Chapter 12
Cultural Resources

12.1 Introduction

This chapter describes the environmental setting of prehistoric and historic cultural resources and paleontological resources and the regulatory setting associated with these resources. It also evaluates environmental impacts on cultural and paleontological resources that could result from the Lower San Joaquin River (LSJR) alternatives and, if applicable, offers mitigation measures that would reduce significant impacts.

The LSJR alternatives would affect the LSJR up to its confluence with the Merced River and the lower portions of the LSJR's three eastside tributaries (the Stanislaus, Tuolumne, and Merced Rivers), including the three upstream dams (i.e., rim dams) on these tributaries (New Melones Dam, New Don Pedro Dam, and New Exchequer Dam) and the reservoirs impounded by these dams (New Melones Reservoir, Don Pedro Reservoir, and Lake McClure, respectively). Because there would be no construction associated with the LSJR alternatives, there would be no potential for disturbing or altering significant known or unknown cultural resources at the reservoirs, along the rivers, and adjacent to the rivers. The potential of cultural resources to exist within the plan area is used to determine if flow and reservoir conditions under the LSLR alternatives, when compared to baseline, would impact cultural and paleontological resources. Table 12-1 summarizes the impacts on cultural resources.

The southern Delta water quality (SDWQ) alternatives are not anticipated to result in impacts on cultural or paleontological resources in the southern Delta. Therefore, the SDWQ alternatives are not discussed in this chapter (see Appendix B, *State Water Board's Environmental Checklist*).

Impacts related to LSJR Alternative 1 and SDWQ Alternative 1 (No Project) are presented in Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, and the supporting technical analysis is presented in Appendix D, *Evaluation of LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*. Impacts related to methods of compliance are discussed in Appendix H, *Evaluation of Methods of Compliance*.

Table 12-1. Summary of Cultural Resource Impacts

Alternative	Summary of Impact(s)	Significance Determination
CUL-1 Substantial adverse change in the significance of a historical or archaeological resource		
LSJR Alternative 1	See note.[1]	
LSJR Alternatives 2–4	The expected changes in reservoir elevations are within historical fluctuations, and known or unknown significant cultural resources are expected to continue to be inundated or exposed as usual under current operations. Changes in river flows are not expected to alter the low potential for significant cultural resources to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant
CUL-2 Disturbance of human remains, including those interred outside formal cemeteries		
LSJR Alternative 1	See note. [1]	
LSJR Alternatives 2–4	The expected changes in reservoir elevations are within historical fluctuations and are not expected to affect human remains due to low potential and prior treatment under existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant
CUL-3 Disturbance or destruction of a unique paleontological resource or site or unique geologic feature		
LSJR Alternative 1	See note. [1]	
LSJR Alternatives 2–4	The expected changes in reservoir elevations are within historical fluctuations and caves are expected to continue to be inundated and exposed as they currently are under operations. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers due to depth of occurrence or previous natural and anthropogenic disturbances.	Less than significant

Note:

[1] The No Project Alternative would result in implementation of flow objectives and salinity objectives identified in the 2006 Bay-Delta Plan. See Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project impact discussion and Appendix D, *Evaluation of LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project Alternative technical analysis.

12.2 Environmental Setting

Cultural resources include archaeological sites of prehistoric or historic origin, built or architectural resources older than 50 years (e.g., historical resources), and traditional or ethnographic resources, as well as paleontological resources (e.g., fossil deposits of paleontological importance). A prehistoric or historic archaeological site, district, built environment resource, or traditional cultural resource that is recognized as historically or culturally significant may be determined to be a "historical resource" as defined by state law (California Public Resources Code [Pub. Resources Code], § 21084.1; 14 California Code of Regulations [Cal. Code Regs.], § 15064.5(a)).

Archaeological resources include both prehistoric and historic remains of human activity. Built environment resources include an array of historic resources such as buildings, structures, and objects serving as a physical connection to California's past. Traditional or ethnographic cultural resources may include Native American sacred sites (traditional cultural properties), traditional cultural places, and traditional resources of any ethnic community that are important for maintaining the cultural traditions of any group.

Prehistoric site locations are often predicted using environmental variables, particularly the availability of water and food, because site occupation and exploitation of natural resources were primarily based on subsistence essentials. For historic-era sites, historical settlement in this region was influenced primarily by the growth of mining in the foothills, agriculture in the valley, and the development of a transportation network of rivers, roads and railroads connecting the valley and foothills Many archaeological sites in the region, particularly along the river drainages, have been destroyed by mining practices and developments in agriculture and irrigation, or previously have been affected by the construction of dams and reservoirs or other development. Although remnants of sites have been discovered within the region, many have been highly disturbed.

Paleontological resources, including mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains, are more than 5,000 years old and occur mainly in Pleistocene or older sedimentary rock units.

Appendix I, *Cultural Resources Overview,* provides an overview of the prehistoric, historic, and paleontological setting of the northern portion of the San Joaquin Valley and the adjacent foothills. Section 12.2.2, describes the setting for the three reservoirs, the LSJR, and the three eastside tributaries.

12.2.1 Reservoir Cultural and Paleontological Resources

The reservoirs evaluated for the presence or absence of cultural and paleontological resources are New Melones Reservoir, Don Pedro Reservoir, and Lake McClure Summaries of cultural resources (prehistoric, historic, and ethnographic) and paleontological resources are described below for each reservoir.

