Section 3.15 Recreation

This section presents the existing recreational opportunities within the area of analysis and discusses potential effects on recreation from the proposed alternatives. Transfers could affect reservoir levels and river flows, which could affect user days at each recreation resource in the area of analysis.

3.15.1 Affected Environment/Environmental Setting

This section provides a description of the recreational facilities with the potential to be affected by the action alternatives and an overview of the regulatory setting associated with recreation.

3.15.1.1 Area of Analysis

Figure 3.15-1 shows the rivers and reservoirs in the area of analysis for recreation. In the Seller Service Area, the area of analysis includes rivers, reservoirs, waterfront parks, and other recreational amenities that would be affected by changes to the associated river flow and/or reservoir levels as a result of water transfers. In the Buyer Service Area, the only recreation facility that could be affected by water transfers is San Luis Reservoir. The water would be conveyed to buyers through canals and aqueducts that are not recreational facilities; therefore, these conveyance structures are not part of the area of analysis.

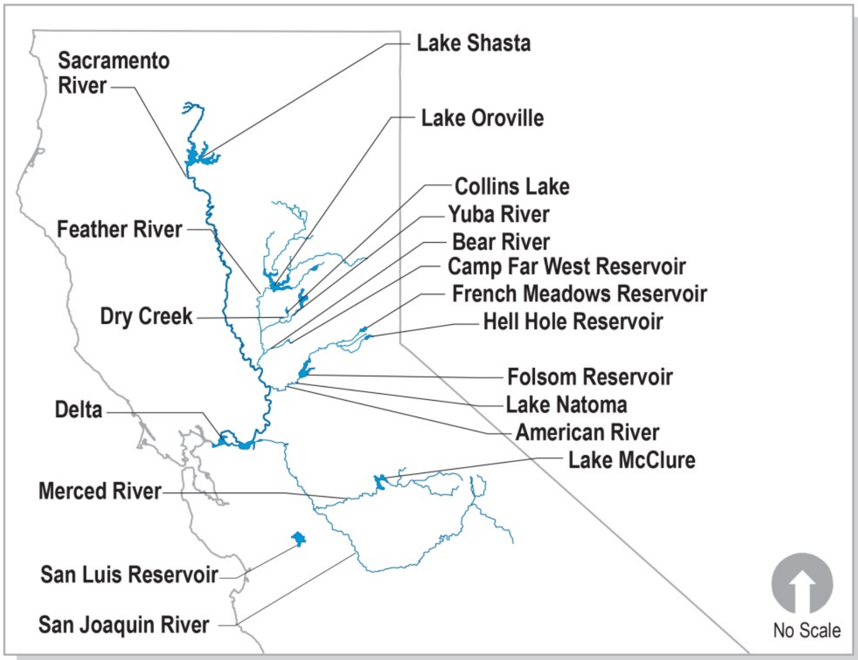

Figure 3.15-1. Recreation Area of Analysis

3.15.1.2 Regulatory Setting

There are no state or federal regulations relevant to recreation for the analysis of long-term water transfers.

3.15.1.3 Existing Conditions

The following section describes the existing recreational areas and types of recreational opportunities within the area of analysis.

3.15.1.3.1 Seller Service Area

Sacramento River

Shasta Reservoir is the major reservoir on the Sacramento River. Shasta Reservoir is managed by the U.S. Forest Service (USFS) Shasta-Trinity National Forest (NF), Shasta Unit. Popular water-related recreational activities at Shasta Reservoir include boating, water-skiing, swimming, and fishing. Both public and private boat launch facilities are available. Table 3.15-1 lists the public boat launches and the number of lanes available at different lake levels. The busiest visitor season is between May and September (USFS Shasta-Trinity NF 2014). In 2008, approximately 47,847 day use tickets were sold at Shasta-Trinity National Recreation Area (NRA) (USFS Natural Resource Manager Shasta-Trinity NRA 2014).

Table 3.15-1. Shasta Reservoir Water Elevation Requirements for Boat Launching

Boat Launch Site	Launching Lanes Available (lake drawdown below elevation 1,067 in feet)
Antlers	4 lanes from 0 to 50 4 lanes from 50 to 75
Bailey Cove	2 lanes from 0 to 50
Centimudi	4 lanes from 0 to 50 4 lanes from 50 to 75 3 lanes from 75 to 95 2 lanes from 95 to 115 2 lanes from 115 to 140 2 lanes from 140 to 160 2 lanes from 160 to 210
Hirz Bay	3 lanes from 0 to 50 3 lanes from 50 to 75 2 lanes from 75 to 95 1 lane from 95 to 115
Jones Valley	4 lanes from 0 to 50 2 lanes from 50 to 75 2 lanes from 75 to 95 2 lanes from 95 to 115 2 lanes from 115 to 140 1 lanes from 140 to 160 1 lanes from 160 to 210
Packers Bay	4 lanes from 0 to 50 2 lanes from 50 to 75 2 lanes from 75 to 95 2 lanes from 95 to 115
Sugarloaf	2 lanes from 75 to 95 2 lanes from 95 to 115 2 lanes from 115 to 140 2lanes from 140 to 160

Source: ShastaLake.com 2014

The Sacramento River encompasses many water dependent recreational areas. Along most of the upper Sacramento River, fishing, rafting, canoeing, kayaking, swimming, and power boating are popular activities. Boating and rafting opportunities are dependent on optimal river flows above 5,000 cubic feet per second (Bureau of Land Management [BLM] n.d.).

Large recreational areas along the river between Red Bluff and Sacramento are owned and/or managed by private companies and several federal, state and local agencies including the California Department of Parks and Recreation (CDPR), Bureau of Reclamation (Reclamation), USFS, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife, Sutter County, Glenn County, Tehama County, Yolo County, Sacramento County, City of Red Bluff. These areas include parks, wildlife refuges, fishing and hunting accesses, wildlife viewing areas, campsites, and boat launch facilities. California State Park day use and camping visitor statistics are available for some recreation areas for fiscal year 2011/2012. Bidwell-Sacramento River State Recreation Area (SRA) reported 51,211 visitors and Colusa-Sacramento River SRA reported 11,725 visitors (CDPR 2012).

3.15.1.3.2 American River

Figure 3.15-2 shows the American River and associated tributaries and reservoirs within the area of analysis. Hell Hole and French Meadows reservoirs are upstream of Folsom Reservoir within the Tahoe NF and managed by the Placer County Water Agency.

Recreational opportunities at Hell Hole Reservoir include: camping, boating and fishing. One boat ramp is available on the west side and is best used in the late spring to mid-summer because the water level of lake drops later in the summer. Usually, only small boats are seen on the reservoir due to its remote location. The boat ramp at Hell Hole is accessible when the surface water elevation is at 4,530 feet or above. Hydrologic data indicates that the boat ramp has remained open during the recreation season in most water year types except during dry and critically dry years where the ramp may close in mid-August and early September respectively. Placer County Water Agency conducted vehicle counts from May 2007 through May 2008 at all developed recreation facilities including the boat ramp and parking areas. Over the year, an average of 4.3 vehicles with boat trailers, with a maximum of 13 vehicles with boat trailers, were counted on weekdays; and an average of 8.1 vehicles with boat trailers, with a maximum of 21 vehicles with boat trailers, were present at Hell Hole Reservoir (Placer County Water Agency 2010).

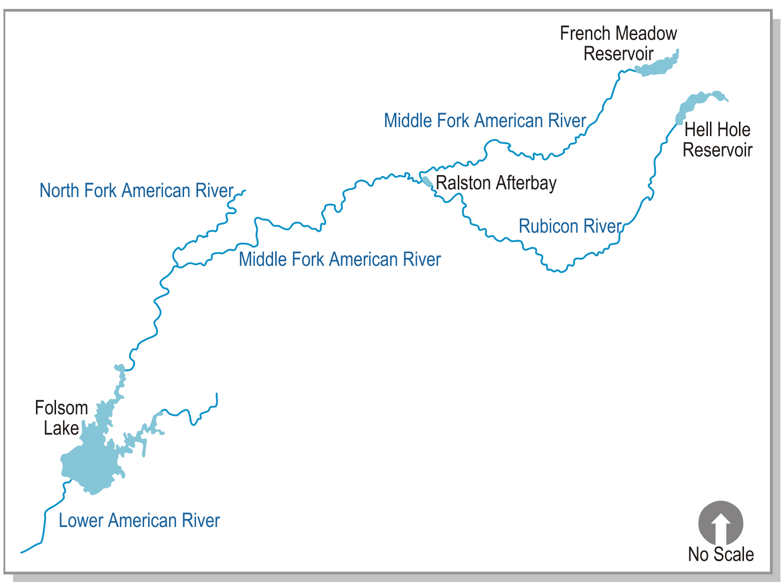

Figure 3.15-2. North and Middle Forks of the American River

Recreational opportunities at French Meadows Reservoir include: camping, picnicking, fishing and boating. The boat ramp at French Meadows Reservoir is accessible when the surface water elevation is at 5,200 feet or above (Placer County Water Agency 2010). Boat ramps are available on both the south and north shores, although water levels drop in the summer months (Placer County Commerce 2014). Hydrologic data indicates that the boat ramps have remained open during the recreation season in all water year types except during critically dry years where the ramp may close in early August. Placer County Water Agency conducted vehicle counts from May 2007 through May 2008 at all developed recreation facilities including the boat ramp and parking areas. Over the year, an average of 2.1 vehicles with boat trailers, with a maximum of nine vehicles with boat trailers, were counted on weekdays; and an average of 4.5 vehicles with boat trailers, with a maximum of 13 vehicles with boat trailers, were present at French Meadows Reservoir (Placer County Water Agency 2010).

