						√					√			√		√					

Table 26-1.
Reasonably Foreseeable Future Actions Included in Qualitative Analysis of Cumulative Resource Area (contd.)

Project	Surface Water Supplies and Facilities Operations	Surface Water Quality	Flood Management	Groundwater	Fisheries	Vegetation and Wildlife	Geology and Soils	Paleontological Resources	Cultural Resources	Indian Trust Assets	Land Use Planning and Agricultural Resources	Recreation	Power and Energy	Visual Resources	Utilities and Service Systems	Public Health and Hazardous Materials	Transportation and Infrastructure	Air Quality	Climate Change	Noise	Socioeconomics
Millerton Lake Resource Management Plan/General Plan						√								√							
Peoria Wildlife Management Area						√								√		√					
Riparian Habitat Joint Venture						√								√							
San Joaquin River Parkway Plan											√	√		√			√				
Vernalis Adaptive Management Program	√	√			√																
New Friant River Outlet Powerhouse													√		√						
Development Projects																					
Fresno County General Plan		√				√	√				√			√	√	√	√	√	√	√	
Madera County General Plan Policy Document		√				√	√				√			√	√	√	√	√	√		
Merced County General Plan		√				√	√				√			√	√	√	√	√	√	√	
City of Fresno General Plan		√				√	√				√			√	√	√	√	√	√	√	
Brighton Crest		√					√				√			√		√	√	√			
Gunner Ranch West Specific Plan		√					√				√			√		√	√	√			
Ventana Annexation		√					√				√			√		√	√	√			
Gateway Village Specific Plan		√					√				√			√		√	√	√			

Key:
CALFED = CALFED Bay-Delta Program
Delta = Sacramento-San Joaquin Delta

Actions were also included as reasonably foreseeable if they were part of "common assumptions" developed jointly by Reclamation and DWR for use in 2030 CalSim modeling runs. Inclusion of these future actions is standard in all CalSim modeling runs conducted for EISs and EIRs. Consequently, the operational parameters of these future actions are incorporated quantitatively in the model runs. Because not all reasonably foreseeable probable future actions have been incorporated into CalSim modeling, cumulative impact analyses for water resources actions are also qualitative.

Based on this review, the effects of the actions described below were qualitatively considered in the assessment of the cumulative effects of the SJRRP. This list is organized into three categories of actions, all of which were considered together when determining potential cumulative effects: water resources projects, resource management plans and programs, and development projects.

CALFED Water Resources Projects. CALFED water resources projects considered in the cumulative effects assessment are briefly described below.

Bay-Delta Conservation Plan and Alternative Delta Conveyance Facilities. The Bay-Delta Conservation Plan (BDCP) is a comprehensive effort to provide for the conservation and management of numerous covered species that are or could potentially be designated as special-status species in accordance with Federal or State endangered-species statutes. The BDCP also endeavors to restore and protect the ability of the CVP/SWP to deliver full contract water amounts when hydrologic conditions result in the availability of sufficient water consistent with terms and provisions of respective water delivery contracts. At present, the BDCP is being developed in coordination with interested water users, nongovernmental stakeholders, and interested Federal, State, and local agencies with responsibility over issuance of applicable permits.

As part of the BDCP, several alternative Delta conveyance facilities are being considered, including an isolated facility that would convey water around the Delta for export through an isolated canal. Other alternatives would continue to convey water through the Delta, using an improved channel reinforced with reconstructed levees, and which could operate alone or in combination with an isolated canal. Establishing new, state-of-the-art CVP/SWP intake facilities on the north side of the Delta would attempt to reduce or eliminate fish losses associated with the existing Delta export pumps, and return a normal flow pattern to the Delta by eliminating reverse flows caused by the existing pumps and water conveyance to the south Delta. This change could have substantial influence on hydrologic and water quality conditions in the Delta. The BDCP also proposes to convert substantial tracts of land currently protected by levees to intertidal wetlands for purposes of increasing habitat for several pelagic fish species and improving habitat for other designated species.

Other conservation measures being considered include a series of programs intended to reduce pollutant discharges to the Delta from runoff, toxic spills, and pesticide use; improving low dissolved oxygen conditions; reducing production of methylmercury; and controlling invasive species and other nonnative predators.

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 an Initial Alternatives Information Report for the project in March 2008. Reclamation is preparing a feasibility study to evaluate the feasibility, benefits, and impacts of the project.

Delta-Mendota Canal/California Aqueduct Intertie. The DMC/California Aqueduct Intertie would consist of constructing and operating a pumping plant and pipeline connection between the DMC and the California Aqueduct in the Delta. The intertie would be 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. The intertie would include a 450 cfs pumping plant at the DMC that would allow water to be pumped from the canal to the California Aqueduct via an underground pipeline. Reclamation and DWR have completed NEPA and CEQA documentation for this project. The NOI/NOP was released in 2006, public scoping meetings were held in August 2006, and the Draft EIS/R was released for public comment in July 2009. The Final EIS/R and Record of Decision was filed in December 2009 and construction commenced in October 2010.

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 November 2007, the CVFPB sent a letter to USACE stating that it would act as the non-Federal sponsor for the project (Reclamation and DWR 2008). Also in November 2007, the board sent letters to all counties, cities, and reclamation districts (RD) within the primary study area describing the State's intent to share the 50 percent non-Federal study cost with other local sponsors, and soliciting their interest in participating in the project. As of early 2008, active participants in the investigation included the San Joaquin Area Flood Control Agency; San Joaquin County; the cities of Stockton, Manteca, and Lathrop; RDs 17 and 404; and tentatively the South Delta Water Agency.

USACE has prepared a preliminary draft of the project management plan for the investigation (Reclamation and DWR 2008). The purpose of the project management plan is to lay out the scope, tasks, schedule, cost, and management for the investigation. Other current activities include preparing a feasibility cost-sharing agreement for the project. Local consensus meetings with concerned stakeholders to develop study priorities and needs will begin on initiation of the project.

North Delta Flood Control and Ecosystem Restoration Project. Reclamation and DWR are implementing the North Delta Flood Control and Ecosystem Restoration Project in the north Delta (DWR 2009a). The goal of this project is to implement flood control

improvements in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. Components being considered for flood control include setback levees, detention basins, dredging, and levee degradation for floodplain expansion, which may also be configured to create quality habitat for species of concern in the north Delta area. These goals would be accomplished by using McCormick–Williamson Tract and Staten Island in the Delta.

The Draft EIR was completed in November 2007, and a 60-day public comment period began on January 28, 2008 (Reclamation and DWR 2008). A public hearing was held on February 21, 2008, in Walnut Grove, California. The Final EIR was certified in October 2010. The final preferred alternative will be selected through the participation of stakeholders in the form of meetings of the North Delta Improvements Group and North Delta Agency Team. Participants include DWR, DFG, the State Lands Commission, San Francisco Bay RWQCB, Delta Protection Commission, RDs, USFWS, and NMFS. No implementation funding for design and construction has yet been identified.

South Delta Improvements Program. DWR and Reclamation are seeking permits for the installation and operation of permanent operable gates to implement improvements in the south Delta for local water levels, water quality, and Chinook salmon protection (Reclamation and DWR 2008). Construction of operable gates at four locations in the south Delta incorporates dredging and extension of agricultural intakes. These proposed actions are intended to maximize diversion capability into the Clifton Court Forebay while providing an adequate water supply for the SDWA and reducing adverse effects of SWP exports on aquatic resources. The SDIP includes physical/structural improvements and operational changes (Reclamation and DWR 2005b). Both the USFWS and NMFS rendered Jeopardy BOs on the CVP/SWP operations. The NMFS CVP/SWP Operations BO was issued in June 2009 and specifically directs DWR to halt implementation of the SDIP. NMFS indicates that consultation for the SDIP cannot be reinitiated until after 3 years of fish predation studies at the South Delta temporary barriers are completed. After all permits have been acquired, DWR can proceed with construction. There currently is not a schedule for project completion.

Franks Tract Project. Reclamation and DWR are proposing 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. In addition to improving water quality, the gates would limit migration of chinook salmon and delta smelt into the central and south Delta, where their survival rates have been reduced by entrainment in waters being conveyed to the south Delta export pumps.

The project gates would be operated seasonally (January through September) and during certain hours of the day, depending on fish presence and diurnal tidal conditions. Boat passage facilities would be included to allow for passing of watercraft when the gates are in operation. 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. A joint draft EIS/R for the project will be published in late 2011.

Two Gates Fish Protection Demonstration Project. Reclamation proposes to install and operate removable gate structures at two key Delta locations (Old River between Bacon Island and Holland Tract, and Connection Slough between Mandeville and Bacon islands) to test the ability of the structures to improve protection for delta smelt and other sensitive aquatic species. In a 5-year pilot study, the gates would control flows in selected interior Delta channels to evaluate whether these changes reduce entrainment of fish into pumps and improve water supplies to SWP and CVP.

Approximately 175-foot wide butterfly gates would be mounted on steel barges and ballasted into place on prepared beds at the Old River and Connection Slough sites. The barges would be held by large rocks (lock rock) placed along each side to provide additional resistance to lateral forces from tidal flows, and they would be connected to sheet pile dikes.

Gate structures would remain in place with gates in an open position from July through November of each year for the 5-year experimental period. A gate operator would be present at each site 24 hours a day during the operational period and at other necessary times, and would open and close the gates in response to fish protection criteria as well as to accommodate passage of commercial, recreational, or emergency vessels. The operator also would conduct the operations necessary for passage of small recreational boats using the levee boat ramps when the gates are closed.

Bay Area Water Quality and Supply Reliability Program. The Bay Area Water Quality and Supply Reliability Program would encourage participating Bay Area partners, specifically the Alameda County WD, Alameda County Flood Control and Wastewater Conservation District, Bay Area Water Users Association, CCWD, East Bay Municipal Utility District, City of San Francisco, and Santa Clara Valley WD, to develop and coordinate regional exchange projects to improve water quality and supply reliability. This project would involve 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 (Reclamation and DWR 2005b). Phase 1 evaluated overall Bay Area water quality, developed a list of potential projects, and provided a qualitative evaluation of the ability of existing infrastructure to supply sufficient high-quality water to meet the drinking water objectives in the CALFED Record of Decision. Several of these projects are in various stages of development and are proceeding, as described in the *Bay Area Integrated Regional Management Plan*, which was released in November 2006 (Bay Area IRWMP 2009).

North Bay Aqueduct Alternative Intake Project. DWR is proposing the North Bay Aqueduct Alternative Intake Project in Solano County (DWR 2009b). A joint EIS/R will be prepared through a collaboration of Federal and State agencies and local water agencies. DWR proposes an alternate intake to the North Bay Aqueduct that would connect to the existing North Bay Aqueduct via an underground pipeline to serve the contractors and users in Solano and Napa counties. Potential alternative intake (diversion) locations may include sites in Yolo and Sacramento counties. The North Bay Aqueduct Alternative Intake Project also involves modifying the existing North Bay Aqueduct to

increase its capacity. The alternatives to the current intake system would be developed based on the following selection criteria:

- improvement of and more consistent water quality for the user agencies,
- potential increased delivery volumes to the user agencies,
- comparative project costs within the range of affordability under various funding scenarios to be developed by the user agencies, and
- environmental and permitting considerations.

Planning efforts for this project are in the preliminary stages. Publication of the Draft EIR is anticipated at the end of 2011.

San Luis Reservoir Low Point Improvement Project. Reclamation and the Santa Clara Valley WD are preparing an EIS/R for the San Luis Reservoir Low Point Improvement Project, which would use one alternative or a combination of alternatives, including treatment options, bypasses, and other storage options, to reduce the risk of "low point" water levels (Reclamation 2008a). When water levels in San Luis Reservoir are low, high water temperatures combined with wind-induced mixing result in algal blooms at the reservoir's water surface. This condition degrades water quality, making it difficult or impractical to treat the water, and preventing deliveries from San Luis Reservoir. To solve the low-point problem, Reclamation and DWR have operated the reservoir to maintain water levels above the critical low elevation, or low point, requiring approximately 200 TAF of water to remain as "carryover" in the reservoir. The project may provide opportunities for ecosystem restoration.

Given likely growth in future water demands, and additional regulatory requirements, it is anticipated that storage in San Luis Reservoir will be more fully exercised and result in more frequent and lower late-summer storage levels in the reservoir (Reclamation 2008a). Alternatives being considered to address water quality issues related to the low-point problem and to increase the effective storage capacity in the reservoir include (1) a bypass to the San Felipe Unit around San Luis Reservoir, (2) treatment options such as dissolved air flotation, (3) algae harvesting or application of algaecides, (4) lowering of the San Felipe Division intake facilities, and (5) expansion of Pacheco Reservoir.

An NOI/NOP to prepare an EIS/R was released in 2002 and public scoping meetings were held that same year. In 2004, the project transitioned to a partnership with Reclamation and the initiation of a 3-year Federal feasibility study and EIS/R for the project. A final appraisal report for the San Luis Reservoir Low Point Improvement Project was issued in 2006, which recommended that a Federal feasibility study be initiated to further assess potential measures for resolving these water-related issues. To fulfill the requirements of NEPA, public scoping meetings were again held in September 2008 to reinitiate these public involvement activities and seek input from the public on the alternatives being carried forward into the Federal feasibility study and EIS/R. The NOI/NOP was issued in August 2008, and an environmental scoping report was prepared in December 2008.

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, Alameda County, and Santa Clara Valley WDs, which in turn provide service to the Cities of Livermore, Dublin, Pleasanton, San Ramon, Freemont, Newark, Union City, Milpitas, Santa Clara, and San Jose (DWR 2009c). The South Bay Aqueduct was the first conveyance facility constructed for the SWP and was designed for a capacity of 300 cfs. Recent flow tests and studies have shown that actual capacity is 270 cfs.

The purpose of this project is to increase the capacity of the South Bay Aqueduct 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 is composed of the following principal features:

- adding four 45 cfs pumps to the South Bay Pumping Plant, including expansion of the existing plant structure, a new service bay, and a new switchyard;
- constructing a third (Stage 3) Brushy Creek pipeline and surge tank parallel to the existing two barrels;
- constructing a 500-acre-foot reservoir (425 acre-feet of active storage) to be served by the Stage 3 Brushy Creek Pipeline;
- raising the height of the canal embankments, canal lining, and canal over-crossing structures and bridges along the Dyer, Livermore, and Alameda canals and at the Patterson Reservoir;
- modifying check structures and siphons along the Dyer, Livermore, and Alameda canals; and
- constructing new drainage overcrossing structures to eliminate drainage into the canals.

The Final EIR was published in December 2006 (DWR). The work was scheduled for completion in 2008. Currently, construction is proceeding to enlarge the South Bay Pumping Plant to make room for the four new pump units being fabricated (DWR 2009c).

In-Delta Storage Program (Delta Wetlands Project). DWR, in coordination with the California Bay-Delta Authority and with technical assistance from Reclamation, completed the State feasibility study for the In-Delta Storage Program in the south Delta. The In-Delta Storage Program would provide capacity to store approximately 217 TAF of water in the south Delta for a wide array of water supply, water quality, and ecosystem benefits. The project would include 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. Planning objectives include enhancing water supply reliability and operational flexibility of the CVP/SWP system, contributing to ecosystem restoration, and providing water for the Environmental Water Account (DWR 2009d).

Detailed planning work on the In-Delta Storage Project has been suspended; however, Semitropic Water Storage District and other local water service areas have been identified as a "place of use." Semitropic Water Storage District issued an NOP for the *Delta Wetlands Project Place of Use Environmental Impact Report* in November 2008, filed petitions with the SWRCB in March 2009 and issued a draft EIR in April 2010.

Los Vaqueros Reservoir Expansion Project. Reclamation and CCWD are conducting a feasibility study for the Los Vaqueros Reservoir Expansion Project (Reclamation and CCWD 2009). The project addresses alternatives to improve water quality and water supply reliability for Bay Area water users while enhancing the Delta's environment. Among the alternative actions being considered is expansion of the existing Los Vaqueros Reservoir. Project planners have evaluated expanding the reservoir storage from 100 TAF up to 275 TAF to improve water quality and water supply reliability. An expanded reservoir would require a new or expanded Delta intake, with a capacity of up to about 1,000 cfs for the maximum reservoir size. Locations being considered for the new Delta intake include Old River and adjacent channels. The purposes of the Los Vaqueros Reservoir expansion include increased reliability, water quality, and environmental water supply. A connection to Bethany Reservoir is also currently under study (Los Vaqueros Study Team 2009). After review of the Final EIS/EIR, the CCWD Board of Directors certified the EIR and approved the Los Vaqueros Reservoir Expansion Project on March 31, 2010. The detailed design of the expansion is moving forward and construction is underway until mid-2012.

North-of-the-Delta Offstream Storage Investigation (Sites Reservoir). Pursuant to the Record of Decision for the CALFED PEIS/R, Reclamation and DWR, in partnership with local interests, are preparing a feasibility study for the North-of-the-Delta Offstream Storage Investigation (DWR 2009d). This study is evaluating potential offstream surface water storage projects in the upper Sacramento River Basin that could improve water supply and reliability, enhance survival of anadromous fish, and provide high-quality water for agricultural, M&I, and environmental uses. With a potential maximum capacity of 1.8 MAF, Sites Reservoir could increase the reliability of water supplies for a large portion of the Sacramento Valley, and could improve fish migration by reducing water diversions on the Sacramento River (Reclamation and DWR 2005b). The project could increase water supplies available for export in years when export supplies would

otherwise be limited. This project also could modify the timing and magnitude of upstream reservoir releases in "wet" years.

An NOI/NOP for this project was issued in November 2001, and public scoping for the project occurred in January 2002. Completion of the Final Feasibility Report and publication of the Draft EIS/R are anticipated for winter 2010/2011.

Shasta Lake Water Resources Investigation (Shasta Reservoir Enlargement). Reclamation and DWR are leading an investigation to improve water supply reliability and anadromous fish survivability in the upper Sacramento River, primarily through an enlargement of Shasta Reservoir by raising Shasta Dam from 6.5 feet up to 18.5 feet. Currently the gross pool storage capacity is 4.55 MAF. With implementation the gross pool storage capacity would be increased to 4.81 (MAF) to 5.19 MAF. The seven resource management measures included in the project are: (1) enlarging the cold-water pool of Shasta Lake, (2) modifying the temperature control device, (3) increasing conservation storage, (4) reducing demand, (5) modifying flood operations, (6) increasing public safety at Shasta Dam, and (7) modifying hydropower facilities. In addition to these resource management measures, the project could include augmenting gravel in the Sacramento River to improve spawning habitat and recreation improvements on Reading Island downstream from Shasta Dam. The NOI for the EIS was released in October 2005, the Draft EIS is anticipated in summer 2011 and the Final EIS is anticipated by the end of 2011.

Upper San Joaquin River Basin Storage Investigation. The Upper San Joaquin River Storage Basin Investigation (USJRBSI) is a joint feasibility study by Reclamation and DWR. The purpose of the USJRBSI is to determine the type and extent of Federal, State, regional and local interests in one or more potential projects in the upper San Joaquin River watershed (upstream from Friant Dam) to expand water storage capacity; improve reliability and flexibility of the water management system for agricultural, urban, and environmental uses; and support fish restoration efforts (Reclamation and DWR 2007). Progress and results of the USJRBSI are being documented in a series of interim reports and will culminate in a Feasibility Report and EIS/R.

Since its inception in 2002, the primary objectives of the USJRBSI have been focused on contributing to San Joaquin River restoration, improving San Joaquin River water quality, facilitating additional conjunctive water management in the eastern San Joaquin Valley to reduce groundwater overdraft, and supporting exchanges that improve the quality of water delivered to urban areas (Reclamation and DWR 2007). These primary objectives drive the formulation of alternatives to be evaluated in the EIS/R.

Water management measures being considered in the formulation of alternative plans include options to increase water storage capacity at or upstream from Millerton Lake, alter conveyance facilities (i.e., create new facilities or modify existing ones), and direct the management of water facilities (i.e., operations) (Reclamation and DWR 2007). The USJRBSI is currently considering three surface water reservoir sites that would provide 690 to 1,260 TAF of additional storage capacity. Conjunctive management/groundwater storage will be an element common to all alternatives.

Potential benefits that could be provided by the alternative plans would include the following:

- Enhance conditions for restoration of the San Joaquin River and improvement of the Delta ecosystem
- Increase water supply reliability to agricultural water users and potential water supply reliability benefits to Friant Division M&I contractors
- Provide higher water quality to urban areas
- Create new hydropower sources
- Reduce frequency and magnitude of flood releases from Friant Dam
- Create recreation opportunities at existing or new reservoir sites

Field investigations have included initial water temperature evaluations, geologic investigations at potential dam and borrow sites, and biological and cultural resources studies. Several interim documents, including an Initial Alternatives Information Report (Reclamation and DWR 2005a) and a Plan Formulation Report (Reclamation and DWR 2008), have been or will be prepared before completion of a Feasibility Report and EIS/R, which are anticipated for publication in summer 2010 (DWR 2009d).

Other Water Resources Projects. Other (non-CALFED) water resources projects considered in the cumulative effects assessment are briefly described below.

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 (CCRCD 2005). 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 WDRs, or waive WDRs, for the discharge. The Central Valley RWQCB's Irrigated Lands Waiver Program has been under development. In December 2002, the Central Valley RWQCB adopted Resolution No. R5-2002-0201, which established a new "Conditional Waiver of WDRs for Discharges from Irrigated Lands within the Central Valley Region."

Irrigated lands are lands where water is applied for producing crops, including row, field, and tree crops, as well as commercial nurseries, nursery stock production, managed wetlands, and rice production. The Central Valley RWQCB adopted a waiver of report of waste discharge and WDRs for three reasons:

- Central Valley RWQCB has limited facility-specific information, and limited water quality data on facility-specific discharges.

- Because of the high numbers of individual dischargers who discharge waste from irrigated lands, it is infeasible to adopt WDRs within a reasonable period of time.

- Although dischargers of waste from irrigated lands have caused impairment of State waters, specific information is generally not available on the nature and causes of impairment, and management practices that mitigate impairments.

The conditions of the conditional waivers will result in development of new and additional information that could provide a more reasonable basis for adoption of individual or general WDRs, where necessary, in the future.

Conveyance of Refuge Water Supply, South San Joaquin Valley Study Area, Mendota Wildlife Area. Reclamation and the Central California ID have prepared an EA/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 and creates the Mendota Pool and fills Fresno Slough, providing water supplies to Mendota Wildlife Area and the Central Valley Project 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.

Section 3406(d) of the CVPIA requires the Secretary of the Interior to provide reliable year-round water supplies of suitable quality that meet peak seasonal needs and to maintain and improve wetland habitat areas in certain refuges in the Central Valley, State wildlife management areas, and the Grassland Resource Conservation District. Wetlands within the Mendota Wildlife Area are completely dependent on water deliveries by gravity flow via specific conveyance structures and ditches, or on sufficient water levels to facilitate infiltration and pumping/extraction of water in fully serving the Mendota Wildlife Area (Reclamation 2008b). Therefore, sufficient water levels are critical, and disruption of year-round water supply deliveries limits effective management of the Mendota Wildlife Area.

During development of project alternatives in 2005, it was suggested that without substantial modifications to Mendota Dam or construction of a new dam, the existing facility could not provide a consistent supply of water to the Mendota Wildlife Area (Reclamation 2008b). 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. Although the passage of anadromous fish either upstream or downstream from the existing dam is a topic of continuing study in the SJRRP, the proposed new dam would be designed so that it could be retrofitted with a fish passageway in the future, as necessary.

The Final EA/IS for this project was completed in May 2008 by Reclamation.

FloodSAFE California. In 2006, DWR launched FloodSAFE California, a multifaceted program to improve public safety through integrated flood management (DWR 2009f). The FloodSAFE Program is designed to help improve integrated flood management statewide, with a substantial emphasis on the Central Valley and the Delta where communities and resources face high risk of catastrophic damage. The program is intended to accomplish these broad goals:

- Reduce the Chance of Flooding. Reduce the frequency and size of floods that could damage California communities, homes and property, and critical public infrastructure.

- Reduce the Consequences of Flooding. Take actions before flooding that will help reduce the adverse consequences of floods when they do occur and allow for quicker recovery after flooding.

- Sustain Economic Growth. Provide continuing opportunities for prudent economic development that supports robust regional and statewide economies without creating additional flood risk.

- Protect and Enhance Ecosystems. Improve flood management systems in ways that protect, restore, and, where possible, enhance ecosystems and other public trust resources.

- Promote Sustainability. Take actions that improve compatibility with the natural environment and reduce the expected costs to operate and maintain flood management systems into the future.

DWR, with active participation by numerous partners, Federal and State agencies, local sponsors, and other stakeholders, is developing the *FloodSAFE Strategic Plan*, which will document a shared vision of the intended accomplishments of DWR and its partners through the FloodSAFE Program, and will describe an implementation approach that can bring about the desired results (DWR 2009f). The public review draft of the *FloodSAFE Strategic Plan* was released in June 2008. The strategic plan will be updated periodically by DWR and its partners based on the input, experiences, and new information gained during implementation. A program management team will use the guidance contained in the strategic plan to prepare a detailed program implementation plan.

The strategic plan identifies a suite of foundational objectives intended to eliminate unacceptable risks of flood damage statewide (DWR 2009f). These objectives include providing at least a 200-year level of flood protection to all urban and urbanizing areas in the Central Valley by 2025, establishing an interagency mitigation banking program by 2013 to provide lasting environmental benefits, designing and implementing a computer-assisted decision support system based on advanced forecasts for reservoirs by 2014, and completing an emergency operations plan for the Delta by December 31, 2009. The strategic plan identifies several other foundational objectives that are consistent with the goals stated above.

Folsom Dam Safety and Flood Damage Reduction Project. USACE and Reclamation are undertaking the Folsom Dam Safety and Flood Damage Reduction Project in the CVP service area on the American River. This project addresses (1) dam safety and security issues that will be implemented by Reclamation, (2) flood damage reduction measures that will be implemented by USACE, and (3) the Joint Federal Project Auxiliary Spillway that will be implemented by both agencies. The measures involve raising Folsom Dam and the related dikes/auxiliary dam, modifying L. L. Anderson Dam, constructing a bridge downstream from Folsom Dam, completing temperature shutter modifications, restoring the area's ecosystem, and constructing an auxiliary spillway (Reclamation et al. 2008). Work on a new bridge has been completed, and construction of an auxiliary spillway is in progress. Construction of the dam raise has not yet begun.

Red Bluff Diversion Dam Pumping Plant. In 2002 and again in 2006, Reclamation circulated a Draft EIS/R that analyzed various options for fish passage improvement at the Red Bluff Diversion Dam, and requested public comments. The Final EIS/R and Record of Decision calling for a pumping plant to be constructed upstream from the dam to improve the ability to divert water into the Tehama-Colusa Canal when gravity diversion is not possible because the Red Bluff Diversion Dam gates are out. Reclamation completed consultations with USFWS and NMFS under Section 7 of the Federal ESA regarding construction of the new pumping plant. The new pumping plant would be capable of operating throughout the year, providing additional flexibility in both operation of the dam's gates and water diversions for Tehama-Colusa Canal Authority customers. To improve passage by adult green sturgeon during their spawning migrations (generally March through July), the gates could remain open during the early part of the irrigation season and the new pumping plant could be used alone or in concert with other means to divert water to the Tehama-Colusa and Corning canals.

Green sturgeon spawn upstream from RBDD; most upstream and downstream migration by adults occurs before July and after August. Once the new pumping plant has been constructed and is operational, RBDD would operate with the gates down from July 1 to August 31. This operation would improve sturgeon and salmon passage.

The pumping plant project will occur in three phases. The first, completion of the NEPA/CEQA process, has already been accomplished. The design and permitting phase is commencing, and includes property acquisition (Darling 2009). The final phase, facilities construction, is anticipated to take approximately 18 months, but this timeline will be updated during final design and permitting.

Sacramento River Water Reliability Study. Reclamation and Placer County Water Agency have proposed to prepare a joint EIS/R for the Sacramento River Water Reliability Study. Placer County Water Agency, Sacramento Suburban WD, and the cities of Roseville and Sacramento are cost-sharing partners. The goal of the Sacramento River Water Reliability Study is to develop a water supply plan consistent with the Sacramento Area Water Forum Agreement objectives of pursuing a Sacramento River diversion to meet water supply needs of the Placer-Sacramento region, and promoting ecosystem preservation along the lower American River. The project location is the greater Sacramento metropolitan area, encompassing portions of southern Sutter County,

northern Sacramento County, and western and southern Placer County. To meet the water supply needs of the cost-sharing partners, the Sacramento River Water Reliability Study will identify a package of water supply infrastructure components, including new or expanded diversion(s) from the Sacramento, Feather, or American rivers, and new or expanded water treatment and pumping facilities, storage tanks, and major transmission and distribution pipelines.

The Sacramento River Water Reliability Study will include a feasibility study and an EIS/R for identified water supply alternatives as the basis for seeking necessary Biological Opinions and permits from the responsible resource agencies to allow execution of necessary agreements and construction of the recommended water supply infrastructure. The NOI/NOP was published in 2003 (68 FR 44811, July 30, 2003).

San Joaquin River Salinity Management Plan. This plan outlines actions taken for management of water quality to improve salt, boron and other constituent conditions on the lower San Joaquin River. The plan focuses on current actions and proposed mitigation components and was developed in conjunction with the management agency agreement between Reclamation and the Central Valley RWQCB. The plan focuses on three major groups of actions taken by Reclamation:

- Providing flows to the system
- Reducing salt load to the river
- Facilitating mitigation

Salt load reduction actions include the Grassland Bypass Project, which is designed to improve water quality in the channels used to deliver water to wetland areas and the San Joaquin River. Before the Grassland Bypass Project was implemented, drainage water from farms in the 97,000-acre Grassland Drainage Area was discharged into the San Joaquin River through Salt Slough and other channels used to deliver water to wetland areas. This drainage water contains high concentrations of selenium, salts, boron, and other constituents that are harmful to wildlife (Reclamation 2004).

San Joaquin River Water Quality Improvement Project. The Panoche WD 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. Ongoing monitoring of soil and water constituents would be performed to protect groundwater and to prevent irreversible changes to any of the project areas. Biotic monitoring also would be continued to monitor project impacts on wildlife. The Notice of Determination was signed in 2007.

South Delta Flood Bypass. Development of the South Delta Flood Bypass and Habitat Restoration Area is proposed in the vicinity of Stewart Tract and Paradise Cut to ease flood pressures along the lower San Joaquin River and south Delta that threaten the residential areas of Lathrop, Manteca, and Stockton, as well as downstream Delta levees (NRDC 2008). The South Delta Flood Bypass would provide a natural buffer against the effects of sea level rise and increased flooding related to climate change. Initial modeling

suggests the proposed bypass could reduce flood stage along urbanized areas of the lower San Joaquin River by nearly 2 feet.

The proposed bypass is the result of a lawsuit against the CVFPB and the developer of the River Islands Project on Stewart Tract by a coalition of conservation and fishing groups, claiming that the CVFPB had issued flood protection permits to River Islands without requiring sufficient protections or analysis of the development's impacts on neighboring levees (NRDC 2008). Under the 2008 settlement agreement, the River Islands developer will fund additional hydraulic modeling to refine the bypass route and will provide funds for potential land acquisition. The settlement removes the conservation groups' opposition to development of the River Islands Project. The River Islands Project is a 5,000-acre master-planned project on Stewart Tract in the City of Lathrop. It is approved for development of 11,000 homes and 5 million square feet of commercial space.

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.

Reclamation is continuing the Tracy Fish Facility Improvement Program to assess and implement operational and structural improvements at the Tracy Fish Collection Facility (Reclamation and DWR 2008). Efficiency studies for delta smelt, salmon, splittail, and green sturgeon; assessment of holding tank stress on delta smelt and salmon; and improved management of debris and predators within the Tracy Fish Collection Facility are being conducted to improve multispecies protection at the Federal export pumps.

The Tracy Fish Facility Improvement Program is identifying and implementing physical improvements and operational changes, assessing fisheries conditions, and monitoring fish salvage operations per agreements signed with DFG in 1992 and in accordance with legal requirements under the 1992 CVPIA (Reclamation 2008c).

The Tracy Fish Facility Improvement Program accomplishments to date have included a predator removal program, updated louver efficiency estimates for most species, holding tank surveys, biology and movements of splittail near the Tracy Fish Collection Facility, secondary louver netting programs, water quality monitoring, fish egg/larvae entrainment estimates, improved fish handling, more accurate fish identifications, demonstrated abilities for collecting and holding salvaged fish with a "fish-friendly" pumping system, and implementation of a "fish-friendly" mitten crab removal system (traveling screen) (Reclamation 2008c).

Facility improvements 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, resurfacing of 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 "fish-friendly" pumping system with an aboveground holding tank, and installation of a large traveling screen for mitten crab removal (Reclamation 2008c).

Resource Management Plans and Programs. Resource management plans and programs considered in the cumulative effects assessment are briefly described below.

California Water Plan. DWR's *California Water Plan* provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future (DWR 2009e). The plan, which is updated every 5 years, presents basic data and information on California's water resources, including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

DWR's goal for the *California Water Plan Update 2009* (Water Plan Update) is to meet requirements of the CWC, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the State, legislators, and other decision-makers (DWR 2009e). As a master plan, it guides the control, protection, conservation, development, management, and efficient use of the water resources of the State (CWC Section 10005(a)).

In January 2009, DWR produced a public review draft of the Water Plan Update (DWR 2009e). The implementation plan contained in the current *California Water Plan* addresses 13 objectives supported by 92 related actions, which were taken in part from DWR's 2008 climate change white paper. Several other companion State plans were considered in preparing the draft objectives and related actions. Identified objectives address water conservation, recycling, and reuse; conjunctive management of water supply sources; environmental enhancement; flood protection and floodplain enhancement; and management for a sustainable Delta. The Water Plan Update identifies several other objectives for management of water resources in California.