New Melones Reservoir

Prehistoric and Historic Resources

The U.S. Army Corps of Engineers (USACE) began construction of the New Melones Dam and reservoir, spillway, and powerhouse on the Stanislaus River in 1966 and completed it in 1979. Management of the project was transferred to U.S. Bureau of Reclamation (USBR) in 1979, and the reservoir is now part of the Central Valley Project (CVP). Archaeological survey, excavation, and analysis were conducted for the project between 1968 and 1981, documenting nearly 700 prehistoric and historic-era sites (Moratto 1984:312). The New Melones Archaeological District, comprised of more than 500 archaeological sites, bedrock mortars, and historic-era homestead sites, is eligible for National Register of Historic Places (NRHP) inclusion (USBR 2010:5.90–5.91). In addition to prehistoric habitation, rock art, and resource processing sites, mortuary chambers used between circa 1000 B.C. and A.D. 700 were identified in numerous caves in the plan area (Moratto 2002:40). The reservoir inundated the Gold Rush era mining towns of Bostwick Bar, Pine Log, and Robinson's Ferry (later renamed Melones, and now State Historical Landmark #276) (USBR 2007:3.14). Completed in 1988, the 10-volume cultural report on the New Melones project presented the evidence for a local archaeological sequence, with occupation of the area beginning as early as 10,000 years ago (USBR 2010:5.84).

A study completed in 2008 for the *New Melones Lake Area Resource Management Plan and Environmental Impact Statement* (RMP/EIS) identified 643 prehistoric, ethnohistoric, and historic-era cultural resources within the New Melones Lake Area, which includes a total of 23,265 acres administered by USBR and the U.S. Bureau of Land Management (BLM) (USBR 2010:5.82). Prehistoric site types, some of which include lithic scatters, human remains, house depressions and/or shell scatters, are bedrock mortar, midden, cave, and rock art. Historic site types are mining, homestead/ranching, water/power systems, transportation, cemetery, and historic feature.

Of the archaeological sites identified within the New Melones Lake Area, 122 sites are located in the permanent pool zone lower than 808 feet above mean sea level (MSL), 33 sites in the permanent pool/fluctuation pool zone 808–1,088 feet above MSL, 232 sites in the fluctuating pool zone only, 24 sites in the fluctuating pool zone/above-pool area, 203 sites above the flood pool zone, and 5 sites that include portions in all zones (USBR 2007:3.1-3.3, Table R-9). The elevation of the remaining sites is uncertain. Of the archaeological resources located in the permanent pool zone, 66 are prehistoric and 75 are historic sites or features (USBR 2007:3.11–3.12, 3.14–3.15). Ninety-six prehistoric and 226 historic sites or features are located entirely or partially within the fluctuating pool zone; these have been subject to wave action, erosion from cyclical inundation and exposure, and are considered by USBR to be most susceptible to damage from lakeside recreational use and vandalism. Known cultural resources above the flood zone include 69 prehistoric and 147 historic sites or features.

No historic-era built environment resources are referenced in the New Melones Lake Area Final RMP/EIS (USBR 2010:5.82–5.83).

Of the 6,735 total acres of the New Melones Lake Area that has not yet been surveyed for the presence or absence of cultural resources, 2,063 acres are below the maximum pool zone (USBR 2010:5.82–5.83, Table 5-14). The potential for a surface survey to yield newly identified cultural resources varies from low to very high depending on the management area and the density of previously recorded resources within each area. In management areas (USBR 2010:Figure 2-2) that

have been completely inventoried (Bowie Flat, Dam and Spillway, Mark Twain) or in those under the maximum pool zone (Middle Bay, North Bay, and South Bay) the discovery of previously unidentified cultural resources is considered unlikely. The potential for surface discovery in nine management areas located under or partially under reservoir waters is considered low to moderate in one (Greenhorn Creek), moderate in two (Bear Creek, Carson), moderate to high in two (Camp Nine, French Flat), high in two (Coyote Creek, Westside), and very high in two (Parrotts Ferry, Stanislaus River Canyon). Four of the designated management areas are outside the reservoir boundary (Bowie Flat, Dam and Spillway, Peoria Wildlife Area, Tuttletown).

No traditional cultural properties (TCPs) or sacred lands have been identified as of February 2010 within the New Melones Lake Area (USBR 2010:5.91). If identified after this date, TCPs are subject to the same impacts as archaeological sites.

All documented or currently undocumented historic properties[1] at New Melones would be protected and managed by the *Resource Protection Plan* administered by the USBR at New Melones Lake (USBR 2010:1.5, 5.81) (Section 12.3.1).

Paleontological Resources

Geologic formations around the reservoir are pre-Tertiary metamorphic or igneous rocks with low paleontological potential; however, there are Calaveras Formation deposits in proximity to New Melones Reservoir (USBR 2010:5.5-5.8). Caves formed in the Calaveras Formation limestone deposits are unique geologic features, and the formation is also considered to have a high paleontological potential since fossilized vertebrate remains have been recovered from its caves (UCMP 2012). Paleontological specimens have been discovered in the New Melones region inside the limestone caves. The caves are managed and protected in accordance with the directives of the *New Melones Lake Revised Cave Management Plan* administered by USBR (Section 12.3.1).

Fossilized remains of Rancholabrean (younger Pleistocene and Holocene fauna) vertebrates recovered from more than a dozen Calaveras Formation caves include ground sloth, horse, deer, rabbit, squirrel, and mole, among others (UCMP 2012). In 1978, before the reservoir was filled, the BLM identified 87 caves within the New Melones Lake Area (USBR 2010:5.10–5.12). The specific location of caves ranked by the BLM as paleontologically significant is confidential, so the following references all 87 caves. Of these, 30 of the 44 caves within the Stanislaus River Canyon are inundated or subject to inundation by the impounded waters. Of the 19 caves in the Coyote Creek Canyon, all but Lower Natural Bridges Cave are above the New Melones Dam spillway elevation of 1,088 feet above MSL. Coyote Creek flows through two caves, Upper and Lower Natural Bridges. In the Skunk Gulch and Grapevine Gulch areas, all 24 caves identified there are above spillway elevation. Five of the caves, including Upper and Lower Natural Bridges, are protected under the Federal Caves Protection Act of 1988. Of these, Lower Natural Bridges (Cave 85) and two others (Caves 25 and 54) are below the 1,088-foot MSL spillway level of the New Melones Dam.