Folsom Reservoir is within the Folsom Reservoir SRA. Boating, fishing and waterskiing are the primary water related activities at Folsom Reservoir. Table 3.15-2 describes the various boat ramps and guidance for usability according to surface water elevation. Hiking, biking, camping, picnicking, and horseback riding are also popular activities within the SRA. Lake Natoma, downstream of Folsom Dam, is also within the Folsom Reservoir SRA. Non-motorized boats and motorized boats with a maximum speed limit of five miles per hour are allowed on Lake Natoma. The lake is popular for rowing, kayaking, fishing, and canoeing. The California State University, Sacramento Aquatics Sports Center is located on Lake Natoma and offers a variety of non-motorized boating activities. It also hosts rowing competitions each year (CDPR 2013b). Visitor attendance at Folsom SRA was 1,491,025 and included day use and camping visitors for fiscal year 2011/2012 (CDPR 2012).

Table 3.15-2. Folsom Reservoir Water Elevation Guidelines for Boat Launching

Boat Launch Site	Surface Water Elevations (in Feet)
Granite Bay	Low Water – 2 lanes between 369 and 396 Stage 1 - 2 lanes between 397and 430 Stage 2 – 8 lanes between 420 and 438 Stage 3 – 10 lanes between 430 and 452. Stage 4 – 2 lanes between 450 and t465 5% - 4 lanes between 408 and465
Folsom Point	2 lanes between 405 and 465 above
Browns Ravine	4 lanes between 399 and 465 4 lanes between 380 and 435
Rattlesnake Bar	2 lanes between 428 and 465
Peninsula	Old Ramp - 1 lane between 410 and465 New Ramp - 2 lanes between 434 and 465

Source: Folsom Lake Marina 2014.

The north fork of the American River from 0.3 miles upstream of Heath Springs to 1,000 feet upstream of the Colfax-Iowa Hill Bridge, and the lower American River from the confluence with the Sacramento River to Nimbus Dam have been designated as National Wild and Scenic Rivers (National Wild & Scenic Rivers System 2014).

Along the entire American River, whitewater boating is ideal during the boating season with many commercial rafting operations and private boaters. The north fork is popular for boating between April and June and provides more advanced boating levels. The middle and south forks are more popular during the summer months with less advanced terrain and some flat water along the south fork. Other recreational opportunities include kayaking, fishing, biking, hiking and horseback riding (The American River 2014).

3.15.1.3.3 Yuba River

Numerous rivers, creeks, tributaries, and reservoirs along the Yuba River offer recreation opportunities and receive extensive use. Boating on the North Yuba River is challenging and recommended for expert boaters during the spring and is known for good fishing during the rest of year. The South Yuba River offers many activities including boating, camping, fishing, hiking and horseback riding. The South Yuba River has been designated as a California Wild and Scenic River (California Legislative Council 2014). Visitor attendance at the South Yuba River State Park was 662,930 visitors during fiscal year 2011/2012 (CDPR 2012).

Merle Collins Reservoir, also known as Collins Lake, is a year-round recreation area offering camping with lakefront recreational vehicle sites, fishing, boating, and day-use beach area. A boat launch, marina and rental boats are available. Every spring, over 50,000 trout ranging from three to eight pounds are planted (Collins Lake 2014). Visitor days in 2011 included 24,379 persons for day use and 128,112 persons for overnight camping (Young 2014).

Fishing in Dry Creek is hindered in the summer and fall because flows are very low or nonexistent. The water temperatures near its confluence with the Yuba River are not attractive to salmon, which do not enter Dry Creek from the Yuba River (Browns Valley Irrigation District [ID] 2009).

3.15.1.3.4 Feather River

Lake Oroville is within the Lake Oroville SRA. Recreational opportunities on the lake include: camping, picnicking, horseback riding, hiking, sail and power boating, water skiing, fishing, swimming, boat-in camping, floating campsites and horse camping (CDPR 2013a). Water levels at the lake affect the number of accessible boat launch ramps and car-top boat launches, swimming beaches and boat-in camps are available to the public. Table 3.15-3 describes the different launch ramps and the availability for launching based on lake elevations. In fiscal year 2011/2012, 1,095,188 visitors were recorded at Lake Oroville SRA, which includes day use and camping.

Table 3.15-3. Lake Oroville Water Elevation Requirements for Boat Launching

Boat Launch Site	Surface Water Elevation (in Feet)
Bidwell Canyon	7 lanes from 850 to 900 5 lanes from 802 to 850 4 lanes from 781 to 802 2 lanes from 735 to 781 3 lanes from 680 to 745
Loafer Creek	8 lanes from 800 to 900 2 lanes from 775 to 800
Spillway Boat Launch	12 lanes from 810 to 900 8 lanes from 726 to 820 2 lanes from 695 to 726 1 lane from 685 to 695
Lime Saddle	8 lanes from 702 to 900
Enterprise	2 lanes from 820 to 900

Source: California Department of Water Resources 2014.

Popular recreational activities along the Lower Feather River include swimming, fishing, hiking, camping, nature viewing, picnicking, and bicycling (USFS Plumas NF 2014). The middle fork of the Feather River is designated as a Wild and Scenic River within the National Wild and Scenic River System from its tributary streams to one kilometer south of Beckwourth, California (National Wild & Scenic Rivers System 2014).

The Bear River is a tributary to the Lower Feather River and provides many recreational activities including camping, swimming, picnicking, kayaking and rafting, and horseback riding upstream of Camp Far West Reservoir. Downstream of Camp Far West, the land is mostly privately owned and developed for agriculture (Sacramento River Watershed Program 2014).

Recreational opportunities available at Camp Far West Reservoir include: camping, boating, swimming, water skiing, jet skiing, hiking, biking, fishing and horseback riding. The north shore of the lake is accessible year-round and the south shore is only open mid-May to September. The reservoir has two boat ramps, one on the north shore and the other on the south shore (Nevada County 2009).

3.15.1.3.5 Merced River

Recreational activities along the Merced River include rafting, hiking, swimming, picnicking, wildlife viewing, and camping at several camp grounds (BLM 2014). The main stem of the Merced River has been designated as a National Wild and Scenic River from its source to Lake McClure, and the south fork from its source to the confluence with the main stem (National Wild and Scenic River System 2014). Approximately 5,000 commercial whitewater boaters and 20,000 campers visit the Merced River upstream of Lake McClure each year (Horn 2014). Downstream of Lake McClure, the Merced River travels through mostly private land, although some limited public access is available.

Lake McClure and Lake McSwain are owned by the Merced ID. Recreational opportunities at Lake McClure and Lake McSwain include camping, fishing, boating, wildlife viewing, swimming, and picnicking. A boat ramp and marina provide boating amenities year round (Merced ID 2012). Table 3.15-4 shows the surface water elevations needed in Lake McClure to keep the boat ramps operational. In 2010, there were 1,397,190 visitors at Lake McClure and 482,030 visitors to Lake McSwain. These counts include each visit during any portion of a 24-hour period (Merced ID 2012).

Table 3.15-4. Lake McClure Water Elevation Requirements for Boat Launching

Boat Launch Site	Surface Water Elevations (in Feet)
Bagby	794 and above
Horseshoe Bend	759 and above
McClure Point	651 and above
Southern Barrett Cove	631 and above
Northern Barrett Cove	591 and above
Piney Creek	591 and above

Source: San Joaquin River Group Authority 1999

3.15.1.3.6 San Joaquin River Region

The area surrounding the San Joaquin River downstream of the Merced River consists mainly of private agricultural lands; therefore, public recreation is limited.

The San Joaquin River National Wildlife Refuge (NWR) encompasses a section of the San Joaquin River between the Tuolumne and Stanislaus rivers and is over 7,000 acres. The NWR offers a trail and educational free-roam exploration area as well as a wildlife-viewing platform (USFWS 2013).

3.15.1.3.7 Delta Region

Many recreational opportunities are available within the Delta. Large recreation areas include the Brannan Island and Franks Tract SRAs. Figure 3.15-3 shows the Delta region and some of the recreation areas. Visitor attendance at Brannan Island SRA was 66,680 visitors, including day use and campers during fiscal year 2011/2012. During the same period, visitor attendance at Franks Tract SRA was recorded as 62,089 visitors (CDPR 2012).