Central Valley Joint Venture. The CVJV is a self-directed coalition consisting of 20 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. The CVJV was established in 1988 as a regional partnership focused on the conservation of waterfowl and wetlands under the North American Waterfowl Management Plan. It has since broadened its focus to the conservation of habitats for other birds, consistent with major national and international bird conservation plans and the North American Bird Conservation Initiative. The CVJV Implementation Plan (2006) has identified specific goals and objectives for conservation activities for waterfowl, shorebirds, waterbirds, and riparian songbirds.

Central Valley Project Improvement Act. On October 30, 1992, Congress signed into law multipurpose water legislation. The CVPIA mandates substantial changes in management of the CVP by addressing fish and wildlife populations and habitats. The CVPIA amended previous authorizations of the CVP to include (1) fish and wildlife protection, restoration, and enhancement as project purposes having equal priority with irrigation and domestic water supply uses, and (2) fish and wildlife enhancement having an equal priority with power generation.

CALFED Ecosystem Restoration Program. DFG, USFWS, and NMFS implement the CALFED Ecosystem Restoration Program (CALFED 2000), which works to improve the ecological health of the Delta, Suisun Bay, and San Francisco Bay watershed by restoring and protecting habitats, ecosystem functions, and native species. 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 Delta, Suisun Bay, and San Francisco Bay and their 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 Delta, Suisun Bay, and San Francisco Bay.
- Improve and/or maintain water and sediment quality conditions that fully support healthy and diverse aquatic ecosystems in the Delta, Suisun Bay, and San Francisco Bay.

Since its inception, Ecosystem Restoration Program agencies have consolidated their vision into a single “blueprint” for ecosystem restoration. They further identified more than 600 programmatic actions and 119 milestones throughout the Bay-Delta watershed. The blueprint has been implemented through a large number of competitive and directed grants.

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.

The San Luis, Merced, and San Joaquin River NWRs are located along the San Joaquin River. The San Luis and Merced NWRs do not have approved comprehensive conservation management plans; however, planning was initiated for both NWRs in 2002 (USFWS 2001). The following are the primary goals of both refuges:

- Provide feeding and resting habitat for migrating and wintering waterfowl and other waterbirds.
- Manage and provide habitat for endangered species, threatened species, and species of special concern.
- Preserve the natural diversity of the flora and fauna representative of the lower San Joaquin Valley and the natural processes that maintain that diversity.
- Provide high-quality wildlife-dependent recreation and environmental education programs.

An additional goal to alleviate crop depredation applies at the Merced NWR.

The San Joaquin River NWR has prepared a final comprehensive conservation management plan (USFWS 2006). The following are the primary goals of this refuge:

- 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.
- Provide optimum wintering habitat for Aleutian Canada geese to enhance the continued recovery from threatened and endangered species status.
- Coordinate the natural resource management of the San Joaquin River NWR in the context of the larger Central Valley/San Francisco ecoregion.
- Provide the public with opportunities for compatible, wildlife-dependent visitor services to enhance understanding, appreciation, and enjoyment of natural resources at the San Joaquin River NWR.

Habitat Management, Preservation, and Restoration Plan for Suisun Marsh. The California Bay-Delta Authority and member agency managers with primary responsibility for actions in Suisun Marsh formed the Suisun Marsh Charter Group Principal Agencies to develop a regional plan for Suisun Marsh that would protect and enhance the Pacific Flyway and existing wildlife values, endangered species, and water quality. Because Suisun Marsh includes private lands, the Suisun Resource Conservation District also serves in the Suisun Marsh Charter Group to represent the interests of private landowners. Other Suisun Marsh Charter Group members include DFG, USFWS,

Reclamation, and DWR. Other California Bay-Delta Authority participating agencies include NMFS and USACE. The regional plan would be developed to balance the goals and objectives of the CALFED program, the Suisun Marsh Preservation Agreement, and other management and restoration programs within Suisun Marsh in a manner responsive to the concerns of stakeholders, and based on voluntary participation by private landowners (DFG 2007). Suisun Marsh is located downstream from the Delta in southern Solano County, within the Suisun Marshlands and Bay Ecological Management Unit of the California Bay-Delta Authority's Suisun Marsh and North San Francisco Bay Ecological Management Zone.

In 2003, Reclamation, USFWS, and DFG proposed to prepare a joint PEIS/R for the regional plan that would outline the actions necessary in Suisun Marsh to preserve and enhance managed seasonal wetlands, implement a comprehensive levee protection/improvement program, and protect ecosystem and drinking water quality while restoring habitat for tidal marsh-dependent sensitive species, consistent with CALFED's strategic goals and objectives. The NOI/NOP was published in 2003 (68 FR 63814, November 10, 2003). The Suisun Marsh Charter Group prepared a scoping report for this PEIS/R in May 2004. The Draft PEIS/R was published on October 29, 2010 with the comment period ending on December 28, 2010.

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, along the north side of Woodward Regional Park (DWR 2009g). The property is owned by the SJRC, which was created by the State legislature to develop and manage the San Joaquin River Parkway. The project would connect the Jensen River Ranch site with Woodward Regional Park via paved and natural public trails. The project area consists of the floodplain from the south riverbank to the south bluffs, which would be recontoured and revegetated. The land was formerly in agricultural use. DWR intends to complete the final construction working drawings and specifications, secure environmental and regulatory compliance, produce a revegetation plan, and prepare cost estimate alternatives for the project. Project activities would include modifying an urban stormwater drainage channel to create oxbows for wetland wildlife habitat, grading to create changes in site hydrology and to widen the riparian terrace, installing hiking and equestrian trails, constructing a public use area with access via a paved main trail, and restoring and enhancing oak woodlands and wetland and riparian habitat. Implementation of the project has been suspended pending issuance of State grant funds for the project (SJRPCT 2009).

Lost Lake Park Master Plan. Lost Lake Park is located at the southern edge of the community of Friant in an unincorporated area of Fresno County (Fresno County 2007). The site covers approximately 273 acres along an approximately 1.8-mile reach of the San Joaquin River. The park includes 197 acres owned by Fresno County and 76 acres that are managed by the county under a long-term lease from DFG and the California Wildlife Conservation Board. The *Lost Lake Park Master Plan* is being prepared by Fresno County to provide connectivity to adjacent public lands, planned parkway and community trails and bikeways, and habitat linkages through the park for wildlife movement. The *Lost Lake Park Master Plan* intends to be consistent with the adopted

Fresno County General Plan and San Joaquin River Parkway Master Plan. Three community workshops were held in 2007 and 2008 to discuss existing conditions, general vision and goals, and park alternatives. Work on the *Lost Lake Park Master Plan* has been temporarily halted because State funding was suspended.

Millerton Lake Resource Management Plan/General Plan. The *Millerton Lake State Recreation Area General Plan* was completed in 1979 (State Parks) and amended in 1983. A joint resource management plan and general plan being developed by Reclamation and State Parks will supersede this plan when it is completed. The existing plan has three main sections – the resource element, the land/water use and facilities element, and the operation element – that provide analysis and recommendations related to recreation resources, needs, allowable use levels, and operations by State Parks and private entities. The plan has specific recommendations for zoning and dispersal of different types of uses around the lake and plans for facility development in the two primary shoreline development areas, referred to as the South Shore and North Shore areas, respectively. The 1983 amendment primarily addressed a revised analysis of long-range boating facility development, providing for additional public boat launching and marina development at the existing marina location and a new location, within potential natural resource and other constraints.

Peoria Wildlife Management Area. Reclamation prepared an EA evaluating potential effects from implementation of an interim resource management plan and a road closure for the Peoria Wildlife Management Area. The Peoria Wildlife Management Area covers approximately 2,500 acres in western Tuolumne County at the south end of New Melones Reservoir (Reclamation 2007b). It is managed by Reclamation as mitigation for habitat lost when New Melones Dam and Lake were built. Implementation of a resource management plan is needed for the protection, preservation, and compatible use of the resources within the Peoria Wildlife Management Area.

An access road crosses approximately 1.8 miles of the Peoria Wildlife Management Area (Reclamation 2007b). This section of road was temporarily closed to public vehicles in December 2002 by Reclamation as a preventative measure to stop increasing damage to natural resources from illegal and inappropriate uses by recreationists. Habitat destruction, erosion and sedimentation, and related resource impacts have severely damaged areas throughout the Peoria Wildlife Management Area access road corridor. Illegal actions, such as target shooting, poaching, off-road driving, fires, littering, dumping of large debris and hazardous materials, vandalism, and illegal camping, have damaged natural resources and compromised the safety of the public and adjacent landowners in the area. Closing the road to use by public vehicles has minimized the continued degradation of this area.

Alternatives evaluated in the EA, in addition to the No-Action Alternative, address various management actions for public access, recreational use opportunities, and natural resource protection (Reclamation 2007b). The proposed action would result in year-round closure of the access road and development and enhancement of recreational facilities and uses at the Peoria Wildlife Management Area. Cooperative management programs

for restoration and enhancement of natural resources would be developed and implemented.

The EA for this project was completed in June 2007.

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. The report notes habitat loss and degradation as one of the most important factors causing the decline of riparian birds in California.

San Joaquin River Parkway Plan. The San Joaquin River Parkway Task Force, an advisory body created by State statute in 1990, adopted the *San Joaquin River Parkway Task Force Plan* in 1992 (SJRC 1992). In 2000, goals, objectives, and policies from the interim master plan were recompiled (SJRC 2000). The parkway plan 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. It addresses portions of Fresno and Madera counties and the City of Fresno. This area is approximately 23 miles long, from Friant Dam to SR 99 on both sides of the river.

Portions of the proposed parkway are managed for recreational or natural resource protection, conservation, and education purposes, although other parts are privately owned and used for other purposes. As of 2006, approximately 4,650 of the 5,900 acres in the proposed parkway were private lands. More land in the parkway is likely in public ownership now. The parkway plan includes the following six fundamental goals (SJRC 2000):

- Preserve and restore a riparian corridor of regional significance along the San Joaquin River from Friant Dam to SR 99.
- Protect wildlife species that depend on or prefer the river environment for at least part of their existence.
- Provide for conservation, education, and recreation, particularly a continuous trail, in a cooperative manner with affected landowners.

- Protect irreplaceable natural and cultural resources in a way that will also meet people's recreational and educational needs.

- Protect existing undeveloped areas of the river bottom, which should remain nonurbanized and be retained in open space or agriculture, if feasible.

- Provide land use and management policies for the San Joaquin River and areas of the river bottom included in the parkway that will enhance the attractiveness of the Fresno-Madera metropolitan area and enhance the quality of life of its residents.

The parkway plan defines land use designations and identifies goals, objectives, and policies for natural resources, flood management, and recreation areas. It also addresses land acquisition and a parkway managing entity. As a result of adoption of the *San Joaquin River Parkway Task Force Plan*, the SJRC was created in 1993 to acquire, manage, and operate parkway lands.

Vernalis Adaptive Management Program. In March 2011, the SJRGA issued a Notice of Determination to continue providing water supply for VAMP by extending the SJRA one year through 2011 for the purpose of completing VAMP as authorized under SWRCB Decision 1641. As described in Chapter 2.0, "Description of Alternatives," although VAMP expires at the end of 2011, the analysis of the program alternatives presented in Chapter 4.0, "Air Quality" through Chapter 25.0, "Visual Resources" includes the continued operation of VAMP or a program with similar conditions.

New Friant River Outlet Powerhouse. A small powerhouse owned by Orange Cove ID using water supplied to the San Joaquin Hatchery is also located at Friant Dam, but is not part of the FPP. This powerhouse is also not 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, 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.

Development Projects. Development projects in the study area that were considered in the cumulative effects assessment are briefly described below.

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, through Reaches 1, 2, and 3 and into Reach 4A. The general plan identifies 27 primary land use designations (defined in terms of allowable uses and intensity standards) and three overlay designations (an overlay land use designation modifies the policies, standards, or procedures established for the

underlying primary land use designation). One of the three overlay designations is for the San Joaquin River corridor.

Agriculture is essential to the visions and goals of the *Fresno County General Plan* (Fresno County 2000). That focus is reflected in its land use policies, which guide decisions to minimize the conversion of productive agricultural land, protect agricultural activities from incompatible land uses, and control expansion of nonagricultural development onto productive agricultural lands. 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.

Policies in the general plan seek to protect natural areas, particularly riparian and wetland habitats, in the county and to preserve habitat diversity in Fresno County through restoring and enhancing habitats that support fish and wildlife species so that populations are maintained at viable levels. 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.

One policy in the general plan directs Fresno County to require riparian protection zones around natural watercourses, recognizing that these areas provide highly valuable wildlife habitat. Another policy recommends the acquisition (through fee acquisition or protective easements, often in cooperation with other Federal, State, and local agencies and private entities) of creek corridors, wetlands, and areas rich in wildlife or of a fragile ecological nature, as public open space where such areas cannot be effectively preserved through regulatory process.

The general plan prioritizes the protection of wetlands, riparian habitat, and meadows because they are recognized as essential habitats for birds and wildlife, and the plan requires a minimum 200-foot-wide wildlife corridor along particular stretches of the San Joaquin and Kings rivers, whenever possible.

Madera County General Plan. In the study area, Madera County's land use jurisdiction lies northeast of the San Joaquin River centerline and continues downstream from Friant Dam through Reaches 1, 2, 3, and 4A. The 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 1995).

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. One policy in the general plan directs the county to support the goals and policies of the *San Joaquin River Parkway Task Force Plan* to preserve existing habitat and maintain, enhance, or restore native vegetation to provide essentially continuous riparian and upland habitat for wildlife along the river between Friant Dam and the SR 145 crossing.

The general plan also identifies a goal to protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels, by protecting critical nesting and foraging areas, important spawning grounds, migratory routes, waterfowl resting areas, oak woodlands, wildlife movement corridors, and other unique wildlife habitats critical to protecting and sustaining wildlife populations, and by ensuring the conservation of sufficiently large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife if such preservation does not threaten the economic well-being of the county.

Another goal of the general plan is to preserve and enhance open space lands to maintain the natural resources of the county by supporting preservation and enhancement of natural land forms, natural vegetation, and natural resources (including wetland preserves, riparian corridors, woodlands, and floodplains) as interconnected open space of sufficient size to protect biodiversity, accommodate wildlife movement, and sustain ecosystems.

Merced County General Plan. The *Merced County Year 2000 General Plan* (Merced County 1990) was adopted in December 1990. In the Restoration Area, Merced County's land use jurisdiction includes half of Reach 4A and all of Reach 5.

The general plan includes a plan for the comprehensive and long-range management, preservation, and conservation of "open-space lands" and contains provisions for managing and conserving Merced County's natural resources and for protecting life, health, and property from natural hazards. Policies associated with implementing this goal are designed to ensure that the development of Merced County will not significantly interfere with or destroy valuable natural resources and that development will occur with recognition of sensitive resources and hazardous conditions. The purpose of the general plan is to maintain the natural topography, vegetation, wildlife, and scenic beauty of Merced County to the greatest extent possible, while recognizing that Merced County must balance needs for affordable housing and economic opportunities. One of the goals of the general plan is to ensure that habitats that support rare, endangered, or threatened species from being substantially degraded and that rare and endangered species are protected from urban development and are recognized in rural 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). Several objectives and policies are provided in the general plan regarding the master parks plan, related primarily to city parks, including the provision of

parklands, park design and location, services and programs, and financing and management of the parks and recreation system.

The general plan also identifies many objectives and policies related to the *San Joaquin River Parkway Master Plan* (SJRC 2000) that are intended to provide city support for development of the parkway. These objectives and policies focus on the following:

- 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. 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. 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 (Perkins, pers. comm., 2009).

Gunner Ranch West Specific Plan. The Gunner Ranch West Specific Plan covers approximately 1,032 acres northwest of the San Joaquin River in southeast Madera County (Gunner Ranch West 2009). This project is a master plan for a community to complement and enhance the existing Children's Hospital of Central California and associated medical activities. Madera County is evaluating the specific plan, which would contain 440 acres of residential uses; 215 acres of mixed-use and nonresidential uses; 118 acres of medical campus, medical office buildings (existing), and a Children's Hospital (existing and expansion); 64 acres of open space; and 195 acres of community services, including a fire station, elementary schools, a wastewater treatment plant, and rights-of-way. Based on the proposed density, approximately 2,840 dwelling units would result. The NOP for an EIR was issued in 2008.

Ventana Annexation. This project amended the City of Madera's general plan to adopt the Ventana Hills Specific Plan, precise plan, prezoning, and tentative subdivision map. The project site is located southeast of the City of Madera in unincorporated Madera County. The annexation area includes all land within the project site (250.6 acres) and 18 parcels (49.55 acres) north of the project site, for a total of approximately 300.2 acres. The project, as planned, will generate approximately 1,000 new dwelling units, 5.5 acres of neighborhood commercial, a 15-acre school site, and 18 acres of public open space. The Draft EIR for the project was circulated in September 2006 (City of Madera), and the Final EIR was published in February 2007 (City of Madera). The Notice of Decision for the project was issued in March 2007. A total of 300.2 acres of unincorporated county area were annexed in the City of Madera. The Madera Local Agency Formation Commission approved the Ventana Annexation on March 4, 2008 (Leon, pers. comm., 2009). It is unknown when construction will begin.

Gateway Village Specific Plan. This project would amend the County of Madera's general plan to adopt the Gateway Village Specific Plan, precise plan, prezoning, and tentative subdivision map. This master planned community would consist of 2,062 acres containing 5,836 low-density units, 132 acres of commercial and mixed-use (including 742 residential units), 40 acres of highway service commercial uses, 19 acres of neighborhood commercial uses, 148 acres of open space, and 177 acres of right-of way. The water demanded by this project would be supplied by groundwater, reclaimed wastewater, water purchased from the Westside Mutual Water Company, and surplus and flood water purchased from the Madera ID. A final EIR has been prepared for this project (ESA 2007), the general plan of Madera County was amended, and the Gateway Village Specific Plan adopted by the County of Madera Board of Supervisors on September 11, 2007.

26.3 Geographic Scope of Effects

The geographic scope of cumulative effects of the SJRRP is shown by resource area in Table 26-2.

Table 26-2.
Geographic Areas Evaluated for Potential Significant Cumulative Effects

Resource Area	Geographic Area				
	San Joaquin River Upstream from Friant Dam	San Joaquin River from Friant Dam to Merced River	San Joaquin River from Merced River to Delta	Sacramento–San Joaquin Delta	CVP/SWP Water Service Areas
Air Quality		X	X		
Biological Resources - Fisheries	X	X	X	X	X
Biological Resources - Vegetation and Wildlife	X	X	X	X	X
Climate Change		X	X		
Cultural Resources		X	X		
Geology and Soils		X	X		
Hydrology - Flood Management	X	X	X	X	
Hydrology - Groundwater		X	X	X	X
Hydrology - Surface Water Supply and Facilities Operations	X	X	X	X	X
Hydrology - Surface Water Quality		X	X	X	
Indian Trust Assets		X			
Land Use Planning and Agricultural Resources		X	X		X
Noise		X	X		
Paleontological Resources		X	X		
Power and Energy	X				X
Public Health and Hazardous Materials		X	X		
Recreation	X	X	X	X	
Socioeconomics		X	X		X
Utilities and Service Systems		X	X		
Visual Resources		X	X		

Key:
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
SWP = State Water Project

26.4 Significance Criteria

Two significance criteria must be met for an environmental consequence to have a significant cumulative impact: 1) the effect must make a cumulatively considerable incremental contribution to an overall cumulative impact, and 2) the overall cumulative impact (considering past, present, and reasonably foreseeable probable future projects) must be significant. These criteria are based on the CEQA Guidelines as amended and the 1997 guidelines prepared by the CEQ, *Considering Cumulative Effects under the National Environmental Policy Act.*

26.5 Mitigation Measures for Significant Cumulative Impacts

To reduce any cumulatively considerable incremental contributions from action alternatives to an overall cumulative impact, feasible mitigation measures were proposed for all potentially significant and significant direct and indirect effects; these measures are presented in the individual resource sections. In all cases where a less-than-significant effect would be cumulatively considerable, no further feasible mitigation measures were available to reduce an action alternative's cumulatively considerable incremental contribution. Furthermore, it was not feasible to reduce any of the overall significant cumulative impacts (in no case was an action alternative's incremental contribution the reason for an overall significant cumulative impact). Therefore, no further feasible mitigation could be applied to reduce significant, or potentially significant, overall cumulative impacts to less-than-significant levels. In this case, the cumulative impacts are considered to be significant and unavoidable.

26.6 Cumulative Effects Analysis

Table 26-3 presents a summary of impacts where the impact was determined to make a considerable incremental contribution to an overall significant cumulative impact. The cumulative effects analysis is described below for each resource area. Given the magnitude of the SJRRP, the number of actions that are common to all action alternatives, and the actions in the Settlement being relatively fixed, there would be minimal differences between action alternatives with respect to cumulative effects. Therefore, the cumulative effects analysis applies to all action alternatives, as well as both project- and program-level implementation of the SJRRP. Several impacts were determined to have the potential to result in a cumulatively considerable incremental contribution to a significant cumulative impact. These impacts are described in the subsequent sections, and include the following:

- **Air Quality**: Construction-Related Emissions of Criteria Air Pollutants and Precursors

- **Biological – Fisheries**: Potential Direct Mortality or Reduced Fecundity of Wild Fall-Run Chinook Salmon in San Joaquin River Tributaries Resulting from Disease Outbreak

- **Climate Change**: Cumulative impacts associated with climate change are discussed in Chapter 7.0, "Climate Change."

- **Cultural Resources:** Disturbance or Destruction of Cultural Resources

- **Hydrology – Groundwater:** Changes in Groundwater Levels and Groundwater Quality in CVP/SWP Water Service Areas

- **Hydrology – Surface Water Supplies and Facilities Operations:** Change in Contra Costa Water District Water Supplies

- **Land Use Planning and Agriculture:** Conversion of Important Farmland to Nonagricultural Uses and Cancellation of Williamson Act Contracts

- **Land Use Planning and Agriculture:** Substantial Diminishment of Agricultural Land Resource Quality and Importance Because of Altered Inundation and/or Soil Saturation

- **Land Use Planning and Agriculture:** Substantial Diminishment of Agricultural Land Resource Quality and Importance Because of Altered Water Deliveries

- **Noise:** Exposure of Sensitive Receptors to Generation of Temporary and Short-Term Construction Noise

- **Noise:** Exposure of Sensitive Receptors to Increased Off-Site Traffic Noise Levels

- **Utilities and Service Systems:** Reduced Water Supplies for Friant Division Water Contractors

- **Visual Resources:** Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character

26.6.1 Air Quality

Cumulative effects on air quality could occur at the local, regional, and global scales. The cumulative effects at the local and regional scales are discussed in this section; cumulative effects at the global scale are discussed separately in Chapter 7, "Climate Change."

The SJVAPCD has established a significance threshold of 10 tons per year for emissions of the ozone precursors ROG and oxides of nitrogen NO_X. For PM_{10}, SJVAPCD requires project applicants to implement effective and comprehensive control measures and comply with applicable rules and regulations (e.g., Regulation VII of Rule 9510,

"Indirect Source Review") rather than quantifying construction emissions in detail. The project proponent would be required by law to comply with SJVAPCD Regulation VIII, "Fugitive Dust PM_{10} Prohibitions," to implement any of the action alternatives. However, additional control measures recommended by SJVAPCD that would be applicable to and feasible for the SJRRP are not currently part of the project description for any of the action alternatives because project design and construction details are not yet known.

The quantity of ROG and NO_X emissions was estimated under a maximum construction intensity scenario. Implementation of the action alternatives with mitigation may exceed SJVAPCD thresholds. Thus, emissions of pollutants during construction of action alternatives could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. In addition, the San Joaquin Air Basin is currently designated as a nonattainment area for ozone, PM_{10}, and $PM_{2.5}$; therefore, construction-generated emissions could contribute considerably to cumulative pollutant concentrations that exceed California ambient air quality standards.

Implementation of mitigation identified in Chapter 4.0, "Air Quality," would reduce construction-related impacts from PM_{10} emissions to a less-than-significant level. Assuming that all reasonably foreseeable probable future projects also implement all feasible construction emissions control measures consistent with SJVAPCD guidelines and regulations, the impact of construction emissions from cumulative projects may be less than significant, although larger projects would likely result in significant and unavoidable air quality impacts on their own. However, given the scale of development that would occur with the reasonably foreseeable probable future projects combined with the nonattainment status of the San Joaquin Valley Air Basin for ozone, PM_{10}, and $PM_{2.5}$, the action alternatives would likely make a considerable contribution to a significant cumulative construction-related air quality impact. This PEIS/R includes all available feasible mitigation to reduce the contribution of the action alternatives to cumulative air quality impacts. These mitigation measures would substantially reduce air emissions associated with the action alternatives, but they are not sufficient to reduce the cumulative contribution of the action alternatives to below a level that is considerable. Consequently, all action alternatives would have a cumulatively considerable incremental contribution to a significant cumulative air quality impact during construction activities. This cumulative impact would be significant and unavoidable.

Long-term reoperation of Friant Dam would not emit ROG, NO_X, PM_{10}, and $PM_{2.5}$. Therefore, the action alternatives would not contribute to significant cumulative impacts. Restoration and water management actions under the action alternatives would result in regional emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from area, stationary, and mobile sources. Emissions generated during SJRRP operations would not exceed SJVAPCD's significance thresholds for ROG and NO_X, and would not generate substantial operational emissions of PM_{10} or toxic air contaminants. Consequently, the action alternatives would not contribute to an increase in regional emissions that conflicts with the budget used for regional air quality planning.

Implementation of the action alternatives would not result in a significant long-term impact. Further, because long-term emissions would not exceed applicable standards, the action alternatives would also comply with growth projections in the air quality attainment plan. The contribution of the action alternatives to nonattainment of air quality standards therefore would not represent a cumulatively considerable incremental contribution to a significant cumulative air quality impact.

26.6.2 Biological Resources – Fisheries

Cumulative impacts to fisheries could occur in the San Joaquin River upstream from Friant Dam, in the Restoration Area, downstream from the Merced River, and in the Delta. Impacts to fisheries from implementing the Settlement include adverse affects from pollutant discharge, sediment discharge, short- and long-term geomorphic changes from channel alterations, displacement, predation, interbreeding, introduction of disease, and entrainment at diversions and pumping plants. Mitigation measures include construction schedule restrictions, implementation of construction BMPs, construction of grade control structures, fish salvage and relocation, implementation of a predator fish reduction program, implementation of a reintroduction plan, and installation and modifications of fish screens. Additive and interactive/multiplicative effects of implementing the Settlement with past, present, and reasonably foreseeable probable future projects are discussed in the following section beginning with the San Joaquin River upstream from Friant Dam and concluding in the San Joaquin-Sacramento Delta.

Fish species residing in Millerton Lake and the San Joaquin River upstream from Millerton Lake have been greatly affected by the operations of Millerton Lake and the many PG&E and Southern California Edison hydroelectric projects. PG&E's Kerckhoff Project is particularly important because it diverts much of the San Joaquin River's water at Kerckhoff Dam, 9 miles upstream from Millerton Lake and returns it to the river at Kerckhoff No. 2 Powerhouse, where the river enters the reservoir. Because of this flow diversion, flow in the river between Kerckhoff Dam and Millerton Lake is generally low, consisting of releases mandated by FERC for instream habitat (PG&E 1999). In the past, sluicing to remove sediments from Kerckhoff Lake resulted in extremely high levels of sediment in this reach of the river, but flood flows in intervening years may have flushed these sediments from the river into Millerton Lake.

As a result of the low flows between Kerckhoff Dam and Millerton Lake, summer water temperatures in this reach of the San Joaquin River often exceed 75ºF. The reduced flows and elevated water temperatures have likely negatively affected rainbow trout, hardhead, and Kern brook lamprey residing in the San Joaquin River upstream from Millerton Lake. This is an ongoing impact on these species.

The USJRBSI, a reasonably foreseeable future project, may also affect fish in Millerton Lake and the San Joaquin River upstream. This project, still under environmental review, may include alternatives with a new dam located in the upper portion of Millerton Lake, which would inundate most or all of the San Joaquin River upstream from Kerckhoff Dam. Results of preliminary investigations indicate that the project would adversely affect rainbow trout, hardhead, and Kern brook lamprey in the San Joaquin River upstream of Friant Dam. The results also indicate that the project would have a minor

negative effect on largemouth bass, spotted bass, and smallmouth bass in Millerton Lake, but would have a strong positive effect on striped bass. The predicted positive effect on striped bass results from an increase in its open-water habitat.

Implementing the Settlement is expected to have a beneficial effect or no impact on most of the fish species selected for analysis of impacts in Millerton Lake and the river upstream; therefore implementation of the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative effect on these species. Because of a predicted reduction of open water habitat used by striped bass in Millerton Lake as a result of implementing the Settlement, the action alternatives were determined to have a less-than-significant impact on striped bass. However, other effects of the alternatives, such as improved shallow water habitat and increased length of riverine habitat upstream from the lake, are expected to improve conditions for striped bass. The net effect to striped bass would be less than significant; therefore, implementation of the action alternatives would not contribute to the combined effects of other past, present, or reasonably foreseeable future activities on striped bass.

Past and present activities by humans have substantially changed aquatic habitats in the San Joaquin River in the Restoration Area compared to historical conditions, resulting in cumulative adverse impacts on the distribution, abundance, and species composition of native fish assemblages. Numerous factors have contributed to these impacts, including highly altered flow regimes and substantial flow reductions, dewatered 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, creation of false migration pathways by flow diversions, introduction of nonnative fish species, and poor water quality.

Of the approximately 21 native fish species historically present in the San Joaquin River, at least eight are now uncommon, rare, or extinct, and an entire fish assemblage—the deep-bodied fish assemblage—has been largely replaced by nonnative warmwater fish species (Moyle 2002). Anadromous fish assemblage in the San Joaquin River upstream from the Merced River has drastically changed since the completion of Friant Dam.

With implementation of SJRRP actions, including habitat improvements in Reach 1 in the vicinity of the Highway 41 Bridge, construction of the Mendota Pool Bypass, implementation of Interim and Restoration flows, and other actions, the overall effect on fisheries is expected to be beneficial. Improvements in environmental conditions for the representative special-status fishes and some representative game fishes would include reduced water temperature; increased spawning, rearing, and feeding habitat; improved passage; reduced predation; and reduced mortality from diversion losses. Overall, the SJRRP actions, when considered separately or in combination with other past, present, and reasonably foreseeable future actions, would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on the representative special-status and game fish species. Instead, they would result in beneficial effects on fisheries in the San Joaquin River between Friant Dam and the Merced River.

As in the Restoration Area, the fish assemblages in the San Joaquin River between the Merced River and the Delta are dominated by nonnative warmwater species. Spring-run Chinook salmon, which historically occurred in the San Joaquin River between the Merced River and the Delta during their migratory and juvenile-rearing life stages, no longer occur upstream from the Merced River due to loss of access to historic habitat. Adult and juvenile fall-run Chinook salmon and steelhead migrate through this section of the river to and from spawning habitat in the major San Joaquin River tributaries, but their populations in the San Joaquin River basin have declined substantially compared to historical conditions. Under extended wet conditions, anadromous fish including steelhead and fall-run Chinook salmon may occasionally be found in the Restoration Area.

The existing fisheries in the San Joaquin River between the Merced River and the Delta have experienced cumulative adverse impacts related to changes in the distribution, abundance, and species composition of native fish assemblages. These impacts have been caused primarily by human-caused factors, including introduction of nonnative fish species, highly altered flow regimes and substantial flow reductions, isolation of floodplains from the river channel by channelization and levee construction, substantial reductions in the frequency, magnitude, and duration of floodplain inundation, creation of false migration pathways by flow diversions, and poor water quality.

Water temperatures in the Reaches 1 and 2 are expected to change as a result of the combined effects of SJRRP Actions and implementation of the USJRBSI. While this will benefit salmonid and other native fishes, a shift in species abundance may occur. The potential impacts are outweighed by the benefits that will arise from this project with respect to water temperature. Although the overall effect of the SJRRP actions is expected to be beneficial to most representative fish species in the San Joaquin River, several SJRRP actions could result in adverse impacts on existing populations of anadromous salmonids and contribute to cumulative impacts. Reintroducing spring-run Chinook salmon to the San Joaquin River in the Restoration Area could result in compromised genetic integrity and fitness of wild stocks in the major San Joaquin River tributaries (the Merced, Tuolumne, and Stanislaus rivers) if reintroduction includes hatchery stock and hybridization between wild and hatchery fish occurs. Disease organisms could also be carried by brood stock from sources in the Sacramento River basin or by hatchery fish used to supplement the reintroduced spring-run Chinook salmon population. Such a disease outbreak could lead to direct mortality or reduced fecundity among wild fall-run Chinook salmon in the major San Joaquin River tributaries. Wild fall-run chinook salmon in the major San Joaquin River tributaries have already experienced a significant cumulative impact from past and present projects alone. Direct mortality or reduced fecundity resulting from such an outbreak would be considered a potentially cumulatively considerable incremental contribution to this overall significant cumulative impact on wild fall-run Chinook salmon in the San Joaquin River tributaries. This potential cumulative impact would be potentially significant and unavoidable.

The combined effects of past and present activities in the Delta and its tributaries have led to declines in a number of special-status species inhabiting the Delta. Ongoing activities that have adversely affected these species and their habitats include altered flow

regimes, dredging, wastewater discharge, agricultural drainage, levee maintenance, water diversions, and introductions of exotic species. Species in decline as a result of these ongoing activities include delta smelt, longfin smelt, green sturgeon, Sacramento splittail, Central Valley fall-run Chinook salmon, Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and Central Valley steelhead. Striped bass, an important game species, is also in decline. Fisheries management plans and restoration programs, including the CVPIA, Anadromous Fish Restoration Program, and the CALFED Ecosystem Restoration Program Plan, have been initiated to offset the negative effects of ongoing activities.