[1] "Historic property" is a term with defined statutory meaning at 36 CFR 800.16(l) and means any cultural resource (prehistoric or historic district, site, building, structure, or object) included in, or eligible for inclusion in, the NRHP. The term includes properties of traditional religious or cultural importance to an Indian tribe that meet the NRHP criteria listed at 36 CFR Section 60.4.

New Don Pedro Reservoir

The New Don Pedro Dam and reservoir on the Tuolumne River were completed in 1971. Archaeological investigations were conducted in the late 1960's but were fairly limited and not initiated before many of the archaeological sites already had been inundated or damaged (TID and MID 2011a:5.246). During 1970 and 1971, salvage archaeology in the reservoir basin recorded the remnants of 41 prehistoric sites (Moratto 1984:311). A July 2010 records search identified 61 prehistoric and historic archaeological sites within the boundary for the Federal Energy Regulatory Commission (FERC) New Don Pedro relicensing application (FERC Project No. 2299) (TID and MID 2011a: 5.255, 5.260–5.263). These include 32 prehistoric, 21 historic, and 2 multi-component sites; 6 sites with missing records are of unknown type. Prehistoric site types found at New Don Pedro Reservoir are bedrock mortar, kiln, lithic scatter, midden, and village; a few of these include human remains, shell scatters, house pits, or evidence for cave dwelling. Historic site types found at New Don Pedro Reservoir are foundations, rock walls, mining features, a gravestone, water conveyance systems, rock dam, roadbeds, debris scatters, and the former location of a mining town called Jacksonville. Of the 61 resources that are currently documented, 4 prehistoric sites have been determined eligible for inclusion in the NRHP and two prehistoric bedrock milling stations, as well as the former location of Jacksonville, which is now a State Historical Landmark (#419), are under the waters of New Don Pedro Reservoir (TID and MID 2011a:5.260–5.263, 2011b:4-5). An inventory and evaluation for NRHP eligibility of historic-era built environment resources is also in progress for the Don Pedro FERC relicensing application (TID and MID 2011b:8).

A survey is planned for the year 2012 that will include the time of year when the reservoir level is at its lowest to ensure as much surface area is exposed as possible for a historic properties study, and additional sites below the high water mark may be identified (TID and MID 2011b:10). A review of historic maps identified more than 50 locations where unrecorded historic-era sites or features may be present, such as roads, trails, buildings, mines, ditches, and the Hetch Hetchy railroad and aqueduct.

No Traditional Cultural Properties (TCPs) or sacred lands have been identified as of November 2011 within the FERC relicensing boundary (TID and MID 2011c:3.5). A TCP study and consultation with local Native American groups or tribes is in progress for the New Don Pedro FERC relicensing application. If identified, TCPs are subject to the same impacts as archaeological sites.

Geologic formations around the reservoir are pre-Tertiary metamorphic or igneous rocks (TID and MID 2011a:5.3) with low paleontological potential. No paleontological resources have been reported at the New Don Pedro Reservoir (TID and MID 2011a).

All documented or undocumented cultural resources at the New Don Pedro Reservoir would be protected and managed under a Historic Properties Management Plan (HPMP) (Section 12.3.3).

Lake McClure

Construction of the New Exchequer dam and Lake McClure Reservoir on the Merced River was completed in 1967, prior to the 1972 enactment of the California Environmental Quality Act (CEQA). No cultural resources investigations were conducted in the plan area prior to 1977 (Merced Irrigation District [Merced ID] 2008: 7.12/4-5). Cultural resources surveys of approximately 6,200 acres were conducted for the Merced River Hydroelectric Project (FERC Project No. 2179) July 2008–July 2010 when lands usually inundated by Lake McClure were exposed and accessible due to lower than normal water levels (Merced ID 2012a: Exhibit E, 411-415). Merced ID has identified a

total of 203 archaeological sites: 38 prehistoric, 149 historic-era, and 16 with prehistoric and historic-era components (Merced ID 2012b:27). Prehistoric site types that were identified include base and temporary camps, sparse lithic scatter, and milling station; site constituents at the camps include bedrock mortars, rock art, midden, and/or artifact scatters (Merced ID 2012b:28). Historic site types found include mining and mining related, road and trail, railroad element, farming and ranching habitation, industrial foundation, rock walls, water control element, refuse deposit, land survey marker, hydroelectric element, transmission line, and Bagby townsite (Merced ID 2012b:31). Multi-component sites include constituents of both prehistoric and historic period use (e.g., bedrock mortars and lithic scatters with cabin foundations, rock walls, or prospect pits) (Merced ID 2012b:30-31). No evidence of burials was observed at the location of a possible cemetery noted on a U.S. Geological Survey (USGS) quadrangle map, and no human remains were found during the survey (Merced ID 2012b:27, 48).

The 203 documented archaeological sites remain unevaluated for potential listing on the NRHP; all prior eligibility assessments are now considered premature (Merced ID 2012a: Exhibit E, 413–414).[2] Of the 203 sites, more than 45 prehistoric and historic-era sites are at or below the high water level (Merced ID 2011: Exhibit E, 334–335). Siltation was noted at 16 of the 45 sites and was considered a positive effect because it provides site protection. Among the Gold Rush-era mining communities now under the waters of Lake McClure are the town of Benton Mills (later renamed Bagby), the Exchequer mining camp, and the Horseshoe Bend camp (Merced ID 2008: 7.12/12).