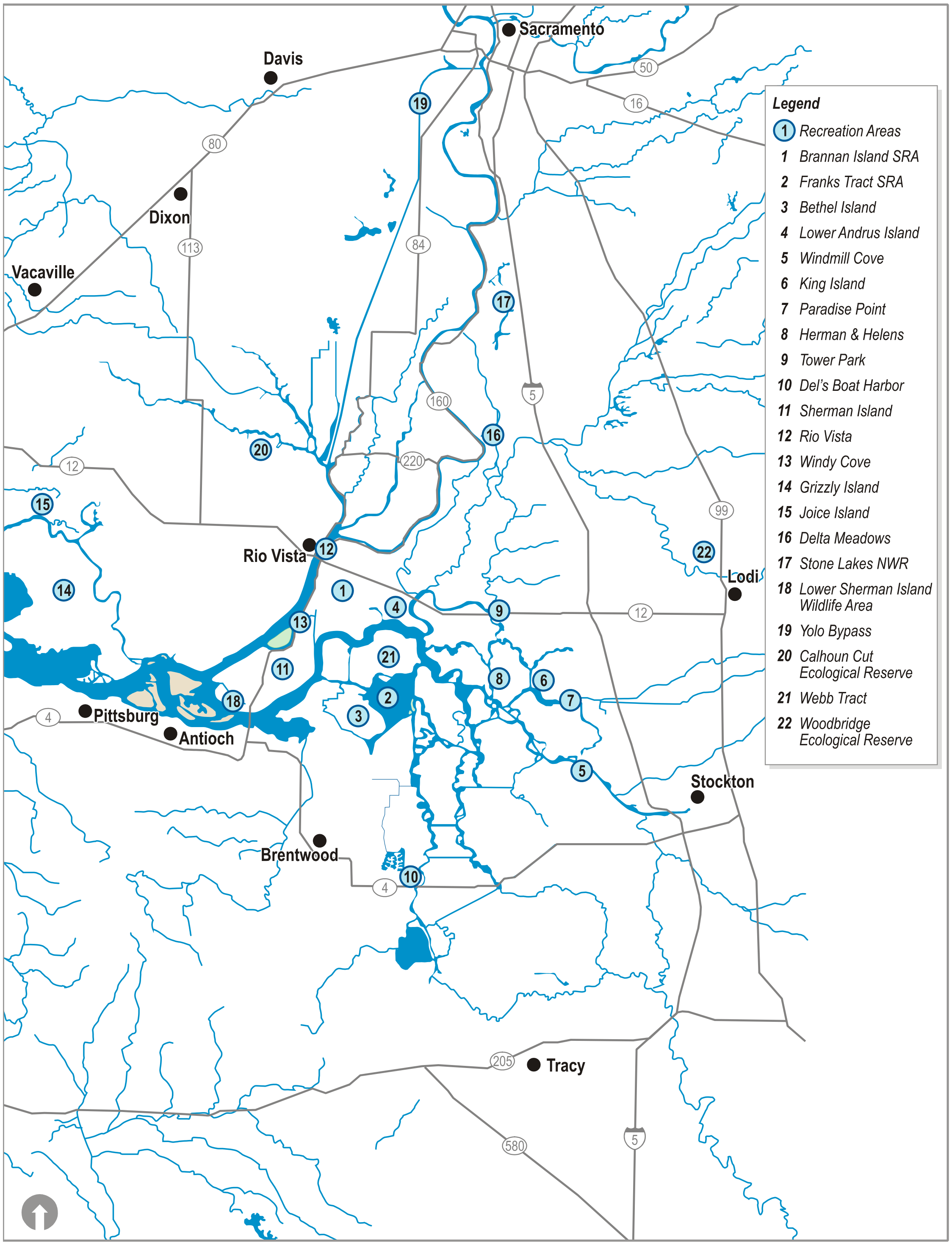

Figure 3.15-3. Sacramento-San Joaquin Delta Major Recreation Areas

Boating, fishing, windsurfing, water skiing and kayaking are some of the water-related recreational opportunities in the Delta. The California Delta Chambers & Visitors Bureau lists approximately 50 public and private marinas on their website each offering a different mix of amenities including: fuel, launching, bait, groceries, propane, restaurants, night clubs, boat sales, marine repair, campgrounds, boat storage, guest docks and boating supplies for sale. Sport fishing is one of the main attractions to the Delta where striped bass, sturgeon, catfish, black bass, salmon, and American shad are caught. Various commercial fishing guides and charter boats are also available for hire (California Delta Chambers & Visitors Bureau 2014).

3.15.1.3.8 Buyer Service Area

San Luis Reservoir is the only recreation area in the Area of Analysis in the Buyer Service Area. San Luis Reservoir SRA is open year round (Figure 3.15-4) and includes San Luis Reservoir, O'Neill Forebay and Los Banos Creek Reservoir, although Los Banos Creek Reservoir would not be affected by the project. San Luis Reservoir SRA provides for activities such as boating, boardsailing, fishing, camping, and picnicking. Boat access is available via one four-lane boat ramp at the Basalt area at the southeastern portion of the reservoir and at Dinosaur Point at the northwestern portion of the reservoir (Reclamation and CDPR 2012). The boat ramp at Basalt becomes inconvenient to use at low reservoir levels (at elevation 340 feet); the boat ramp at Dinosaur Point is difficult to access at elevation 360 feet. There are no designated swimming areas or beaches at San Luis Reservoir, but O'Neill Forebay (with its stable surface elevation) has swimming, boating, fishing, and camping opportunities (San Joaquin River Group 1999). Visitor attendance during fiscal year 2011/2012 at San Luis SRA was 149,890 visitors including campers (CDPR 2012).

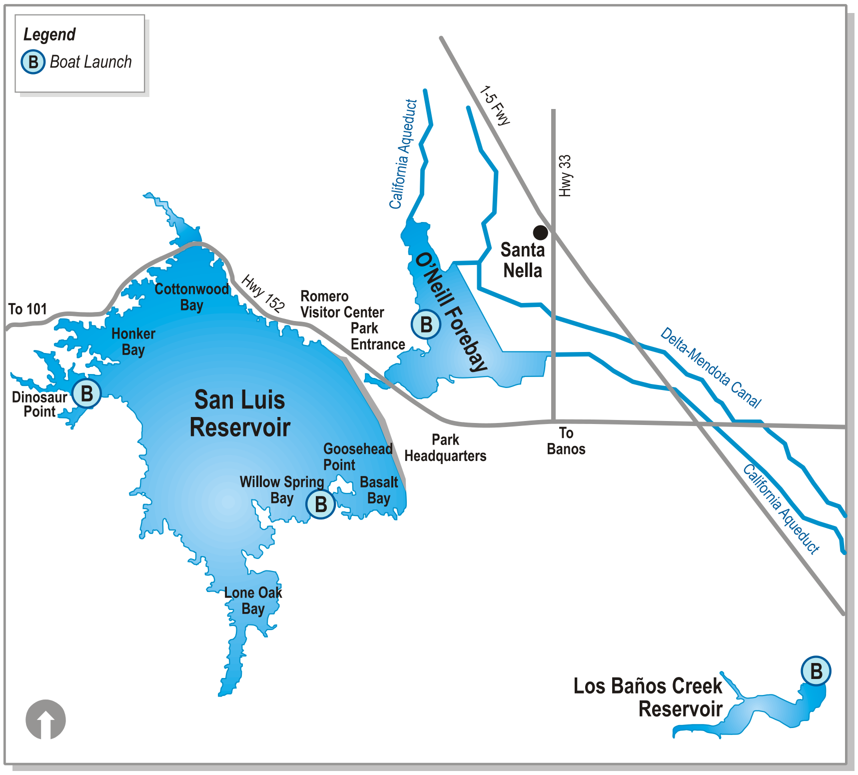

Figure 3.15-4. San Luis Reservoir San Luis SRA

3.15.2 Environmental Consequences/Environmental Impacts

This section describes the assessment methods and environmental consequences/environmental impacts associated with each alternative.

3.15.2.1 Assessment Methods

The effects analysis uses both quantitative and qualitative methods to assess changes in recreational opportunities and use of affected facilities. Quantitative methods include consideration of thresholds at which recreational opportunities are affected (e.g., the reservoir level at which boat ramps become unusable). Qualitative methods used to assess recreation effects include consideration of potential effects on the availability, accessibility, and quality of recreation sites.

The quantitative analysis relies on hydrologic modeling output that estimates changes to river flow and reservoir water surface elevations under the alternatives. Surface water elevation data is not available for all reservoirs included in the area of analysis. Where this data is not available, effects are evaluated based on transfer quantities, changes in water storage, and the timing of proposed transfers under the various action alternatives.