In addition to the ongoing activities, several reasonably foreseeable future projects and programs may affect Delta fishes. New projects and programs recently implemented or likely to be implemented in the near future are listed in Table 26-2. Some of these projects and programs may adversely affect Delta fishes, but others are likely to improve their condition. The near-term net effect of new and ongoing programs, projects, and restoration efforts is difficult to predict; however, over time, the net effect expected would be a reduction or cessation of the fish declines. Despite potential future projects that could benefit Delta fisheries, it is clear that the effects of past, present, and reasonably foreseeable future projects on special-status Delta fish species and striped bass have resulted in a significant cumulative impact on these species.

The action alternatives would be expected to have a beneficial effect, no impact, or a less-than-significant impact on most of the environmental conditions affecting Delta fish species and would not make a considerable contribution to a significant cumulative effect on these species. The action alternatives would increase the pumping at the facilities, but not beyond the limits allowed by BOs. Those limits are deemed effective to protect Delta fishes and maintain the impacts at a mitigated or less-than-significant level. Implementation of the CVP and SWP Operations BOs for delta smelt, Chinook salmon, steelhead, and green sturgeon; and all other regulatory conditions and court orders in effect for the life of the project will minimize the SJRRP's contribution to the overall ongoing significant cumulative impact to these Delta fish species, as well as the level of the significant cumulative impacts expected on these Delta species. Consequently, this cumulative impact is considered to be less than significant.

In summary, all action alternatives would only result in one potentially significant and unavoidable cumulative impact, the potential direct mortality or reduced fecundity of wild fall-run Chinook salmon in the San Joaquin River tributaries resulting from a disease outbreak.

26.6.3 Biological Resources - Vegetation and Wildlife

Cumulative impacts to vegetation and wildlife could occur in the San Joaquin River upstream from Friant Dam, in the Restoration Area, downstream from the Merced River, and in the Delta. Impacts to vegetation and wildlife from implementing the Settlement include alteration of riparian habitat and other sensitive communities; fragmentation, isolation, diversion, or substantial alteration of jurisdictional waters of the United States; increased distribution of invasive plants and wildlife, take of special-status plants and wildlife, alteration of designated Critical Habitat, and conflicts with adopted conservation

plans. No mitigation measures are required for potential impacts to vegetation and wildlife because the SJRRP includes implementation of vegetation and wildlife management plans that are designed to minimize adverse affects on sensitive habitats, take of special-status plant and wildlife species, and control of nonnative invasive plants and wildlife species. Impacts to waters of the United States are compensated under compliance with Section 404 of the CWA. Additive and interactive/multiplicative effects of implementing the SJRRP with past, present, and reasonably foreseeable probable future projects are discussed below.

Past actions by humans have substantially changed wildlife populations and vegetation in the Restoration Area, and throughout the study area, compared to historical conditions. The most important of these past actions has been the conversion of natural vegetation to agricultural and developed land uses; water development actions, particularly the construction and operation of Friant Dam, the rest of the CVP, and the SWP; and the introduction of nonnative plant and animal species.

These changes have resulted in overall significant adverse effects on the extent, species composition, and functioning of wetlands, riparian habitats, and other sensitive communities; and on the distribution and abundance of wildlife species. The threatened and endangered status of numerous plant and animal species, and the dramatic reductions in the extent of wetland and riparian vegetation in the study area are evidence of these overall significant adverse effects.

Several reasonably foreseeable future actions also have the potential to affect vegetation and wildlife in the Restoration Area and in other portions of the study area. These actions include a number of restoration programs and plans from which vegetation and wildlife resources would benefit. In contrast, the adverse effects on vegetation and wildlife caused by the spread of invasive species are likely to increase. Also, although mitigation would reduce the adverse effects of population growth and associated projects, these adverse effects are unlikely to be fully mitigated.

Implementing the Settlement would result in both adverse and beneficial effects on vegetation and wildlife. The conservation strategy of the SJRRP contains conservation measures that would reduce, or more than offset the adverse effects on vegetation and wildlife. Most adverse effects on vegetation and wildlife would be local in scale; however, beneficial effects of the action alternatives would be regional in scale and would benefit many of the same plant communities and species that would be adversely affected at a local scale. As a consequence, the overall effect of the SJRRP on vegetation and wildlife would be beneficial, and would not make a cumulatively considerable incremental contribution to significant cumulative effects on vegetation and wildlife. The incremental cumulative effects of the SJRRP are described in greater detail below for riparian habitat, wetlands, and other sensitive communities, and for special-status plants and animals.

The SJRRP would have a beneficial effect on riparian habitats. Locally, riparian habitat would be disturbed or removed at some locations during construction of SJRRP projects, but these effects would be mitigated to achieve no net loss of riparian habitat as a result

of the SJRRP. The SJRRP also would create and enhance riparian habitat at some locations through restoration actions. At a regional scale, the program also would enhance riparian habitat throughout the Restoration Area, through implementing the Vegetation Monitoring and Management Plan (Appendix L, "Biological Resources – Vegetation and Wildlife"), which includes measures for controlling the most problematic invasive plant species in the Restoration Area. Also at a regional scale, the reoperation of Friant Dam would substantially increase the extent and functions provided by riparian habitats in the Restoration Area. This would be a substantial, regional-scale beneficial effect, which together with the other effects of the SJRRP would result in an overall beneficial effect of the SJRRP on riparian habitats. Thus, there would not be a cumulatively considerable incremental contribution to significant cumulative effects on riparian habitats.

Effects of the action alternatives on wetlands differ among wetland types. Emergent marsh and other seasonal and perennial wetland habitats would primarily be affected along the San Joaquin River. Effects on these communities would be beneficial, as described for riparian habitats, and would not be a considerable contribution to cumulative effects on these wetlands. However, some seasonal wetlands, such as vernal pools, are not associated with the river corridor, though they may occur near the river as well as in upland landscapes. These wetlands would benefit little from SJRRP actions, yet could be adversely affected by local-scale effects related to construction of projects, and possibly by localized inundation resulting from reoperation of Friant Dam. These effects would be reduced to a no-net-loss level both for extent and functions of these communities with implementation of the Conservation Strategy. Furthermore, for vernal pools and other wetlands that provide habitat for federally and/or State listed species, conservation measures would be required to fully compensate or beneficially affect these habitats. Overall, conservation measures to avoid, minimize, and compensate for effects would fully offset local-scale adverse effects. However, because the SJRRP would provide only limited regional-scale beneficial effects for these communities, the benefits to vernal pools and other seasonal wetlands would be relatively small. Because the action alternatives would result in beneficial effects, there would not be a cumulatively considerable incremental contribution to significant cumulative impacts on wetlands.

Similar to riparian habitats and wetlands, and for the same reasons, the SJRRP would substantially benefit special-status plants and animals associated with the river corridor, but result in only small to negligible benefits for special-status species associated with other adjacent landscapes. Local-scale effects, related to construction of projects, and in some instances to reoperation of Friant Dam, could affect any of the special-status species associated with the river corridor or other landscapes in the Restoration Area. However, these effects would be offset by the conservation strategy included in the action alternatives. Conservation measures would be required to fully offset impacts or beneficially affect federally and State-listed species. Comparable conservation measures would be required to offset adverse effects on other special-status species, and these species would also benefit from the conservation measures for federally and State-listed species associated with the same habitats. Furthermore, plant and animal species associated with riverine, wetland, or riparian habitats of the river corridor would benefit substantially from the regional-scale creation and enhancement of these habitats that

would result from the SJRRP. In addition to creating extensive areas of riparian habitat, the restoration of a river flow regime with greater flows and a timing of flows much more similar to unaltered conditions, would enhance the habitat quality of riparian, wetland, and adjacent upland vegetation throughout the Restoration Area's 150-mile-long river corridor. Control of invasive species would also enhance these habitats throughout the Restoration Area. In summary, with implementation of the conservation strategy of the SJRRP, the SJRRP's effects would be beneficial with a range from negligible to substantial benefits for the different special-status plant and animal species. There would not be a cumulatively considerable incremental contribution to significant cumulative effects on special-status plant and animal species.

26.6.4 Climate Change

Cumulative impacts associated with climate change are discussed in Chapter 7, "Climate Change."

26.6.5 Cultural Resources

Cumulative impacts to cultural resources could occur in the San Joaquin River upstream from Friant Dam, in the Restoration Area, downstream from the Merced River, and in the Delta. Impacts to cultural resources from implementing the Settlement would include disturbances or destruction of these resources. Mitigation measures that will be implemented to minimize the significance of these impacts include compliance with Section 106 of the NHPA and implementation of a programmatic agreement for the treatment of significant cultural resources and artifacts if they are found. Additive and interactive/multiplicative effects of implementing the Settlement with past, present, and reasonably foreseeable probable future projects are discussed in the following section.

Prehistoric human habitation sites are common in riverbank and floodplain areas, and burial sites are often encountered in the course of ground-disturbing activities. It is likely that known or unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities for any of the action alternatives. Losses of a unique archaeological resource could occur where excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees), or where recovery would not be sufficient to prevent the loss of the cultural material's significance. Historic resources could also be damaged or require removal from areas near flood control facilities under the action alternatives. If these resources would be eligible for National Register of Historic Places listing, the impact of their modification or destruction would be significant. Although mitigation would be implemented to reduce effects on potentially significant cultural resources, adverse effects, particularly on archaeological resources, may still occur, and thus the impact would be significant and unavoidable. Losses of archaeological resources would add to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance; therefore, there is an overall significant cumulative impact on cultural resources along the San Joaquin River. Despite the implementation of mitigation measures, the action alternatives have the potential to make a cumulatively considerable incremental contribution to a significant cumulative impact on cultural resources along the San Joaquin River. This cumulative impact is potentially significant and unavoidable.

26.6.6 Geology and Soils

Cumulative impacts to geology and soils could occur in the San Joaquin River upstream from Friant Dam, in the Restoration Area, downstream from the Merced River, and in the Delta. Impacts to geology and soils from implementing the Settlement would include localized soil erosion, sedimentation, and inadvertent soil loss; loss of availability of a valuable mineral; and increased channel erosion, sediment transport, and meander migration. Construction BMPs will be implemented to minimize the significance of these impacts. Additive and interactive/multiplicative effects of implementing the Settlement with past, present, and reasonably foreseeable probable future projects are discussed in the following section.

Several potential changes could occur from reasonable foreseeable probable future projects. In particular, new USACE levee vegetation policy has the potential to affect geology and soils in the study area. Written as a white paper in April 2007, this policy calls for the removal of vegetation from levees as necessary to maintain levee integrity and firefighting access. However, how the policy will be implemented in the study area is not yet known. Discussions are continuing between USACE, other Federal agencies, and State and local agencies in California with responsibilities for levee maintenance, and may result in local variances to the national policy allowing less vegetation removal. Implementation of this policy may result in removal of vegetation from the San Joaquin River channel and bypasses that could result in localized erosion. In addition, implementing other present and reasonably foreseeable probable future actions would add to soil erosion and sedimentation expected to occur with implementation of USACE's vegetation removal policy. Erosion and sedimentation effects along the San Joaquin River, when considering past, present, and reasonably foreseeable probable future projects, are considered to be an overall significant cumulative impact on erosion and sedimentation.

Implementing the action alternatives would result in potential localized erosion and sedimentation in the study area. These effects could be caused during vegetation removal, channel construction, levee construction, and other ground-disturbing activities, and as a result of increased flows under the project-level reoperation of the Friant Dam for Interim and Restoration Flows. Mitigation measures specified in this PEIS/R will reduce potentially significant and significant impacts to a less-than-significant level. Measures include implementing BMPs such as covering exposed slopes, installing silt fences, and placing straddles, among other accepted erosion control measures. Implementing the action alternatives with mitigation measures would result in some less-than-significant localized erosion and sedimentation transport. The action alternatives, however, would not cause a cumulatively considerable incremental contribution to the overall significant cumulative impact on San Joaquin River erosion and sedimentation.

26.6.7 Hydrology – Flood Management

A purpose of Friant Dam and levees along the San Joaquin River is to substantially reduce flood risk. Reasonably foreseeable water resources projects, as previously described, would also be designed to either have no effect on flood risk or to lessen flood risk. Consequently, past, present, and reasonably foreseeable probable future projects do

not result in an overall significant cumulative impact that increases flood risk. Cumulatively, the flood risk has been reduced, which is a beneficial effect.

For all action alternatives, levee improvements in the Restoration Area, along with other hydraulic structures and channel modifications, could lead to increased risk of flood damage in adjacent areas. However, as described in Chapter 11.0, "Hydrology – Flood Management," flood management operations at the Friant Dam, Chowchilla Bypass Bifurcation Structure, and related facilities would not change under any of the action alternatives relative to the No-Action Alternative, and actions are included in each of the action alternatives that ensure that the flood risk in the Restoration Area and in downstream reaches would not be significantly increased. Therefore, the action alternatives would not make a cumulatively considerable incremental contribution to a significant cumulative effect on flood management; the incremental contribution would be minor and the overall cumulative impact on flood management would continue to be beneficial.

The SJRRP is being implemented concurrently with other programs that other agencies are considering to modify the San Joaquin River and the Lower San Joaquin River Flood Control Project to address flood protection needs. In particular, DWR is characterizing the condition of levees along the San Joaquin River and the bypasses in the Restoration Area through the NULE Program as part of the California FloodSAFE Initiative. Channel improvements to address these deficiencies in flood protection have not yet been identified and evaluated, and are not included in the Settlement (and therefore are not part of the action alternatives). Specific future modifications to the flood control system under the FloodSAFE initiative would provide flood control benefits and have independent utility outside of the implementation of the Settlement. Specific future modifications to the flood control system under the FloodSAFE initiative are uncertain and speculative, and are not considered reasonably foreseeable or probable future actions at this time. Reclamation and DWR recognize the importance of coordination and communication in planning and implementing projects that affect the flood control system in order to prevent impacts to flood management. Therefore the potential for cumulative effects on the flood control system associated with the implementation of the Settlement and currently speculative FloodSAFE programs and projects is qualitatively discussed below.

Initial findings from the NULE Program evaluations indicate deficiencies in flood conveyance capacity at several locations in the Restoration Area that were not identified for channel improvements in the Settlement. Potential channel improvements to increase channel capacity and/or to improve levee integrity for conveyance of flood flows in reaches other than Reaches 2B and 4B1 could be accomplished through FloodSAFE, SJRRP, or other Federal, State, or local programs. Such modifications could include setback levees; cutoff/slurry walls; seepage berms; levee strengthening, widening, and raising; and channel dredging, sediment traps, grade control structures, or other techniques. These activities could improve flow conveyance capacities in the Restoration Area, and could enable higher Interim or Restoration flows than otherwise would have been possible with Settlement-stipulated improvements alone. Under actions included in the action alternatives, Reclamation would release Interim and Restoration flows above in-channel flows (flows that maintain a water surface elevation at or below the elevation

of the landside levee toe) only to the extent that a Factor of Safety of 1.4 or higher would be maintained at all times. Observation of levee erosion, seepage, boils, impaired emergency levee access, or other indications of increased flood risk as a result of ongoing monitoring at potential erosion sites would indicate that the minimum Factor of Safety is not met and trigger immediate reductions in Interim and Restoration flows at the site. Such observations would supersede channel capacity estimates, and Interim and Restoration flows would be reduced in areas where these conditions occur. Therefore, implementing the Settlement would not make a cumulatively considerable incremental contribution to a significant cumulative effect on flood management; the incremental contribution would be minor and the overall cumulative impact on flood management would continue to be beneficial.

26.6.8 Hydrology – Groundwater

The 2008 Approval of One-Year Temporary Warren Act Contracts for the Conveyance of Non-CVP Water in the DMC could have potentially accelerated the drawdown of groundwater levels in non-CVP regions within the San Joaquin Valley Groundwater Basin by extracting up to 50 TAF from the aquifer. Also, a number of reasonably foreseeable probable future residential developments in the groundwater basin could contribute to the drawdown of groundwater levels in some areas. Alternatively, the USJRBSI could potentially develop additional water supply to enhance conjunctive management in the San Joaquin River Basin, reducing groundwater reliance with additional surface-water supplies. Groundwater pumped from the San Joaquin Valley Groundwater Basin would be expected to continue to contribute to overdraft conditions throughout much of the basin. Groundwater levels along the San Joaquin River from Friant Dam to the Delta would be expected to remain shallow as a result of infiltration losses or groundwater seepage from the San Joaquin River as identified in Exhibit B of the Settlement. Groundwater seepage could potentially cause impacts to adjacent lands to the San Joaquin River. However, shallow groundwater levels would not be expected to be sustained. Potential in-lieu and direct recharge groundwater banks have been identified in Chapter 12.0, “Hydrology – Groundwater.” These potential groundwater banks have been identified as opportunities to take advantage of surplus water prescribed in the San Joaquin River Restoration Settlement Act. These potential banks are discussed further in Appendix G, “Plan Formulation.”

Based on past, present, and reasonably foreseeable probable future actions, groundwater levels in the San Joaquin Valley are generally substantially reduced from historical levels and an overall significant cumulative impact exists on groundwater basins. However, groundwater levels along the San Joaquin River remain shallow, as they likely were in historic conditions. Consequently, past, present, and reasonably foreseeable probable future actions have not caused an overall significant cumulative effect on groundwater levels in the localized areas along the San Joaquin River.

In the short term (within 3 years after commencement of the program), the action alternatives would not substantially deplete groundwater supplies or interfere with groundwater recharge, because groundwater drawdown within the Friant Division would be within the range of historical fluctuations in groundwater levels. In the long term, however, the action alternatives would accelerate the downward trend of groundwater

levels in the Friant Division. This incremental contribution would be considered to be cumulatively considerable because groundwater pumping would be anticipated to increase in response to a reduction in surface-water deliveries to the Friant Division long-term contractors. It is too speculative for meaningful consideration to identify potential legal actions that may arise as a result of increased groundwater pumping within the Friant Division long-term contractor areas. However, it is anticipated that Friant Division long-term contractor districts that have groundwater management plans (GMP) in place would follow guidelines outlined in the GMP, such as BMPs to protect the underlying aquifer. A potential outcome could lead to fallowing land, if it is identified as the BMP in the GMP. Consequently, the action alternatives would cause a cumulatively considerable incremental contribution to a significant cumulative impact on groundwater levels and supplies. The cumulative impact is significant and unavoidable.

In the short term, reoperation of Friant Dam under the action alternatives would replenish the shallow groundwater aquifer along the San Joaquin River between Friant Dam and the Delta because river water would infiltrate to groundwater as a result of higher surface-water elevations in the San Joaquin River and accompanying groundwater losses. In the long term, the action alternatives would be expected to have the same effect. This infiltration of surface water could potentially lead to the development of a shallow groundwater table where it was not previously observed, which could adversely affect some agricultural crops if the groundwater table were to intrude on the root zones. However, such potential impacts would be reduced to a less-than-significant level with implementation of the appropriate mitigation identified in the Monitoring and Management Plan for Physical Conditions within the Restoration Area (Appendix D). Consequently, the action alternatives would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on local groundwater levels and aquifers along the San Joaquin River.

Groundwater extraction in the San Joaquin Valley has resulted in changes to groundwater quality. Irrigation of crops along the west side of the San Joaquin Valley has resulted in increased salts and trace metals in the localized shallow groundwater table. The San Joaquin River Water Quality Improvement Project would be expected to have a beneficial effect by expanding the In-Valley Treatment/Drainage Reuse Facility. Nonetheless, there is an overall significant cumulative impact on groundwater quality in the San Joaquin Valley because of past, present, and reasonably foreseeable probable future actions.

Under the No-Action Alternative, the water quality of shallow localized groundwater would not be anticipated to change substantially along the San Joaquin River between Friant Dam and the Delta, and groundwater quality would not be substantially degraded. Similarly, under the action alternatives, groundwater quality along the San Joaquin River between Friant Dam and the Delta would not be substantially degraded. Shallow groundwater levels along the San Joaquin River between Friant Dam and the Delta would be monitored and flows would be managed to reduce potential salt mobilization into the crop root zones with implementation of the appropriate immediate mitigation measures identified in the Monitoring and Management Plan for Physical Conditions within the Restoration Area (Appendix D). Therefore, the action alternatives would not cause a

cumulatively considerable incremental contribution to a significant cumulative impact on shallow groundwater quality in the San Joaquin River between Friant Dam and the Delta.

In the short term, drawdown of the groundwater levels is estimated to be within the historical range of groundwater levels, which is not anticipated to lead to upwelling of saline groundwater. In the long term, however, groundwater quality could be substantially degraded under the No-Action Alternative in the Friant Division service area because overdraft of the groundwater aquifer would continue, potentially leading to upwelling of more saline groundwater into the exercised aquifer. Under the action alternatives, drawdown of groundwater levels in the Friant Division service area would be accelerated in the short term. This accelerated drawdown would result in further degradation of groundwater quality because increased groundwater pumping would be expected as a result of reductions in surface water deliveries. Implementation of any of the action alternatives could accelerate the upwelling of saline groundwater into the groundwater aquifer. The extent of and the speed in which groundwater quality would be degraded is not known and there are no feasible mitigation measures for this impact. Because of the uncertainty and lack of mitigation, the action alternatives would cause a cumulatively considerable incremental contribution to an overall significant cumulative impact on groundwater quality and the extent of groundwater upwelling in the Friant Division service area. This cumulative impact would be significant and unavoidable

26.6.9 Hydrology – Surface Water Supplies and Facilities Operations

The ability of Reclamation to comply with Holding Contract requirements along Reach 1 could be affected by projects that may alter releases from Friant Dam, such as the USJRBSI. However, implementing the Settlement could increase reliability of flows in the San Joaquin River and would have a beneficial effect on Holding Contract deliveries. The action alternatives would have minor, less-than-significant impacts on diversions in Reach 1, but the impacts would be mitigated to provide temporary or permanent alternative access. Therefore, the action alternatives would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on water supplies along the San Joaquin River.

Several past and present projects have affected and continue to affect flows in the San Joaquin and Sacramento rivers, resulting in changing Delta conditions. These changes in Delta conditions can lead to reoperation of CVP and SWP Delta export pumps, which would affect water levels in the south Delta.

The South Delta Water Agency and local farmers in the south and central Delta are interested in maintaining water levels so that their siphons and pumps, which are installed at fixed locations in the Delta, can continue to be used for irrigation diversions at all times. The South Delta Temporary Barriers Program, which involves seasonal installation of four temporary barriers, was initiated by DWR to ensure adequate water levels and water quality for agricultural diversions and to provide design data for permanent gates. Thus, implementing this program reduces impacts on south Delta water levels, resulting in no significant cumulative effect.

Under future conditions, with management of CVP and SWP pumping activities, implementing the proposed permanent tidal and fish control gates under the SDIP, and operating these facilities according to regulatory constraints, adverse impacts on Delta agricultural irrigation users in the south Delta would be prevented.

The action alternatives would have less-than-significant impacts on water levels in the south Delta, as shown in Chapter 13.0, "Hydrology – Surface Water Supplies and Facilities Operations." These effects have been quantified through modeling runs that incorporate into their analysis future water projects that are reasonably foreseeable. Consequently, the action alternatives do not cause a cumulatively considerable incremental contribution to a significant cumulative impact on south Delta water levels.

Delta outflow is primarily a product of Delta inflow and export pumping. As mentioned previously, several past and present projects, especially storage projects associated with the CVP and SWP, have affected and continue to affect flows in the San Joaquin and Sacramento rivers, resulting in changing Delta conditions and an overall significant cumulative effect on Delta water supplies and the frequency of excess conditions in the Delta. Several reasonably foreseeable probable future storage projects affecting the San Joaquin and Sacramento rivers (e.g., USJRBSI, Shasta Lake Water Resources Investigation (Shasta Reservoir Enlargement), Sites Reservoir), along with potential alternative Delta conveyance projects (e.g., Bay-Delta Conservation Plan), could also contribute considerably to the significant cumulative effect. They may limit the availability and timing of excess water in the Delta causing a reduction in the recurrence of Delta excess water conditions (i.e., when Delta outflow exceeds regulatory requirements in the Delta and Delta diversions and is therefore in "excess"). The reduction in the occurrence of Delta excess-water conditions under the No-Action Alternative would occur often enough to potentially affect CCWD's ability to fill Los Vaqueros Reservoir, because under State Water Resources Control Board Water Right Decision 1629, CCWD's ability to fill Los Vaqueros Reservoir is restricted to when the Delta is in excess water conditions – from November 1 to June 30.

The action alternatives would have minor, less-than-significant impacts on Delta excess-water recurrence. Because the impacts, caused by a reduction in Millerton Lake flood releases reaching the Delta, would be sufficiently few, small, and scattered, implementation of any of the action alternatives would not make a cumulatively considerable incremental contribution to the overall significant cumulative impacts of reduced recurrence of Delta excess water. All action alternatives would cause infrequent impacts to CCWD's ability to fill Los Vaqueros Reservoir, however because CCWD's ability to fill Los Vaqueros Reservoir would be frequently impacted by increased water demand under the No-Action Alternative, the actions alternatives would cause a cumulatively considerable incremental contribution to a significant cumulative effect on CCWD water supplies. This cumulative impact would be significant and unavoidable.

26.6.10 Hydrology – Surface Water Quality

Cumulative impacts to surface water quality could occur in the San Joaquin River upstream from Friant Dam, in the Restoration Area, downstream from the Merced River, and in the Delta. Implementing the Settlement would impact surface water quality from

ground-disturbing construction activities. To minimize the severity of these potential adverse effects, a SWPPP will be prepared and implemented and construction would comply with all conditions of a Phase I Environmental Site Assessment conducted for each program element requiring construction.

Surface water quality in the study area has been substantially affected by past and present projects through changes in land use and hydrologic conditions. Water quality in various segments of the San Joaquin River has been a problem for several decades because of low flow and discharges from agricultural areas and wastewater treatment plants. Much effort has been expended to control discharges to the river and the levels and types of herbicides, fungicides, and pesticides that can be used in the environment. Over time, regulatory requirements for water quality in the river have become more stringent and the number of locations along the river at which specific water quality objectives are identified and monitored has increased.

Future foreseeable projects included in the cumulative impacts analyses, including the San Luis Drainage Feature Reevaluation and various total maximum daily load programs, would have a beneficial effect on surface water quality in the study area by managing the quality of runoff in the San Joaquin River watershed. Construction activities within the watershed, however, could cause soil erosion and sedimentation of local drainages and the San Joaquin River, and the inadvertent introduction of waste petroleum products or construction-related substances into the San Joaquin River through site runoff or on-site spills. The effects of past, present, and reasonably foreseeable probable future actions would cause an overall significant cumulative impact on surface water quality in the San Joaquin River.

As described in Chapter 14.0, “Hydrology – Surface Water Quality,” in the short term, the action alternatives could cause potentially significant adverse effects on surface water quality without mitigation. These impacts, caused by construction of channel and structural improvements, would temporarily affect water quality in the San Joaquin River from Friant Dam to the Merced River. Soil erosion and sedimentation of local drainages and the San Joaquin River could occur, and/or waste petroleum products or other construction-related substances could be discharged and inadvertently introduced to the San Joaquin River through site runoff or on-site spills during construction. Implementing BMPs and mitigation measures would reduce these potential adverse but temporary construction-related impacts on surface water quality to less-than-significant levels. Moreover, the increase in flows, as discussed below, would result in an overall water quality benefit in the San Joaquin River. Therefore, the action alternatives would not cause a cumulatively considerable incremental contribution to an overall significant cumulative impact that exists with respect to surface water quality. Furthermore, the action alternatives would be beneficial and reduce the overall significant cumulative impacts on San Joaquin River surface water quality.

The action alternatives would also result in long-term changes in river flows through releases to the San Joaquin River at Friant Dam to meet restoration goals. Water quality criteria that are currently not met are not anticipated to be met as a result of these flow increases; however, the increases in river flows would decrease concentrations of

constituents for some established water quality criteria, and therefore would have a beneficial effect. Implementation of any of the action alternatives in combination with the USJRBSI may enhance the ability of Reclamation and DWR to manage water temperatures. Under the action alternatives, impacts on water temperature in the study area would be beneficial within Reaches 1 and 2, and less than significant downstream from Reach 2.

The action alternatives could also affect surface water quality conditions in the San Joaquin River from the Merced River to the Delta and in the Delta by changing hydrologic conditions and surface water operations. These impacts would be beneficial because changes in water quality conditions would not result in any additional violations of existing water quality standards, and no substantial water quality changes would occur that would adversely affect beneficial uses or have substantive impacts on public health.

The action alternatives therefore would not cause a cumulatively considerable incremental contribution to significant cumulative impacts on surface water quality in the San Joaquin River. The action alternatives would have overall beneficial effects, which would reduce the overall significant cumulative impact on San Joaquin River surface water quality downstream from Friant Dam.

26.6.11 Indian Trust Assets

Indian Trust Assets are not located within the study area. Implementing the Settlement would have no effects on Indian Trust Assets and therefore there would be no cumulatively considerable incremental contribution to a significant cumulative impact on Indian Trust Assets.

26.6.12 Land Use Planning and Agriculture

Projects that have the potential to cumulatively affect the land use planning and agricultural resources of the study area are located throughout the San Joaquin Valley and within the Delta. Table 26-2 lists the projects within the region that have the potential to contribute to cumulative land use planning and agricultural resources impacts.

Cumulative impacts related to land use planning and agricultural resources may result from residential, commercial, and industrial development, flood control projects, and habitat restoration projects. These cumulative impacts would be interactive with construction, land use conversions, and raised shallow groundwater levels.

Reasonably foreseeable probable future projects under cumulative conditions may result in a variety of physical impacts related to consistency with adopted land use plans. Impacts involving adopted land use plans or policies and zoning generally would not combine to result in cumulative impacts. As described by Appendix G of the State CEQA Guidelines, an impact related to this issue would be significant if implementation of 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.

Implementing restoration actions in the Restoration Area and the San Joaquin River between Friant Dam and the Merced River (i.e., in the Restoration Area) and constructing the pumping plant and conveyance facility along the river between the Merced River and the Delta (Alternatives C1 and C2) would result in inconsistencies at some sites with goals and policies of the general plans for Fresno, Madera, and Merced counties. Specifically, these actions would be inconsistent with goals and policies for ensuring economic viability of productive agricultural lands and avoiding conversion of agricultural lands to other uses. As a matter of policy, Reclamation would ultimately ensure consistency of SJRRP actions with adopted local land use plans, policies, and zoning by cooperating with Fresno, Madera, and Merced counties to determine whether site-specific general plan amendments, zoning changes, or conditional use permits would be necessary for land under their land use jurisdiction.

Land use inconsistency, by itself, is not considered a significant cumulative effect 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. Those impacts are considered in the appropriate sections of this PEIS/R.

Land use impacts would occur on a project-specific basis rather than a cumulative basis. Therefore, implementing the action alternatives and constructing the pumping plant and conveyance facility (Alternatives C1 and C2) would not make a cumulatively considerable incremental contribution to a significant cumulative impact on land use planning.

In the Restoration Area, constructing the levee system in Reaches 2B and 4B1 and the Mendota Pool Bypass and establishing floodplain habitat would affect agricultural resources directly and indirectly. Constructing a new pump station and conveyance facility along the San Joaquin River between the Merced River and the Delta would further affect agricultural resources (Alternatives C1 and C2).

Restoration actions in Reach 2B would convert up to 2,300 acres of Important Farmland. Constructing a bypass around Mendota Pool with integrated floodplain habitat would convert up to 420 acres of Important Farmland; restoration actions in Reach 4B1 would convert up to 5,600 acres of Important Farmland. Lands used for borrow sites are assumed to be designated as Important Farmland. The area of disturbance required for the borrow sites is unknown, and the acreage of Important Farmland that may be directly converted to nonagricultural uses for borrow sites cannot be quantified at this time.

Approximately 2,100 acres of land for construction of the levee system in Reach 2B, 5,500 acres in Reach 4B1, and 375 acres of land for construction of the Mendota Pool Bypass would be removed permanently from Williamson Act contracts. It is assumed that lands used for borrow sites would require termination of Williamson Act contracts. The area of disturbance required for the borrow sites is unknown, and the acreage of land that would be removed from Williamson Act contracts for borrow sites cannot be quantified at this time.

The loss of Important Farmland and cancellation of Williamson Act contracts is considered a cumulatively considerable incremental impact when evaluated in connection with the significant cumulative losses that would occur in the cumulative context, including implementation of restoration actions and construction of the pumping plant and conveyance facility; past farmland conversions; planned future residential, commercial, and industrial development; flood control projects; and habitat restoration projects in Fresno, Madera, and Merced counties.

Implementation of Mitigation Measures LUP-2 and LUP-3 in Section 16.0, "Land Use Planning and Agricultural Resources," would reduce potential impacts on Important Farmland and impacts associated with the cancellation of Williamson Act contracts. However, the impacts would not be reduced to a less-than-significant level because conversion of a substantial amount of Prime Farmland and cancellation of Williamson Act contracts 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, and some of the effects from numerous projects may contribute considerably to significant cumulative impacts. Therefore, the action alternatives would cause a cumulatively considerable incremental contribution to a significant cumulative impact on land use planning. This cumulative impact would be significant and unavoidable.

Interim and Restoration flows would change the duration and seasonality of inundation and soil saturation, which could potentially adversely affect crop production in the Restoration Area. These effects would be reduced but cannot be eliminated through feasible mitigation, and would combine with other significant cumulative effects on agricultural productivity from other past, present, and reasonably foreseeable probable future actions.