The archaeological site on the north and south banks of the Merced River comprising the townsite of Bagby/Benton Mills includes artifacts and 31 features (e.g., foundations, structure pads, pits, cisterns, retaining walls) (Merced ID 2012b:30–32). Although normally submerged, portions of the townsite were exposed during low water levels in 2009 (Merced ID 2010b:48). Remnants of Yosemite Valley Railroad elements were exposed during the low water levels in 2008 (Merced ID 2010b:34–38). During the survey within the two drought years (2008–2010), portions of a prehistoric base camp were also noted to extend underwater into the Merced River (Merced ID 2010b:28).

In 2011, Merced ID completed its study of the built environment for the Merced River Hydroelectric Project (FERC Project No. 2179), and determined the New Exchequer and McSwain Dams, powerhouses, and other project features, most of which were constructed in the late 1960's, are not currently eligible for inclusion on the NRHP but will be reevaluated once individual facilities become 50 years old (Merced ID 2012a: Exhibit E, 412-414). Seventeen buildings and structures more than 50 years old, including the original Exchequer Dam and a gauging station, were determined not eligible for NRHP listing. The original Exchequer Dam is normally submerged but was exposed in 2008 during the low water levels (below 720-foot elevation) (Merced ID 2010b:38).

No TCPs or sacred lands have been identified prior to submission of the final license application for the Merced River Hydroelectric Project in February 2012 (Merced ID 2012a: Exhibit E, 412). Ethnographic interviews with the Southern Sierra Miwok Nation (also known as the American Indian Council of Mariposa County, Inc.) may be conducted during the term of the new license and may identify potential TCPs. If identified, TCPs are subject to the same impacts as archaeological sites.

[2] It is anticipated that concurrence by the State Historic Preservation Officer (SHPO) on NRHP recommendations will be received by the end of 2012.

Geologic formations around the reservoir are pre-Tertiary metamorphic or igneous rocks (Merced ID 2012a, b:E3.47, Figure 3.3.1-1) with low paleontological potential. No paleontological resources have been reported within the boundaries of the Merced River Hydroelectric Project (FERC Project No. 2179) (Merced ID 2008, 2012b).

All documented or undocumented cultural resources at Lake McClure would be protected and managed under an HPMP (Section 12.3.3).

12.2.2 River Cultural and Paleontological Resources

The potential presence or absence of cultural resources along the LSJR and the Merced, Stanislaus, and Tuolumne Rivers below the major rim dams and reservoirs has been presented in numerous documents. It was most recently summarized in the Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) prepared to meet the flow objectives for the San Joaquin River Agreement (SJRA) (EA Engineering 1999). Due to the extensive reach of the LSJR and its three eastside tributaries, the summary of prehistoric and historic resources was presented in two tables tabulated by the total number of sites recorded in each county (EA Engineering 1999: Tables 3.7–2 and 3.7–3). Because little change is likely in the number of recorded cultural resources between the time that document was prepared and now, the same information is presented in Table 12-2 and Table 12-3 (below) for the six counties traversed by the LSJR and the Merced, Stanislaus, and Tuolumne Rivers. Following Table 12-2 and Table 12-3 is a discussion of anthropogenic practices that have disturbed or destroyed archaeological sites during the historic period.

Geologic formations along the LSJR and the Merced, Stanislaus, and Tuolumne Rivers downstream of the rim dams include eight Pleistocene or older sedimentary rock units that have a high paleontological potential and are mapped at the surface or beneath Holocene-age alluvium. As detailed below, these units are the Ione, Laguna, Mehrten, Modesto, Moreno, Riverbank, Turlock Lake, and Valley Springs Formations, each of which has yielded the fossilized remains of plants, invertebrates, or vertebrates.

Prehistoric Cultural Resources

A summary of prehistoric resources by county is provided in Table 12-2. Together, these counties have more than 2,600 recorded prehistoric sites and range from 2 to 15 percent surveyed for cultural resources. Although people were present in the northern San Joaquin Valley and Sierra Nevada foothills as early as 12,000 years ago (Rondeau et al. 2007:65; Rosenthal et al. 2007:151), the majority of prehistoric sites documented in this region are less than 500 years old (EA Engineering 1999:3.106–3.109). Prehistoric sites recorded in the region include villages, seasonal occupation areas, burials, bedrock mortars, and lithic scatters, among other site types.

Table 12-2. Prehistoric Sites by County

County	Total Number of Recorded Sites	Number of Prehistoric Sites	Percentage of County Land Surveyed	Areas with High Density of Sites	Overall Amount of Significant Disturbance in the County
Calaveras	1,527	929	10–15	Stanislaus, N. Fork Stanislaus, and Mokelumne Rivers; creeks, ridge flats	Low
Mariposa	1,264	856	5	Merced River; along creeks; in Yosemite National Park	Low
Merced	341	316	2	Unknown	Low
San Joaquin	249	189	5	San Joaquin and Mokelumne Rivers	Low to moderate
Stanislaus	350	280	3	Stanislaus, Tuolumne, and San Joaquin Rivers; along smaller creeks	Low
Tuolumne	3,540	Unknown	10	Stanislaus and Tuolumne Rivers; along creeks, ridge flats	Low
Totals	7,271	>2,570			

Source: EA Engineering 1999:Table 3.7-2.