Sac Yr Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Lower Feather River												
W	0.0	0.0	-6.3	-6.3	0.0	-3.9	0.0	0.0	0.0	0.0	0.0	0.0
AN	0.0	0.0	0.0	-40.7	0.0	-16.8	0.0	-33.6	0.0	54.2	-40.7	-14.0
BN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	0.0	0.0	0.0	0.0	-12.0	-19.5	0.0	-24.3	0.0	-2.1	237.2	-66.0
C	0.0	0.0	0.0	0.0	-44.6	-5.8	0.0	0.0	-13.2	62.2	127.2	12.4
All	0.0	0.0	-2.4	-9.6	-11.3	-9.1	0.0	-10.2	-2.7	22.0	60.9	-11.6
American River at H Street												
W	9.7	36.2	-28.6	-18.6	-20.7	-1.1	0.0	9.6	-13.5	-0.5	-0.8	0.0
AN	10.4	4.4	1.7	-132.1	-233.9	-33.2	0.3	0.1	0.0	0.0	0.0	0.0
BN	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	20.8	11.7	57.6	-52.2	-21.2	-72.2	-113.6	-24.3	0.0	55.6	33.9	32.2
C	36.5	28.6	31.5	18.2	18.3	26.8	26.8	38.6	-6.8	97.4	59.6	55.8
All	16.7	22.6	6.0	-35.9	-48.8	-13.5	-14.5	7.3	-6.6	29.7	17.9	17.2
Merced River at San Joaquin River												
W	0.0	0.0	0.0	0.0	-41.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-84.0	0.0	0.0	0.0
BN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	162.6	0.0	0.0
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.7	0.0	0.0
All	0.0	0.0	0.0	0.0	-15.9	0.0	0.0	0.0	-14.8	43.1	0.0	0.0

Note: Negative numbers indicate that Alternative 4 would decrease river flows compared to the No Action/No Project Alternative; positive numbers indicate that Alternative 4 would increase river flows.

The flow increases would only be during the dry season of dry and critical years, when flood flows are not present in the system. Impacts on flood control in rivers in the Seller Service Area would be less than significant.

3.17.2.6.2 Buyer Service Area

Water transfers would change storage at San Luis Reservoir. Similar to the Proposed Action, storage at San Luis Reservoir under Alternative 4 could change because the reservoir would be used to regulate transfers. Because San Luis Reservoir is an off-stream storage reservoir and has little inflow from natural rivers and increases in storage would be at a time of year when the reservoir is typically low, increases in storage would have little to no effect on flood control. The effects of transfers from Alternative 4 would be less-than-significant for flood control at San Luis Reservoir.

3.17.3 Comparative Analysis of Alternatives

Table 3.17-7 summarizes the effects of each of the action alternatives. The following text supplements the table by comparing the effects of the action alternatives and No Action/No Project Alternative.

Table 3.17-7. Comparative Analysis of Alternatives

Potential Impacts	Alternative(s)	Significance	Proposed Mitigation	Significance after Mitigation
Reservoirs operations would remain the same as existing conditions with regards to flood control, including flood storage capacity and timing of releases	1	No change from existing conditions (NCFEC)	None	NCFEC
There would be no changes in river flows that could potentially compromise levee stability	1	NCFEC	None	NCFEC
There would be no changes to storage at San Luis Reservoir that could affect flood control	1	NCFEC	None	NCFEC
Water transfers would change storage levels in CVP and SWP reservoirs, potentially affecting flood control.	2, 3, 4	LTS	None	LTS
Water transfers ~~could~~ would change storage levels in non-Project reservoirs, potentially affecting flood control.	2, 3, 4	B	None	B
Water transfers could ~~change~~ increase river flows, potentially affecting flood capacity or levee stability.	2, 3, 4	B	None	B
Water transfers would change storage at San Luis Reservoir, potentially affecting flood control.	2, 3, 4	LTS	None	LTS

3.17.3.1 Alternative 1: No Action/No Project Alternative

There would be no impacts on flood control.

3.17.3.2 Alternative 2: Full Range of Transfers (Proposed Action)

Water transfers under the Proposed Action could change reservoir storage and river flows in the area of analysis; however, most of the changes would occur outside the flood season and would be well within the existing capacities of the reservoirs and channels. All effects on flood control would be less than significant.

3.17.3.3 Alternative 3: No Cropland Modifications

This alternative would have similar flood control effects as the Proposed Action. All effects on flood control would be less than significant.

3.17.3.4 Alternative 4: No Groundwater Substitution

Alternative 4 would not include groundwater substitution transfers, so the streamflow depletion effects on reservoir levels and river flows in the other two action alternatives would not occur. Effects on reservoir storage and river flows associated with storing and conveying water transfers would still occur, but they would be focused during the transfer period. All effects on flood control would be less than significant.

3.17.4 Environmental Commitments/Mitigation Measures

There are no significant flood control impacts; therefore no mitigation measures are required.

3.17.5 Potentially Significant Unavoidable Impacts

None of the alternatives would result in potentially significant and unavoidable impacts related to flood control.

3.17.6 Cumulative Effects

The timeline for the flood control cumulative effects analysis extends from 2015 through 2024, a ten year period. The relevant geographic study area for the cumulative effects analysis is the same area of analysis as shown above in Figure 3.17-1. The following section analyzes the cumulative effects using the project method, which is further described in Chapter 4. Chapter 4 describes the projects included in the cumulative condition. The cumulative analysis for flood control considers projects that could affect reservoir storage or river flow, or could otherwise compromise flood control facilities or flood management.

In addition to the cumulative projects in Chapter 4, several other efforts could affect the cumulative condition for flood management. Multiple areas in the Central Valley do not currently have adequate flood protection. The population at risk is over one million people, and the existing level of flood protection is among the lowest for metropolitan areas in the nation (DWR 2012b). In response to existing flood management concerns, multiple efforts are ongoing to improve conditions (DWR 2014):

- American River Watershed Project: construction of dam improvements at Folsom Dam (under the Folsom Joint Federal Project) and levee improvements on the American and Sacramento rivers (under the American River Common Features Project).

- Delta Levees System Integrity Program: levee repair, maintenance, and improvement within the Delta area.

- South Sacramento County Streams Program: improvements to Morrison Creek and Unionhouse Creek have improved flood management in the south Sacramento area.
- Yuba Feather Flood Protection Program: projects within the areas of the Yuba, Feather, and Bear rivers to reduce flooding and improve public safety.
- Urban Streams Protection Program: provides funding for urban flood management; recent focus has included levee improvements near Sacramento and Yuba City.

Multiple other small projects are also ongoing or planned to improve flood management in the Central Valley (DWR 2014).

3.17.6.1 Alternative 2: Full Range of Transfers (Proposed Action)

3.17.6.1.1 Seller Service Area

Water transfers would change storage levels in reservoirs and potentially affect flood control. In addition to the cumulative projects listed above, the projects in Chapter 4 (including SWP transfers, the CVP Municipal and Industrial Water Shortage Policy, the Lower Yuba River Accord, refuge transfers, and the San Joaquin River Restoration Program) have the potential to affect storage. These projects, however, would be unlikely to adversely affect storage during the flood season. Overall, the cumulative condition for flood control in the Central Valley includes many areas where existing flood management facilities are not adequate to provide flood protection to people and property. The cumulative condition has significant adverse effects relative to flood control. The Proposed Action would have a minimal effect on CVP and SWP reservoir storage and would be unlikely to affect flood conservation storage. The Proposed Action would have the potential to improve flood management in non-Project reservoirs; however, these improvements would not be sufficient to offset the multiple flood control issues and concerns in the cumulative condition. Therefore, the Proposed Action's incremental contribution would not be cumulatively considerable.

Water transfers could increase river flows and potentially affect flood capacity or levee stability. As described above, the cumulative condition has substantial issues and concerns related to flood management that result in a significant cumulative impact. Water transfers in the Proposed Action could increase flows in rivers and in the Delta during the period when water transfers are conveyed from the sellers to the buyers and decrease river flows because of streamflow depletion from groundwater substitution transfers. The flow increases would only be during the dry season of dry and critical years, when flood flows are not present in the system. Decreased river flows during wetter periods could provide additional capacity for flood flows; however, these changes are small and would not be adequate to substantially improve the cumulative condition.

The Proposed Action's incremental contribution would not be cumulatively considerable related to flood control.

3.17.6.1.2 Buyer Service Area

Changes in storage at San Luis Reservoir as a result of water transfers could affect flood control. Because San Luis Reservoir does not provide substantial flood management for local flows, the cumulative condition does not include many past, present, or future efforts in the reservoir aimed at flood control. The cumulative condition would be less than significant related to flood control.

3.17.6.2 Alternative 3: No Cropland Modifications

The flood control impacts (and magnitude of those impacts) under Alternative 3 would be very similar to the Proposed Action. As under the Proposed Action, the cumulative condition would have significant effects relative to flood control, but the incremental contribution from Alternative 3 would not be cumulatively considerable.

3.17.6.3 Alternative 4: No Groundwater Substitution

Alternative 4 would have similar (but slightly smaller) potential increases in river and reservoir levels compared to the Proposed Action. As under the Proposed Action, the cumulative condition would have significant effects relative to flood control, but the incremental contribution from Alternative 4 would not be cumulatively considerable.