The amount of Interim and Restoration flows would change over time as programmatic restoration actions are implemented, and so would the amount of water recaptured and returned to Friant Division long-term contractors, and storage of and groundwater recharge by surplus water from wet years. Overall, however, there would be reduced water deliveries to Friant Division long-term contractors that would affect cropping patterns, idling of farmland, and productivity, and would combine with other significant cumulative effects on agricultural productivity.

Overall, the action alternatives would cause a cumulatively considerable incremental contribution to a significant cumulative impact on agricultural resources and productivity, Important Farmland, and Williamson Act contracts. This cumulative impact would be significant and unavoidable.

26.6.13 Noise

Implementing the Settlement would result in significant noise impacts associated with construction activities such as borrow-site activities and borrow-site material hauling along study area roadways. Noise impacts from construction and borrow-site activities could be reduced to less-than-significant levels with implementation of Mitigation

Measures NOI-1 and NOI-4; however, noise impacts from these activities may be significant and unavoidable when sensitive receptors are near construction or borrow-site areas. Implementation of Mitigation Measure NOI-2 would reduce potentially significant and significant exterior traffic noise levels to less than significant. However, site restrictions at some sensitive receptors may limit the inclusion of mitigation measures, potentially resulting in significant and unavoidable impacts. It should be noted that Mitigation Measure NOI-2 would identify the future haul routes that would affect the fewest sensitive receptors.

Noise is a localized occurrence and attenuates rapidly with distance. Therefore, only future development projects in the immediate vicinity of the study area would have the potential to add to noise generated by program activities, thus resulting in cumulative noise impacts. Proposed development related to the buildout goals of individual general plans may generate types of noise similar to those of the program, and like the program, development in these areas would have the potential to affect nearby sensitive receptors.

Stationary-source noise associated with the SJRRP and related projects could potentially exceed jurisdictional noise regulations at sensitive receptors. Noise from any stationary noise sources associated with the related projects could be controlled at the source (by means of noise walls, enclosures, and other measures), but there is no guarantee that all the related projects would include such noise controls as part of their proposals. Therefore, significant cumulative noise impacts associated with stationary noise sources could occur. Implementation of Mitigation Measure NOI-3 would reduce project-generated stationary-source noise impacts to a less-than-significant level.

Some jurisdictional noise regulations limit construction activities to daytime hours. It is similarly anticipated that compliance with these regulations alone would not avoid significant construction-related noise impacts associated with the SJRRP. Therefore, potentially significant noise impacts associated with construction activities could occur. Other reasonably foreseeable projects could occur in close proximity to sensitive receptors. It is assumed that these reasonably foreseeable future projects would also implement noise-reducing measures and could still have potentially significant noise impacts. Implementation of the Settlement actions without noise mitigation when added to the other reasonably foreseeable projects could result in significant noise impacts and implementation would result in a cumulatively significant impact. Implementation of Mitigation Measure NOI-1 would reduce program-related construction-noise impacts, but not to a less-than-significant level. Because implementation of Mitigation Measure NOI-1 would not reduce the cumulatively significant construction noise impact to a less-than-significant level, the contribution of construction noise from ~~the~~ program-related actions would be cumulatively considerable.

Construction noise and stationary-source noise can be controlled on-site at the point of origin; however, traffic noise may extend beyond a project site along existing roadways, resulting in significant traffic noise impacts on sensitive uses along those roadways. Because full buildout of the SJRRP may result in a perceptible increase in traffic noise, SJRRP actions may incrementally contribute to a cumulative impact. Furthermore, the combined cumulative increase in traffic would extend the 60-dBA (A-weighted decibel)

noise contour distances for some roadway segments, potentially causing additional sensitive receptors to fall within this contour. Thus, cumulative traffic noise impacts from the SJRRP and the related projects, taken together, would be significant. Erecting temporary sound curtains and other noise-attenuating features (e.g., stockpiles) throughout the area would require site-specific footprints on private property and may not be feasible to implement on account of site requirements. Because it is considered infeasible to sufficiently reduce noise at every existing and proposed sensitive receptor that may be affected, this cumulative traffic noise impact would be significant. Overall, the action alternatives would cause a cumulatively considerable incremental contribution to a significant cumulative impact on construction-related noise. This cumulative impact would be significant and unavoidable.

26.6.14 Paleontological Resources

A records search of the University of California Museum of Paleontology's Paleontology Collections database in Berkeley, California, did not identify any previously recorded fossil localities within the study area. However, the study area is underlain by Pleistocene-age sediments of the Modesto and Turlock Lake formations, which are considered paleontologically sensitive rock units. The recovery of vertebrate fossils throughout the Sacramento and San Joaquin valleys in sediments referable to these formations suggests that the potential exists to uncover additional similar fossil remains during earthmoving activities of reasonably foreseeable projects and program-level actions under the action alternatives. Mitigation measures are contained in Chapter 18.0, "Paleontological Resources," to reduce potential impacts of the action alternatives on previously undiscovered paleontological resources to less-than-significant levels.

Fossil discoveries resulting from excavation and earthmoving activities associated with development are occurring with increasing frequency throughout the State. However, unique, scientifically important fossil discoveries are relatively rare, and the likelihood of encountering them is site-specific and is based on the type of specific rock formations found underground, which vary from location to location. Furthermore, when unique, scientifically important fossils are encountered by construction activities, the subsequent opportunities for data collection and study generally provide a benefit to the scientific community.

Because of the low probability that any project would encounter unique, scientifically important fossils, and the benefits that would occur from recovery and further study of those fossils if encountered, development of related projects and other development in the region would not result in a cumulatively considerable impact on paleontological resources. Therefore, the action alternatives would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on paleontological resources.

26.6.15 Power and Energy

Projects that could affect hydropower generation and consumption by CVP and SWP facilities, and/or result in increased temporary energy consumption during construction were considered for the analysis of cumulative impacts. Historical operation of hydropower facilities, pumping plant construction, increases in energy demand caused by

population increases, and changes in flow patterns and reservoir elevations resulting from new water resources facilities have all contributed to hydropower generation and consumption within the study area. These historical changes are reflected in both existing conditions and the No-Action Alternative.

Energy estimates were made using the "common assumptions" power tools developed by Reclamation and DWR, Long_Term_Gen and SWP_Power, for CVP and SWP facilities, respectively. LTG and SWP Power use operations data from CalSim II simulations to predict energy generation and consumption throughout the CVP and SWP. The methods used to run the models are described in Chapter 19.0, "Power and Energy." The following reasonably foreseeable projects were used to represent conditions under the No-Action Alternative, based on a forecasted 2030 level of demands for water supplies:

- New Placer County Water Agency pump station along the American River
- Freeport Regional Water Project
- DMC intertie
- CCWD Middle River Intake and Pump Station (formerly the Alternative Intake Project)
- Sacramento Valley Water Management – Phase 8 Short-Term Agreement regarding water transfer supplies

Cumulative effects on hydropower generation and consumption by CVP and SWP facilities were quantified by comparing modeling runs under the 2030 baseline (i.e., the No-Action Alternative) to modeling runs under the 2005 baseline (i.e., existing conditions). In addition to the No-Action conditions, the following present or reasonably foreseeable (probable) future actions were also included in the cumulative context for power and energy:

- Los Vaqueros Reservoir Expansion Project
- Upper San Joaquin River Basin Storage Investigation
- Shasta Lake Water Resources Investigation (Shasta Reservoir Enlargement)
- North-of-the-Delta Offstream Storage Investigation (Sites Reservoir)
- Franks Tract Project
- Sacramento River Water Reliability Study

The SJRRP would not result in significant changes to hydropower generation and consumption by CVP and SWP facilities. When the SJRRP is combined with any number of the projects in the cumulative scenario, river flows and reservoir elevations would be likely to change, but not considerably. Any new project or program along the Sacramento River, San Joaquin River, and in the Delta could potentially affect hydropower generation at CVP and SWP facilities and energy consumption of any of the action alternatives.

Therefore, the SJRRP would not make a cumulatively considerable incremental contribution to a significant cumulative impact on power generation and consumption.

Temporary increases in energy consumption in roadway capacity would result from construction activities associated with various development projects in the study area. Short-term construction-related power and energy impacts would be evaluated in the environmental review document for projects with which the impacts would be associated, and these impacts would be mitigated to the extent feasible. Because the impacts would be temporary or short-term and mitigated, the combined effects of these impacts would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on energy consumption.

26.6.16 Public Health and Hazardous Materials

Actions associated with implementation of the SJRRP could result in potentially significant public health effects or safety hazards associated with exposure to hazardous materials, disruption of idle or abandoned oil or gas wells, and exposure to disease vectors. Reoperation of Friant Dam could also result in a potentially significant impact associated with exposure to disease vectors. Mitigation measures to reduce the significance of these potential impacts include complying with Phase I Environmental Site Assessments conducted for specific program elements, implementing workplace precautions for West Nile Virus and Valley Fever, minimizing potential hazards to school safety, implementing safety precautions around idle and abandoned wells, and coordinating with vector control districts. Additive and interactive/multiplicative effects of implementing the SJRRP with past, present, and reasonably foreseeable probable future projects are discussed in the following section.

Specific details of reasonably foreseeable probable future actions are unknown at this time. It can be assumed, however, that the action alternatives, when considered in combination with other projects that would occur nearby and at the same time, could contribute to some degree or amount to a cumulative impact from exposure to hazardous substances or materials, or disruption of idle or abandoned oil or gas wells. Similarly, potentially significant impacts of the action alternatives associated with exposure to disease vectors could combine with significant impacts of one or more past, present, or reasonably foreseeable actions, thereby resulting in a cumulatively significant effect.

However, mitigation measures 20-1 through 20-4 would be included to reduce potentially significant impacts of the action alternatives related to exposure to hazardous materials, exposure to disease vectors, school safety, and disruption of idle or abandoned oil or gas wells.

Implementation of these recommended mitigation measures would serve to prevent the potential effects of the action alternatives from combining with other effects from past, present, or reasonable foreseeable probable future actions. The measures would reduce the contribution of the action alternatives to these potentially significant cumulative effects. Therefore, the action alternatives would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on public health and hazardous materials.

26.6.17 Recreation

Cumulative impacts to recreational resources could occur in the San Joaquin River upstream from Friant Dam, in the Restoration Area, downstream from the Merced River, and in the Delta. Implementing the Settlement would increase usage of recreational facilities at Millerton Lake and in the Restoration Area; interfere with recreational opportunities during construction; change opportunities for fishing; reduce boat ramp access to the edge of Millerton Lake; and increase flow effects on swimmers and boaters in the Restoration Area. Mitigation measures to reduce the significance of these impacts include restoring recreation access after construction, enhancing fishing access at various locations, extending existing boat ramps, and developing and implementing a public outreach program. Additive and interactive/multiplicative effects of implementing the Settlement with past, present, and reasonably foreseeable probable future projects are discussed in the following section.

Several related and reasonably foreseeable projects and actions may affect recreation resources in the study area. The CALFED Surface Water Storage Program includes the USJRBSI. The USJRBSI involves evaluating alternatives that would result in major modifications to Millerton Lake, with the potential construction of a dam within Millerton Lake between Friant Dam and Kerckhoff Dam (Reclamation and DWR 2007). Also at Millerton Lake, Reclamation and State Parks are in the final stages of preparing a joint resource management plan/general plan, which would guide management of recreation and other resources at the lake for the next 20 years (Reclamation and State Parks 2008).

Downstream from Friant Dam, several additional projects, all on Reach 1, may also affect recreation in the Restoration Area. In the long term, the SJRC will continue efforts to complete the San Joaquin River Parkway and implement the *San Joaquin River Parkway Master Plan*. A goal of the master plan is to eventually acquire approximately 5,900 acres of land within the 22-mile-long parkway area (SJRC 2000). More immediately, the conservancy is implementing the 167-acre Jensen River Ranch Habitat Enhancement and Public Access Project, which will include new trails connecting to other facilities in the parkway and day-use facilities (Jones & Stokes Association 2002). Lastly, the Fresno County Parks Unit has identified a preferred master plan for Lost Lake Park that emphasizes riparian restoration and shifting of facilities out of the 100-year floodplain, while providing more recreational opportunities in the upland area of the park.

The USJRBSI, which is focused on surface storage upstream from Friant Dam, and the several other reasonably foreseeable projects downstream from Friant Dam on Reach 1, would result in cumulatively beneficial effects on recreation resources in the region. Together these projects would maintain, and potentially enhance, reservoir-oriented recreation upstream from Friant Dam. They would also enhance river-oriented recreation downstream from Friant Dam.

The potential adverse effects and benefits of the USJRBSI related to recreation have not yet been determined. However, in general, the USJRBSI alternatives involve tradeoffs between different types of reservoir-oriented recreation opportunities. Some existing recreation opportunities on Millerton Lake would be lost under most alternatives, but new

opportunities would potentially be created on a new reservoir under all alternatives. New or enhanced recreation opportunities could also be developed on Millerton Lake. Under some alternatives, river-oriented recreation opportunities could be lost on the portion of the San Joaquin River upstream from the existing Millerton Lake. However, use of that remote and largely inaccessible stretch of river is generally low.

The reasonably foreseeable probable future projects downstream from Friant Dam, on Reach 1, would all result in beneficial effects on recreation resources in the region. The area and diversity of public lands and quality of recreation facilities within the popular San Joaquin River Parkway would be expanded.

The impacts of the action alternatives on recreation resources above Friant Dam would be less than significant and would not combine with potential effects of the USJRBSI on recreation resources. Therefore, the SJRRP would not cause a cumulatively considerable incremental contribution to a significant cumulative effect on recreation above Friant Dam.

The impacts of the action alternatives on recreation resources below Friant Dam would be less than significant or beneficial and would not combine with potential effects of the San Joaquin River Parkway projects in Reach 1. Therefore, the SJRRP would not make a cumulatively considerable incremental contribution to an overall significant cumulative effect on recreation downstream of Friant Dam.

Overall, the action alternatives would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on recreation.

26.6.18 Socioeconomics

A cumulative socioeconomic assessment assesses the collective impacts posed by individual projects throughout the study area generally and within specific geographic regions (e.g., collections of counties). Cumulative impacts on the socioeconomics of the geographic regions analyzed in this document may result from residential, commercial, and industrial development, as well as the conversion of agricultural land to restored habitats or urban development.

Projects that have the potential to cumulatively affect the socioeconomics of the study area are located throughout the San Joaquin Valley and within the Delta. The projects within the region that have the potential to contribute to cumulative socioeconomic impacts are listed in Chapter 22.0, “Socioeconomics.”

In general, CALFED Surface Water Storage Program projects would create facilities and capacity for water storage. These projects would either create biological habitat or create storage facilities that would increase water supply reliability for water users (including agricultural users) during drought periods, emergencies, or shortages caused by regulatory and environmental restrictions. Projects associated with the CALFED Conveyance and Drinking Water Quality Programs are similar in scope. Some are concerned with adding capacity or improving the connectivity between areas in California, so that water can be conveyed to meet or mitigate local problems (including

droughts and floods). Other projects associated with these CALFED programs are intended to improve the watershed management of the area, increasing the operational capacity, and/or streamlining existing facilities.

Because many of these projects would entail some amount of construction, socioeconomic benefits may result from increased construction employment in the area. The SJRRP actions are wide-ranging and the corresponding construction expenditures could have significant impacts on the cumulative effects of the SJRRP. It is uncertain at this time, however, which SJRRP actions would ultimately be implemented. Also uncertain are the scale of each action, and the likelihood that multiple actions would be implemented simultaneously. As a result, the ultimate expenditures for SJRRP actions in the region, and the corresponding socioeconomic impacts, are not yet known. Implementing all construction at once, rather than using a phased approach, could create adverse cumulative socioeconomic impacts. However, the likelihood that this would occur is small, and socioeconomic impacts would most likely be beneficial, though modest. The subsequent implementation of the SJRRP actions should not have significant socioeconomic impacts and the employment growth should be beneficial.

Projects related to CVP/SWP system operations include several actions to change and improve the existing conveyance activities in the area. In ways similar to the CALFED programs discussed above, many of these projects would entail some amount of construction, which may lead to some short-term socioeconomic impacts. These impacts would be beneficial, however, and would not be an adverse effect when considered together.

Projects focused on recreating habitat or ecosystems, like the CALFED Ecosystem Restoration Program and the other habitat restoration programs, would likely involve reintroducing native species, removing invasive species, and enhancing existing habitat. These projects would likely involve some amount of construction, which could lead to some short-term economic benefits, but the restoration actions may also affect agricultural land uses. If widespread areas of agricultural land were to be removed from production, cumulative socioeconomic impacts on the region may result. The accumulation of these impacts may be a significant cumulative impact if the SJRRP were to drastically reduce the amount of agricultural land in Fresno, Merced, and Madera counties. In all likelihood, however, potential reductions in the amount of agricultural lands through conversion to habitat would not be significant, and widespread habitat restoration would have to occur to cumulatively affect regional socioeconomics. The additional residential development in the region may further reduce agricultural lands, but the added socioeconomic benefits that a larger population can provide would likely outweigh any losses caused by a decrease in agricultural acreage.

For the reasons discussed above, the combined effects of reasonably foreseeable probable future urban growth (i.e., residential, commercial, and industrial development projects), water supply and other water resource projects, and habitat restoration projects, together with the effects of the SJRRP, would not result in a cumulatively considerable incremental contribution to a significant cumulative impact on socioeconomics (population, housing, employment, or urban blight).

26.6.19 Transportation and Infrastructure

The action alternatives and cumulative impacts to utilities and service systems could result in reduced traffic circulation and roadway capacity, creation of a hazard as a result of a project action design feature, inadequate emergency access, or reduced bicycle and pedestrian circulation. Mitigation measures to reduce the significance of these impacts include preparing and implementing a traffic management plan, avoiding disruption of subsurface utility capacity, minimizing impacts on public bicycle and pedestrian circulation facilities, and preparing and implementing vehicle detour planning. Additive and interactive/multiplicative effects of implementing the Settlement with existing, past, and reasonably foreseeable probable future projects are discussed in the following section beginning with reduced traffic circulation and concluding with reduced public bicycle and pedestrian circulation.

Under the No-Action Alternative, increased traffic congestion and reduced roadway capacity are anticipated to result from projected population growth in the study area. In addition, temporary increases in traffic and reductions in roadway capacity would result from construction activities associated with various development projects in the study area. The long-term effects on traffic levels of service and roadway capacity would be reduced to acceptable levels through implementation of the transportation elements, in conjunction with implementation of the land use elements, of the general plans that guide growth in the counties in which the SJRRP would be undertaken (Fresno County 2000a, Madera County 1995, Merced County 1990). Because traffic and roadway levels of service would be maintained relative to growth, the combined long-term effects would not be cumulatively significant. However, short-term construction-related traffic and roadway capacity impacts would be evaluated in the environmental review document for projects with which the impacts would be associated, and these impacts would be mitigated to the extent feasible. Because the impacts would be temporary or short-term and mitigated, the combined effects of these impacts would not be cumulatively significant.

The action alternatives could cause short-term increases in traffic and reduction of capacity in the near term. The SJRRP could also increase traffic and reduce roadway capacity in the long term as a result of the increase in recreation opportunities in the study area.

Implementation of Mitigation Measure 23-1 would reduce short-term construction impacts on traffic circulation and roadway capacity because Reclamation would implement a traffic management plan that would be prepared in coordination with the local transportation planning department. The traffic management plan would include mitigation measures, subject to approval by the local agency, which would maintain levels of service on roads affected by construction activities. With implementation of those measures, temporary and short-term construction-related impacts would be minimal.

In the long term, the number of additional recreation-based visitors to the study area would not be substantial enough to warrant constructing new or expanded roadway facilities. Long-term effects on traffic and roadway capacity resulting from the increase

of such visitors to the study area would be addressed in the local general plans, which guide population growth and development through the coordinated implementation of land use, transportation, and recreation elements. Because new roadway facilities would not need to be constructed to accommodate additional visitors and the increase in visitors would be accounted for in local land-use planning, long-term impacts of the SJRRP on traffic and roadway capacity would be less than significant. The short- and long-term contributions of SJRRP traffic and roadway capacity impacts to cumulative impacts would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on transportation.

Additional visitors would come to the study area because the Interim and Restoration flows would increase recreation opportunities. The action alternatives would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on traffic from additional visitors. Many utility lines cross the San Joaquin River in the study area. Under the No-Action Alternative, no impact on utility crossings would occur, nor would any impact occur when the No-Action Alternative is combined with the reasonably foreseeable projects. The SJRRP could create a hazard as a result of a SJRRP action design feature. Ground-disturbing activities could disrupt gas pipelines and other utility transmission lines. Interim and Restoration flows could cause seepage that exceeds the design capacity of the utility line that crosses the river. Implementation of Mitigation Measure 23-2 would reduce the significance of the impacts to a less-than-significant level. Implementation of that mitigation measure would ensure that no damage to existing gas pipelines and other utility lines would occur. No significant cumulative impact would occur because no hazard to these utilities currently exists, implementation of Mitigation Measure 23-2 would protect pipelines and utilities from damage, and protection of utility lines would be maintained if the Settlement was implemented in addition to reasonably foreseeable probable future actions.

As discussed in Chapter 12, “Hydrology – Groundwater,” deep-well groundwater pumping since the early 1920s has depleted groundwater supplies in the San Joaquin Valley and Tulare Lake Hydrologic Regions. In addition, groundwater levels fluctuate greatly in the groundwater subbasins of the San Joaquin Valley Groundwater Basin; groundwater levels drop during dry periods, and rise during wet periods. The long-term decline of groundwater levels in combination with large fluctuations in groundwater levels during relatively short periods has resulted in land subsidence. This subsidence has occurred in the past, currently occurs, and will occur in the future because deep groundwater will continue to be extracted. The SJRRP would contribute to increased groundwater extraction, and thus, could contribute to subsidence.

Subsidence has the potential to affect existing transportation and utilities infrastructure during the ground settling process. However, standard engineering practices for designing infrastructure factor in potential subsidence based on geology, depths to groundwater, and numbers and locations of deep groundwater wells in the region. Thus, standard engineering practices ensure that effects of the SJRRP on subsidence risks to transportation and utilities infrastructure would not be cumulatively considerable.

Several roadways in the study area cross the San Joaquin River riverbed at or slightly above grade. Under the No-Action Alternative, no impacts on roadway crossings would occur that would interfere with emergency access, nor would any occur when the No-Action Alternative is combined with reasonably foreseeable probable future projects.

Implementing the Settlement could impede emergency access. Construction activities in the Restoration Area and along the San Joaquin River between the Merced River and the Delta could disrupt circulation patterns, resulting in potentially inadequate emergency access. Interim and Restoration flows could overtop roadways that cross the river at grade or slightly above the grade of the riverbed, impeding emergency vehicles in the Restoration Area.

Implementation of Mitigation Measure 23-3, in combination with Mitigation Measure 23-1, would reduce the significance of the impacts to a less-than-significant level. Implementing those measures would provide adequate emergency access and coordination of traffic management plans with local emergency service providers. No cumulatively significant impact on emergency access would occur because no impediment to emergency access currently exists, the SJRRP would maintain emergency access through implementation of the applicable mitigation measures, and emergency access would be maintained when SJRRP is added to reasonably foreseeable probable future actions.

The action alternatives could affect bicycle and pedestrian facilities, reducing ease of circulation. Reduced bicycle or pedestrian circulation would be potentially significant. This reduced circulation would add considerably to the impacts of other construction projects that would reduce circulation, and the combined effect would result in a significant cumulative impact without mitigation. Implementation of Mitigation Measure 23-5 would eliminate this impact on bicycle and pedestrian circulation by relocating affected facilities in coordination with local transportation and recreation planning departments. The SJRRP would not contribute to potentially significant cumulative impacts on bicycle and pedestrian facilities.

Therefore, the action alternatives would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on transportation and infrastructure.

26.6.20 Utilities and Service Systems

Cumulative impacts to utilities and service systems could result in the need for new construction or expansion of water or wastewater treatment facilities, inability to meet wastewater treatment requirements, insufficient existing water supply entitlements, insufficient landfill capacity, or insufficient capacity to respond to emergencies. The following mitigation measures will be implemented to reduce the significance of these potential impacts: obtain required permits for hatchery wastewater discharges and implement BMPs and dispose solid wastes at landfills with adequate capacity. Additive and interactive/multiplicative effects of implementing the Settlement with past, present, and reasonably foreseeable probable future projects are discussed in the following section

Under the No-Action Alternative, increased demand for water and increased generation of wastewater are anticipated as a result of projected population growth in the study area. Reasonably foreseeable probable future development projects in the study area would also increase demand for water and wastewater treatment services. These increases would result in the need to expand existing or construct new water and wastewater treatment facilities, the construction of which could result in significant impacts on the environment (Fresno County 2000, Madera County 1995, Merced County 1990). The combined effects of these impacts with other past, present, and reasonably foreseeable probable future projects could be cumulatively significant.

The action alternatives could include a new fish hatchery in the Restoration Area, which depending on the location and design, could require water or wastewater treatment services in excess of available capacity. Constructing new or expanded water or wastewater treatment facilities could result in significant impacts on the environment, causing or contributing considerably to significant adverse effects. Therefore, if a new hatchery would be constructed without appropriate mitigation, the contribution of the SJRRP to cumulative impacts of constructing new or expanded facilities would be cumulatively considerable when considered in combination with past, present, and reasonably foreseeable probable future actions and projected population growth.

This impact could be mitigated by locating the hatchery where it would not require the construction of new or expanded water or wastewater treatment facilities. The hatchery could also possibly be designed to eliminate the need for new or expanded facilities. It is not known, however, whether this mitigation would be feasible. Actions to provide new or expanded capacity would be subject to project-level environmental review, and mitigation to minimize impacts would be developed and adopted. Additionally, permits issued for the new or expanded facilities would include environmental impact minimization measures as conditions. Nonetheless, it is not known whether impacts could be partially or fully mitigated. Therefore, if a new hatchery would be needed under the action alternatives, the potential exists for the SJRRP to cause a cumulatively considerable incremental contribution to a significant cumulative impact related to construction of expanded or new water and wastewater treatment facilities. This cumulative impact is potentially significant and unavoidable.

If a new hatchery would not be constructed, then demand for new or expanded water or wastewater facilities would not increase under the action alternatives and no impact would occur, because no other SJRRP actions would increase demand for these services. In this case, the SJRRP would not cause a cumulatively considerable incremental contribution to a significant cumulative impact associated with the construction of new or expanded facilities.

Demand for new or expanded water or wastewater facilities would not increase under the action alternatives (i.e., demand for new or expanded water or wastewater facilities would be comparable to such demand under the No-Action Alternative), and no impact, cumulative or otherwise, would occur.

Projected population growth and reasonably foreseeable probable future development would result in new or expanded wastewater treatment facilities. The potential also exists under the No-Action Alternative for projected population increases to adversely affect the ability of some existing treatment facilities to meet wastewater treatment requirements set by the Central Valley RWQCB. New development that would occur as a result of reasonably foreseeable probable future actions also would potentially have the same result.

Implementing the regulatory regime would ensure that no cumulative adverse effects would occur because existing facilities that do not meet treatment requirements are subject to a cease-and-desist order and may be required to implement upgrades to comply with new permit requirements. Any new or expanded facilities would be required to meet permit design or performance requirements. Therefore, with implementation of Interim and Restoration flows, no impact would occur related to the ability of treatment facilities to meet wastewater treatment requirements. Operation of a proposed new fish hatchery would be the only action that could generate wastewater and potentially cause a wastewater treatment facility to exceed permit requirements. Implementation of mitigation measures would reduce this contribution to a potentially significant cumulative impact to a less-than-considerable level because required permits would be implemented and BMPs would be implemented in accordance with permit conditions and recommended guidance.

No significant cumulative impact currently exists, and mitigation measures would be implemented under the SJRRP. Therefore, the SJRRP would not cause a cumulatively considerable incremental contribution to a significant cumulative impact on wastewater treatment, facilities, and impacts.

Water supply to the Central Valley and elsewhere in California is limited by groundwater availability and surface-water supply provided by the CVP and SWP and other local entities. As a result of increased agricultural production during the past century and long-term population growth throughout California, much of the available water is obligated through water rights and conjunctive use programs. During drier years, surface-water supplies to the study area may be insufficient to meet demand. Any new development to support population growth in the study area would exacerbate this problem. These conditions resulting from past, present, and reasonably foreseeable probable future growth and development constitute a significant cumulative impact related to water supply availability.

Either entitlements or additional water resources (i.e., groundwater) could be required to operate a hatchery to reintroduce fish species to the San Joaquin River in the Restoration Area, depending on the location, design, and size of the hatchery. However, this potentially significant impact would be reduced to a less-than-significant level with implementation of mitigation measures.

Actions under Alternatives C1 and C2 would include a new pumping plant between the Merced River confluence and the Delta to recapture Restoration Flows. This facility would be subject to environmental review and implementation of mitigation to minimize

potential impacts on the environment, as well as on other water rights holders. In addition, a water rights permit would be required before this facility could begin operation, which would substantially reduce or preclude impacts to existing water supply entitlements. Because environmental review, mitigation, and a water rights permit would be required before this pumping facility could be implemented, the incremental contribution of the SJRRP to this significant cumulative impact related to water supply availability would not be cumulatively considerable.

Implementing Interim and Restoration flows under the action alternatives would result in reduced water deliveries to Friant Division water contractors. This impact would be interactive with water supply reductions associated with regulatory compliance for habitat restoration, fisheries management, and constraints of existing facilities. Consistent with the Act, a plan to recirculate, recapture, reuse, exchange, or transfer water released for Interim and Restoration flows would be developed and implemented to minimize impacts of reduced deliveries to Friant Division long-term contractors. In addition, a RWA would be established to provide an accounting of reductions in water supply deliveries to Friant Division long-term contractors and to make surplus water available at a discounted rate to the affected contractors. However, these actions would not fully mitigate the losses in water deliveries, and new water sources could be required. Therefore, the SJRRP would result in a cumulatively considerable incremental contribution to the significant cumulative impact of reduced water supplies to Friant Division water contractors.

Under the No-Action Alternative, increased generation of solid waste is anticipated as a result of projected population growth in the study area. Reasonably foreseeable probable future development projects in the study area would also increase solid waste generation. However, existing landfill capacity would be sufficient to serve projected growth and development (Fresno County 2000, Madera County 1995, Merced County 1990). Therefore, no significant cumulative impact would occur.

Although some short-term construction-related actions and a new fish hatchery under the action alternatives would generate solid waste, implementation of mitigation measures would ensure that the permitted capacity of landfills would not be exceeded, and project-level actions would not generate solid waste. Therefore, none of the action alternatives would result in a cumulatively considerable incremental contribution to a significant cumulative impact on landfill capacity.

Under the No-Action Alternative, increased demand for emergency services is anticipated as a result of projected population growth in the study area. Reasonably foreseeable probable future development projects in the study area would also increase demand for emergency services. These increases would result in the need to expand some existing fire protection or law enforcement facilities and possibly construct new facilities. Therefore, there is an overall significant cumulative impact associated with the need to construct or expand facilities that provide emergency response services. The SJRRP would not increase demands on emergency services beyond available capacity. SJRRP actions would not cause a cumulatively considerable incremental contribution to this significant cumulative impact related to provision of emergency response services.

26.6.21 Visual Resources

Development is increasingly changing the visual character of the study area from vast areas of open space to urban uses, thus altering and limiting the views available to recreationists and residents living in the area. This trend will continue as reasonably foreseeable probable future projects are implemented in the study area. Substantial changes in visual conditions will continue as agricultural lands and open space are replaced by urban and industrial development and infrastructure projects, and as vegetation is removed to make room for future development. Increased urban development will also lead to increased nighttime light and glare and subsequent skyglow in the region and more limited views of the night sky.

In the study area, several large projects in various stages of planning and implementation may have adverse impacts on visual resources. Those projects include the DMC Recirculation Project, the City of Stockton Delta Water Supply Project, implementation of the USACE policy on levee vegetation, and various proposed residential, commercial, and industrial developments. Conversely, several projects in the planning stages within the study area could have a beneficial effect on visual resources. The cumulative effect of these changes on visual resources from past, present, and reasonably foreseeable planned future projects would be significant. These cumulative impacts can be minimized to a degree through vegetative and topographic screening of structures, use of outdoor lighting that limits glare, appropriate building design, and other measures; however, the significant cumulative impact cannot be mitigated to a less-than-significant level. Therefore, the cumulative change of agricultural and open-space views in the study area to urban landscape and the associated increase in nighttime light and glare and subsequent skyglow would be significant under the No-Action Alternative.

The release of Interim and Restoration flows under the action alternatives would provide a net beneficial effect on visual resources by improving habitat along the San Joaquin River below Friant Dam. However, the incremental contributions of program-level impacts could be cumulatively considerable if construction of a new fish hatchery or major levee work along the river in the Restoration Area would occur and the visual impacts of these actions could not be appropriately mitigated. Overall, the action alternatives would cause a potential cumulatively considerable incremental contribution to the significant cumulative impact on visual resources in the Restoration Area and downstream at the site of any new pumping plant. This cumulative impact is potentially significant and unavoidable.

Chapter 27.0 Other NEPA and CEQA Considerations

In addition to the factors described in the preceding chapters, CEQA requires consideration of significant and unavoidable impacts, NEPA requires consideration of the relationship of short-term uses and long-term productivity, and both NEPA and CEQA require consideration of irreversible and irretrievable commitments of resources as well as growth-inducing impacts. These considerations are described in the following sections.