The areas in the six counties with the highest density of documented prehistoric sites are along the rivers (Table 12-2). The natural channels and meanders of these rivers have changed during the historic period by agriculture, irrigation, and mining practices, eliminating much of the natural floodplains and terraces, creating large in-channel and off-channel pits, and resulting in relatively static channels with narrow floodways confined by dikes or levees and agricultural fields. Other activities, such as hydraulic mining practiced in the New Melones Lake area, have also disturbed much of the river areas (USBR 2010:5–9). Historical dredge tailings remain visible, flanking the Merced River between Lake McSwain and the community of Hopeton, and locally along parts of the Tuolumne River between the community of La Grange and the City of Waterford, indicating past areas of substantial disturbance (Merced ID 2010a:2.5–2.6; TID and MID 2011a:5.8). Large-scale aggregate mining along the lower Merced and Tuolumne Rivers began in the early 1900's, and gold mining continued on the lower Tuolumne River near Waterford into the mid-1900's, which also disturbed large areas of the rivers (Merced ID 2008:7.1/3–7.1/4; TID and MID 2011a:5.8).

The prehistoric site data reflect the preference of indigenous Californians for occupation along major watercourses, as well as the location of cultural resource management projects during the last three to four decades. Although a high number of prehistoric archaeological sites have been recorded along the rivers, sites have been destroyed by agriculture and irrigation practices, mining activities, or development. Furthermore, although Table 12-2 indicates the overall amount of significant disturbance in the six counties is relatively low; many of the known sites along the rivers have been highly disturbed by these types of activities (EA Engineering 1999:3.106).

Historic Cultural Resources

A summary by county of historic-era resources listed in the NRHP and the California Historical Resources Inventory is provided in Table 12-3. Together, these six counties have more than 1,000 recorded historic sites, of which more than 200 have been evaluated for listing in the NRHP, California Register of Historical Resources (CRHR), or local registers. The counties also include a number of historic properties listed in the NRHP, as well as California Historical Landmarks and Points of Historical Interest.

Table 12-3. Historic Resources by County in the Northern San Joaquin Valley

County	Number of Historic Sites[1]	Number of Properties in the NRHP	Number of California Historical Landmarks	Number of Evaluated Sites in California Historical Resources Inventory	Number of California Points of Historical Interest
Calaveras	598	13	42	56	4
Mariposa	408	29	8	15	0
Merced	25	12	5	13	7
San Joaquin	60	31	23	28	8
Stanislaus	70	17	5	12	7
Tuolumne	Unknown	19	20	79	4
Totals	>1,161	121	103	203	30

Source: EA Engineering 1999:Tables 3.7-2 and 3.7-3.

[1] Calculated by subtracting the number of prehistoric sites from the recorded sites total provided in Table 12-2.

NRHP = National Register of Historic Places

The historic period in the northern San Joaquin Valley is characterized by agricultural settlement, while mining activities influenced the east side of the valley and the Sierra Nevada foothills. The availability of water, as well as soil and landform type, was an important factor in early agricultural settlement and the interrelated locations of settlements and towns (Caltrans 2006:16–17, 34–35; Caltrans 2007:31–35).

Many of the documented historic-era resources in the six counties shown in Table 12-3 represent early settlement along the rivers during the Gold Rush era. Historic-era resources recorded along the rivers include buildings, structures or features of farming and ranching homesteads and rural communities, cemeteries, ferry landings, bridges, boat ramps and anchors, irrigation ditches or canals, early trails and roadways, rock walls, and assorted historic features and debris. In the Sierra Nevada foothills, resources related to the establishment and growth of mining, most of which are located along the rivers and smaller waterways, are represented by the buildings or remnants of camps and towns, refuse deposits, ditches, earthen dams, flumes, prospect pits, rock walls, and remains of stamp mills and other mining structures. Recorded resources also include transportation features, such as abandoned railroad grades, bridges, and roadways that connected the mines, ferry crossings, and settlements in the foothills to the San Joaquin Valley.

The natural channels and meanders of the LSJR and the lower Merced, Tuolumne, and Stanislaus Rivers have been extremely modified by anthropogenic processes during the historic period, particularly by agriculture, irrigation, and mining practices, as discussed above. Although a high number of historic period archaeological sites or built resources have been recorded along the rivers, many have been highly disturbed or destroyed. Due to these disruptive practices and considering the young age of the alluviallandforms, the potential for buried historic-era archaeological sites along the four rivers is considered low (Rosenthal and Meyer 2004:106–107, Table 18).

In addition to agriculture, irrigation practices, and aggregate mining, commercial and residential development continues to affect riverside cultural resources. For example, the riverside town of Burneyville, dating from the 1870's, has been absorbed by the expanding City of Riverbank on the Stanislaus River (Hoover et al. 2002:521). The City of Modesto, initially established in 1870 as a railroad town, prospered in the early 1900's following the establishment of the Modesto Irrigation District (MID) and modern irrigation practices, and has now absorbed lands along both sides of the Tuolumne River, an area sensitive for the presence of historic-era sites related to ranching, agriculture, and early transportation practices (ICF Jones & Stokes 2008:V/8.3–5). Similarly, the City of Livingston's proposal to expand its sphere of influence within the agricultural lands along the southern side of the Merced River could affect historic-era resources (PMC 2008:1.0/5–6, Figure 2-1).