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Chapter 4 Cumulative Effects Methodology

Cumulative effects are those environmental effects that on their own, may not be considered significant, but when combined with similar effects over time, result in significant adverse effects. Cumulative effects are an important part of the environmental analysis because they allow decision makers to look not only at the impacts of an individual proposed project, but the overall impacts to a specific resource, ecosystem, or human community over time from many different projects. This chapter describes the cumulative effects analysis for the Long-Term Water Transfers Environmental Impact Statement/Environmental Impact Report (EIS/EIR). Each resource section in Chapter 3 includes the complete cumulative effects analysis for that resource.

4.1 Regulatory Requirements

Both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) require consideration of cumulative effects in an EIS/EIR. Additionally, the National Historic Preservation Act (NHPA) requires consideration of cumulative effects to historic properties.

4.1.1 NEPA

Cumulative effects are defined 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 actions" (40 Code of Federal Regulations [CFR] Section 1508.7).

NEPA regulations require an analysis of direct, indirect, and cumulative effects and define "effects" as "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative" (40 CFR Section 1508.8). In addition, the NEPA regulations state that when determining the scope of an EIS, both connected and cumulative actions must be discussed in the same document as the Proposed Action (40 CFR Section 1508.25(a)(1) and (2)).

4.1.2 CEQA

Cumulative effects are defined in the CEQA Guidelines as:

> "Two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changes resulting from a single project or a number of separate projects.
>
> (b) The cumulative impact from several projects is 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 probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines Section 15355)

According to the CEQA Guidelines, a lead agency must discuss the cumulative impacts of a project when a cumulative effect is significant and the project's incremental contribution to the cumulative effect would be "cumulatively considerable," that is, when the incremental effects of a project would be significant when viewed in connection with the effects of past, present, and probable future projects (CEQA Guidelines Section 15065(a)(3); Section 15130(a)).

If the combined cumulative impact associated with the project's incremental effect and the effects of other projects would not be significant, an EIR should briefly indicate why the cumulative impact is not significant (CEQA Guidelines Section 15130(a)(2)).

Additionally, an EIR can determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and therefore not significant. A project's contribution can also be less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The lead agency must identify facts supporting this conclusion (CEQA Guidelines Section 15130(a)(3)).

4.1.3 NHPA

The regulations for Section 106 of the NHPA define "adverse effect" as an undertaking that "may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." (36 CFR Section 800.5(a)(1)). "Adverse effects" explicitly include "reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative." (36 CFR Section 800.5(a)(1)). Cumulative effect under Section 106 of the NHPA applies only to those resources that are listed in or eligible for the National Register.

Section 3.13, Cultural Resources, evaluates effects to historic properties, including cumulative effects. NHPA is not further discussed in this chapter.

4.2 Methodology for Assessing Cumulative Effects

4.2.1 Area of Analysis

NEPA and CEQA require a defined geographic scope for a cumulative effects analysis (Council of Environmental Quality 1997; CEQA Guidelines 15130(b)(3)). The cumulative area of analysis for each resource in the EIS/EIR varies depending on the type of impacts that could occur and the nature of those impacts. The areas of analysis for some resource areas have clearly defined cumulative boundaries while others are more general in nature. Each resource area in Chapter 3 identifies a specific area of analysis for cumulative effects, and it may expand beyond the area of analysis identified for the Environmental Consequences/Environmental Impacts section for project related effects.

4.2.2 Timeframe

This EIS/EIR evaluates water transfers from 2015 through 2024, a ten-year period. Therefore, all projects considered in the cumulative analysis should be implemented and operational during the ten-year period to potentially result in cumulative effects.

4.2.3 Identifying Past, Present, and Future Actions and Projects Contributing to Cumulative Effects

CEQA Section 15130(b)(1) identifies two methods that may be used to analyze cumulative impacts:

1. "A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency," and/or

2. "A summary of projections contained in an adopted local, regional, or statewide plan or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the lead agency."

This EIS/EIR analyzes cumulative impacts using both CEQA methods identified above. These methods are expected to be sufficient to satisfy NEPA and CEQA requirements for identifying past, present, and future actions and projects that may contribute to cumulative effects. Most EIS/EIR resources use one method or the other, but several resource areas use a combination of both methods.

A variety of federal, state, county, and local government sources were reviewed to identify and collect information on past, present, and reasonably foreseeable actions in the project area that could contribute to cumulative effects. These include:

- City and County General Plans;
- Future population, housing, traffic, and other projections found in existing city and county general plans;
- Published reports, documents, and plans;
- Biological Management Plans (biological opinions, Habitat Conservation Plans, etc);
- Environmental documents (such as EIS/EIRs).
- Scoping comments; and
- Consultation with federal and state agencies.

A table or list is provided in each resource section that describes all applicable documents, plans, projects, and other cumulative actions that could contribute to cumulative effects on that specific resource. After the table or list, there is a discussion on the cumulative condition of that resource, referring to the past, present, and reasonably foreseeable future plans, projects, and other actions in the table or list, and what cumulative effects they are contributing to.

4.2.4 Cumulative Effects Determinations

To be consistent with CEQA requirements, there are three different possible impact statement outcomes for the cumulative effects analysis:

1. **There would be no significant cumulative effects**. This requires a discussion providing evidence to support this conclusion.
2. **There would be significant cumulative effects**. The Proposed Action's incremental contribution to the significant cumulative effects would not be cumulatively considerable. This requires a discussion on why the Proposed Action's incremental contribution would not be significant or cumulatively considerable. There may be mitigation implemented to reduce/avoid/minimize impacts, or the magnitude of

the impact may be very small, suggesting the Proposed Action's contribution to any significant effects would be minimal.

3. **There would be significant cumulative effects**. The Proposed Action's incremental contribution to the significant cumulative effects would be cumulatively considerable. This requires a discussion of all feasible mitigation. If no feasible mitigation is available, this impact remains cumulatively considerable (significant and unavoidable).

The EIS/EIR must identify potential mitigation measures if a project would result in cumulatively considerable effects.

4.3 Cumulative Projects Considered for All Resources

The following projects or programs are considered in the cumulative analysis for all environmental resources. Each resource section in Chapter 3 identifies additional projects or programs directly relevant to the resource.

4.3.1 State Water Project (SWP) Transfers

SWP contractors also implement transfers from agencies north of the Delta to SWP contractors south of the Delta. Table 4-1 indicates potential SWP transfers that could occur annually over the ten-year period, depending on need and export capacity. The contractors generally serve areas along the Feather River and receive SWP supplies for Lake Oroville.

Table 4-1. Potential SWP Sellers (Upper Limits)

	(Acre feet)	
Water Agency (County)	**Groundwater Substitution**	**Cropland Idling/ Crop Shifting**
Biggs-West Gridley WD (Butte)		32,190
Richvale ID (Butte)		12,000
Plumas Mutual Water Company (Yuba)	2,800	1,750
Sutter Extension WD (Sutter)	4,000	11,000
Western Canal WD (Butte and Glenn)		30,000
Total	6,800	86,930

Abbreviations:
ID: Irrigation District
WA: Water Agency
WD: Water District

Water transfers purchased by SWP contractors would largely be used for M&I uses. Some SWP contractors may purchase water for agricultural uses in the south San Joaquin Valley. Table 4-2 lists potential SWP buyers. SWP water transfers would have priority over Central Valley Project (CVP) transfers moved through SWP's Harvey O. Banks Pumping Plant.

Table 4-2. Potential SWP Buyers

Alameda County WD
Antelope Valley East Kern Water Agency
Castaic Lake Water Agency
Central Coast Water Authority
Desert Water Agency
Dudley Ridge Water District
Kern County Water Agency
Metropolitan Water District of Southern California
Mojave Water Agency
Napa County Flood Control and Water Conservation District
Oak Flat Water District
Palmdale Water District
San Bernardino Valley Municipal Water District
San Diego County Water Authority
Santa Clara Valley Water District
Tulare Lake Basin Water Storage District

4.3.2 CVP Municipal and Industrial (M&I) Water Shortage Policy (WSP)

Allocation of CVP water supplies for any given water year is based upon forecasted reservoir inflows and Central Valley hydrologic conditions, amounts of storage in CVP reservoirs, regulatory requirements, and management of Section 3406(b)(2) resources and refuge water supplies in accordance with implementation of the Central Valley Project Improvement Act (CVPIA). In some cases, M&I water shortage allocations may differ between CVP divisions due to regional CVP water supply availability, system capacity, or other operational constraints.

The purposes of the M&I WSP are to:

- Define water shortage terms and conditions applicable to all CVP M&I contractors.
- Establish a water supply level that (a) with M&I contractors' drought water conservation measures and other water supplies will sustain urban areas during droughts, and (b) during severe or continuing droughts will, as far as possible, protect public health and safety.
- Provide information to help M&I contractors develop drought contingency plans.

The M&I WSP and implementation guidelines are intended to provide detailed, clear, and objective guidelines for the distribution of CVP water supplies during water shortage conditions, thereby allowing CVP water users to know when, and by how much, water deliveries may be reduced in drought and other low water supply conditions. This increased level of predictability is needed by water managers and the entities that receive CVP water to better plan for and manage available CVP water supplies, and to better integrate the use of CVP water with other available non-CVP water supplies.