27.1 Significant and Unavoidable Impacts

Section 21100(b)(2)(A) of CEQA provides that an EIR shall include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Chapters 4 through 26 provide a detailed analysis of all potentially significant environmental impacts of implementing the Settlement, list feasible mitigation measures that could reduce or avoid the significant impacts of the action alternatives, and specify whether these mitigation measures would reduce these impacts to a less-than-significant level, as summarized in Table 27-1. If a specific impact cannot be reduced to a less-than-significant level, it is considered a significant and unavoidable impact. As shown in Table 27-1, implementing the Settlement would have several significant and unavoidable environmental impacts. Where feasible mitigation exists, it has been included to reduce these impacts; however, the mitigation would not be sufficient to reduce these impacts to a less-than-significant level. Chapter 26.0, "Cumulative Effects," describes the contribution of the Settlement to effects caused, or would be caused, by past, present, and reasonably foreseeable future actions.

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Air Quality: Program-Level				
AIR-1: Temporary and Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors	A1	PS	AIR-1: Prepare Project-Level Quantitative Analysis of Construction-Related Emissions and Implement Measures to Minimize Emissions	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
Climate Change: Program-Level				
CLM-1: Construction-Related Emissions of GHGs in the Restoration Area	A1	PS	CLM-1: Implement All Feasible Measures to Reduce Emissions	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
Climate Change: Project-Level				
CLM-4: Operational Emissions of GHGs	A1	PS	CLM-1: Implement All Feasible Measures to Reduce Emissions	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Cultural Resources: Program-Level				
CUL-1: Disturbance or Destruction of Cultural Resources Within the Restoration Area	A1	PS	CUL-1: Comply with Section 106 of the NHPA Process or Equivalent	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Cultural Resources: Project-Level				
CUL-2: Disturbance or Destruction of Cultural Resources Around Millerton Lake	A1	PS	CUL-2: Comply with Section 106 of the NHPA and Develop and Implement a Programmatic Agreement	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
CUL-3: Disturbance or Destruction of Cultural Resources in the Restoration Area	A1	PS	CUL-2: Comply with Section 106 of the NHPA and Develop and Implement a Programmatic Agreement	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
CUL-4: Disturbance or Destruction of Cultural Resources Along the San Joaquin River Downstream from the Merced River	A1	PS	CUL-2: Comply with Section 106 of the NHPA and Develop and Implement a Programmatic Agreement	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Geology and Soils: Program-Level				
GEO-1: Potential Localized Soil Erosion, Sedimentation, and Inadvertent Permanent Soil Loss	A1	PS	GEO-1: Prepare and Implement a Stormwater Pollution Prevention Plan that Minimizes the Potential Contamination of Surface Waters, and Complies with Applicable Federal Regulations Concerning Construction Activities	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Hydrology - Flood Management: Program-Level				
FLD-1: Expose People or Structures to a Significant Risk of Loss, Injury, or Death Involving Flooding, Including Flooding as a Result of the Failure or a Levee or Dam	A1	PS	FLD-1: Implement Design Standards to Minimize Risk of Loss, Injury, or Death Involving Flooding	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Hydrology – Groundwater: Program-Level				
GRW-1: Temporary Construction-Related Effects on Groundwater Quality	A1	PS	GRW-1a: Prepare and Implement a Stormwater Pollution Prevention Plan That Minimizes the Potential Contamination of Surface Waters, and Complies with Applicable Federal Regulations Concerning Construction Activities GRW-1b: Conduct Phase I Environmental Site Assessments	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Hydrology – Groundwater: Project-Level				
GRW-4: Changes in Groundwater Levels in CVP/SWP Water Service Areas	A1	PSU	--	PSU
	A2	PSU	--	PSU
	B1	PSU	--	PSU
	B2	PSU	--	PSU
	C1	PSU	--	PSU
	C2	PSU	--	PSU

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Hydrology – Groundwater: Project-Level (contd.)				
GRW-5: Changes in Groundwater Quality in CVP/SWP Water Service Areas	A1	PSU	--	PSU
	A2	PSU	--	PSU
	B1	PSU	--	PSU
	B2	PSU	--	PSU
	C1	PSU	--	PSU
	C2	PSU	--	PSU
Hydrology - Surface Water Supplies and Facilities Operations: Program-Level				
SWS-1: Changes in Diversion Capacities	A1	PS	SWS-1: Provide Alternate Temporary or Permanent River Access to Avoid Diversion Losses	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Hydrology - Surface Water Quality: Program-Level				
SWQ-1: Temporary Construction-Related Effects on Surface Water Quality in the San Joaquin River from Friant Dam to the Merced River, San Joaquin River from the Merced River to the Delta, the Delta, and CVP/SWP Water Service Areas	A1	PS	SWQ-1A: Prepare and Implement a Stormwater Pollution Prevention Plan that Minimizes the Potential Contamination of Surface Waters, and Complies with Applicable Federal Regulations Concerning Construction Activities SWQ-1B: Conduct and Comply with Phase I Environmental Site Assessments in the Restoration Area	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Land Use: Program-Level				
LUP-1: Conversion of Important Farmland to Nonagricultural Uses and Cancellation of Williamson Act Contracts	A1	Significant	LUP-1a: Design and Implement Levee Setbacks to Preserve Agricultural Productivity of Important Farmland to the Extent Possible and Comply with the Surface Mining and Reclamation Act LUP-1b: Minimize Impacts on Williamson Act–Contracted Lands, Comply with Government Code Sections 51290–51293, and Coordinate with Landowners and Agricultural Operators	SU
	A2	Significant		SU
	B1	Significant		SU
	B2	Significant		SU
	C1	Significant		SU
	C2	Significant		SU
LUP-3: Conflict with Adopted Land Use Plans, Goals, Policies, and Ordinances of Affected Jurisdictions	A1	SU	--	SU
	A2	SU	--	SU
	B1	SU	--	SU
	B2	SU	--	SU
	C1	SU	--	SU
	C2	SU	--	SU
Land Use: Project-Level				
LUP-4: Physically Divide or Disrupt an Established Community	A1	PS	LUP-4: Implement Vehicular Traffic Detour Planning	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Land Use: Project-Level (contd.)				
LUP-5: Substantial Diminishment of Agricultural Land Resource Quality and Importance Because of Altered Inundation and/or Soil Saturation	A1	PS	LUP-5: Preserve Agricultural Productivity of Important Farmland to Minimize Effects of Inundation and Saturation Effects	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
LUP-8: Substantial Diminishment of Agricultural Land Resource Quality and Importance Because of Altered Water Deliveries	A1	SU	--	SU
	A2	SU	--	SU
	B1	SU	--	SU
	B2	SU	--	SU
	C1	SU	--	SU
	C2	SU	--	SU
Noise: Program-Level				
NOI-1: Exposure of Sensitive Receptors to Generation of Temporary and Short-Term Construction Noise	A1	PS	NOI-1: Implement Measures to Reduce Temporary and Short-Term Noise Levels from Construction-Related Equipment Near Sensitive Receptors	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
NOI-2: Exposure of Sensitive Receptors to Increased Offsite Traffic Noise Levels	A1	PS	NOI-2: Implement Measures to Reduce Temporary Noise Levels from Construction-Related Traffic Increases Near Sensitive Receptors	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Noise: Program-Level (contd.)				
NOI-3: Exposure of Sensitive Receptors to Long-Term Operation-Related Noise Levels from Stationary Sources	C1	PS	NOI-3: Implement Measures to Reduce Long-Term Operation-Related Noise Levels from Stationary Sources on Sensitive Receptors	LTS
	C2	PS		LTS
NOI-4: Exposure of Sensitive Receptors to Increased Noise from Borrow Site-Related Activities	A1	PS	NOI-4: Implement Measures to Reduce Borrow Site Noise Levels Near Sensitive Receptors	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
NOI-5: Exposure of Sensitive Receptors to or Generation of Excessive Ground-borne Vibration	A1	PS	NOI-5: Implement Measures to Reduce Temporary and Short-term Ground-borne Noise and Vibration Levels Near Sensitive Receptors	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Paleontological Resources: Program-Level				
PAL-1: Possible Damage to or Destruction of Unique Paleontological Resources	A1	PS	PAL-1: Stop Work if Paleontological Resources Are Encountered During Earthmoving Activities and Implement Recovery Plan	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Public Health and Hazardous Materials: Program-Level				
PHH-1: Exposure of Construction Workers and Others to Hazardous Materials	A1	PS	PHH-1: Conduct Phase I Environmental Site Assessments	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
PHH-4: Exposure to Diseases	A1	PS	PHH-4: Implement Workplace Precautions against West Nile Virus and Valley Fever	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
PHH-5: Creation of a Substantial Hazard to School Safety	A1	PS	PHH-5: Minimize Hazards to School Safety	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
PHH-6: Creation of a Substantial Hazard from Idle and Abandoned Wells	A1	PS	PHH-6: Minimize Hazards from Idle and Abandoned Wells	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Public Health and Hazardous Materials: Project-Level				
PHH-9: Exposure to Diseases in the San Joaquin River upstream from Friant Dam, in the Restoration Area, and in the San Joaquin River from Merced River to the Delta	A1	PS	PHH-9: Coordinate with and Support Vector Control District(s)	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Recreation: Program-Level				
REC-3: Effects of Construction, Operation, and Maintenance of New Projects or Facilities on Recreation Opportunities in the Restoration Area	A2	PS	REC-3: Restore Recreation Access and Facilities Affected by Construction, Operation, and Maintenance from Settlement Actions in the San Luis Unit of the San Luis National Wildlife Refuge	LTS
	B2	PS		LTS
	C2	PS		LTS
REC-4: Effects of Reintroducing Salmon to the Restoration Area on Reach 1 Angling Opportunities	A1	PS	REC-4: Enhance Fishing Access and Fish Populations on the Kings River below Pine Flat Dam	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
REC-5: Effects on Reach 1 Warm-Water Angling Opportunities from Program Actions within the Restoration Area	A1	PS	REC-5: Enhance Warm-Water Fishing Access and Fish Populations in the Vicinity of the San Joaquin River below Friant Dam	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Recreation: Project-Level				
REC-9: Effects on Recreation Opportunities from Earlier Seasonal Drawdown of Millerton Lake Related to Timing of Release of Interim and Restoration Flows	A1	PS	REC-9: Extend Millerton Lake Boat Ramps or Construct a New Low-water Ramp to Allow Boat Launching at the Lower Pool Elevations that May Result from Interim and Restoration Flows during Dry and Critical-High Years	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
REC-12: Effects on Boating Opportunities from Increased Flow in the Restoration Area	A1	Significant	REC-12: Develop and Implement Recreation Outreach Program	LTS
	A2	Significant		LTS
	B1	Significant		LTS
	B2	Significant		LTS
	C1	Significant		LTS
	C2	Significant		LTS
Transportation and Infrastructure: Program-Level				
TRN-1: Reduced Traffic Circulation and Roadway Capacity	A1	PS	TRN-1: Minimize Short-term Impacts on Traffic Circulation and Roadway Capacity	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
TRN-2: Creation of a Hazard as a Result of a Design Feature	A1	PS	TRN-2: Avoid Disruption of Subsurface Utility Facilities	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Transportation and Infrastructure: Program-Level (contd.)				
TRN-3: Reduced Emergency Access	A1	PS	TRN-1: Minimize Short-term Impacts on Traffic Circulation and Roadway Capacity	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
TRN-4: Reduced Bicycle and Pedestrian Circulation	A1	PS	TRN-4: Minimize Impacts on Public Bicycle and Pedestrian Circulation Facilities	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Transportation Infrastructure: Project Level				
TRN-7: Inadequate Emergency Access	A1	PS	TRN-7: Implement Vehicular Traffic Detour Planning	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Utilities and Service Systems: Program-Level				
UTL-2: Potential Reduction in Ability of Facilities in the Restoration Area to Meet Wastewater Treatment Requirements	A1	PS	UTL-2: Obtain Required Permits for Hatchery Wastewater Discharges and Implement Best Management Practices to Reduce Pollutant Discharges	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
UTL-4: Potential for Generation of Solid Waste in the Restoration Area in Excess of Permitted Landfill Capacity	A1	PS	UTL-4: Identify Landfills with Adequate Permitted Capacity to Accept Solid Waste Generated by Settlement Activities and Dispose of Waste in Accordance with Applicable Regulations	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS
Utilities and Service Systems: Project-Level				
UTL-11: Potential for Insufficient Existing Water Supply and Resources in the Restoration Area	A1	PSU	--	PSU
	A2	PSU	--	PSU
	B1	PSU	--	PSU
	B2	PSU	--	PSU
	C1	PSU	--	PSU
	C2	PSU	--	PSU
UTL-16: Potential for Insufficient Existing Water Supply and Resources from Recapture of Interim and Restoration Flows Between the Merced River and the Delta	A1	PSU	--	PSU
	A2	PSU	--	PSU
	B1	PSU	--	PSU
	B2	PSU	--	PSU
	C1	PSU	--	PSU
	C2	PSU	--	PSU

Table 27-1.
Summary of Potentially Significant Impacts and Mitigation (contd.)

Impacts	Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Visual Resources: Program-Level				
VIS-2: Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character	A1	PS	VIS-2: Screen New Facilities and Minimize Adverse Visual Impacts	PSU
	A2	PS		PSU
	B1	PS		PSU
	B2	PS		PSU
	C1	PS		PSU
	C2	PS		PSU
VIS-3: Substantial Changes in Light or Glare	A1	PS	VIS-3: Establish and Require Conformance to Lighting Standards, and Prepare and Implement a Lighting Plan	LTS
	A2	PS		LTS
	B1	PS		LTS
	B2	PS		LTS
	C1	PS		LTS
	C2	PS		LTS

Key:
— = not applicable
LTS = less than significant
PS = potentially significant
PSU = potentially significant and unavoidable

27.2 Relationship Between Short-Term Uses and Long-Term Productivity

NEPA requires that an EIS consider "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). Such consideration 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.

Construction activities would include short-term uses of capital, labor, fuels, and construction materials, as well as habitats and recreation areas. General commitments of construction materials are largely irreversible because most of the construction materials

are unsalvageable (see Section 27.3, “Irreversible and Irretrievable Commitments of Resources”). Construction would also result in short-term construction-related effects such as interference with local traffic and circulation; and increased air emissions, ambient noise levels, dust generation, and disturbance of wildlife. These effects would be temporary, occurring only during construction, and are not expected to alter the long-term productivity of the natural environment.

In the short term, implementing the Settlement would directly increase demand for construction, and technical services. The additional economic activity in these sectors could create jobs for construction contractors and workers; consulting engineers and designers; environmental consultants, such as biologists, botanists, and ecologists; and other personnel. It also would indirectly increase economic activity in industries that provide construction materials and industries providing goods and services to construction workers. In turn, the demand for these services could result in new jobs. Conversely, agricultural production would be reduced in the short term as a result of the loss and conversion of currently productive farm and rangeland to restoration uses. The reduction of productive agricultural land would result in fewer jobs in the agricultural sector. The effects of Settlement implementation on employment and economic activity are discussed in Chapter 22.0, “Socioeconomics.”

Long-term productivity resulting from implementing the Settlement would increase in some cases and would decrease or remain unchanged in others. The short-term increase in construction-related economic activity would not be sustained over the long term. Implementing the Settlement would result in a long-term reduction in water deliveries to the Friant Division, and an associated potential for a long-term decrease in agricultural productivity within the Friant Division. Implementation of the Settlement would also permanently remove some lands adjacent to the river from agricultural production. Conversely, the Settlement resolves long-term disputes regarding Reclamation's renewal of the Friant Division long-term contracts, and implementing the Settlement consistent with the Act provides long-term certainty regarding the quantity of water delivery reduction to the Friant Division long-term contractors, and provides long-term protections for water users along the San Joaquin River.

Most importantly, Settlement implementation is expected to restore self-sustaining fall-run and spring-run Chinook salmon populations in the San Joaquin River below Friant Dam. Even if the number of new fish is not substantial enough to have a significant beneficial economic effect on the fishing industry, related ecosystems may benefit from the implementation of the Settlement. Within the Restoration Area, Settlement implementation would result in other long-term effects, such as increased riparian habitat, increased recreational opportunities and use of existing facilities, and improved visual experience both for recreationists and adjacent landowners. No identified adverse effects would pose a long-term risk to human health and safety.

In summary, the short-term uses would generate regional economic activity that would decrease over the long term as construction activities are completed. The benefits of aquatic and riparian habitat restoration, self-sustaining salmon populations, and increased recreational opportunities are substantial and would continue into the long term.

Implementing the Settlement, including implementation of mitigation as described in this Draft PEIS/R, would foster and promote the general welfare; create and maintain conditions under which people and nature can exist in productive harmony; and fulfill social, economic, and other requirements of present and future generations.

27.3 Irreversible and Irretrievable Commitments of Resources

NEPA requires that an EIS include a discussion of the irreversible and irretrievable commitments of resources that may be involved should an action be implemented. Similarly, the State CEQA Guidelines (Section 15126(c)) require that an EIR include a discussion of the significant irreversible environmental changes that would be caused by a proposed project should it be implemented. The discussion below addresses the entire SJRRP and suite of actions proposed for meeting the Restoration and Water Management goals.

An 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. The proposed action would result in the irreversible and irretrievable commitment of the following:

- Construction materials (program level)
- Nonrenewable energy (program level)
- Land area and associated agricultural resources committed to restoration use (program and project level)
- Water committed to restoration purposes (project level)

Program activities under all action alternatives would commit material resources to the construction of new facilities. Under all action alternatives, construction materials would be committed to a variety of actions that would construct or modify existing facilities. With the exception of fill material, the SJRRP would commit only a small quantity of these material resources relative to projected residential, commercial, industrial, and institutional development. Therefore, the commitment of these material resources would not result in a permanent loss of this resource for the future or alternative purposes.

A substantial amount of material resources committed as a result of the action alternatives would be fill material (soil, and to a much lesser extent, rock aggregate) primarily for earthen levee construction and gravel pit isolation. The Fresno area is projected to have less than 10 years of permitted aggregate resources remaining, based on projected population growth (Kohler 2006). The SJRRP is not accounted for in that 10-year estimate of demand for aggregate resources. Therefore, if aggregate material is obtained from commercially available sources, the commitment of this aggregate material to actions could result in a permanent loss of this resource for the future or alternative purposes, such as for private development. However, if aggregate material is not obtained

from existing commercial sources, that is, if this fill material is obtained from private or public lands, the SJRRP would not commit aggregate resources that would deprive other purposes.

Implementing program-level actions would commit nonrenewable energy in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for the construction, operation, and maintenance of actions. However, these commitments of nonrenewable energy resources used for implementing the Settlement are not expected to adversely affect other activities that require electricity, gasoline, diesel fuel, and oil. Moreover, no actions are proposed that would change the capacity of the hydroelectric plant at Friant Dam.

The SJRRP would commit land to supporting the Restoration Goal. Farm and rangeland (including Important Farmland) would be converted to nonagricultural uses (e.g., levee and bypass footprints, floodplain habitat). This conversion would be long term but not necessarily irreversible or irretrievable.

Reoperating Friant Dam in accordance with the Act would commit up to 10 percent of the surface water supply currently contracted to Friant Division long-term contractors for restoration purposes. The Settlement and Act seek to offset this change through the Water Management Goal. On average, however, water deliveries to Friant Division long-term contractors could be reduced, which would result in a shortfall of surface water supplies during some dry years and, thus, could result in additional groundwater pumping, changes in agricultural practices (e.g., crop selection), and idling of cropland. This impact would be significant and unavoidable.

27.4 Growth-Inducing Impacts

NEPA requires that an EIS consider indirect effects of a project, which are often the result of growth inducement. CEQA requires that an EIR discuss how a project may induce growth (CCR Section 15126.2(d)). A project will have a growth-inducing impact if it directly or indirectly:

- Removes obstacles to population or economic growth
- Requires the construction of additional community service facilities that could cause significant environmental effects
- Encourages and facilitates other activities that would significantly affect the environment, either individually or cumulatively

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 disclosing growth-inducing effects. The EIR must describe the directness or indirectness of the effect. It must also describe the ability of the lead agency to forecast actual effects. Based on these factors,

the lead agency may consider mitigation measures for the anticipated effects. Growth-inducing effects are evaluated for the alternatives in accordance with the California Court of Appeal's 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 Environmental Impact Report (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.*

None of the action alternatives removes an obstacle to population or economic growth. No utility (i.e., domestic water, wastewater treatment, sewer, or stormwater treatment) expansion is proposed under any of the alternatives. No new, additional transportation facilities are proposed, nor is there any proposal to increase the capacity of existing facilities. In summary, implementing the Settlement would not induce growth because the local labor pool is expected to serve the demand for construction workers, and increased economic activity resulting from added recreation opportunities would not be of a magnitude that would drive demand for new housing. Because service systems would not be constructed or expanded, none of the alternatives would remove an impediment to growth. The potential for growth-inducing impacts as a result of project- or program-level actions are addressed in greater detail the following sections.

27.4.1 Project-Level Actions

The project-level actions would not remove obstacles to growth or require construction of additional community service facilities that could cause significant environmental effects. The project-level actions would result in recreation opportunities that would not exist under the No-Action Alternative. However, recreation opportunities would not be at a level that would encourage or facilitate other activities that would significantly affect the environment, either individually or cumulatively.

Reoperating Friant Dam would increase recreation, but this increase would be insufficient to induce growth. Chapter 21.0, "Recreation," describes existing recreation opportunities in the Restoration Area and estimates opportunities available in 2030 were the Settlement not implemented. Chapter 21.0 further describes how an increase in recreational activity, particularly in fishing, boating, and nature watching, would occur in the Restoration Area. Chapter 22.0, "Socioeconomics," discusses how increased recreation would affect the local and regional economy. There would be insufficient economic activity to increase demand for development above that anticipated by local land-use planning agencies.

27.4.2 Program-Level Actions

The program-level actions would not remove obstacles to growth, require construction of additional community service facilities that could cause significant environmental effects, or encourage or facilitate other activities that would significantly affect the environment. Settlement implementation would temporarily increase construction, but as described below, this would not induce growth. Settlement implementation also would result in long-term reduction of economic activity because of loss of agricultural land or changes in current cropping practices.

Chapter 22.0, "Socioeconomics," describes the existing employment characteristics in the Restoration Area and estimates what the employment characteristics are expected to be in 2030. Chapter 22.0 also describes the temporary increase in demand for construction personnel and related support services that implementation of the program actions would create. Depending on the pace at which the Settlement is implemented, this increased demand could range from minimal to substantial. The demand is expected to be met by the local construction workforce; workers would not need to be brought to the Restoration Area from beyond the local area. In recent employment trends, as presented in Chapter 22.0, the construction sector has been one of the hardest hit by the recession in the counties where the Restoration Area is located. For that reason, labor demand is expected to be met by the local labor pool. Therefore, new demand on housing is not expected to substantially increase, even if the Settlement was implemented at the most ambitious pace.

27.5 Environmentally Preferable/Superior Alternative

CEQ Regulations require identification of an environmentally preferable alternative, and the CEQA Guidelines require identification of an environmentally superior alternative. However, the CEQ Guidelines and CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. As described in Chapter 1.0, the Final PEIS/R 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 is based on the information presented in this PEIS/R.

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" (CEQ 1981).

Similar to the environmentally preferable alternative under NEPA, the CEQA Guidelines, Sections 15120 and 15126.6(e)(2), require identification of an environmentally superior alternative. If the environmentally superior alternative is the "no project" alternative, the

CEQA Guidelines, Section 15126.6(e)(2), require identification of an environmentally superior alternative among the action alternatives.

To identify the environmentally preferable/superior alternative, each of the program alternatives was evaluated based on significance thresholds and the potential adverse impacts identified. The relative potential for each action alternative to benefit the resource areas was also identified. The action alternative(s) with the fewest adverse impacts and greatest benefits (where applicable) was identified for each resource category, as summarized below. Additional simulation is under preparation to determine the impacts of the program alternatives under the 2008 USFWS CVP/SWP Operations BO and the 2009 NMFS CVP/SWP Operations BO. The results of this assessment would change the anticipated effects of the alternatives; however, relative impacts and overall impact mechanisms are not anticipated to change with the results of this assessment. The results of this assessment will be provided in the Final PEIS/R.

All of the action alternatives would achieve implementation of the Settlement and contribute to the success of the Restoration and Water Management goals. The alternatives contribute to the success of these goals to varying extents. Under all action alternatives, construction and long-term operations and maintenance impacts would occur related to biology – fisheries, climate change, cultural resources, hydrology – flood management, hydrology – groundwater, land-use planning and agricultural resources, noise, power and energy, recreation, socioeconomics, and visual resources, compared to the No-Action Alternative or existing conditions, even after implementation of mitigation measures described in Chapters 4.0 through 26.0.

For the reasons summarized in the following subsections, Alternative B2 would be the environmentally preferable/superior alternative, unless a future study of the benefits of floodplain restoration in Reach 4B1 determines that Alternative B1 is the environmentally preferable/superior alternative. The environmentally preferable/superior alternative may not be the preferred alternative for implementation. Reclamation and DWR will identify the preferred alternative following additional public participation, including input from stakeholders and interested agencies, and consideration of comments received during the public review period for this Draft PEIS/R.

Alternatives C1 and C2 could reduce surface water supply, groundwater, and socioeconomic impacts compared with Alternatives A1 and A2, however Alternatives C1 and C2 would have greater adverse impacts related to the construction of new pumping infrastructure on the San Joaquin River between the Merced River confluence and the Delta. Because recapture of Interim and Restoration flows along the San Joaquin River under Alternatives B1 and B2 would not impede the ability to meet existing water quality objectives or otherwise interfere with the ability to meet the Restoration Goal, but could reduce surface water supply, groundwater, and socioeconomic impacts compared with Alternatives A1 and A2, Alternatives B1 and B2 have the least adverse impacts outside the Restoration Area.

Alternative B2 would result in similar impacts in the Restoration Area as Alternative B1; however, construction activities in Reach 4B1 under Alternative B2 would result in

greater impacts than would Alternative B1. The extent of these short-term impacts would depend on the level of disturbance to existing conditions necessary to provide at least 4,500 cfs capacity, and would involve the removal of some or all existing vegetation, as described in Chapter 6.0. Increased floodplain habitat under Alternative B2 would provide greater long-term benefits to vegetation, wildlife, and fisheries than Alternative B1. The net benefit to fisheries of floodplain improvements in Reach 4B1 under Alternative B2 is unknown at this time; however, the benefit is assumed to be substantially greater than the fisheries benefits under Alternative B1 until a future study can be completed. Increased channel capacity under Alternatives B1 and B2 would provide benefits to flood management, increasing flood management flexibility through the increased capacity of Reach 4B1 to convey flood flows. Benefits to flood management would be greater under Alternative B2 compared to Alternative B1, as Alternative B2 would result in greater channel capacity in Reach 4B1.

27.5.1 Air Quality

All of the action alternatives would result in significant and unavoidable impacts due to temporary and short-term construction-related emissions of criteria air pollutants and precursors. None of the action alternatives would benefit air quality. However, Alternative C2, because it requires the most construction activity, would have the most adverse impacts. Conversely, Alternative A1 would have the least adverse impacts because it requires the least construction activity.

27.5.2 Biological Resources – Fisheries

As previously described, the Settlement includes modifications in Reach 4B1 to convey 4,500 cfs unless the Secretary, in consultation with the RA and with the concurrence of NMFS and USFWS, determines that such modifications would not "substantially enhance achievement of the Restoration Goal." Therefore, it is assumed that providing at least 4,500 cfs of capacity in Reach 4B1 would have a greater benefit to fisheries within the Restoration Area than would providing at least 475 cfs capacity. The relative benefits to fisheries would be the subject a future study in accordance with the Act and the Settlement. Until that study is completed, Alternatives A2, B2, and C2, which would provide at least 4,500 cfs capacity in Reach 4B1, are assumed to provide greater benefits to fisheries within the Restoration Area than Alternatives A1, B1, and C1.

Alternatives C1 and C2 would have the most adverse impacts to fisheries because these alternatives include the most construction activity. Conversely, Alternatives B1 and B2 would have the least adverse impacts to fisheries, because these alternatives include the least construction activity and minimize exports in the Delta.

Overall, Alternative B2 would provide the greatest benefits and least adverse impacts to fisheries.

27.5.3 Biological Resources – Vegetation and Wildlife

Alternative C2 would have the most adverse impacts to vegetation and wildlife because this alternative would have the most construction activity (including construction in Reach 4B1 and in the San Joaquin River downstream from the Merced River). Alternatives A1 and B1 would have the least short-term adverse impacts associated with

construction. Alternatives A2, B2, and C2 would have the greatest long-term benefits to vegetation and wildlife associated with enhanced riparian vegetation in Reach 4B1. Overall, Alternative A2 would provide the greatest benefits and least adverse impacts to vegetation and wildlife.

27.5.4 Climate Change

Alternative C2 would have the most adverse impacts to climate change because this alternative would have high short-term construction-related emissions of GHGs combined with the most long-term operational emissions of GHGs. Alternatives A1 and B1 would have the least adverse impacts on climate change. Alternatives A2, B2, and C2 would benefit climate change by increasing riparian and floodplain habitat, which has the capacity to absorb some GHGs.

27.5.5 Cultural Resources

Alternative C2 could have the most adverse impacts to cultural resources because this alternative has the most ground-disturbing construction activity. Alternatives A1 and B1 would have the least adverse impacts to cultural resources because these alternatives have the least ground-disturbing construction activity.

27.5.6 Geology and Soils

Alternative C2 could have the most adverse impacts to geology and soils because this alternative has the most construction activity and therefore the greatest potential to cause localized soil erosion, sedimentation, and inadvertent permanent soil loss. Alternatives A1 and B1would have the least adverse impacts to geology and soils because these alternatives have the least construction activity.

27.5.7 Hydrology – Flood Management

All action alternatives would provide flood management benefits by reducing the elevation of Millerton Reservoir during the spring when inflow to Millerton Reservoir is greatest. Alternatives A2, B2, and C2 would provide additional benefits to flood management by enabling the routing of up to 1,500 cfs of flood flows through Reach 4B1, thereby reducing flood flows in the bypass system. All action alternatives would have similar adverse impacts to flood management, including potential impacts to channel capacity and levee stability.

27.5.8 Hydrology – Groundwater

Alternatives C1 and C2 provide the greatest opportunity to recapture Interim and Restoration flows; therefore, these alternatives provide the least adverse impacts to groundwater. Conversely, Alternatives A1 and A2 provide the least opportunity to recapture Interim and Restoration flows; therefore, these alternatives provide the most adverse impacts to groundwater.

27.5.9 Hydrology – Surface Water Supplies and Facilities Operations

All action alternatives would have similar impacts to surface water supplies and facilities operations. Alternatives C1 and C2 provide the most opportunity to recapture Interim and Restoration flows; therefore, these alternatives provide the least adverse impacts to surface water supplies and facilities operations.

27.5.10 Hydrology – Surface Water Quality

All action alternatives would have similar long-term impacts to surface water quality. Alternatives A1 and A2 would have the greatest benefit to surface water quality conditions in the Delta because these alternatives provide the least opportunity to recapture Interim and Restoration flows, and this relatively high-quality water would not be exported before reaching the Delta. Alternative C2 would have the most adverse impacts to surface water quality, related to temporary construction activities. Alternatives A1 and B1 would have the least adverse impacts related to temporary construction activities.

27.5.11 Indian Trust Assets

No action alternatives would have an impact on ITA. There are no reservations or rancherias located within the study area. All action alternatives do not affect land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in-stream flow associated with trust lands.

27.5.12 Land-Use Planning and Agricultural Resources

Alternative C2 would result in the most adverse impacts to land-use planning and agricultural resources because this alternative includes the most construction activities with potential to affect land-use planning and agricultural resources. Alternatives A1 and B1 would have the least construction activities and therefore the least adverse impacts to land-use planning and agricultural resources.

27.5.13 Noise

Alternative C2 would have the most adverse impacts to noise, due to both temporary construction activities and the long-term operations and maintenance of new pumping infrastructure on the San Joaquin River. Alternatives A1 and B1 would have the least adverse impacts to noise.

27.5.14 Paleontological Resources

Alternative C2 would have the most adverse impacts to paleontological resources because this alternative includes the most construction activities. Alternatives A1 and B1 would have the least construction activities and therefore the least adverse impacts to paleontological resources.

27.5.15 Power and Energy

Alternatives A1 and A2 would have the least adverse impacts to power and energy because these alternatives would provide the least opportunity to recapture Interim and Restoration flows and therefore cause the smallest increase in CVP/SWP power generation and consumption. Conversely, Alternatives B1, B2, C1, and C2 would have greater adverse impacts to power and energy because these alternatives would provide the greatest opportunity to recapture Interim and Restoration flows.

27.5.16 Public Health and Hazardous Materials

Alternative C2 includes the most construction activities and therefore could have most adverse impacts to public health and hazardous materials. Conversely, Alternatives A1

and B1 have the least construction and therefore could have the least adverse impacts to public health and hazardous materials.

27.5.17 Recreation

All action alternatives would have some beneficial impacts to recreation through enhanced wildlife- and fisheries-based recreation opportunities. Alternative C2 includes the most construction activities and would have the most adverse impacts to recreation. Alternatives A1 and B1 include the least construction activities and would have the least adverse impacts to recreation.

27.5.18 Socioeconomics

All action alternatives would provide some temporary employment benefits due to construction activities, with Alternative C2 providing the most temporary employment benefits. Alternatives C1 and C2 provide the greatest opportunity to recapture Interim and Restoration flows; therefore, these alternatives provide the least adverse impacts to socioeconomics. Conversely, Alternatives A1 and A2 provide the least opportunity to recapture Interim and Restoration flows; therefore, these alternatives provide the most adverse impacts to socioeconomics.

27.5.19 Transportation and Traffic

Alternative C2 includes the most construction activities and would have the most adverse impacts to transportation and traffic. Alternatives A1 and B1 include the least construction activities and would have the least adverse impacts to transportation and traffic.