Paleontological Resources

The Holocene riverine floodplain deposits along the LSJR and the lower portions of the three eastside tributaries (Merced, Stanislaus, and Tuolumne Rivers) are surrounded mainly by a mixture of continental rocks and deposits that include younger Holocene and older Pleistocene alluvium, three Pleistocene formations (Modesto, Riverbank, and Turlock Lake), and the Pliocene Laguna Formation (Page 1986: Plate 2). There is a large area with Holocene-age sand dunes mapped on the stretch of the Merced River between the communities of Irwin and Cressey. A few small sand dune patches are also mapped on the Stanislaus River west of the City of Riverbank. The sand dunes range in thickness up to about 140 feet (Page 1986:19). At the confluence of the three eastside tributaries with the LSJR are Holocene flood-basin deposits, some of which may be Pleistocene Modesto Formation (Page 1986:18–19). The thickness of the flood-basin deposits in the San Joaquin Valley is estimated to be as much as 100 feet. The geologic formations (e.g., Miocene and Pliocene-age Mehrten Formation deposits) in the area have a high paleontological potential and have produced fossils as described below in Table 12-4.

As discussed previously, the natural channels and meanders of the LSJR and the Merced, Tuolumne, and Stanislaus Rivers have been extremely modified by anthropogenic processes, particularly agriculture, irrigation, and mining practices. The natural floodplains and terraces have been mostly eliminated and the rivers confined by dikes, levees, and agricultural fields to relatively static channels with narrow floodways. During the historic era, native soils and sediments along the waterways draining westward from the foothills were displaced or buried by hydraulic mining and dredging, two particularly destructive mining methods that have been followed by modern large-scale aggregate mining (USBR 2010:5–9; Merced ID 2008:7.1/3–7.1/4; Merced ID 2010a:2.5–2.6; TID and MID 2011a:5.8). Although a number of fossil localities have been recorded along the rivers in the northern San Joaquin Valley, these are typically identified at depths below surficial Holocene-age deposits, including those native sediments rearranged by the anthropogenic practices that have recontoured and continue to recontour the riverine landscapes.

Table 12-4. Summary of Formations with High Paleontological Potential along the LSJR and Three Eastside Tributaries

Formation	Characteristics	Fossil Presence
Ione	This middle Eocene rock unit extends more than 200 miles along the western edge of the Sierra Nevada (Creely and Force 2007:10). The marine sandstone and kaolinitic clay deposits have produced few marine body fossils, but trace burrows are abundant in many places.	Plant fossils have been recovered from deposits in Calaveras County near Comanche Reservoir, and invertebrate fossils in Mariposa, Stanislaus and Tuolumne Counties (UCMP 2012). Near the alternatives, the Ione Formation contains fossils of an Eocene fossil index bivalve at the Planicosta Buttes just south of the bridge at Merced Falls (Arkley 1962:5).
Laguna	This Pliocene rock unit consists of moderately consolidated, interbedded, arkosic alluvial gravel, sand, and silt (Helley and Harwood 1985:17). The gravel beds are predominantly comprised of quartz and metamorphic rock fragments.	Land vertebrate fossils have been found in fine-grained deposits of the Laguna Formation, mainly along the Sierra Nevada foothills.
Mehrten	This rock unit is comprised of a sequence of dark sandstone, conglomerate and claystone beds of late Miocene and Pliocene age (Arkley 1962:6-7) that unconformably overlies the Valley Springs Formation and consists of fluvial material reworked from volcanic deposits. In the Modesto area, the Mehrten attains a maximum thickness of about 1,200 feet where it lies at a depth of about 1,100 feet (Page 1986:11).	Microfossils and fossilized plant specimens have been identified in the Mehrten in Tuolumne County. Vertebrate fossils, including horse, pronghorn, and peccary, have been found at Goodwin Dam in Calaveras County, near Columbia and Two Mile Bar in Tuolumne County, and at Oakdale and Turlock Lake State Recreation Area in Stanislaus County (UCMP 2012).
Modesto	This Pleistocene rock unit was deposited by rivers still existing today and forms alluvial terraces and fans of major rivers along the axis of the Central Valley, including the San Joaquin and Sacramento Rivers, and is widely distributed along the rivers in the Sacramento and San Joaquin Valleys (Helley and Harwood 1985:10). The upper and lower member are dated 9,000–73,000 years ago.	The type section for this unit is along the south bluff of the Tuolumne River south of Modesto. Vertebrate fossils have been recovered from sediments in Merced, San Joaquin and Stanislaus Counties, and from nearly every major community in the San Joaquin Valley, including Fresno, Lathrop, Lodi, Manteca, Merced, Modesto, Stockton, and Tracy (UCMP 2012).

Formation	Characteristics	Fossil Presence
Moreno	Late Cretaceous in age, the Moreno Formation is the most important fossil locality of Cretaceous-aged marine vertebrates in the western United States.	Fossilized bony fish and plesiosaur and mosasaur remains have been found in Merced County near Laguna Seca and Rattlesnake Creeks (UCMP 2012). Moreno Formation deposits in Merced and Stanislaus Counties have produced invertebrate fossils. Microfossils have been found in Merced and San Joaquin Counties. Fossilized plant remains have been identified near Del Puerto and Little Salado Creeks in Stanislaus County.
Riverbank	Formed during the Pleistocene age, 2.6 million to 11,700 years ago, this formation forms arkosic alluvial terraces and fans consisting of weathered, reddish gravel, sand and silt with some mafic igneous rock fragments. In the San Joaquin Valley, the Riverbank is broken into informal upper and middle members (Helley and Harwood 1985:11).	Fossils have mainly been recovered from fine-grained deposits, typically at a depth of 12 feet or more below the surface. Vertebrate fossils have been identified at various locations in Merced, San Joaquin, and Stanislaus Counties.
Turlock Lake	The alluvial sediments of this Pleistocene rock unit originated from the Sierra Nevada, and the formation is more widespread in the San Joaquin Valley than the Sacramento Valley (Helley and Harwood 1985:11-12). The age of the lower and upper members is estimated to at least 730,000 years and 600,000 years ago, respectively.	A series of exposures in Turlock Lake State Recreation Area in Stanislaus County are the type site for this formation. The most well-known locality is the Fairmead Landfill near Chowchilla in Madera County that has produced more than 3,000 fossil specimens from 35 different species (Dundas et al. 1996).
Valley Springs	This formation is generally considered to be late Miocene age (Arkley 1962:5; Page 1986:10). It consists of a fluvial sequence of rhyolitic ash, sandy clay, and siliceous gravel, and in most areas lies unconformably over the Ione Formation.	Fossilized plant specimens have been found near the community of Burson in Calaveras County (UCMP 2012).