While the specific future policy and shortage allocation process is currently under evaluation, it is likely that both agricultural and M&I water service contractors will receive reduced allocations during shortage conditions. Reclamation will periodically reassess both the availability of CVP water supply and CVP water demand.

Reclamation is currently implementing the 2001 draft M&I WSP, as modified by Alternative 1B of the 2005 Environmental Assessment (Reclamation 2014). Table 4-3 summarizes the water shortage allocations currently being implemented by Reclamation.

Table 4-3. Existing Water Shortage Allocation Steps

Allocation Step	Allocation to Agricultural Water Service Contractors (% of contract total)	Allocation to M&I Water Service Contractors[1]
1	100% to 75%	100% of Contract Total
2	70%	95% of historical use
3	65%	90% of historical use
4	60%	85% of historical use
5	55%	80% of historical use
6	50% to 25%	75% of historical use
7	20%[2]	The maximum of: (1) 70% of M&I historical use or (2) unmet PH&S need up to 75% of historical use
8	15%[2]	The maximum of: (1) 65% of M&I historical use or (2) unmet PH&S need up to 75% of historical use
9	10%[2]	The maximum of: (1) 60% of M&I historical use or (2) unmet PH&S need up to 75% of historical use
10	5%[2]	The maximum of: (1) 55% of M&I historical use or (2) unmet PH&S need up to 75% of historical use
11	0%[2]	The maximum of: (1) 50% of M&I historical use or (2) unmet PH&S need up to 75% of historical use

Source: Reclamation 2014

Note:

[1] The historical use amount is determined by averaging the amount of water the contractor took during the last three years of unconstrained flow (or 100%) M&I allocation.

[2] Allocations to Agricultural water service contractors will be further reduced, if necessary, within the Contract Year to provide public health and safety water quantities to M&I water service contractors within the same Contract Year, provided CVP water is available.

Key:

PH&S = public health and safety

M&I = municipal and industrial

Reclamation is in the process of updating the M&I WSP and is currently preparing the ~~draft~~ EIS for alternatives to the current M&I WSP. ~~It is~~

~~anticipated that t~~The draft EIS ~~will be available~~was released for public review in late 2014.

4.3.3 Lower Yuba River Accord

The Lower Yuba River Accord (Yuba Accord) is a set of three agreements that resolve litigation over in-stream flow requirements on the Lower Yuba River. The three agreements include a Fisheries Agreement, a Water Purchase Agreement, and Conjunctive Use Agreements.

The Fisheries Agreement establishes higher in-stream flow requirements and a flow schedule during specific periods of the year to meet fish needs. The agreement also requires a groundwater substitution program to increase surface flows in the Lower Yuba River and calls for studies of Lower Yuba River fish or fish habitat, monitoring of flows or temperatures and salmon fry studies.

The Water Purchase Agreement establishes conditions when the Yuba County Water Agency would make water available for water supply reliability and fish and wildlife purposes. The agreement separates water purchases into four components with variations in pricing, purpose of use and schedule. For Component 1 Water Supplies, California Department of Water Resources (DWR) purchased 60,000 acre-feet (AF) per year for eight years for fish and wildlife purposes. Components 2, 3, and 4 Water Supplies are also purchased by DWR, but the actual amounts vary depending on hydrologic year types and allocation scenarios.

The Conjunctive Use Agreements require Yuba County Water Agency and seven member districts to implement conjunctive use measures to provide local water supplies in dry years to facilitate storage operations to meet in-stream flow requirements in the Lower Yuba River, as defined in the Fisheries Agreement.

Collectively, the agreements are expected to achieve the following environmental and economic benefits:

- Higher instream flow requirements to protect lower Yuba River Chinook salmon, steelhead, and other fish species, ranging from 260,000 AF in a dry year to more than 574,000 AF in a wet year, an increase of 25,000 AF in a dry year to more than 170,000 AF in a wet year.

- Improved water supply reliability for SWP and CVP water users, including a commitment of 60,000 AF of water per year for environmental purposes (Component 1 Water) and up to an additional 140,000 AF of water (Components 2, 3, and 4 Water) in dry years for the SWP and CVP customers. Presently, CVP customers receive a share of the Yuba Accord water via the San Luis & Delta-Mendota Water Authority (SLDMWA) which has an agreement with DWR.

- A $6 million long-term lower Yuba River fisheries monitoring, studies, and enhancement program.
- Improved water supply reliability for Yuba County farmers, along with a responsible conjunctive use program to improve water use efficiency for local farmers.
- A secure funding source for Yuba County Water Agency and local irrigation districts to finance conjunctive use and water use efficiency activities, levee strengthening, and other water management actions in Yuba County (Yuba County Water Agency 2008).

The Yuba Accord's instream flow requirements may be modified when the Federal Energy Regulatory Commission issues a new long-term Federal Power Act license to Yuba County Water Agency for the Yuba Project, which will occur during or after 2016.

4.3.4 San Joaquin River Restoration Program (SJRRP)

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC) filed a lawsuit, known as NRDC, et al., v. Kirk Rodgers, et al., challenging the renewal of long-term water service contracts between the United States and the CVP Friant Division contractors. On September 13, 2006, after more than 18 years of litigation, the Settling Parties, including NRDC, Friant Water Authority, and the United States Departments of the Interior and Commerce, agreed on the terms and conditions of a Settlement subsequently approved by the United States Eastern District Court of California on October 23, 2006. The San Joaquin River Restoration Settlement Act, included in Public Law 111-11 and signed into law on March 30, 2009, authorizes and directs the Secretary of the Interior to implement the Settlement. The Settlement establishes two primary goals:

1. Restoration Goal – To restore and maintain fish populations in "good condition" in the main stem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.
2. Water Management Goal – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim and Restoration flows provided for in the Settlement.

To achieve the Restoration Goal, the Settlement calls for a combination of channel and structural modifications along the San Joaquin River below Friant Dam, releases of water from Friant Dam to the confluence of the Merced River (referred to as Interim and Restoration flows), and reintroduction of Chinook salmon. To achieve the Water Management Goal, the Settlement calls for downstream recapture of Interim and Restoration flows from the San Joaquin

River and the Delta and recirculation of that water to replace reductions in water supplies to Friant Division long-term contractors resulting from the release of Interim and Restoration flows. Interim Flow releases began October 1, 2009. In addition, the Settlement establishes a Recovered Water Account and allows the delivery of surplus water supplies to Friant Division long-term contractors during wet hydrologic conditions.

The SJRRP will implement the Settlement consistent with the San Joaquin River Restoration Settlement Act. Agencies responsible for managing and implementing the SJRRP are Reclamation, National Oceanic and Atmospheric Administration Fisheries Service, DWR, and California Department of Fish and Wildlife. The Settlement includes a detailed timeline for developing and implementing SJRRP actions.

4.3.5 Refuge Water Supplies

A Report on Refuge Water Supply Investigations (Reclamation 1989) describes water needs and delivery requirements for National Wildlife Refuges (NWR), State Wildlife Management Areas, and the Grassland Resource Conservation District in the Central Valley of California. In this report, the average annual historical water supplies were termed "Level 2" (L2), and the supplies needed for optimum habitat management were termed "Level 4". Section 3406(d)(1) of the CVPIA requires the Secretary of the Interior to provide firm delivery of L2 water supplies to certain wildlife refuges in the Central Valley of California. Section 3406(d)(2) of the CVPIA further directs the Secretary to provide additional water supplies to meet Incremental Level 4 needs through the acquisition of water from willing sellers.

For refuge water transfers, Reclamation (as a "willing buyer"), in cooperation with willing sellers, negotiates and develops agreements to purchase water for transfer to CVPIA refuges and prepares the associated National Environmental Policy Act/Endangered Species Act environmental compliance documents, as applicable.

Before Reclamation can facilitate water transfers, it must first provide CVP water to meet all regulatory requirements mandated by the State Water Resources Control Board (Delta flow and water quality standards), CVPIA (specifically the "(b)(2) water" and refuge L2 water), and the Reasonable and Prudent Alternative actions listed in the USFWS's (2008) and National Oceanic and Atmospheric Administration (NOAA) Fisheries' (2009) respective Biological Opinions on the Coordinated Operations of the CVP and SWP. Reclamation must then meet its contractual obligations to CVP agricultural and municipal and industrial (M&I) water service contractors. If all these requirements are satisfied and excess pumping capacity is available, only then will Reclamation facilitate potential north-to-south water transfers. Water transfers under this EIS/EIR cannot affect Reclamation's ability to deliver allocated CVP L2 water to refuges.

Table 4-4 shows Reclamation's refuge related water transfers ("re-allocation" regarding L2 supplies) from 2009 through 2013. Most of these transfers do not need to be moved through the Delta. Merced Irrigation District (ID) is one exception, but Merced ID has multiple means of delivering transferred water and it does not need to be conveyed through the Delta (see Section 2.3.2.3). Additionally, Reclamation has permanently purchased water from Corning, Thames, and Proberta Water Districts (WDs) that is moved through the Delta in some years; however, this water is more frequently used for refuges in the Sacramento Valley and is not conveyed through the Delta. Because the Level 4 refuge transfers typically do not rely on through-Delta conveyance, the action alternatives are not expected to affect the potential for refuges to receive these supplies.