27.5.20 Utilities and Service Systems

Because of the increased potential for generation of solid waste in excess of permitted landfill capacity during construction, Alternative C2 could have the most adverse impacts to utilities and service systems. Conversely, Alternatives A1 and B1 would have the least adverse impacts to utilities and service systems because these alternatives would have the fewest construction activities.

27.5.21 Visual Resources

Alternatives A2, B2, and C2 would create a widened floodplain in Reach 4B1, providing additional visual screening and improving views in this reach of the San Joaquin River. Therefore, Alternatives A2, B2, and C2 would provide the most benefits to visual resources. Alternative C2 would involve the most construction activities and would therefore have greater potential temporary construction-related impacts to visual resources, as well as the potential for the construction of new pumping infrastructure to degrade the visual character of an area, or to affect a scenic vista. Conversely, Alternatives A1 and B1 would have the least adverse impacts to visual resources.

Chapter 28.0 Consultation, Coordination, and Compliance

This chapter summarizes the activities undertaken by Reclamation and DWR to satisfy NEPA, CEQA, and other regulatory requirements, as well as activities undertaken for public and agency involvement. In addition, this chapter lists the needed permits, petitions, compliance documents, etc. for the project and program-level actions. For a complete list of project-level and program-level actions, see Chapter 2.0, "Description of Alternatives." The discussion of the needed permits, petitions, and compliance documents assumed program-level actions would require future project-specific analysis, unless otherwise noted. This chapter also describes the public scoping process used to involve the public and agencies in the development of the PEIS/R. Section 28.3, "Distribution List," lists the entities receiving a copy of this Draft PEIS/R.

Reclamation and DWR jointly conducted public outreach and agency involvement efforts related to development of this Draft PEIS/R. These consultations assisted Reclamation and DWR in determining the scope of the Draft PEIS/R, developing program components and objectives, identifying the range of alternatives, defining potential environmental impacts and the significance of those impacts, and identifying appropriate mitigation measures. These efforts consist of public scoping meetings and ongoing meetings with stakeholders to obtain their input and comments. Reclamation and DWR will continue to solicit public and agency input on Settlement implementation by encouraging review of this Draft PEIS/R. Past and future public involvement, consultation, and coordination efforts are discussed in Section 28.2.3.

28.1 Compliance with Related Laws, Rules, Regulations, and Executive Orders

Federal and State laws, rules and regulations, EOs, and compliance requirements for implementation of the alternatives are described in the following sections. Descriptions are organized by Federal and State requirements.

28.1.1 Federal Requirements

Compliance with Federal laws, rules and regulations for implementation of the alternatives are summarized below. A total of 22 Federal requirements are identified.

San Joaquin River Restoration Settlement Act

The Act (Appendix B) authorizes and directs the Secretary to implement the Settlement. Sections of the Act are described below with a focus on their relation, where applicable, to the action alternatives described in Chapter 2.0 of this PEIS/R:

- Section 10001. Short title
- Section 10002. Purpose
- Section 10003. Definitions
- Section 10004. Implementation of Settlement
- Section 10005. Acquisition and disposal of property; title to facilities
- Section 10006. Compliance with applicable law
- Section 10007. Compliance with CVPIA
- Section 10008. No private right of action
- Section 10009. Appropriations; Settlement Fund
- Section 10010. Repayment contracts and acceleration of repayment of construction
- Section 10011. California Central Valley spring-run Chinook salmon

Section 10001 – Short Title. This section is administrative in nature and does not apply to implementation of the action alternatives.

Section 10002 – Purpose. This section states that the purpose of the Act is to authorize implementation of the Settlement. The text in Chapter 1.0, "Introduction" is consistent with the purpose of the SJRRP as stated in the Act.

Section 10003 – Definitions. This section is administrative in nature and does not apply to implementation of the action alternatives.

Section 10004 – Implementation of the Settlement. This section addresses agreements between the Secretary and other parties; funding, mitigation of impacts, design and engineering studies; water contracts, including the San Joaquin River Exchange Contract; water contract allocations, and study of Interim Flows. Specific subsections are described below.

Section 10004(a). Section 10004(a) authorizes and directs the Secretary to implement the terms of the Settlement. Section 10004(a)(1) authorizes the design and construction of high-priority channel and structural improvement actions outlined in Paragraph 11 of the Settlement; therefore, all Paragraph 11 actions are included in all action alternatives, as described in Chapter 2.0.

Section 10004(a)(2) authorizes and directs the reoperation of Friant Dam for release of Interim Flows. This is included in all action alternatives, as described in Chapter 2.0. Section 10004(a)(3) authorizes and directs the acquisition of water, as described in Paragraph 13 of the Settlement. The release of such water is included in all action alternatives; however, the acquisition of water is outside the scope of this PEIS/R and is not included in the action alternatives. The acquisition of water would be addressed on a case-by-case basis in future environmental compliance as more information on each acquisition is known.

Section 10004(a)(4) authorizes and directs implementation of Paragraph 16 of the Settlement related to recirculation, recapture, reuse, exchange or transfer of Interim and Restoration flows for accomplishing the Water Management goal in the Settlement. Consistent with Paragraph 16 and in compliance with the Act, all action alternatives include the recapture of Interim and Restoration flows consistent with applicable laws, and applicable agreements with downstream agencies, entities, and landowners. Applicable laws and agreements include California water law, the use of CVP facilities to deliver CVP water (other than Interim or Restoration flows) or CVP transfers to existing south-of-Delta CVP contractors, and the Secretary's ability to fulfill the conditions of the Agreement of November 24, 1986, between the United States of America and DWR for the coordinated operation of CVP and SWP, as authorized by Congress in Section 2(d) of the Act of August 26, 1937 (50 Statute 850, 100 Statute 3051).

Section 10004(a)(5) authorizes and directs the Secretary to develop and implement the RWA. Reclamation, in consultation with the Settling Parties, is developing and will implement the RWA. The RWA is an accounting process and would not require future environmental compliance. This process is not part of the action alternatives and therefore is not described in detail in this PEIS/R.

Section 10004(b). Section 10004(b) authorizes and directs the Secretary to enter into any agreements with State, tribal, or local governments, or private parties deemed necessary to achieve the Settlement. Such agreements could include contracts, memoranda of understanding, financial assistance agreements, cost sharing agreements, or other appropriate agreements. The action alternatives may require one or more such agreements.

Section 10004(c). This section authorizes the Secretary to accept and expend non-Federal funds to facilitate implementation of the Settlement. This section may apply to the future implementation of the Settlement.

Section 10004(d). This section states that the Secretary shall identify the impacts associated with actions to construct, improve, operate, or maintain facilities to implement the Settlement. This section also states that the Secretary shall identify the measures necessary to mitigate impacts on adjacent and downstream water users and landowners. The PEIS/R identifies all impacts associated with the program alternatives, and presents mitigation measures where appropriate. This information is presented in Chapters 4.0 through 26.0 of the PEIS/R.

Section 10004(e). This section authorizes the Secretary to conduct any design or engineering studies that are necessary to implement the Settlement. Preliminary design and engineering studies were conducted to facilitate alternatives development and to identify potential impacts. Additional design and engineering studies would be necessary to implement many of the actions included in the action alternatives.

Sections 10004(f) and 10004(g). These sections prohibit involuntary reduction in water contract allocations to CVP long-term contractors other than Friant Division long-term contractors, as well as modification or amendment of water rights and obligations to any existing water service, repayment, purchase, or exchange contract, except as provided in

the Settlement or in other sections of the Act. Specifically, as described in Chapter 2.0 of the PEIS/R, release, recapture, and recirculation of WY 2010 Interim Flows would be subject to available capacity within CVP/SWP storage and conveyance facilities; available capacity is defined as capacity that is available after all statutory and contractual obligations are satisfied to existing water service or supply contracts, exchange contracts, settlement contracts, transfers, or other agreements involving or intended to benefit CVP/SWP contractors served water through CVP/SWP facilities. All other provisions of the action alternatives are consistent with this section of the Act.

Section 10004(h). This section requires the Secretary to conduct an analysis consistent with NEPA, and discusses actions associated with seepage impacts and the Hills Ferry Barrier for the release of Interim Flows. This section also includes several subsections discussed below: Required Studies, Conditions for Interim Flow Release, Seepage Impacts, and Temporary Fish Barrier Program.

Required Studies for Interim Flows. The PEIS/R is prepared consistent with NEPA and this section of the Act. Section 10004(h) requires several elements be included in the PEIS/R, including the following:

- **Analysis of channel conveyance capacities and potential for levee or groundwater seepage** – Channel conveyance capacities and the potential for levee or groundwater seepage have been estimated for each reach based on analytical modeling, review of previous studies, and/or landowner feedback. The sources used to identify channel capacity are identified in Chapter 11.0 of this PEIS/R.

- **Description of the seepage monitoring program** – The Physical Monitoring and Management Plan ea addresses seepage monitoring and management and is provided in Appendix D. The plan will be updated, as appropriate, with additional information collected during the implementation of Interim Flows. The monitoring efforts associated with release of WY 2010 and WY 2011 Interim Flows are described in the WY 2010 Interim Flows EA/IS and the WY 2011 Interim Flows Supplemental EA (SJRRP 2009 and 2010).

- **Evaluation of possible impacts associated with release of Interim Flows and mitigation measures for impacts determined to be significant** – Chapters 4.0 through 26.0 of this PEIS/R describe potential impacts of the action alternatives, and present mitigation measures for significant impacts.

- **Description of the flow monitoring program –** The Physical Monitoring and Management Plan addresses flow monitoring and management and is provided in Appendix D. The plan will be updated, as appropriate, with additional information collected during the implementation of Interim Flows. The monitoring efforts associated with release of WY 2010 Interim Flows are described in the WY 2010 Interim Flows EA/IS and the WY 2011 Interim Flows Supplemental EA (SJRRP 2009 and 2010).

- **Analysis of the Federal costs of any fish screens, fish bypass facilities, fish salvage facilities, and related operations on the San Joaquin River south of the confluence with the Merced River required under the Federal ESA (16 USC 1531 et seq.) as a result of the Interim Flows** – Except with respect to operations related to the Hills Ferry Barrier, described below under *Temporary Fish Barrier Program*, the action alternatives do not include any fish screens, fish bypass facilities, fish salvage facilities, or related operations on the San Joaquin River south of the confluence with the Merced River as a result of Interim Flows. Therefore, no Federal cost expenditures for these purposes are proposed. Although no fish screens, fish bypass facilities, or fish salvage facilities are anticipated to be necessary as a result of Interim Flows, if such facilities are determined to be necessary under the Endangered Species Act of 1973 (16 USC 1531 et seq.) as a result of implementing the Settlement, Reclamation would comply with the terms of the Act, including those terms in Section 10004(h)(4), *Temporary Fish Barrier Program*, described below.

Conditions for Interim Flow Release. This section of the Act authorizes the Secretary to release Interim Flows to the extent that flows would not impede or delay completion of Paragraph 11 actions or exceed existing downstream channel capacities. The action alternatives are designed to comply with this section of the Act and related sections of the Settlement, as described in Chapter 2.0 of this PEIS/R. The quantity of water to be released from Friant Dam as Interim Flows is defined by the hydrologic year type classifications provided in Exhibit B, consistent with the Restoration Flow Guidelines (see Appendix G, "Plan Formulation"), and reduced, as appropriate, within the limits of channel capacity, anticipated infiltration losses, and diversion capacities. Additional reductions in flow could be made, in consideration of water supply demands, presence of special-status species, and potential seepage effects (as described in Appendix D, "Physical Monitoring and Management Plan"), or to accommodate completion of Paragraph 11 actions included in the action alternatives.

Seepage Impacts. This section of the Act states that the Secretary shall reduce Interim Flows to address material seepage impacts as identified through the monitoring program. As described in Appendix D, "Physical Monitoring and Management Plan," Interim Flows would be reduced to avoid seepage impacts as necessary.

Temporary Fish Barrier Program. This section of the Act states that the Secretary, in consultation with DFG, shall evaluate the effectiveness of the Hills Ferry Barrier in preventing unintended upstream migration of anadromous fish in the San Joaquin River and any false migratory pathways. This section further authorizes the Secretary to assist DFG in making any improvements to the Hills Ferry Barrier, if necessary to avoid imposing additional regulatory actions against third parties. In addition, if third parties are required to install fish screens or bypass facilities to comply with the Federal ESA (16 USC 1531 et seq.), this section states that the Federal Government shall bear the costs of installing such screens or facilities, except to the extent that such costs are already or willingly borne by others.

Reclamation and DWR have consulted with DFG and NMFS on the use of the Hills Ferry Barrier and potential need for other temporary barriers. The action alternatives include measures to be consistent with this section of the Act, as described in Chapter 2.0 of the PEIS/R. Reclamation and DWR are developing a plan to evaluate the effectiveness of the Hills Ferry Barrier. No additional screens or facilities were found necessary for implementation of the Interim Flows.

Consistent with this section of the Act (10004(h)(4)), if it is determined that any unintended upstream migration of anadromous fish upstream from the Merced River confluence occurs and is caused by Interim Flows, and such migration would result in regulatory action against third parties, the Secretary would comply with the conditions of the Act including assisting DFG in making any necessary improvements to the Hills Ferry Barrier, and bearing the costs of installing any fish screens or fish facilities necessary to comply with the ESA of 1973 (16 USC 1531 et seq.), except to the extent that such costs are already or willingly borne by others.

Section 10004(i). This section describes the availability of funding for the purpose of implementing the Settlement and the Act. This section is administrative in nature and does not apply to implementation of the action alternatives.

Section 10004(j). This section clarifies that nothing in the Act "…shall modify or amend the rights and obligations under the Purchase Contract between Miller and Lux and the United States and the Second Amended Exchange Contract between the United States, Department of the Interior, Bureau of Reclamation and Central California Irrigation District, San Luis Canal Company, Firebaugh Canal Water District and Columbia Canal Company." As described in Chapter 2.0 of this PEIS/R, implementation of the action alternatives would be consistent with existing operating criteria, and prevailing and relevant laws, regulations, BOs, and court orders in place at the time of implementation. Specifically, if Reclamation must make deliveries to the San Joaquin River Exchange Contractors via the San Joaquin River, these water deliveries would have a higher priority to channel capacity over Interim or Restoration flows, as described in Chapter 2.0 of this PEIS/R. Therefore Interim and Restoration flows would be reduced, if necessary to provide channel capacity for water delivery to the San Joaquin River Exchange Contractors via the San Joaquin River.

Section 10005 – Acquisition and Disposal of Property; Title to Facilities. This section addresses the acquisition and disposal of properties or title to facilities modified or improved by implementation of the Settlement, along with the operation of any groundwater bank along or adjacent to the San Joaquin River upstream from the confluence of the Merced River. Potential modifications to facilities, such as installing seals on the Chowchilla Bypass Bifurcation Structure, are described in Chapter 2.0 of this PEIS/R. The action alternatives do not include a change in ownership of any facilities, in compliance with Section 10005(a) of the Act. Section 10005(b) authorizes acquisition of property needed to implement the Settlement, and Section 10005(c) addresses the disposal of such property in the event that it is no longer needed. These sections apply to future implementation of actions addressed at a program level in the action alternatives; property needed for the implementation of these actions would be identified during subsequent

studies. Additional property may be needed for implementation of Interim and Restoration flows following modifications to existing channel capacities, as described in Appendix D, "Physical Monitoring and Management Plan." Section 10005(d) of the Act clarifies that Section 10005 does not authorize operation of a groundwater bank along or adjacent to the San Joaquin River upstream from the confluence of the Merced River. No groundwater banks are included in the action alternatives.

Section 10006 – Compliance with Applicable Law. This section describes implementation of the Settlement in compliance with existing Federal and State laws, rules, and regulations, and describes the use of funds to complete environmental reviews or otherwise implement the Act. As described in Chapter 2.0 of this PEIS/R, and in this chapter, implementation of the action alternatives would be conducted in a manner that is consistent with existing operating criteria, and prevailing and relevant laws, regulations, BOs, and court orders in place at the time of implementation.

Section 10007 – Compliance with Central Valley Project Improvement Act. This section describes implementation of the Settlement in compliance with the CVPIA, including the collection and use of certain funds.

Section 10008 – No Private Right of Action. This section is administrative in nature and does not apply to implementation of the action alternatives.

Section 10009 – Appropriations; Settlement Fund. This section describes and limits sources of funds to implement the Settlement, authorizes appropriation of funds to implement the Settlement, establishes the San Joaquin River Restoration Fund, and directs the Secretary to conduct a study of modifications to Reach 4B, as described in the Settlement. As described in Chapter 2.0, "Description of Alternatives," modifications to increase the capacity of Reach 4B1 to at least 4,500 cfs would only be implemented following completion of a study and a finding by the Secretary, in consultation with the RA and with concurrence by NMFS and USFWS, that such modifications would substantially enhance achievement of the Restoration Goal. The range of alternatives presented in this PEIS/R accommodates this future study by encompassing, rather than predicting, the potential outcomes of this future study.

This section does not apply to the action alternatives.

Section 10010 – Repayment Contracts and Acceleration of Repayment of Construction. This section describes the conversion and alteration of CVP contracts; the provisions for arranging transfers or exchanges to reduce, avoid, or mitigate impacts to water deliveries caused by Interim or Restoration flows; the accounting of such transfers or exchanges; and State law regarding place of use of transferred or exchanged water. As described in Chapter 2.0 of this PEIS/R, recirculation of recaptured water to the Friant Division could require mutual agreements between Reclamation, DWR, Friant Division long-term contractors, and other south-of-Delta CVP/SWP contractors. Reclamation would assist in developing these agreements; however, the action alternatives do not address the recirculation of Interim or Restoration flows because the specific recirculation actions are

not known at this time. Specific recirculation activities will be the subject of subsequent, separate NEPA analysis, as needed, once the specific actions have been identified.

In particular, Section 10010(e) states that, pursuant to Paragraphs 13 or 15 of the Settlement, any short- or long-term agreement, to which one or more long-term Friant Division, Hidden Unit, or Buchanan Unit contractors enters into for the purpose of recirculation, "…shall be deemed to satisfy the provisions of subsection 3405(a)(1)(A) and (I) of the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102–575) without the further concurrence of the Secretary as to compliance with said subsections if the contractor provides… not later than 30 days before commencement of any proposed transfer or exchange with duration of less than 1 year, written notice to the Secretary stating how the proposed transfer or exchange is intended to reduce, avoid, or mitigate impacts to water deliveries caused by the Interim Flows or Restoration Flows or is intended to otherwise facilitate the Water Management Goal, as described in the Settlement. The Secretary shall promptly make such notice publicly available." No such short- or long-term agreements are included under the action alternatives; however, the action alternatives would not impede actions under this section of the Act.

Section 10011 – California Central Valley Spring Run Chinook Salmon. This section addresses the reintroduction of spring-run Chinook salmon consistent with the Settlement.

Section 10011(a). Section 10011(a) states that the implementation of the Settlement is a "unique and unprecedented circumstance" requiring explicit expression of how the ESA of 1973 should be applied to achieve the Restoration Goal and, specifically, the reintroduction of spring-run Chinook salmon. Sections 10011(b) through 10011(e) contain this expression. The action alternatives include the reintroduction of spring-run Chinook salmon, and are designed to comply with these sections of the Act.

Section 10011(b). Section 10011(b) states that spring-run Chinook salmon shall be reintroduced pursuant to Section 10(j) of the ESA of 1973; provided that the Secretary of Commerce finds that a permit for reintroduction can be issued. The reintroduction of spring-run Chinook salmon pursuant to the ESA is further described in this chapter in the section "Federal Endangered Species Act of 1973, as Amended."

Section 10011(c). Section 10011(c) states that the Secretary shall issue a final rule on the reintroduction of spring-run Chinook salmon, pursuant to the ESA of 1973, prior to the reintroduction, provided that reintroduction would "not impose more than *de minimus*; water supply reductions, additional storage releases, or bypass flows on unwilling third parties due to such reintroduction." Third parties, as defined in Section 10011(c), specifically exclude the Friant Division long-term contractors. This section applies to the implementation of all action alternatives.

Section 10011(d). Section 10011(d) directs the Secretary of Commerce to report to Congress on the progress made on reintroduction no later than December 31, 2024, and sets forth requirements for that report. This section does not apply directly to the implementation of the action alternatives or to the development of the PEIS/R.

The Act is Part I, Subtitle A, Title X of the Omnibus Public Land Management Act of 2009. Subtitle A of Title X of the Omnibus Public Land Management Act of 2009 pertains to implementation of the Settlement, and contains three parts. Part I (the Act), as described above, contains several sections that are specific to the implementation of the action alternatives and/or to the development of the PEIS/R.

Part II of Subtitle A, titled "Study to Develop Water Plan; Report," directs the Secretary to provide direct financial assistance to the California Water Institute to conduct a study regarding the coordination and integration of subregional integrated watershed management plans into a unified Integrated Regional Water Management Plan. The study area for the plan in Part II is the San Joaquin River and Tulare Lake hydrologic regions, as defined by DWR Bulletin 160–05, volume 3, chapters 7 and 8. Part III of Subtitle A, titled "Friant Division Improvements," authorizes and directs the Secretary to conduct feasibility studies on restoring design capacity to the Friant-Kern and Madera canals, and on constructing reverse flow pump-back facilities on the Friant-Kern Canal; and authorizes construction of these improvements and facilities. Part III also authorizes the Secretary to provide financial assistance to other agencies to study and construct facilities designed to reduce, avoid, or offset the quantity of the expected water supply impacts to Friant Division long-term contractors caused by Interim or Restoration flows. The Secretary is in the process of developing, in consultation with the Friant Division long-term contractors, proposed guidelines for the application of the criteria that projects must meet to receive financial assistance under Part III. Parts II and III identify and describe funding for implementation of these parts, including authorizations for appropriation of funds.

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. It 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 effects, and contains action-forcing procedures to ensure that decision makers at Federal agencies take environmental factors into account.

NEPA requires that an appropriate document be prepared to ensure that Federal agencies accomplish the law's purposes. CEQ has adopted regulations and other guidance providing detailed procedures that Federal agencies follow to implement NEPA. The U.S. Department of the Interior has also developed regulations for the implementation of NEPA (43 CFR Part 46). Reclamation will use this PEIS/R as a cornerstone to comply with CEQ and U.S. Department of the Interior regulations and document NEPA compliance, as well as to guide the content of numerous other second-tier NEPA documents, as necessary, to implement specific actions.

Project-level actions are analyzed in this PEIS/R at a project-specific level and this Draft PEIS/R, once finalized, will comprise the complete NEPA compliance for these project-level actions. Program-related actions would require future, project-specific preparation of NEPA and CEQA compliance documentation before implementation.

Clean Water Act

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 include traditionally navigable rivers and their tributaries and adjacent wetlands that have a significant nexus to waters of the United States. Waters of the United States are defined for regulatory purposes, at 33 CFR 328.3 (a), 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, (including intermittent 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 (a)(1) through (4) of this section; (6) The territorial seas; and (7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.*

The California Rapid Assessment Method will be used to assess the overall condition of wetlands including accurately mapping the wetlands and quantifying essential wetland functions (California Wetlands Monitoring Workgroup, 2009). In addition, the Regional Supplement to the Corps of Engineers Wetland Delineation manual will be used for completing Wetland Delineations (USACE, 2008).

CWA Section 404(b) requires that USACE process permits in compliance with guidelines developed by EPA. These guidelines, the CWA Section 404(b)(1) Guidelines, require analysis of alternatives available to meet a project's 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, USACE must permit the least environmentally damaging practicable alternative.

Actions typically subject to Section 404 requirements are those that would take place in wetlands or stream channels, including intermittent streams, even if they have been realigned or otherwise altered in the past. Within stream channels, a permit under Section 404 would be needed for any discharge activity below the ordinary high water mark. The term "ordinary high water mark" refers to "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line

impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (33 CFR 328.3(e)). The Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States will be used to determine the Ordinary High Water Mark (Lichvar and McColley, 2008).

Reclamation and DWR consulted early in the planning process with USACE regarding the Section 404 CWA compliance. It was determined that a Section 404 permit will not be required for actions described at the project-level in this Draft PEIS/R.

Before initiating any program-level actions that could result in discharge into jurisdictional features, the project proponents for subsequent site-specific projects will apply for a CWA permit from USACE. USACE will evaluate the proposed action to determine whether it is the least environmentally damaging practicable alternative pursuant to Section 404(b)(1) Guidelines.

This PEIS/R evaluates the environmental effects on jurisdictional features resulting from the discharge of dredged and fill material to support a Section 404(b)(1) analysis, although details specific to restoration and other actions would need to be submitted at the time of the permitting process. USACE will determine whether the specific proposed action would be authorized under the Nationwide Permit Program or whether an individual permit would be applicable . Early and ongoing coordination with USACE, and the requirement to obtain permits from USACE before initiating any actions, demonstrates that Reclamation and DWR are committed to complying with the CWA. Reclamation, DWR, and USACE have been meeting regularly to discuss Section 404 compliance issues.

Note that Section 404 of the CWA does not apply to authorities granted to USACE under the Rivers and Harbors Act of 1899, except that some of the same waters may be regulated under both statutes. USACE typically combines the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 CWA into a single permitting process.

Section 401. Under CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the 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 Federal agency approval, 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 SWRCB, and applications for water quality certification under CWA Section 401 are typically processed by the RWQCB with local jurisdiction — in this case, the Central Valley RWQCB. 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. Coordination with the Central Valley RWQCB relative to

compliance with CWA Section 401 is discussed below, under Section 6.4.2, "State Requirements."

It was determined that a Section 404 permit will not be required for project-level actions, therefore a Section 401 water quality certification is not required for project-level actions.

Prior to initiating any program-level actions that could result in discharge of pollutants into jurisdictional features, Reclamation and/or DWR will apply for a Section 401 water quality certification from the Central Valley RWQCB.

Rivers and Harbors Act of 1899, as Amended (Sections 14 and Section 10)

RHA 1899 addresses activities that involve the construction of, among other structures, dams, bridges, and dikes across any navigable water. The act also addresses placement of obstructions to navigation outside established Federal lines, as well as the excavation or deposition of material in such waters. All of these actions require permits from USACE. Navigable waters are defined in 33 CFR 329.4 as follows:

> *Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.*

In the USACE Sacramento District, navigable waters of the United States in the study area that are subject to the requirements of the RHA include all waterways in the Sacramento–San Joaquin drainage basin affected by tidal action. Sections of the River and Harbors Act applicable to the alternatives are described below.

Section 14. Under RHA Section 14 (33 USC 408), referred to as "Section 408," the Secretary of the Army, on the recommendation of the Chief of Engineers, may grant permission for alteration of the Federal levee system by a non-Federal entity if the alteration would not be injurious to the public. These actions could include degradations, raisings, realignments or other alteration or modifications to the Federal levee system which would cause significant changes to the authorized flood control project's scope. Certain actions could alter the Federal levee system and be undertaken by a non-Federal entity, such as DWR. These project and program-level actions need further development to determine whether they would be subject to Section 408 requirements.

Section 10. Under RHA Section 10, USACE regulates work in, over, or under; excavation of material from; or deposition of material into navigable waters. The jurisdiction of USACE under CWA overlaps and extends beyond the geographic scope of its jurisdiction under the RHA. USACE permitting authority under the RHA is not subject to EPA oversight or any other restrictions specific to the CWA and, in some cases, the RHA alone will apply to waters. A permit from USACE is required prior to any work in, over, or under; excavation of material from, or deposition of material into, navigable waters.

The San Joaquin River is navigable for a length of 236 miles from its mouth to a point approximately 7 miles downstream from SR 99, encompassing Reaches 1B downstream through Reach 5 and the San Joaquin River from the Merced River to the Delta. Restoration actions are proposed in the navigable Reaches 1B through5. Alternatives C1 and C2 propose new pumping infrastructure in navigable waters of the San Joaquin River, between the Merced River and the Delta.

A Section 10 permit would be required prior to any activity that would alter these waters. Reclamation and/or DWR would apply for a Section 10 permit from USACE's Sacramento District prior to construction, and that application would be processed simultaneously with the Section 404 CWA permit application. This PEIS/R evaluates program-level environmental effects on waters of the United States, including navigable waters. This evaluation, combined with action-specific environmental documents, would be needed to support issuance of a Section 10 permit.

Reclamation and DWR consulted early in the planning process with USACE regarding the Section 10 CWA compliance. It was determined that a Section 10 permit will not be required for project-level actions.

Before initiating any program-level actions that could result in discharge into jurisdictional features, Reclamation will apply for a Section 10 permit from USACE.

Federal Endangered Species Act of 1973, as Amended

USFWS and NMFS share responsibility for regulatory implementation and enforcement of the ESA. USFWS has jurisdiction over non-anadromous freshwater fish (e.g., delta smelt), and wildlife and plant species, and NMFS has jurisdiction over marine and anadromous species (e.g., Chinook salmon). Both agencies, upon request, evaluate the effects of proposed projects to determine if the proposed project will jeopardize the continued existence of a Federally listed (threatened or endangered) species or adversely modify designated critical habitat.

Section 7 of the ESA outlines procedures for Federal interagency cooperation for implementation of the ESA. Section 7(a)(2) requires Federal agencies consult with USFWS and/or NMFS to ensure that "any action authorized, funded, or carried out by such agency" does not jeopardize the existence of a listed species or adversely modify critical habitat. Regulations jointly issued by USFWS and NMFS guide the consultation process.

When implementing Section 7(a)(2), there are three possible determinations that a Federal agency can make: No Effect, may affect but is Not Likely to Adversely Affect (NLAA), and May Adversely Affect (MAA). If the Federal agency determines that the proposed action will have No Effect upon listed species or designated critical habitats, and documents a logical rationale and reasoning for that determination, then the agency's ESA compliance for that project is complete. If the agency makes a NLAA determination, then it must seek concurrence from USFWS and/or NMFS with that determination. Such determinations are made when the project is wholly beneficial to a listed species, or the anticipated effects are insignificant and/or discountable (extremely unlikely). If the agency

makes a MAA determination, then it must enter into a formal consultation which usually concludes with the issuance of a BO.

Section 9 of the ESA prohibits the "take" of Federally listed species. Take is defined, under Section 3 of the ESA, as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct". Under Federal regulations, "take" is further defined to include habitat modification or degradation when it actually results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. A BO issued under Section 7(a)(2) will include an Incidental Take Statement which, among other purposes, serves as a formal exemption to the Section 9 prohibition for that project.

Section 10 of the ESA addresses exceptions to the requirements found elsewhere in the ESA. Section 10(j) permits establishing and maintaining experimental populations. The Secretary of the Interior or the Secretary of Commerce may authorize the release (and related transportation) of any population (including eggs, propagates, or individuals) of an endangered or a threatened species outside the current range of such species, if the Secretary determines that such release would further the conservation of such species. Before authorizing the release of any experimental population, the Secretary must identify the population and determine, on the basis of the best available information, whether such a population is essential to the continued existence of an endangered or a threatened species.

Reclamation and DWR have been consulting with USFWS and NMFS on an ongoing basis since early in the planning process to incorporate ESA Section 7(a)(2) consultation for the incidental take of listed species. An analysis of the anticipated effects of the proposed action upon listed species and designated critical habitats will be transmitted by Reclamation to USFWS and NMFS in a Biological Assessment (BA). The BA will be a programmatic document to address both project and program level actions. It is anticipated that USFWS and NMFS will issues programmatic BO's to address those actions. This PEIS/R will support the Section 7(a)(2) consultation with USFWS and NMFS.

Reclamation will not initiate any action that would affect a species Federally listed as endangered or threatened, without first completing the appropriate consultation(s) with USFWS or NMFS and receiving formal notice that the action would not jeopardize the continued existence of the listed species. or adversely modify designated critical habitat.

Reclamation, USFWS, and NMFS are currently evaluating a reintroduction strategy. USFWS submitted a 10(a)(1)(a) Enhancement of Species Permit application to NMFS on September 30, 2010 to initiate the reintroduction process. NMFS will issue a final rule on an ESA Section 10(j) permit for the reintroduction of Chinook salmon by April 30, 2012.

Reclamation consulted with the Fisheries Management Work Group (FMWG), including members from the Implementing Agencies, early in the planning process regarding ESA Section 10(j) compliance for implementing the Settlement. This Draft PEIS/R evaluates program-level effects on the environment that would result from reintroducing Chinook salmon into the San Joaquin River within the Restoration Area. The Final PEIS/R,

combined with the more specific information prepared by the FMWG, is expected to support a Section 10(j) final rule by NMFS.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. The purpose of the Act is to take immediate action to conserve and manage the fishery resource off the U.S. coasts, and U.S. anadromous species, and promote the protection of Essential Fish Habitat (EFH). NMFS requires projects not adversely affect EFH, as defined in the 1996 Sustainable Fisheries Act (Public Law 104-297), and to stop or reverse the continued loss of fish habitats through the goals of habitat protection, conservation, and enhancement. This legislation requires that all Federal agencies consult with NMFS regarding actions or proposed actions permitted, funded, or undertaken that may adversely affect "essential fish habitat." EFH is defined as "those 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 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 EFH. Although the concept of essential fish habitat is similar to that of designated "critical habitat" under the ESA, measures recommended to protect EFH by NMFS are advisory, not prescriptive. Federal activities that occur outside EFH but that may, nonetheless, have an impact on waters and substrate constituting EFH must also be considered in the consultation process.

Under the Magnuson-Stevens Act, effects on habitat must be considered. The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other Federal statutes, such as NEPA, FWCA, CWA, and ESA. Consultation requirements for EFH requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH, and if the notification meets requirements for the EFH assessment.

The programmatic BA will address both project-level and program-level actions on EFH. It is anticipated that the programmatic BO will address both project and program-level actions. Subsequent ESA Section 7 consultation for program-level actions could include informal or formal consultation, and would incorporate the findings in the programmatic BO, as appropriate.