12.2.3 Southern Delta Cultural and Paleontological Resources

The SDWQ alternatives were eliminated from detailed environmental analysis. Therefore, the setting and summary of cultural and paleontological resources for the southern Delta is not presented in this section.

12.3 Regulatory Setting

12.3.1 Federal

Relevant federal programs, policies, plans, or regulations related to cultural resources are described below.

National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA) of 1966 (16 United States Code [U.S.C.], § 470), as amended, is the primary federal law governing the preservation of cultural and historic resources in the United States. The NHPA establishes the federal government policy on historic preservation and the programs through which this policy is implemented. Section 106 of NHPA (16 U.S.C., § 470f) requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or determined eligible for inclusion in the NRHP and to afford the ACHP a reasonable opportunity to comment on such undertakings (36 Code of Federal Regulations [CFR], § 800.1).

Under Section 106 of the NHPA, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to reduce any impacts to an acceptable level. Significant cultural resources ("historic properties") are those resources that are listed in, or are eligible for listing on the NRHP per the criteria listed at 36 CFR Section 60.4. Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a Native American tribe to be determined eligible for inclusion on the NRHP. Section 106 also directs federal agencies to involve consulting parties, including the SHPO, Native American tribes, and local governments, and to provide an opportunity for public involvement during the compliance process (800 CFR, § 800.2(4)(c)).

To be eligible for the NRHP, cultural resources must possess integrity and meet at least one of the following four criteria delineated in 36 CFR Section 60.4.

- Are associated with events that have made a significant contribution to the broad patterns of our history (Criterion A).
- Are associated with the lives of persons significant in our past (Criterion B).
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction(Criterion C).
- Have yielded, or may be likely to yield, information important in prehistory or history(Criterion D).

Under Section 106, a project's impacts on historic properties that affect the characteristics that qualify a property for NRHP inclusion are considered an adverse effect on the environment. Examples of adverse effects on historic properties are listed under 36 CFR Section 800.5(a)(2) and include, but are not limited to, physical destruction or damage to all or part of a property, change of the character of the use of the property or physical feature within the setting of the property that contribute to its significance, or introduction of visual, atmospheric, or audible elements that diminish the integrity of significant features of the property. If an adverse effect is found, the agency shall act pursuant to 36 CFR, Section 800.6 (36 CFR, § 800.5[d][2]) to resolve the adverse effect by developing and evaluating alternatives or modifications to the undertaking that "could avoid, minimize or mitigate adverse effects on historic properties" (36 CFR, § 800.6[a]). Cultural resources that have been determined noneligible for the NRHP, in consultation with the SHPO and interested parties, require no further consideration unless new discoveries trigger reevaluation.

Section 106 of the NHPA does not apply to paleontological resources unless they are found in a culturally-related context. In addition to the Antiquities Act (16 U.S.C., §§ 431–433) of 1906, the preservation and salvage of fossils and other paleontological resources can be protected under the National Registry of Natural Landmarks (16 U.S.C., §§ 461–467) and the National Environmental Policy Act (NEPA), which directs federal agencies to "preserve important historic, cultural, and natural aspects of our national heritage."

Archeological Resources Protection Act of 1979

The Archeological Resources Protection Act (ARPA) of 1979 (43 CFR, § 7) may impose additional requirements on an agency if federal or Native American lands are involved. The act: (1) prohibits unauthorized excavation on federal and Indian lands, (2) establishes standards for permissible excavation, (3) prescribes civil and criminal penalties, (4) requires agencies to identify archeological sites, and (5) encourages cooperation between federal agencies and private individuals.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S.C., 1996 and 1996a) affirms the right of Native Americans to have access to their sacred places. If a place of religious importance to American Indians may be affected by an undertaking, AIRFA promotes consultation with Indian religious practitioners; this may be done in coordination with Section 106 consultation. Amendments to Section 101 of NHPA in 1992 strengthened the interface between AIRFA and NHPA by clarifying the following: (1) properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization may be determined to be eligible for inclusion in the NRHP, and (2) in carrying out its responsibilities under Section 106, a federal agency shall consult with any American Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to properties described under (1).

Native American Graves Protection and Repatriation Act of 1990

For activities on federal lands, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (43 CFR, § 10) requires consultation with "appropriate" Indian tribes (including Alaska Native villages) or Native Hawaiian organizations prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony. For activities on Native American or Native Hawaiian lands, which are defined in the statute, NAGPRA requires the consent of the Indian tribe or Native Hawaiian

organization prior to the removal of cultural items. The law also provides for the repatriation of such items from federal agencies and federally assisted museums and other repositories.

The 1992 amendments to the NHPA strengthened NAGPRA by encouraging "protection of Native American cultural items . . .and of properties of religious or cultural importance to Indian tribes, Native Hawaiians, or other Native American groups" (§ 112[b][3]); and by stipulating that a federal ". . . agency's procedures for compliance with Section 106 . . . provide for the disposition of Native American cultural items from federal or tribal land in a manner consistent with Section 3(c) of the Native American Graves Protection and Repatriation Act . . . ."