Table 4-4. Refuge Transferred Water Supplies, 2009-2013

Seller	Water Transferred (AF)[1]	Notes
WY 2013		
Corning, Thames, and Proberta WDs	3,308	Permanently purchased NOD IL4 water transferred to the Kern NWR SOD
SJRECWA	19,500	Purchased IL4
Merced ID	7,256	Purchased for the East Bear Creek Unit of the San Luis NWR Complex as L2, then exchanged to meet SOD IL4 demands
WY 2012		
SJRECWA	25,000	Purchased IL4
Santa Clara Valley WD	10,000	Purchased IL4
Merced ID	3,480	Purchased for the East Bear Creek Unit of the San Luis NWR Complex as L2, then exchanged to meet SOD IL4 demands
WY 2011		
SJRECWA	50,333	Purchased IL4
Panoche WD	4,250	Purchased IL4
San Luis WD	5,000	Purchased IL4
Santa Clara Valley WD	10,000	Purchased IL4
Merced ID	1,627	Purchased for the East Bear Creek Unit of the San Luis NWR Complex as L2, then exchanged to meet SOD IL4 demands
East Side Canal and Irrigation Company	3,291	Purchased as L2, then exchanged to meet IL4 demands
WY 2010		
Corning, Thames, and Proberta WDs and Sacramento Valley NWR Complex	4,506	Permanently purchased NOD IL4 water and reallocated NOD conserved L2 water delivered to Kern NWR and GRCD
SJRECWA	35,714	Purchased IL4
Kern-Tulare WD	7,000	Purchased IL4
Panoche WD	10,000	Purchased IL4

Seller	Water Transferred (AF)[1]	Notes
Merced ID	500	Purchased for the East Bear Creek Unit of the San Luis NWR Complex as L2, then exchanged to meet SOD IL4 demands
Stevinson WD	4,080	Purchased for the East Bear Creek Unit of the San Luis NWR Complex as L2, then exchanged to meet SOD IL4 demands
WY 2009		
Sacramento Valley NWR Complex	5,342	NOD Conserved L2 water delivered to Kern NWR and the GCRD
SJRECWA	18,687	Purchased IL4
Stevinson WD	4,280	Purchased as L2, then exchanged to meet IL4 demands

Key:
AF – Acre-feet, GRCD – Grasslands Resource Conservation District, ID – Irrigation District, IL4 – Incremental Level 4, L2 – Level 2, NOD – North of Delta, NWR – National Wildlife Refuge, SJRECWA – San Joaquin River Exchange Contractors Water Authority, SOD – South of Delta, WD – Water District, WY – Water Year
Note 1: Gross amount of transferred water (IL4) and re-allocated L2. Conveyance losses from source to destination were incurred and are not represented here; therefore, the amount total does not reflect the amount delivered to the refuges.

4.4 References

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Chapter 5
Other Required Disclosures

Other required disclosures of environmental documents include irreversible and irretrievable commitment of resources; the relationship between short-term uses and long-term productivity; growth inducing impacts; significant and unavoidable impacts; and issues raised by the public. The summary of environmental impacts by alternative~~; and significant and unavoidable impacts~~ and~~;~~ the environmentally superior alternative are included in Chapter 2.

5.1 Irreversible and Irretrievable Commitment of Resources

According to the National Environmental Policy Act (NEPA), an environmental impact statement (EIS) must contain a discussion of irreversible and irretrievable commitment of resources that would result from the Full Range of Transfers Alternative (Proposed Action) if it was implemented (40 Code of Federal Regulations [CFR] Section 1502.16). The irreversible commitment of resources generally refers to the use or destruction of a resource that cannot be replaced or restored over a long period of time. The irretrievable commitment of resources refers to the loss of production or use of natural resources and represents lost opportunities for the period when the resource cannot be used. The California Environmental Quality Act (CEQA) also requires a discussion of any significant effect on the environment that would be irreversible if the project were implemented or would result in an irretrievable commitment of resources (CEQA Guidelines Sections 15126(c) and 15127).

Transfers from potential sellers upstream from the Delta to buyers in the Central Valley or Bay Area would involve the consumption of nonrenewable natural resources. These nonrenewable natural resources would consist of petroleum for fuels necessary to operate equipment used during groundwater pumping activities. The Full Range of Transfers Alternative (preferred alternative) would include the operation of diesel and natural gas-fueled agricultural engines during groundwater pumping activities.

5.2 Relationship Between Short-Term Uses and Long-Term Productivity

As required by NEPA (40 CFR Section 1502.16), this section describes the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity.

All three action alternatives provide water for transfer through cropland idling, groundwater substitution, crop shifting, conservation, and reservoir release actions. Different combinations of the transfer types would be used in each action alternative. The transfers are temporary as water is transferred from sellers to buyers on an annual basis. The transfers would require short term uses of energy for increased groundwater pumping for groundwater substitution transfers and increased pumping for transfers south of the Delta.

Transfers would benefit long-term productivity in the Buyer Service Area. Water transfers could reduce groundwater pumping in the Buyer Service Area, which could increase groundwater levels, decrease subsidence, and improve groundwater quality. Related beneficial effects would also occur for air quality by reducing windblown erosion (fugitive dust) on otherwise barren fields in the Buyer Service Area because water would be provided for irrigation. Additionally, agricultural land uses would be maintained in the Buyer Service Area with the transferred water. During dry years, water transfers would maintain agricultural productivity in the Buyer Service Area by providing water for irrigation and protect long-term production of permanent crops.

5.3 Growth Inducing Impacts

Both NEPA (Council on Environmental Quality NEPA Sections 1502.16(b) and 1508.8(b)) and CEQA (Section 15126.2(d)) describe the required analysis of direct and indirect impacts of growth-inducing impacts from projects. Section 1502.16(b) requires the analysis of indirect effects. Under NEPA, indirect effects as stated in Section 1508.8(b) include reasonably foreseeable growth inducing effects from changes caused by a project. CEQA Section 15126.2(b) requires an analysis of a project's influence on economic or population growth, or increased housing construction and the future developments' associated environmental impacts.

Direct growth-inducing impacts are usually associated with the construction of new infrastructure, housing, or commercial development. A project which promotes growth, such as new employment opportunities or infrastructure expansion (i.e. water supply or waste water treatment capabilities) could have indirect growth inducing effects. Generally, growth inducing impacts would be considered significant if the ability to provide needed public services by agencies is hindered, or, the potential growth adversely affects the environment.

Water proposed for transfer would be transferred from willing sellers to buyers to meet existing demands when there are shortages in Central Valley Project supplies. The proposed water transfers would not directly or indirectly affect growth beyond what is already planned. The term proposed for the transfers under the Proposed Action is 10 years beginning in 2015. The Proposed Action would not induce development growth or remove a barrier for growth because it is not a reliable source of water that could be used to approve development projects by local agencies. Therefore, the Proposed Action would have no growth inducing impacts.

5.4 Significant and Unavoidable Impacts

Significant and unavoidable adverse effects refer to the environmental consequences of an action that cannot be avoided by redesigning the project, changing the nature of the project, or implementing mitigation measures. NEPA requires a discussion of any adverse impacts that cannot be avoided (40 CFR Section 1502.15). The CEQA Guidelines require a discussion on significant environmental effects that cannot be avoided as well as those that can be mitigated but not reduced to an insignificant level (Section 15126.2(b) and Section 15126.2(a)). No significant and unavoidable adverse effects would occur from implementation of the action alternatives.

5.5 Controversies and Issues Raised by Agencies and the Public

CEQA requires the disclosure of controversial project issues raised by agencies and the public. Table 5-1 presents a summary of the project issues identified during the scoping period. The scoping report (Bureau of Reclamation and San Luis & Delta-Mendota Water Authority 2011) provides further information on issues identified by agencies and the public during the scoping process.

Table 5-1. Summary of Controversies and Issues Raised by Agencies and the Public.