Fish and Wildlife Coordination Act of 1934, as Amended

Coordination under the FWCA is intended to promote conservation of fish and wildlife resources by preventing their loss or damage and to provide for development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and the appropriate fish and wildlife agency – in this case, DFG, in project reports, and to include measures to reduce impacts on fish and wildlife in project plans.

Compliance with the FWCA involves assessing the impacts of the proposed action on preservation, conservation, and enhancement of fish and wildlife habitat. Reclamation will 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 DFG, and does not replace the analysis required by Section 7 of the ESA.

Through early coordination with USFWS, NMFS, and DFG, it was determined that compliance with the FWCA would be documented in a separate FWCA report prepared by USFWS. Information identified in the FWCA report, in conjunction with information contained in this PEIS/R and programmatic BAs would be incorporated into implementation of alternatives, as necessary. The FWCA report is provided in Appendix F, "Coordination Act Report."

Project- and program-level actions will be addressed in the FWCA report. Subsequent FWCA reporting may be required for program-level actions.

Federal Clean Air Act of 1963, as Amended

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 an evaluation of any Federal action to determine its potential impact on air quality in the project region. California has a corresponding law, which also must be considered during the preparation of the PEIS/R.

Proponents of specific projects must demonstrate that the actions will conform to the CAA and the SIP. A Federal action conforms with an applicable SIP if (1) the total of direct and indirect emissions from the action are compliant and consistent with the requirements of the SIP, and (2) one of a list of enumerated, pollutant-specific requirements is satisfied (such as accounting for the Federal action's projected emission of any criteria pollutant in the SIP, or offsetting ozone or nitrogen dioxide emissions within the nonattainment area) (42 CFR 93.158(a)). Ultimately, a conformity analysis may require revising a SIP, implementing mitigation measures to bring the Federal action's emissions levels down, or altering the action, possibly by reducing the magnitude of the action, to reduce emissions to levels within the budgets established by the SIP for specific pollutants.

Section 176 of the CAA prohibits Federal agencies from engaging in or supporting an action or activity that does not conform to an applicable SIP. Actions and activities must conform to a SIP's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards, and in attaining those standards expeditiously.

A conformity analysis is performed concurrently with the permitting process of the Federal permit being sought. For the program-level actions, a conformity analysis would likely be completed in a manner concurrent with the permitting processes of Section 10 of the RHA and Section 404 of the CWA. At the point a program-level action is proposed, construction and operation emissions are known, and a permit application has been submitted, Reclamation would conduct a conformity analysis of the specific action. The analysis

would be documented and submitted to the SJVAPCD for concurrence that the action is in conformity. The fact that no action would be implemented without being in conformity, and Reclamation would obtain concurrence from the air pollution control district, demonstrates Reclamation's commitment to conforming with the CAA. Project-level actions would conform with CAA and SIP as described in Chapter 4.0.

Federal Water Project Recreation Act of 1965, as Amended

The Federal Water Project Recreation Act requires Federal agencies with authority to require 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 resources project that affects water-related recreation on Federally owned or operated land and waters. The Federal Water Project Recreation Act states that "full consideration shall be given to the opportunities, if any, which the project affords for outdoor recreation and for fish and wildlife enhancement and that, wherever any such project can reasonably serve either or both of these purposes consistently with the provisions of this Act, it shall be constructed, operated, and maintained accordingly."Compliance with the Federal Water Project Recreation Act is achieved through documented consideration of recreation opportunities in NEPA documents. Reclamation owns, maintains, and operates Millerton Lake and the surrounding lands. This PEIS/R discusses potential program and project-level effects at Millerton Lake under all alternatives, and any impacts would be addressed by Reclamation and the California Department of Parks and Recreation, as guided by the joint resource management plan and general plan currently being developed for the Millerton Lake State Recreation Area. Therefore, for both project and program-level actions, it is anticipated the PEIS/R will provide compliance with Federal Water Project Recreation Act. Any subsequent NEPA documentation completed for implementation of program-level actions would be developed consistent with Federal Water Project Recreation Act.

Safe Drinking Water Act of 1974, as Amended

The Safe Drinking Water Act mandates that EPA establishes regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and create a joint Federal-State/Tribal system for compliance with these standards. The Safe Drinking Water Act also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA developed primary and secondary drinking water standards under the authority of the Safe Drinking Water Act. EPA and authorized states and tribes enforce the primary drinking water standards, which are contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant-level goals (MCLG), which are nonenforceable health-based goals, and maximum contaminant levels, which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The Settlement includes water management actions that deliver Restoration Flows back to the Friant Division. Water used for domestic purposes is required to be treated by the local or regional water supply in accordance with Federal and State standards. Reclamation is in compliance with the Safe Drinking Water Act because implementing the Settlement would

not change existing license requirements or impede enforcement of primary drinking water standards. Therefore, it is assumed no further analysis is needed for project-level or program-level actions.

National Historic Preservation Act of 1966, as Amended

Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 CFR Part 800, as amended in 1999) require Federal agencies to consider the effects of their actions, or those they fund or permit, on properties that may be eligible for listing or are listed 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 used to evaluate cultural resources for inclusion in NRHP. Cultural resources can be significant on the Federal, 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 if they meet the following criteria:

(A) are associated with events that have made a significant contribution to the broad patterns of our history;

(B) are associated with the lives of persons significant in our past;

(C) 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; or

(D) have yielded, or may be likely to yield, information important in prehistory or history.

Before implementing any program-level action, the project proponent would identify the APE, inventory it for cultural resources, and evaluate whether documented resources are eligible for listing on the NRHP. Any proposed action within the APE would be assessed to determine whether it would significantly impact a National Register-eligible cultural resource. If impacts to a NRHP-eligible resource would be unavoidable, then appropriate mitigation efforts would be implemented in compliance with Section 106 of the NHPA.

Project-level actions could result in the disturbance or destruction of cultural resources, as described in Chapter 8.0, “Cultural Resources.” To mitigate these potential impacts, Reclamation will develop a PA with the SHPO through the Section 106 consultation process. As part of the PA, Reclamation will identify archaeological sites and historic Native American places with the potential for significant impacts to occur due to changes in reservoir operations. In the event that release of Interim or Restoration flows are likely to cause damage to a historic property, Reclamation will comply with the process identified in the PA for the evaluation and recovery of data at any such cultural resource. Undocumented cultural resources may also exist in the reservoir basin. If such a site is identified during implementation of the alternatives and release of Interim or Restoration

flows is likely to cause damage to such a site, Reclamation will ensure the evaluation and recovery of data at these sites.

Farmland Protection Policy Act of 1981

The Farmland Protection Policy Act requires that a Federal agency examine the potential impacts of a proposed action on prime and unique farmland, as defined by the Natural Resources Conservation Service and, if the action would adversely affect farmland preservation, consider alternatives to lessen the adverse effects. As a Federal agency preparing environmental compliance documents, Reclamation is required to conduct a farmland assessment designed to minimize adverse impacts on prime and unique farmlands and provide for mitigation**,** as appropriate.

This PEIS/R evaluates the conversion of prime and unique farmland to other uses that would result from any project or program-level actions, as described in Chapter 16.0. Mitigation measures have been identified for farmland conversion, and include avoidance to the maximum amount practicable and feasible. Reclamation has demonstrated compliance with the Farmland Protection Policy Act through avoidance and mitigation for project and program-level actions.

Migratory Bird Treaty Act of 1918

The MBTA, first enacted in 1918, implements domestically a series of treaties between the United States**,** Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union**,** and provides for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, hunt, take, capture, kill, attempt to take, capture, 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 actions, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially all native birds. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

This PEIS/R evaluates potential project and program-level impacts to migratory bird species and identifies conservation strategies to avoid direct and indirect take of birds, active nests, or eggs. Reclamation would comply with the MBTA through implementing the conservation strategies described herein before and during implementation of any project and program-level actions.

Indian Trust Assets

All Federal agencies have a responsibility to protect ITAs. ITAs 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, and typically include lands, minerals, water rights, hunting and fishing rights, natural resources, money, or claims. If ITAs are affected by the project or program-level actions, Reclamation would identify mitigation or compensation measures so that no net loss is incurred by the Native American beneficial owners of the asset. As described in Chapter 15.0, project and program-level actions would not affect ITAs.

Executive Order 11988 – Floodplain Management

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. It requires that all 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. Specifically, EO 11988 dictates that all Federal agencies avoid construction or management practices that would adversely affect floodplains, unless an agency finds that no practical alternative exists and the proposed action has been designed or modified to minimize harm or risk to structures or facilities located within the floodplain.

This PEIS/R evaluates potential project and program-level modifications to floodplains. The alternatives include commitments to minimize adverse effects to floodplains.

Executive Order 11990 – Protection of Wetlands

EO 11990 is an overall wetlands policy for all agencies that manage Federal lands, sponsor Federal projects, or provide Federal funds to State or local projects. This EO requires Federal agencies to 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.

This PEIS/R evaluates potential impacts to wetlands from project and program-level actions. The alternatives include conservation measures which incorporate avoidance and preservation procedures, including restoration enhancement and replacement of wetlands.

Executive Order 12898 – Environmental Justice in Minority and Low-Income Populations

EO 12898 requires Federal agencies to identify and address 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 that may affect minority or low-income populations.

This PEIS/R evaluates the proportion of adverse human health and environmental effects on minority and low-income populations that would result from project and program-level actions. With publication of the socioeconomic analysis and environmental justice evaluation in this PEIS/R, Reclamation solicits further public comment and inclusion in the planning process. Reclamation's compliance with EO 12898 has been accomplished thus far in the planning process and will continue through implementation of the Settlement.

Executive Order 13007 (Indian Sacred Sites) and April 29, 1994, Executive Memorandum

EO 13007 requires that Federal agencies with land management responsibilities accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners. This EO further requires that those agencies avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies also must maintain the

confidentiality of sacred sites. Other requirements stipulate that the agencies provide reasonable notice of proposed actions or land management policies that may restrict future access to or ceremonial use of sacred sites, or that may 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."

Reclamation received information from NAHC about which Native American groups would be interested in Settlement actions. Reclamation mailed letters requesting their comments. Also, these Native American groups were notified of the public scoping meetings and are included in the distribution list for this PEIS/R. Reaching out to Native American groups, including the groups that participated in scoping and review of this PEIS/R, demonstrates that Reclamation has complied with EO 13007. Continued compliance with this EO would be demonstrated through implementation of mitigation measures, as needed.

Executive Order 13112 – National Invasive Species Management Plan

EO 13112 directs all Federal agencies to prevent and control introductions of invasive nonnative species in a cost-effective and environmentally sound manner**,** to minimize economic, ecological, and human health impacts. EO 13112 established a national Invasive Species Council made up of Federal agencies and departments and a 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 preparing a national management plan for invasive species.

An invasive species management plan is included in this PEIS/R and includes methods for managing the spread of invasive plant species from project and program-level actions. Including an invasive species management plan in the alternatives demonstrates compliance with EO 13112. Reclamation would demonstrate continued compliance with this EO by implementing the methods described in the invasive species management plan.

Federal Transit Administration

To address the human response to groundborne vibration, FTA has set forth guidelines for criteria related to maximum acceptable vibration for different types of land uses. These include 65 VdB for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-technology manufacturing, and laboratory facilities), 80 VdB for residential uses and buildings where people normally sleep, and 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, and offices) (FTA 2006).

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the CHABA at the request of EPA (FTA 2006). For fragile structures, CHABA recommends a maximum limit of 0.25 in/sec PPV (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.

This PEIS/R evaluates potential groundborne vibration impacts on sensitive receptors, including the maximum sensitivity of 65 VdB described above for hospitals, high-technology manufacturing, and laboratory facilities. The rate of 65 VdB could be generated by pile-driving activities. Reclamation has demonstrated consistency with this policy by evaluating program-level actions that would generate the maximum possible groundborne vibration at the highest sensitive uses. Reclamation also has included conservation strategies to reduce the impact in accordance with this policy. Implementation of the mitigation measures would demonstrate that Reclamation would be consistent with the FTA policy for groundborne vibration. The project-level actions were analyzed and did not meet the maximum sensitivity of 65 VdB as described above, therefore, no further action is anticipated.

National Wild and Scenic Rivers System

The National Wild and Scenic Rivers Act of 1968, as amended (Public Law 90-542; 16 USC 1271–1287), established the National Wild and Scenic Rivers System, which identifies distinguished rivers of the Nation that possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other related values. This act preserves the free-flowing condition of the rivers so designated and protects their local environments. Section 5(d)(1) of the act requires that all Federal agencies, when planning for the use and development of water and related land resources, shall consider potential national wild, scenic, and recreational river areas.

No reaches of the San Joaquin River in the study area are designated as a Wild and Scenic River. Compliance with this law is not relevant to implementation of the Settlement.

U.S. Coast Guard

The U.S. Coast Guard is responsible for approval of the location and plans of bridges and causeways constructed across navigable waters of the United States. In addition, the Coast Guard is responsible for approval of the location and plans of international bridges and the alteration of bridges found to be unreasonable obstructions to navigation. Program-level actions have the potential to affect the location and plans of several bridges over the San Joaquin River. Reclamation will coordinate with the U.S. Coast Guard with respect to any program-level actions potentially affecting the location and plans of bridges. Project-level actions are not anticipated to affect the locations or plans of bridges or causeways constructed across navigable waters of the United States.

28.1.2 State Requirements

Compliance with State laws, rules, and regulations for implementation of the alternatives are summarized below. A total of sixteen State requirements are identified.

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 is a statute that requires State and local agencies to identify the significant environmental impacts of their actions and 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 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

Depending on the potential impacts of a proposed project, environmental information is presented in one of three CEQA documents: a Notice of Exemption, an Initial Study supporting either a Negative Declaration or Mitigated Negative Declaration, or an EIR.

As NEPA and CEQA lead agencies, respectively, Reclamation and DWR collaborated to prepare this joint PEIS/R. Project-level actions are analyzed in this PEIS/R at a project-specific level. Program-related actions would require future, project-specific preparation of NEPA and CEQA compliance documentation before implementation. This document identifies anticipated and probable significant effects of the program and project-level actions, as well as feasible mitigation measures. This document also compares No-Action Alternative and action alternatives to allow evaluation of their relative environmental consequences.

California Endangered Species Act

Pursuant to CESA, a permit from DFG is required for projects that could result in the take of a plant or animal species that is State-listed as threatened, endangered or as a candidate species. Under CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species, but unlike the Federal ESA, the CESA definition of take does not include “harming” or “harassing.” Section 86 of the California Fish and Game code defines Take as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." As a result, the threshold for take is higher under CESA than under ESA (i.e., habitat modification is not necessarily considered take under CESA).

A separate incidental permit or multiple incidental take permits under Section 2081 of CESA will likely need to be obtained to implement project-level actions. The appropriate process for obtaining incidental take authorization under CESA is determined based on DFG recommendations. Reclamation and DWR have involved DFG at the early stages of planning to incorporate avoidance measures for State-listed species that may be affected. As described in this document, project proponents for subsequent site-specific projects may obtain a 2081 CESA prior to implementing project-level actions that would result in take of State-listed species.

California Fish and Game Code Sections 3503 and 3503.5 state that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, and that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders *Falconiformes* and *Strigiformes),* including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removing vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for issuing any type of incidental take permit.

This document identifies program-level actions that would potentially disturb nesting birds. To comply with Sections 3503 and 3503.5, this PEIS/R described conservation strategies to avoid disturbing nesting birds. These measures include conducting preconstruction surveys, ceasing vegetation removal activities if the vegetation is occupied by active nests, and establishing environmentally sensitive areas around nesting birds to minimize construction disturbance of any nesting pair, and to avoid forced fledging.

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. DFG is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. DFG has informed non-Federal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

Reclamation and DWR are working closely with DFG to evaluate methods to avoid take of fully protected species.

California Fish and Game Code 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 DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG:

> *…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. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

This combined PEIS/R identifies potential program-level actions that would require the alteration of stream features subject to Section 1602 of the California Fish and Game Code. Project proponents for subsequent site-specific projects that could result in the alteration of stream features subject to Section1602, will apply for a Streambed Alteration Agreement from the DFG. Project-level actions detailed in this PEIS/R are not anticipated to result in the alteration of stream features and are therefore not anticipated to require a Section 1602 Streambed Alteration Agreement.

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 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. This legislation seeks to address flood management problems in the Sacramento-San Joaquin Valley by directing DWR to prepare for the Central Valley Flood Protection Board (CVFPB) to adopt a Central Valley Flood Protection Plan (CVFPP) by mid-2012. The CVFPP is to establish 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.

The flood legislation also requires DWR and the CVFPB to adopt a schedule for mapping flood risk areas in the Central Valley, and sets deadlines for cities and counties in the Central Valley to amend their general plans and zoning ordinances to conform to the CVFPP within 24 months and 36 months, respectively, of its adoption by the CVFPB. Once the general plan and zoning ordinance amendments are enacted, the approval of development agreements and subdivision maps is subject to restrictions in flood hazard zones. Central Valley counties are obligated to develop flood emergency plans within 24 months of CVFPB adoption.

Reclamation and DWR have jointly developed the proposed action in a manner that is consistent with the Central Valley Flood Control Act**,** and which would not inhibit development of the CVFPP.

Central Valley Flood Protection Board Encroachment Permit

Under Title 23 of the California Code of Regulations, the State of California's CVFPB (formerly The Reclamation Board of the State of California) issues encroachment permits

to maintain the integrity and safety of flood control project levees and floodways that were constructed according to flood control plans adopted by CVFPB or the California Legislature. In accordance with the provisions of Title 33, CFR section 208.10, all permit requests for construction of improvements of any nature within the limits of a Federal project right-of-way shall be referred to the USACE District Engineer for review.

Certain program and project-level actions will require work along the San Joaquin River in areas that may be subject to Title 23 because the river is managed for flood control and thus contains features subject to the jurisdiction of CVFPB. Project proponents for subsequent site-specific projects will secure encroachment permits, as needed, to satisfy Title 23 before performing any work along relevant reaches of the San Joaquin River that contain flood control features subject to CVFPB jurisdiction.

California Water Code (Water Rights)

A water right is a legally protected right, granted by law, to take control of water and to put it to beneficial use. Under the California Water Code, the SWRCB is responsible for allocating surface water rights and permitting the diversion and use of water throughout the state. Through its Division of Water Rights, the SWRCB issues permits to store and to divert water for new appropriations and it authorizes changes to existing water rights. The protection and the recapture of Interim and Restoration Flows constitute project level actions that are components of all of the Action Alternatives. In order to implement the San Joaquin River Settlement Act, Reclamation will initially petition the SWRCB for its approval of project-level water right changes pursuant to applicable provision of the California Water Code in order to accomplish these project-level actions. The water rights involved in implementing the San Joaquin River Settlement Act are permitted water right Applications 23, 234, and 5626, which presently authorize storage, direct diversion, and rediversion at Friant Dam. The new authorizations sought pursuant to these initial petitions will accomplish the following:

- Dedicate Interim and Restoration flows, made available through the release of previously stored water at Friant Dam, to instream fish and wildlife purposes through the entire stretch of the San Joaquin River from Friant Dam, through Delta Channels, to Jones and Banks Pumping Plants. This dedication also includes flows routed through Reaches 2 and 3 of the Eastside Bypass, the entire Mariposa Bypass, and the reach of Bear Creek from the confluence of the Eastside Bypass downstream to the confluence with the San Joaquin River. All dedicated flows remain within then-existing channel capacities.

- Authorize Mendota Dam and associated canals, Sack Dam and associated canal, and the Sand Slough Control Structure as points of rediversion for Interim flows

- Authorize Jones and Banks Pumping Plants and San Luis Dam as points of rediversion of Interim and Restoration flows

- Authorize Fish and Wildlife Preservation and Enhancement as a purpose of use for Interim and Restoration flows within all the protected reaches described above and within the boundaries of the East Bear Creek unit

This PEIS/R provides the complete environmental review and demonstration of requisite findings under the California Water Code in order for the SWRCB to approve the initial petitions for change for protection and recapture of Interim and Restoration flows at the project-level.

Implementation of program-level actions for the action alternatives, as described in this PEIS/R, in order to fully implement those alternatives, would require the filing of subsequent water right petitions after further development of additional project-level analysis. These future program-level actions require the approval of additional petitions for water right changes to authorize:

- Operation of new infrastructure on the San Joaquin River below the confluence of the Merced River to recapture Interim and Restoration flows under Action Alternatives C1 and C2

- Operation of existing infrastructure on the San Joaquin River below the confluence of the Merced River to recapture Interim and Restoration flows under Action Alternatives B1, B2, C1 and C2

- Routing of Interim and Restoration Flows above existing channel capacities in River Reach 2B, River Reach 4B1, Eastside Bypass Reaches 2 and 3, and in the Mariposa Bypass

- Routing of Interim or Restoration Flows following completion of the River Reach 2B modification and construction of the Mendota Pool Bypass (among the Common Restoration Actions)

California Wild and Scenic Rivers Act

The California Wild and Scenic Rivers Act of 1972, as amended (PRC Section 5093.50 et seq.), aims to preserve designated rivers possessing extraordinary scenic, recreation, fishery, or wildlife values.

Implementation of the alternatives would not affect any State-designated wild and scenic river.

California Harbors and Navigation Code

The California Harbors and Navigation Code details the jurisdictions of the DBW, which focus development of public access to waterways, safety of vessels and boating facilities, and on-the-water safety.

None of the program-level actions include installing new or modifying existing boating facilities, such as boat ramps, docks, or marinas. Therefore, coordination with DBW is not necessary at this time. This PEIS/R finds that project-level actions would increase boating on the San Joaquin River downstream from Friant Dam and could indirectly encourage development of boating facilities in the future. Coordination with DWB regarding design standards for future boating facilities could be required at that time.

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 RWQCB (in this case, the Central Valley RWQCB). Under the act, the appropriate RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control point and nonpoint sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet the RWQCB's waste discharge requirements, which may be issued in addition to a water quality certification under Section 401 of the CWA.

Program and project-level actions that have the potential to adversely affect water quality are identified in this document. All actions would be implemented consistent with implementation programs under the water quality control plan for the Sacramento River and San Joaquin River basins, as revised through February 2007 (Central Valley RWQCB 1998), and with the RWQCB's waste discharge requirements. Implementing most program-level actions would also include application for and finalization of NPDES permits and Section 401 water quality certifications.

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 the preservation of agricultural lands in California. The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use for 10 years. In return, landowners receive property tax assessments based on farming and open space uses as opposed to 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 and other compatible uses. On establishment of such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land 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.

As a public agency that may acquire lands within agricultural preserves, including lands under contract, DWR is exempt from the normal cancellation process for Williamson Act contracts. This is because the contract is nullified for the portion of the land actually acquired by a public agency (California Government Code Section 51295). DWR must provide notice to the DOC before acquiring such lands (California Government Code Section 51291(b)). A second notice is required within 10 working days after the land is actually acquired (California Government Code Section 51291(c)). DWR would be exempt from the findings required in California Government Code Section 51292 (California Government Code Section 51293(e)(2)) for the acquisition of lands under Williamson Act contracts. Preliminary notice to DOC, provided before lands are actually

acquired, would demonstrate the purpose of the project and exemption from the findings. DOC was provided a copy of this PEIS/R, along with a request for comments.

Project-level actions may result in the need to acquire Important Farmland including lands under Williamson Act contracts. The extent of lands that could be affected due to project-level actions would be determined during the Interim Flow releases, as described in Chapter 16.0, "Land Use and Agricultural Resources." Reclamation is not exempt from, and would follow the normal cancellation process for, Williamson Act contracts, if such lands would be acquired due to project-level actions. The extent of lands that could be affected due to program-level actions would be determined during subsequent site-specific studies. The agency or agencies responsible for acquiring lands under Williamson Act contracts due to implementation of program-level actions would follow the applicable cancellation process as part of the site-specific process.

California Clean Air Act

The CCAA of 1988 requires nonattainment areas, such as the San Joaquin Valley Air Basin, to achieve and maintain State ambient air quality standards by the earliest practicable date. The CCAA also requires local air districts to develop plans for attaining State ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide standards.

This PEIS/R evaluates the contribution of program and project-level actions to any violation of air quality standards and identifies program-level mitigation measures to help achieve consistency with the SIP attainment goal before implementation of any program-level actions. Implementing the project-level actions would be consistent with the SIP attainment goal.

California Native Plant Protection Act

In addition to CESA, the California Native Plant Protection Act (CNPPA) provides protection to "endangered" and "rare" plant species, subspecies, and varieties of wild native plants in California. The CNPPA's definitions of "endangered" and "rare" closely parallel the CESA definitions of endangered and threatened plant species. All program and project-level actions are evaluated in this PEIS/R for consistency with this act. Conservation measures included in the alternatives would be implemented, as necessary, to offset potential program and project-level adverse effects on special-status plants under CNPPA.

California Native Plant Society Species Designations

CNPS is a ***s***tatewide nonprofit organization that seeks to increase understanding of California's native flora**,** and to preserve this rich resource for future generations. CNPS has developed and maintains lists of vascular plants of special concern in California. CNPS-listed species have no formal legal protection, but the value and importance of these lists are widely recognized.

This PEIS/R identifies plants of concern on CNPS lists that may be affected by program and project-level actions, using these lists as a method of identifying species of concern. Conservation measures included in the alternatives would be implemented, as necessary, to reduce or avoid adverse effects to these species of concern.

State Lands Commission Land Use Lease

The California State Lands Commission was given authority and responsibility to manage and protect the important natural and cultural resources on certain public lands within the State, and the public's rights to access these lands. The public lands under the commission's jurisdiction are of two distinct types: 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, as well as the State's tidal and submerged lands along the coastline, extending from the shoreline to 3 miles offshore. A project cannot use these State lands unless a lease is first obtained from the California State Lands Commission

The San Joaquin River is defined as "navigable in fact" from its mouth upstream to approximately 8 miles downstream from SR 99, and is therefore subject to the jurisdiction of the California State Lands Commission. Program-level actions that require work on the San Joaquin River would require a lease from the State Lands Commission. DWR is coordinating with the State Lands Commission as a Responsible Agency under CEQA in preparing this PEIS/R. Implementing the project-level actions would not cause substantial adverse effects to natural and cultural resources on lands subject to the jurisdiction of the California State Lands Commission.

California Department of Transportation

Caltrans is responsible for planning, designing, construction, operating, and maintaining all State-owned roadways in California. The Caltrans Highway Designs Manual (2008) establishes uniform policies and procedures to carry out the Caltrans 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.

Highway improvements or modifications, as may be needed for implementation of this project, may require an encroachment permit as issued through Caltrans. The project may involve modifications to roadways that Caltrans considers "complex" and require extensive communication with the Caltrans Department of Engineering Services or structure-specific encroachment permits. These are detailed in the Caltrans Encroachment Permits Manual (2002), which is available at the Caltrans Web site. Any improvements to roadways subject to Caltrans jurisdiction would be subject to Caltrans design standards, which would include standards for protecting cultural resources and structures.

Program-level actions may require improving or modifying roadways subject to Caltrans jurisdiction. Encroachment permits are a necessary condition of work on any roadway subject to Caltrans jurisdiction. The permitting process and conditions of approval would include satisfying Caltrans standards for protection of cultural resources and structures. Implementing the project-level actions would not improve or modify any roadways subject to Caltrans jurisdiction.

California Public Resources Code

The California PRC contains several sections relevant to the project. Some examples include the California Park and Recreational Facilities Act of 1984 (Section 5096.225) and the Federal Water Project Recreation Act (Section 5094).

Compliance with these acts is achieved by analyzing in this PEIS/R the impact of project and program-level actions on recreation opportunities. Reclamation owns and leases Millerton Lake and the surrounding lands to California State Parks, which operates the lake and environs as a State Recreation Area.

California Surface Mining and Reclamation Act

The California Surface Mining and Reclamation Act of 1975 (California PRC Section 2710 et seq.), SMARA, addresses surface mining. Activities subject to SMARA include, but are not limited to mining of minerals, gravel, and borrow material. 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. The SMARA statute requires mitigation to reduce adverse impacts on public health, property, and the environment. Because Reclamation and DWR would require borrow material for program-level construction activities, Reclamation and DWR must comply with SMARA. SMARA is implemented through ordinances for permitting developed by local-government lead agencies that provide the regulatory framework under which local mining and reclamation activities are conducted. The State Mining and Geology Board of the California Department of Conservation reviews the local ordinances compliance with the procedures established by SMARA.

The respective counties in which borrow activity would occur are the SMARA lead agencies for borrow excavation operations for program-level actions. In general, SMARA permitting requires the lead agency to approve a permit and reclamation plan, and post approved financial assurance for reclamation of the mined land. Project proponents for subsequent site-specific projects will coordinate with the SMARA lead agencies and the California Department of Conservation to identify the appropriate vehicle for SMARA compliance for removing borrow. Compliance would be achieved by obtaining either SMARA permits or exemptions from SMARA.

When a SMARA lead agency approves a SMARA permit, this discretionary action also requires that the SMARA lead agency satisfy CEQA. This PEIS/R analyzes anticipated impacts of program-level actions, including impacts associated with removing borrow material. If removing borrow for future program-level actions is consistent with the level and range of impacts identified in this PEIS/R, compliance with CEQA for borrow removal may be achieved by using the checklist in Chapter 16.0 of this PEIS/R. Implementing project-level actions are not anticipated to be subject to SMARA, as these actions would not include mining of minerals, gravel, or borrow material or similar activities.

28.1.3 Local Plans and Policies

This PEIS/R analyzes alternatives for consistency with the general plan policies of the relevant counties and cities. These jurisdictions include Madera, Merced, Fresno, and

Stanislaus counties and the cities of Fresno and Firebaugh. Compliance with local plans and polices for implementation of the alternatives is summarized below.

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 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 the 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.

28.2 Consultation and Coordination

Consultation and coordination for the SJRRP included Program Scoping, and consultation with agencies and organizations, as described in the following sections. Future consultation and coordination are also described in this section.

28.2.1 Program Scoping

Public scoping activities are conducted as part of compliance with both NEPA and CEQA. NEPA scoping is a continuous planning process that is required throughout the planning of the SJRRP and during the early stages of EIS preparation. The scoping process helps to identify areas to be studied and to eliminat***e issues*** from detailed study that are not critical to the decision at hand.

The Draft PEIS/R is being developed under congressional authorization granted to the Secretary under the San Joaquin River Restoration Settlement Act (Public Law 111-11). Development of the Draft PEIS/R is the initial planning and environmental review necessary to implement the Stipulation of Settlement in NRDC et al. v. Kirk Rodgers et al.

Notice of Intent

Reclamation published the NOI to prepare a PEIS/R and the notice of public scoping meetings pursuant to NEPA in the FR on August 2, 2007 (Volume 72, No. 148, pages 42,428–42,429). The NOI is available at www.restoresjr.net.

Notice of Preparation

DWR initiated the CEQA process by issuing a NOP on August 24, 2007, and the project was assigned State Clearinghouse Number 2007081125. Four scoping meetings were identified in the NOP. Parties were given 30 days from the date of receiving the NOP to comment on the document. The review period of the NOP began August 24, 2007, and ended September 24, 2007. The NOP is available at www.restoresjr.net.

Public Scoping Meetings

As mentioned, a notice of scoping meetings was published in the Federal Register (Volume 72, No. 148, pages 42,428–42,429) on August 2, 2007, as part of Reclamation's NOI. On the same day, Reclamation announced the scoping meetings in a news release posted on the SJRRP Web site, and distributed the meeting schedule to media in the study area via e-mail. The release also was distributed to stakeholders, organizations, and other interested parties, and Reclamation and DWR also sent notices to groups and individuals about the scoping meetings through a variety of methods. Before each public scoping meeting, paid advertisements were placed in the San Francisco Chronicle, Sacramento Bee, Bakersfield Californian, Fresno Bee, Visalia Times Delta, Merced Sun Star, and Modesto Bee newspapers to inform the public of meeting dates and locations. Reclamation and DWR mailed postcard notices with details for each meeting to approximately 3,800 agencies, organizations, and individuals. In addition, the lead agencies distributed a press release to Reclamation's media lists for the Sacramento and San Joaquin areas that included all of the aforementioned newspapers, including Spanish-language media and Farm Bureau publications for the counties of San Joaquin, Stanislaus, and Merced.

In 2007, four public scoping meetings were conducted in "open house" formats throughout the San Joaquin Valley, between Fresno and Sacramento, to update the public on the status of the proposed action and to solicit and receive input on alternatives, concerns, and issues to be addressed in the Draft PEIS/R. The Implementing Agencies convened the four public scoping meetings, one each in Tulare (August 28, 2007), Fresno (August 29, 2007), Los Banos (August 30, 2007) and Sacramento (September 10, 2007). Each scoping meeting began with presentations from Reclamation, DWR, NRDC, and FWA. The presentations explained the purpose of the meeting, provided an overview of the Settlement and Settlement implementation, and described the public scoping process. The presentation phase was followed by an open house to provide an opportunity for participants to discuss and clarify specific issues of concern with agency and SJRRP staff available at five resource-specific stations:

- Program and Process (goals, process, and timeline)
- Fish Restoration (fish restoration strategy)
- Water Management (water management options)
- Flood Management (coordination between the State flood management program and SJRRP)
- Reach-by-Reach Considerations (key features in each of five river reaches, as described in the SJRRP Program Management Plan (SJRRP 2007a))

A public comment session was held after the open house portion, during which meeting attendees were invited to provide oral comments. Reclamation and DWR received written scoping comments between August 2, 2007, and September 26, 2007. At public scoping meetings during this period 25 written and oral comments were received, as shown in Table 28-1. Reclamation and DWR also received written comments outside of public scoping

meetings from a total of 85 entities, including Federal and State agencies, local interest groups, local residents, farmers, landowners, environmental groups, public advocacy groups, and Native American groups. Public issues and Major Areas of Controversy are outlined below.

Table 28-1.
Public Scoping Meeting Locations and Comments Received

Meeting Location	Date	Oral Comments	Written Comments
Tulare, California	August 28, 2007	2	1
Fresno, California	August 29, 2007	1	7
Los Banos, California	August 30, 2007	9	2
Sacramento, California	September 10, 2007	2	1
Total		14	11

Source: SJRRP 2007b

Other Public Outreach

Reclamation and DWR conducted the following additional public outreach activities since the scoping meetings:

- Issued public scoping report in December 2007 (SJRRP 2007b)
- Hosted regularly scheduled technical feedback meetings with subject-matter experts, Settling Parties, affected stakeholders, and the general public to obtain information or viewpoints from individual attendees
- Provided updates on the status of Work Group (WG) work products
- Kept Technical Feedback Group up-to-date with the status of the program
- Gathered feedback on program documents to discuss potential opportunities and constraints that may have arisen
- Built and maintained a public, agency, and media mailing list for distributing program information
- Developed and distributed a wide variety of SJRRP information, including quarterly program updates, two annual reports, news releases, fact sheets, and brochures to keep the public informed
- Provided program leadership and staff as key speakers and guides during the Water Education Foundation's 2008 and 2009 tours of the San Joaquin River attended by the public, stakeholders, and agency representatives

- Established a landowner coordinator to serve as a technical resource and liaison for program staff and landowners to conduct all field activities necessary for successfully implementing the Settlement, and to inform potentially affected property owners of field activities on their land

- Held river reach-specific landowner workshops quarterly in 2008 and 2009 to update potentially affected landowners on SJRRP activities, and to obtain landowner feedback on program plans and progress

- Developed a process and form for obtaining landowner permission for temporary access to private property in support of program field activities

- Offered informational San Joaquin River tours for staff of Federal and State legislators

- Offered reconnaissance-level tours for Implementing Agency staff and consultant teams, and one-day WG tours

- Maintained a Web site for the SJRRP that offers timely information and updates on program activities and opportunities for public involvement, a calendar of events, contact information, and a document repository that includes technical memoranda (www.restoresjr.net)

Public Issues and Major Areas of Controversy

A public scoping report dated December 14, 2007, summarizes the results of the scoping meetings and comments received (SJRRP 2007b), and is available to the public on the SJRRP Web site. The comments received assisted Reclamation and DWR in identifying the final range of actions, alternatives, site design options, environmental resources, and mitigation measures that are analyzed in the Draft PEIS/R.

During SJRRP meetings and workshops, the public and Federal, State, and local stakeholders identified the following 36 areas of concern. Each area of concern listed below is addressed more fully in the public scoping report (SJRRP 2007b), and the complete comments are reproduced in Appendix C of that report. The major areas of known controversy, as required by CEQA Guidelines, as listed below.

- Concerns were raised by some members of the public about the ability to avoid seepage damage to properties along the river. The Physical Monitoring and Management Plan will provide additional information during Interim and Restoration flows about the response of the system to flows in the river channel. This information should be used during the planning stages of site-specific projects which may alter the channel or otherwise influence seepage.

- There is uncertainty about the ability to reintroduce Chinook salmon and establish self-sustaining populations within the Restoration Area. The Fisheries Management Plan describes the framework for addressing specific actions related to fisheries and evaluates their merits (including uncertainty) in an action routing process.

- Additional specificity is necessary to achieve elements of the Water Management Goal, including recirculation of Interim and Restoration flows to the Friant Division long-term contractors, and the ability to convey and store surplus supplies under Paragraph 16(b) of the Settlement. These elements of the Water Management Goal are the subject of a Water Management Plan, currently under development by Reclamation.

- Additional simulation is being prepared to determine the impacts of the program alternatives under the 2008 USFWS CVP/SWP Operations BO and the 2009 NMFS CVP/SWP Operations BO. The results of this assessment will change the anticipated effects of the alternatives; however, the relative impacts and overall impact mechanisms are not anticipated to change with the results of this assessment. The results of this assessment will be provided in the Final PEIS/R.

Additional comments were received regarding the following:

- Air Quality
  - Specific documentation on existing air quality conditions affecting the project area, and specific guidance given by the district for addressing project-level air quality impacts
  - Mitigation measures addressing impacts at the project level
- Climate Change
  - Potential consequences of climate change on restoration efforts
- Coordination between the SJRRP and agencies and nongovernmental organizations
  - Restoration efforts on SJRC lands consistent with the San Joaquin River Parkway Master Plan (SJRC 2000)
  - Riparian habitat planning in consultation with the Riparian Habitat Joint Venture throughout the study area
  - Allowance and integration of local restoration efforts, including database management systems that are transparent and user-friendly
- Cultural Resources
  - Clarification of area location previously surveyed for cultural resources
  - Specific consultation with Native American representatives for input on potential project impacts
  - Disclosure of whether probability for presence of unrecorded cultural resources is low, moderate, or high within the study area

- Eastside and Mariposa Bypass Flows: preferences were expressed for the following:
  - Leaving the bypasses intact for the sole purpose of flood flow conveyance
  - Routing Restoration Flows through both bypasses, and dredging the center of bypasses to deepen water depth for temperature control
- Eastside and Mariposa Bypass Flows: preferences were expressed against the following:
  - Increasing channel capacity in the Reach 4 mainstem
  - Constructing levees to accommodate increased flows in Reach 4B
  - Increasing flows down the river channel
  - Endangered and Threatened Species
    - Impact on third parties from reintroduction of Chinook salmon
    - Potential impacts on State-listed species already existing in the study area
- Fisheries in San Joaquin River Tributaries
  - Request for evaluation of measures to preclude accidental migration of Chinook salmon or other species into tributary rivers and streams
  - Concerns about coordination with ongoing Merced River restoration and other ongoing projects
- Fish Screening
  - Concerns about costs versus alternatives to using screens
- Flood Management
  - Concerns about risks to property, engineering design, and permitting, including meeting USACE criteria
- Funding and Costs
  - Methodology for addressing project selection based on cost and available funding limitations
  - Concerns about implementing alternatives if full funding is not received, and flexibility to adjust Settlement implementation to available funding
- Gravel
  - Concern about whether gravel sources for habitat would come from mining

- Habitat
  - Desire to see close integration of riparian and wetland habitats, and need to complete restoration and revegetation before Chinook salmon are reintroduced
  - Exploration of interconnectivity of habitat types and benefits of habitat to multiple species
  - Regulatory jurisdiction over State-listed species
- Hatchery and Fish Selection
  - Concerns about genetic viability of wild versus hatchery Chinook salmon for reintroduction success, including adequate monitoring
- Invasive Species
  - Concerns regarding flora and fauna and need to address in the planning process and data needs elements of the project
- Levees
  - Concerns about channel capacity and baseline flows to be used for levee system design
  - Long-term water quality impacts, and the benefits of levee removal for habitat creation by allowing more natural downstream flows
- Mendota Dam, Sack Dam, and Arroyo Canal
  - Alternative to screening Mendota Dam, and constraints of ownership for other dams
  - Optimum flows for agricultural deliveries and impacts of fish screens
- Monitoring
  - Addressing gaps as well as using a comprehensive monitoring and assessment process, especially to track restoration and water management
- Natural River Processes
  - Incorporation of natural river channel features to move sediments, form sand channels, and recharge aquifers, and their impacts on the ability to meet biological needs of different habitats

- Outreach
  - Suggestions for stakeholder groups to be involved, including the SJRPCT
  - Suggestions for involvement in and notification of the Work Group meetings on the Web site
  - Sections from the California State Lands Commission, a responsible agency, suggested that the lead agencies conduct agency/public workshops to formulate program alternatives
- Permitting and Enforcement
  - DFG for CESA permit, including activities after the ESA Section 10(j) experimental population status is removed
  - USACE for issuance of Section 404 Clean Water Act permits for work that discharges fill material into waters of the United States, including the potential sedimentation resulting from reintroduced flows
  - CVFPB (formerly the Reclamation Board of the State of California) to provide integrity of the flood management systems
  - Central Valley RWQCB to implement and enforce the State's nondegradation plan by establishing salinity protection standards and restrictions
  - Concerns raised by other public organizations about poaching and potential over-harvesting
- Pollution
  - Concern about increased litter resulting from increased public access
  - Identification of hazardous waste sites, as required by the California PRC
  - Potential impacts of runoff to the river from agricultural and other users
- Program Area
  - Concern that study area not yet defined
  - Need to address watershed area above Friant Dam
  - Identification of San Joaquin River Conservancy lands affected by significant restoration projects
- Program Process and Implementation
  - Reintroduction strategies, including timing of both flows and Chinook salmon in the river with functionality of Restoration Goal
  - Concurrence of goal development for restoration and for water management.

- Responsibility for O&M
- Early Public analysis and review of priorities
- Agency roles and Work Group composition

- Property
  - Landowner safeguards during restoration efforts
  - Property Acquisition Schedule
  - Seepage due to increased flows
  - Transportation issues related to properties adjacent to and include islands in the river
  - California State Lands Commission's regulatory role through sovereign ownership of land under the river

- Recreation
  - Impacts on existing uses, both fishing and nonfishing
  - Potential for new uses
  - Millerton Lake State Recreation Area and impact of changing water levels
  - Evaluation of Lost Lake Park impacts
  - Creation of a conservation zone from the Bay to preserve recreational amenities

- River Reaches
  - Levee stability and seepage, and improvements coordination
  - Riparian habitat restoration, water supply, and flood management operations
  - Specific comments for reach-related project-level analysis

- Social and Economic Impacts
  - Potential for creating jobs and developing marketable workforce skills
  - Impacts of removing land from agricultural production
  - Impacts of future population growth and water supply demands
  - Impacts on rural, low-income, minority, and other populations

- Stakeholder Groups
  - Role of nongovernmental organizations
  - Capacity to mobilize large volunteer groups

- Vegetation
  - Native riparian vegetation as critical habitat for salmon
  - Use in optimizing spawning habitat, including shade, runoff filtration, and woody debris
- Water and Irrigation Districts
  - Impacts on irrigation districts without water contracts, if no water is available for purchase
  - Approvals and discretionary actions of Exchange Contractors
- Water Exchanges, Transfers, and Recovery
  - Alternatives for evaluation at the project level
- Water Rights and Long-Term Water Contracts
  - Recognition of, and evaluation of impacts on, water rights of lands downstream from Friant Dam
- Water Shortages
  - Articulation of Water Management Goal so that mitigation of water shortages is fully understood
  - Suggested water conservation measures to mitigate water shortages
- Water Storage, Supply, and Availability
  - Identification of comprehensive water storage options, including recycling of water, groundwater recharge, water transfers, and surface storage
- Water Temperature and Quality
  - Concern about meeting safe temperature limits using April and May releases from Friant Dam
  - Increased water quality degradation from Friant Dam releases
  - Establishment of limits in nondegradation plan before reintroduction of fish begins

Engagement of local governments, nongovernmental organizations, and individuals, as well as coordination between the SJRRP and agencies, has been and continues to be facilitated through SJRRP Work Groups. Continuation of scheduled meetings and open sharing of information via the SJRRP Web site are evidence of this commitment. Memoranda of Understanding are prepared, as required, for cooperating agencies under NEPA, and continued collaboration with responsible agencies, especially those with a trust responsibility, is a goal and commitment of the SJRRP. Continued involvement and open sharing of information through the SJRRP Web site show that the comments raised regarding public outreach are recognized. The need to balance open sharing of information with adherence to agency responsibilities will continue to be a goal.

28.2.2 Agencies and Organizations Consulted

This section discusses agency consultations and coordination that occurred during the development of the Draft PEIS/R and summarizes the agency involvement activities undertaken by Reclamation and DWR to satisfy NEPA and CEQA.

NEPA Consultation

Reclamation invited eligible governmental entities to participate as Cooperating Agencies, in accordance with 43 CFR Part 46.225(3)(b), in developing the Draft PEIS/R. Several agencies requested identification as Cooperating Agencies under NEPA, including the San Joaquin River Exchange Contractors Water Authority (SJRECWA), acting on behalf of its members and, specifically, the Central California ID, San Luis Canal Company (SLCC), and Columbia Canal Company (CCC); Arvin-Edison WSD; Chowchilla WD; Porterville ID; Saucelito ID; Terra Bella ID; EPA; and FWA. Reclamation will be responding to their requests for Cooperating Agency status in accordance with 43 CFR Part 46 and the U.S. Department of the Interior's Final Rule for Implementation of NEPA.

Reclamation, as one of five Implementing Agencies, follows the public involvement/public outreach plan, adopted in April 2007, to guide SJRRP outreach. As defined in 43 CFR Part 46.110, Reclamation is ultimately responsible for ensuring that consensus-based alternatives, if any, are fully consistent with NEPA, CEQ regulations, and applicable statutory and regulatory provisions.

CEQA Consultation

DWR contacted the responsible agencies, as required under CEQA. Comments were received from the DWR Division of Floodplain Management, DFG Region 4, California State Lands Commission, and NAHC. Agencies that requested identification as responsible agencies under CEQA included the CVFPB; the SJRECWA, acting on behalf of its members, specifically Central California ID , SLCC, and CCC; Arvin-Edison WSD; Chowchilla WD; Porterville ID; Saucelito ID; and Terra Bella ID. Because DFG will be issuing a streambed alteration agreement, DFG is a responsible agency under CEQA.

Native American Consultation

On behalf of Reclamation, Davis-King & Associates contacted NAHC to request a Sacred Lands File search for sacred sites within the Restoration Area. NAHC responded that its records show an absence of sacred sites, but provided an extensive contact list of Native Americans who may have information about the Restoration Area. Meetings were held

with four groups identified on the list, and another 8–10 groups have been identified for future meetings. This work is ongoing, and because of the sensitive and sometimes confidential nature of the Native American concerns, details will be provided when the studies are completed.

In a letter from the California Department of Parks and Recreation, the Dumna Tribe was identified as requesting specific notice about future plans and changes to project operations in Millerton Lake.

28.2.3 Future Public Involvement

In accordance with NEPA and CEQA review requirements, this Draft PEIS/R will be circulated for public and agency review and comment for a 60-day period following the date when the EPA publishes the Notice of Availability in the Federal Register, and the filing of the Notice of Completion with the State Clearinghouse by DWR. Similar to the approach to public scoping, public hearings will be held to receive public input on the Draft PEIS/R. These hearings will be held during the public comment period so that any comments received at the hearings can be addressed in the Final PEIS/R. In addition, written comments from the public, reviewing agencies, and stakeholders will be accepted during the public comment period.

The Final PEIS/R will be prepared and circulated in accordance with NEPA and CEQA requirements, and will include responses to comments. Reclamation will then issue its Record of Decision. The Record of Decision will identify Reclamation's decision regarding the alternatives considered, and address substantive comments received on the Final PEIS/R.

Following lead agency consideration of all comments received during the public review period of the Draft PEIS/R and circulation of the Final PEIS/R, DWR will hold a public meeting to consider certification of the Final PEIR and decide whether to approve the proposed action or an alternative. A Notice of Determination documenting the decision will then be issued. To support a decision on the proposed action, DWR must prepare and adopt written findings of fact for each significant environmental impact identified in the Draft PEIS/R, a statement of overriding considerations, if needed, and a mitigation monitoring and reporting program for implementing the mitigation measures and project revisions, if any, identified in the Draft PEIS/R.

28.3 Distribution List

This section provides a list of those Federal, State, and local agencies, as well as Indian Tribes, organizations, and individuals that have been identified to receive a copy of this Draft PEIS/R. A Notice of Availability will also be widely distributed, indicating the document is available for viewing on the SJRRP public website at w*ww.restoresjr.net*.

28.3.1 Federal Agencies

Federal Emergency Management Agency, Region IX
National Marine Fisheries Service
Natural Resource Conservation Service
Office of Environmental Policy and Compliance, Dept. of the Interior
Army Corps of Engineers
Bureau of Indian Affairs
Bureau of Land Management - San Joaquin River Gorge
Coast Guard
Coast Guard, Division of Boating Safety
Department of Agriculture, Forest Service - Sierra National Forest
Environmental Protection Agency, Region 9, CED-2, Com. & Ecosystem Division
Environmental Protection Agency, WTR-3
Fish & Wildlife Service
Fish & Wildlife Service, Merced and San Luis National Wildlife Refuges
Fish &Wildlife Service, Central Valley Joint Venture
Geological Survey - California Water Science Center
National Park Service, Pacific West Region

28.3.2 United States Congress

U.S. Congressional Representative, 11th District. Jim McNerney
U.S. Congressional Representative, 17th District. Sam Farr
U.S. Congressional Representative, 18th District. Dennis Cardoza
U.S. Congressional Representative, 19th District. Jeff Denham
U.S. Congressional Representative, 20th District. Jim Costa
U.S. Congressional Representative, 21st District. Devin Nunes
U.S. Congressional Representative, 22nd District. Kevin McCarthy
U.S. Congressional Senate, Dianne Feinstein
U.S. Congressional Senate, Barbara Boxer

28.3.3 State Agencies

California Air Resources Board
California Business, Transportation, and Housing Authority
California Coastal Commission
California Department of Boating and Waterways
California Department of Conservation
California Department of Fish and Game
California Department of Food and Agriculture
California Department of Forestry
California Department of Parks and Recreation
California Department of Toxic Substances Control
California Department of Transportation, District 10
California Department of Transportation, District 6
California Environmental Protection Agency
California Highway Patrol
California Natural Resources Agency
California Natural Resources Agency - Policy Planning Department

California Office of Emergency Services
California Office of Historic Preservation
California State Lands Commission
California State University, Fresno
California State University, Stanislaus
Central San Joaquin Water Conservation District
Central Valley Flood Protection Board
Central Valley Regional Water Quality Control Board
Central Valley Regional Water Quality Control Board
Central Valley Regional Water Quality Control Board
Delta Protection Commission
Delta Stewardship Council
Native American Heritage Commission
San Joaquin River Parkway and Conservation Trust
State Clearinghouse
State Water Resources Control Board
University of California, Water Resources Center Archives

28.3.4 California Legislature

California State Assembly, 17th District. Cathleen Galgiana
California State Assembly, 29th District. Linda Haleman
California State Assembly, 30th District. David Valadao
California State Assembly, 31st District. Henry Perea
California State Assembly, 34th District. Connie Conway
California State Assembly, 6th District. Jared Huffman
California State Senate, 12th District. Anthony Cannella
California State Senate, 14th District. Tom Berryhill
California State Senate, 16th District. Michael Rubio

28.3.5 Tribes

Big Sandy Rancheria
Buena Vista Rancheria
Central Valley Miwok Tribe
Chicken Ranch Rancheria
Choinumni Tribe
Cold Springs Rancheria
Dumna Tribal Government
Ione Band of Miwok Indians
Jackson Rancheria
American Indian Movement
North Fork Rancheria
Picayne Rancheria of Chukchansi Indians
Southern Sierra Miwok Nation
Table Mountain Rancheria
Tachi Yokut Tribe
Tule River Tribe
United Auburn Indian Community of the Auburn Rancheria

28.3.6 Libraries

Fresno Central Branch Library
Los Banos Public Library
Sacramento Public Library
Visalia Branch Library
Willows Public Library
Yolo County Library
Yolo County Library, Davis Branch

28.3.7 Local Agencies

Alameda County Planning Department
Alameda County Water District
Alpaugh Irrigation District
American Indian Council of Mariposa County
Anderson-Cottonwood Irrigation District
Arvin-Edison Water Storage District
Atwell Island Water District
Banta-Carbona Irrigation District
Bella Vista Water District
Broadview Water District
Butte Slough Irrigation Company
Byron-Bethany Irrigation District
Carter Mutual Water District
Cawelo Water District
Centinella Water District
Central California Irrigation District
Central Delta Water Agency
Central Valley Project Water Association
Chowchilla Water District
City of Avenal
City of Coalinga
City of Dos Palos
City of Firebaugh
City of Folsom
City of Fresno
City of Huron
City of Lindsay
City of Los Banos
City of Madera
City of Mendota
City of Merced, Planning Department
City of Orange Cove
City of Redding
City of Roseville
City of Sacramento
City of Tracy

Clay Water District
Columbia Canal Company
Colusa County
Colusa County Water District
Colusa Drain Mutual Water Company
Consolidated Irrigation District
Contra Costa Water District
Corcoran Irrigation District
Corning Water District
Cortina Water District
County of Fresno, Department of Public Works and Planning
County of Madera, Planning Department
County of Merced, Planning and Development Services
Davis Water District
Deer Creek and Tule River Authority
Del Puerto Water District
Delano-Earlimart Irrigation District
Dos Palos Joint Powers Authority
Dunnigan Water District
Eagle Field Irrigation District
East Bay Municipal Utility District
East Contra Costa Irrigation District
Eastside Mutual Water District
El Camino Irrigation District
El Dorado County Water Agency
El Dorado Irrigation District
Exeter Irrigation District
Farmers Water District
Feather Water District
Firebaugh Canal Water District
Firebaugh Canal Water District
Foresthill Public Utility District
Fresno County Board of Supervisors
Fresno County Clerk/Register of Voters
Fresno County Dept. of Public Works and Planning
Fresno County Economic Opportunities Commission
Fresno County Farm Bureau
Fresno County Office of Education
Fresno Irrigation District
Fresno Metropolitan Flood Control District
Fresno Sheriff's Department
Friant Water Authority
Friant Water Users Authority
Friant Water Users Authority
Garfield Water District
Glenn-Colusa Irrigation District

Grassland Water District
Gravelly Ford Water District
International Water District
Ivanhoe Irrigation District
James Irrigation District
Kaweah Delta Water Conservation District
Kern County Board of Supervisors
Kern County Water Agency
Kern Valley Indian Council
Kern-Tulare Water District
Kings County Administrative Office
Kings River Water Association
Kings River Conservation District
Laguna Water District
Lewis Creek Water District
Lindmore Irrigation District
Lindsay-Strathmore Irrigation District
Los Banos Wildlife Management Area
Lower San Joaquin Levee District
Lower Tule River Irrigation District
Madera City Council
Madera County Agricultural Commissioner
Madera County Board of Supervisors
Madera County Clerk
Madera County Farm Bureau
Madera County Planning Department
Madera County Sheriff's Department
Madera Irrigation District
Maxwell Irrigation District
Merced County Clerk
Merced County Farm Bureau
Merced County Sheriff's Department
Mercy Springs Water District
Meridian Farms Water Company
Metropolitan Water District
Mid-Valley Water Authority
Mid-Valley Water District
Millerton Lake Area Chamber of Commerce
Modesto Irrigation District
Myers-March Mutual Water Company
Natomas Central Mutual Water Company
Natural Resources Defense Council
North Delta Water Agency
North San Joaquin Water Conservation District
Northern California Power Agency
Oakdale Irrigation District

Omochumne-Hartnell Water District
Orange Cove Irrigation District
Orland-Artois Water District
Oro Loma Water District
Pacheco Water District
Pajaro Valley Water Management Agency
Panoche Water District
Patterson Irrigation District
Pelger Mutual Water Company
Pixley Irrigation District
Placer County Water Agency
Pleasant Grove-Verona Mutual Water Company
Pleasant Valley Water District
Porterville Irrigation District
Princeton-Codora-Glenn Irrigation District
Proberta Water District
Provident Irrigation District
Reclamation District No. 1004
Reclamation District No. 108
Reclamation District No. 1606
Reclamation District No. 770
Reclamation District No. 830
Regional Water Authority
Roberts Ditch Irrigation Company
Root Creek Water District
Rosedale-Rio Bravo Water Storage District
Sacramento County Public Works - Planning Department
Sacramento County Water Agency
Sacramento Groundwater Agency
Sacramento Municipal Utility District
Sacramento River Water Contractors Authority
Sacramento Suburban Water District
Sacramento Area Flood Control Agency
San Benito County Water District
San Joaquin County Flood Control and Water Conservation District
San Joaquin County Planning Department
San Joaquin River Association
San Joaquin River Parkway and Conservation Trust
San Joaquin Tributary Association
San Joaquin Valley Air Pollution Control District
San Joaquin Valley Air Pollution Control District
San Juan Water District
San Luis & Delta-Mendota Water Authority
San Luis Canal Company
San Luis Water District
Santa Clara Valley Water District

Santa Nella County Water District
Saucelito Irrigation District
Semitropic Water Storage District
Shafter-Wasco Irrigation District
Shasta County Water Agency
San Joaquin River Resources Management Coalition
South Delta Water Agency
Southern San Joaquin Municipal Utility District
Stanislaus County
Stockton East Water District
Stone Corral Irrigation District
Stony Creek Water District
Sutter Mutual Water Company
Sutter-Extension Water District
Swinford Tract Irrigation District
Tea Pot Dome Water District
Tehama-Colusa Canal Authority
Terra Bella Irrigation District
The West Side Irrigation District
Thomes Creek Water District
Tisdale Irrigation & Drainage Company
Traditional Choinumni Tribe
Tranquility Irrigation District
Tranquility Public Utility District
Tri-Valley Water District
Tulare County
Tulare County Planning and Development
Tulare Irrigation District
Tuolumne Rancheria
Tuolumne Utilities District
Turlock Irrigation District
Turner Island Farms
Turner Island Water District
Union Public Utility District
West Stanislaus Irrigation District
Westlands Water District
Westside Water District
Widren Water District
Willow Creek Mutual Water Company
Woodbridge Irrigation District

28.3.8 County Board of Supervisors

Mr. Scott Haggerty, Alameda County Board of Supervisors, District 1
Ms. Nadia Lockyer, Alameda County Board of Supervisors, District 2
Ms. Wilma Chan, Alameda County Board of Supervisors, District 3
Mr. Nate Miley, Alameda County Board of Supervisors, District 4

Mr. Keith Carson, Alameda County Board of Supervisors, District 5
Mr. John Gioia, Contra Costa County Board of Supervisors, District 1
Ms. Gayle Uilkema, Contra Costa County Board of Supervisors, District 2
Ms. Mary Piepho, Contra Costa County Board of Supervisors, District 3
Ms. Karen Mitchoff, Contra Costa County Board of Supervisors, District 4
Mr. Federal D. Glover, Contra Costa County Board of Supervisors, District 5
Mr. Phil Larson, Fresno County Board of Supervisors, District 1
Ms. Susan B. Anderson, Fresno County Board of Supervisors, District 2
Mr. Henry Perea, Fresno County Board of Supervisors, District 3
Ms. Judy Case, Fresno County Board of Supervisors, District 4
Ms. Debbie Poochigian, Fresno County Board of Supervisors, District 5
Mr. Jon McQuiston, Kern County Board of Supervisors, District 1
Mr. Zack Scrivner, Kern County Board of Supervisors, District 2
Mr. Mike Maggard, Kern County Board of Supervisors, District 3
Mr. Ray Watson, Kern County Board of Supervisors, District 4
Ms. Karen Goh, Kern County Board of Supervisors, District 5
Mr. Joe Neves, Kings County Board of Supervisors, District 1 - Government Center
Mr. Richard Valle, Kings County Board of Supervisors, District 2 - Government Center
Mr. Doug Verboon, Kings County Board of Supervisors, District 3- Government Center
Mr. Tony Barba, Kings County Board of Supervisors, District 4 - Government Center
Mr. Richard Fagundes, Kings County Board of Supervisors, District 5 - Government Center
Mr. Frank Bigelow, Madera County Board of Supervisors, District 1
Mr. David Rogers, Madera County Board of Supervisors, District 2
Mr. Ronn Dominici, Madera County Board of Supervisors, District 3
Mr. Max Rodriguez, Madera County Board of Supervisors, District 4
Mr. Tom Wheelter, Madera County Board of Supervisors, District 5
Mr. John Pedrozo, Merced County Board of Supervisors, District 1
Mr. Hubert "Hub" Walsh, Merced County Board of Supervisors, District 2
Mr. Linn Davis, Merced County Board of Supervisors, District 3
Ms. Deidre F. Kelsey, Merced County Board of Supervisors, District 4
Mr. Jerry O'Banion, Merced County Board of Supervisors, District 5
Honorable Phil Serna, Sacramento County Board of Supervisors District 1
Honorable Jimmie Yee, Sacramento County Board of Supervisors District 2
Honorable Susan Peters, Sacramento County Board of Supervisors District 3
Honorable Roberta MacClashan, Sacramento County Board of Supervisors District 4
Honorable Don Nottoli, Sacramento County Board of Supervisors District 5
Mr. Carlos Villapudua, San Joaquin County Board of Supervisors, District 1
Mr. Frank L. Ruhstaller, San Joaquin County Board of Supervisors, District 2
Mr. Steve J. Bestolarides, San Joaquin County Board of Supervisors, District 3
Mr. Ken Vogel, San Joaquin County Board of Supervisors, District 4
Mr. Leroy Ornellas, San Joaquin County Board of Supervisors, District 5
Mr. William O'Brien, Stanislaus County Board of Supervisors, District 1
Mr. Vito Chiesa, Stanislaus County Board of Supervisors, District 2
Mr. Terry Withrow, Stanislaus County Board of Supervisors, District 3
Mr. Dick Monteith, Stanislaus County Board of Supervisors, District 4
Mr. James DeMartini, Stanislaus County Board of Supervisors, District 5

Mr. Lee Stetson, Mariposa County Board of Supervisors, District 1
Mr. Lyle Turpin, Mariposa County Board of Supervisors, District 2
Ms. Janet Bibby, Mariposa County Board of Supervisors, District 3
Mr. Kevin Cann, Mariposa County Board of Supervisors, Disctict 4
Mr. Jim Allen, Mariposa County Board of Supervisors, District 5
Mr. Allen Ishida, Tulare County Board of Supervisors, District 1
Mr. Pete Vander Poel, Tulare County Board of Supervisors, District 2
Mr. Phillip Cox, Tulare County Board of Supervisors, District 3
Mr. Steve Worthley, Tulare County Board of Supervisors, District 4
Mr. Mike Ennis, Tulare County Board of Supervisors, District 5

28.3.9 Organizations

San Joaquin River Exchange Contractors Water Authority
San Joaquin River Resources Management Coalition
Agricultural Council of California
Association of California Water Agencies
Barger Farms
Bowles Farming Company
California Sportfishing Protection Alliance
California Association of Resource Conservation Districts
California Audubon Society
California Bass Federation
California Farm Bureau Federation
California Farm Water Coalition
California Fish and Game Commission
California Native Plant Society
California State Counties Association
California State Water Contractors
California Striped Bass Association
California Water Impact Network
California Waterfowl Association
CalTrout
Coalition for Urban/Rural Environmental Stewardship
Deer Creek Watershed Conservancy
Ducks Unlimited
Environmental Defense Fund
Fly Fishers for Conservation
Friends of the San Joaquin
Great Valley Center
Mill Creek Conservancy
Millerton Area Watershed Coalition
Pacific Gas and Electric, Technical and Ecological Services
Revive the San Joaquin
River Partners
River Tree Volunteers
Sierra and Foothills Citizen Alliance

The Bay Institute
The Nature Conservancy
The Water Agency, Inc.
Traditional Mono Basket
Tree Fresno
TreeTOPS
Upper San Joaquin Stewardship Council
Water Education Foundation
Water Quality Improvement SPA

28.3.10 Individuals

Mr. Alex Lehman
Mr. Basilo Amaro
B N and S K Coburn Family Trust
Mr. Barry Baker and Byron Baker et al
Mr. Bill Ward, BB Limited
Bob Spain, Jr Trust
Bownick Partnership
Mr. Cannon Michael
Cardella Family Limited Partnership
Ms. Carolyn Butts
Castle Duck Club, Douglas Federighi, Secretary
Connley Clayton, Clayton Family Partnership
D & D Pompo LLC
Mr. Dan McNamara
Mr. Darrell Vincent
Mr. Dennis Fox
Mr. Dennis Westcot
Mr. Donald Peracchi, DJP Farm LLC
Mr. E. Merlic
Mr. Fred Petroni
Mr. G. Fred Lee and Anne Jones-Lee
Mr. Gary Martin
Mr. Gary Pirtle
Mr. James Areias
Mr. James Lopes
Mr. James Maiorino and Annette Maiorino Trust
Mr. James O'Banion
Mr. Jessi Limas, Sr.
Mr. Jim Morehead and Ms. Betty Morehead
Mr. Joe Coelho, River Ranch LLC
Mr. Joe Eugene Sequeira and Sharon Sequeira A Co Trustee Trust
Mr. John Mancebo and Becky Mancebo Trust
Mr. John Roselli
Mr. Lawrence and Richard Harman
Ms. Lynn DeFehr
Ms. Laura Heckman and Family

Main Stone Corporation Inc.
Ms. Marie Martin, Locke Ranch
Menefee River Ranch Co.
Mr. Michael and Wendy Vander Dussen Trust
Mr. Michael Martin, PhD
Mr. Mike Case
Mumby Farms Inc. A Corporation
Mr. Nelson w. Howell
Mr. Pat Palazzo
Mr. Patrick Miller
Mr. Paul Hunger
Mr. Peter WeberMr. Ray Knight

Mr. Reno and Ms. Suzanna Lanfranco
Mr. Richie Iest, Accommodators, Inc.
Mr. Robert Frusetta
Mr. Robert Swingley
Mr. Rod Meade
Mr. Rick Shehren
Mr. Robert Waldron
Mr. and Mrs. Shane and Becky Burkhart
Mr. Shane Teixeira
Mr. Stanley Cotta
Mr. Steve Fausone, Redfern Ranches
Mr. Steve Haugen
Mr. Tom Ehrich
Mr. Tom Teixeira
Mr. Tony Mellilo
Ms. Wendy Willis

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29.6 Chapter 6 – Biological Resources – Vegetation and Wildlife

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Chapter 30.0
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31.0 Index