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
Alternatives Analyzed in the EIS/EIR	The range of alternatives considered in the EIS/EIR.	Chapter 2 Proposed Action and Description of the Alternatives
Cumulative Impacts	The cumulative effects analysis must include all water transfers and programs that result in additional groundwater pumping.	Chapter 4 Cumulative Effects Methodology
Economic Impacts	Crop idling causes economic impacts to local farmers and farm-related industries.	Chapter 3.10 Regional Economics
Groundwater Impacts	Water transfers could result in long-term impacts to groundwater by decreasing groundwater levels and adversely affecting third party groundwater users.	Chapter 3.3 Groundwater Resources
Impacts to Migratory Waterfowl	The EIS/EIR must analyze the potential impact to migratory waterfowl associated with idling rice, potential loss of wetlands, and impact of delivery to wetlands south of the Delta.	Chapter 3.8 Vegetation and Wildlife
Impacts to Historical Resources	The EIR/EIS must assess whether the project will have an adverse effect on historical resources within the area of analysis.	Chapter 3.13 Cultural Resources
Impacts to Recreation	The EIS/EIR should include analysis of how water transfers may affect the San Luis Reservoir State Recreation Area.	Chapter 3.15 Recreation
Impacts to Water Quality	Analysis must include water quality effects related to degraded water bodies, particularly issues related to mercury and dissolved oxygen	Chapter 3.2 Water Quality
Third Party Impacts	Water transfers could result in third-party impacts to adjacent water users, local economies, and fish and wildlife.	Chapter 3.1 Water Supply, Chapter 3.10 Regional Economics, Chapter 3.7 Fisheries, and Chapter 3.8 Vegetation and Wildlife

Key:
EIS/EIR = Environmental Impact Statement/Environmental Impact Report

5.6 References

U.S. Bureau of Reclamation and San Luis & Delta-Mendota Water Authority. 2011. Long-Term Water Transfers Environmental Impact Statement/ Environmental Impact Report. Scoping Report. May. Accessed on: 07 22 2014. Available online at: http://www.usbr.gov/mp/cvp/ltwt/scoping_report/index.html

Chapter 6
Consultation and Coordination

This chapter documents the consultation and coordination efforts that have occurred during development of the Long-Term Water Transfers Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

6.1 Public Involvement

Both National Environmental Policy Act and California Environmental Quality Act encourage public involvement during preparation of EISs and EIRs. The following sections describe the public involvement opportunities that have occurred or will occur during the EIS/EIR process.

6.1.1 Public Scoping

On December 28, 2010, the Bureau of Reclamation (Reclamation) published a Notice of Intent in the Federal Register and on January 5, 2011, a Notice of Preparation for Long-Term Water Transfers was published with the California State Clearinghouse. Public scoping meetings were held between January 11 and 13, 2011 in the cities of Chico, Sacramento, and Los Banos, California. Reclamation and the San Luis & Delta-Mendota Water Authority (SLDMWA) prepared the "Long-Term Water Transfers EIS/EIR Public Scoping Report" (dated May 2011), which summarized the comments and concerns raised during the meetings, as well as public comments obtained during the public comment period.

6.1.2 Public Meetings

Reclamation and SLDMWA held public meetings after release of the Public Draft EIS/EIR to solicit public comments. Meetings were held in Sacramento, Los Banos, and Chico, California in October 2014. Reclamation and SLDMWA also provided a 60-day comment period for the public and agencies to submit written comments on the Public Draft EIS/EIR. Appendix J includes comment responses to all comments received at the public hearings and during the comment period.

6.2 Agency Coordination

The development of the Long-Term Water Transfers EIS/EIR has required coordination with a variety of local, Federal, and State agencies. The following sections describe these agencies and their roles in the process.

6.2.1 Buyers and Sellers

Reclamation and SLDMWA coordinated frequently with buyers and sellers to define transfer types and quantities, provide progress updates on modeling efforts, and discuss potential impacts and proposed mitigation measures. In addition to frequent communication on an individual basis with buyers and sellers, Reclamation facilitated several workshops with buyers and sellers to present preliminary information on the Long-Term Water Transfers EIS/EIR.

Reclamation and SLDMWA also coordinated with the buyers and sellers during development of the 2014 Water Transfers Environmental Assessment and Initial Study, which contributed to development of this EIS/EIR. The 2014 Water Transfers Finding of No Significant Impact and Mitigated Negative Declamation were published on April 11, 2014.

6.2.2 California Department of Water Resources (DWR)

Reclamation and SLDMWA coordinated with DWR throughout development of the EIS/EIR. Specifically, Reclamation and SLDMWA met with DWR to discuss groundwater and surface water modeling approaches and results, transfer types and quantities, and use of State Water Project facilities. DWR was also involved in briefings and reviews related to the Sacramento Valley Finite Element Groundwater Model (SACFEM2013) peer review. DWR's input on the SACFEM2013 peer review process was utilized to make revisions to the model. DWR also provided input on administrative draft sections of the EIS/EIR.

6.2.3 Resource Agencies

Reclamation and SLDMWA have been coordinating efforts with U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife on the impacts analysis on special status species and environmental commitments. Reclamation will submit a Biological Assessment for USFWS review under Section 7 of the Federal Endangered Species Act.

Chapter 7
List of Preparers and Contributors

The following is a list of preparers who contributed to the development of the Long-Term Water Transfers Environmental Impact Statement/Environmental Impact Report.

Table 7-1. Federal Agencies

Preparers	Agency	Role In Preparation
Alex Aviles	Reclamation	Environmental Justice, Air Quality
Bob Collela	Reclamation	Project Description
Georgiana Gregory	Reclamation	Water Supply, Power, Flood Control
Russ Grimes	Reclamation	NEPA Guidance
Shelly Hattleberg	Reclamation	Coordination and Review, Agricultural Land Use, Visual, Air Quality, Climate Change
Brad Hubbard	Reclamation	NEPA Lead Agency Project Manager
John Hutchings	Reclamation	Flood Control, Power
Joshua Israel	Reclamation	Fisheries
Michael Inthavong	Reclamation	Regional Economics
Erma Leal	Reclamation	Project Description
Kirk Nelson	Reclamation	Groundwater
Elizabeth Kiteck	Reclamation	Central Valley Project Operations
Stanley Parrot	Reclamation	Groundwater
Laurie Perry	Reclamation	Cultural Resources
Patricia Rivera	Reclamation	Indian Trust Assets
Tim Rust	Reclamation	Water Supply
Scott Springer	Reclamation	Recreation
David Van Rijn	Reclamation	Vegetation and Wildlife
Natalie Wolder	Reclamation	Water Supply

Notes:
NEPA – National Environmental Policy Act

Table 7-2. Regional Agencies

Preparers	Agency	Role In Preparation
Frances Mizuno	San Luis & Delta-Mendota Water Authority	CEQA Lead Agency Project Manager

Notes:
CEQA – California Environmental Quality Act

Table 7-3. CDM Smith

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Carrie Buckman, P.E.	M. Environmental Engineering 16 years experience	Water Resources Engineer	Project Manager, Project Description, Introduction
Selena Evans	M. Urban and Regional Planning 6 years experience	Environmental Planner	Visual Resources, Environmental Justice, and Indian Trust Assets
Donielle Grimsley	B.S. Biology 8 years experience	Environmental Scientist	Water Quality
Brian Heywood, P.E.	M.S. Civil Engineering 17 years experience	Senior Water Resource Engineer	Groundwater
Anusha Kashyap	M.S. Environmental Engineering 5 years experience	Environmental Engineer	Groundwater and Flood Control
Alexandra Kleyman	M.A. Environmental Policy and Urban Planning 5 years experience	Environmental Planner	Geology and Soils and Agricultural Land Use
Sami Nall, P.E.	M.S. Environmental Engineering 6 years experience	Environmental Engineer	Water Supply and Power
Christopher Park, AICP	M.S. City and Regional Planning 8 years experience	Water Resources Planner	Cumulative
Gwen Pelletier	M.S. Environmental Studies 14 years experience	Environmental Scientist	Air Quality, Greenhouse Gases
Gina Veronese	M.S. Agricultural and Resource Economics 13 years experience	Resource Economist	Regional Economics
Suzanne Wilkins, AICP	B.S. Business Administration 26 years experience	Water Resources Planner	Recreation

Table 7-4. Pacific Legacy

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Lisa Holm	Ph.D., 20 years experience	Supervisor - Prehistoric/Historic Archaeology	Cultural Resources
John Holson	M.A., 35 years experience	Principal - Regulatory Compliance; Prehistoric/Historic Archaeology	Cultural Resources

Table 7-5. ICF International

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Angela Alcala	BS 15 years experience	Wildlife Biology	Terrestrial Resources
Gerrit Platenkamp	PhD, MS, BS 22 years experience	Plant Ecology	Terrestrial Resources
Gregg Roy	BS 25 years experience	CEQA/NEPA	Terrestrial Resources, Aquatic Resources
Rick Wilder	PhD, BS 11 years experience	Fisheries Biology	Aquatic Resources

Table 7-6. MBK Engineers

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Lee Bergfeld	M.S. Civil Engineering, 19 years experience	Hydrological Modeling	Transfers Operations Model, Groundwater Model
Walter Bourez	M.S. Civil Engineering, 25 years experience	Hydrological Modeling	Transfers Operations Model, Groundwater Model

Table 7-7. CH2M Hill

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Peter Lawson	25 years experience	Hydrogeology	Groundwater Model
Nate Brown	19 years experience	Hydrogeology	Groundwater Model
Heather Perry	11 years experience	Hydrogeology	Groundwater Model
Lisa Porta	8 years experience	Groundwater Hydrology	Groundwater Model

Table 7-8. Resource Management Associates

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Marianne Guerin	25 years experience	Delta Modeling	DSM2 modeling, Appendix C

Table 7-9. RMann Economics

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Roger Mann	Ph.D. Agricultural Economics and Economics 37 years experience	Natural Resources Economist	Regional Economics Model

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