The final rule of the NAGPRA regulations, effective May 14, 2010, added procedures for the disposition of culturally unidentifiable Native American human remains in the possession or control of museums of federal agencies. The rule also amended sections of NAGPRA related to purpose and applicability of the regulations, definitions, inventories of human remains and related funerary objects, civil penalties, and limitations and remedies.

Federal Cave Resources Protection Act of 1988

The Federal Cave Resources Protection Act of 1988 (16 U.S.C., §§ 4301–4309) requires inventory of significant caves on federal lands, implementation of management measures, and provides certain protections of cave resources. It also requires that significant caves, defined as having an invaluable and irreplaceable part of the nation's heritage, are considered in the preparation of resource management plans and that the public be invited to participate in the planning. It provides for the issuance of permits for collection or removal of cave resources and identifies criminal and civil penalties for prohibited acts.

Paleontological Resources Preservation Act of 2009

The Paleontological Resources Preservation Act as provided in Title VI, Subtitle D, Paleontological Resources Preservation of the Omnibus Public Land Management Act of 2009 (Public Law 111-011), requires the secretaries of the interior and agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. The law, which applies only to federal lands, reaffirms the authority of federal land managing agencies to implement many of the policies for managing paleontological resources, such as issuing permits for collecting paleontological resources, curating paleontological resources, and maintaining confidentiality of locality data. The law provides authority for the protection of significant paleontological resources on federal lands, including criminal and civil penalties for fossil theft and vandalism.

Executive Order 11593 (1971): Protection and Enhancement of the Cultural Environment

Under Executive Order 11593 (36 Federal Register 8921), the federal government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the nation. This Executive Order addresses the NRHP and provides guidance to those involved with federally controlled or owned properties that should be inventoried and nominated for listing on the NRHP.

Executive Order 13007 (1996): Protection and Preservation of Native American Sacred Sites

Executive Order 13007 (61 Federal Register 26771–26772) is meant to improve the management of Native American sacred sites on federal lands. The Executive Order strives to protect and preserve Indian religious practices by accommodating access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and by avoiding adversely affecting the physical integrity of such sacred sites.

New Melones Lake Resource Management Plan

The purpose of the RMP is to develop a framework for management guidance on recreational, natural, and cultural resource management. The RMP document would reflect contemporary resource needs for the New Melones Lake Area, while ensuring the dam and reservoir continue to meet their authorized purposes of flood control, water supply, power recreation, water quality, and fish and wildlife enhancement. The RMP serves as the basis for future resource management decision-making that, when implemented, may result in the desired future condition for the management area.

All documented or currently undocumented historic properties at New Melones would be protected and managed by the Resource Protection Plan administered by USBR at New Melones Lake (USBR 2010:1.5, 5.81). Projects undertaken by USBR follow the directives and guidelines found in a series of Policy and Directives and Standards in the USBR manual that establish policies for cultural resource identification, evaluation, and management. The policies include standard unanticipated discovery and treatment measures should any previously unknown cultural resources, including human remains, be discovered during continued operation of the dam. In addition, USBR park rangers currently patrol recreational facilities and check on the condition of cultural resources in the New Melones Lake Area (USBR 2010:5.73).

New Melones Lake Revised Cave Management Plan

The caves at New Melones are managed and protected in accordance with the directives of the New Melones Lake Revised Cave Management Plan administered by USBR (USBR 2007:3.5; USBR 2010:1.16). The plan was prepared in 1996 and updated the information presented in the Draft Cave Management Plan of 1978. The current plan includes guidance to minimize publicity and access to sensitive cave locations, to avoid constructing trails, and to install gates where necessary for conservation purposes.

12.3.2 State

Relevant state programs, policies, plans, or regulations related to cultural resources are described below.

California Environmental Quality Act of 1972

CEQA (Pub. Resources Code, § 21000, *et seq.*; California Environmental Quality Act Guidelines, Cal. Code Regs., § 1500, et seq.) is the principal regulatory control addressing impacts on historical and paleontological resources in California. Projects with the potential to adversely affect significant cultural resources must be reviewed through the CEQA process. The lead agency is responsible for

complying with CEQA's requirements regarding the identification of feasible measures to mitigate significant adverse changes to historical and paleontological resources and ensuring that the measures are enforceable through permit conditions, agreements, or other measures.

State CEQA Guidelines (14 Cal. Code Regs., § 15064.5), "Determining the Significance of Impacts to Archaeological and Historical Resources," provide further direction regarding cultural resources. Subsection (a) defines the term "historical resources." Subsection (b) explains when a project may be deemed to have a significant effect on historical resources and defines terms used in describing those situations. Subsection (c) describes CEQA's applicability to archaeological sites and provides a bridge between the application of the terms "historical resource" and a "unique" archaeological resource.

The term "historical resource" is similar to but more inclusive than the NRHP criteria. Under CEQA, a historical resource includes, but is not limited to the following.

- A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in the CRHR (Pub. Resources Code, § 5024.1; 14 Cal. Code Regs., § 4852).
- A resource included in a local register of historical resources (as defined by Pub. Resources Code, § 5020.1[k]), or identified in a historical resource survey meeting the requirements of Public Resources Code, Section 5024.1(g) (presumption of historical significance).
- A resource that meets at least one of the following criteria for CRHR listing.
    - Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1).
    - Is associated with the lives of persons important in our past (Criterion 2).
    - Embodies the distinctive characteristics of a type, period, region, or method of installation, represents the work of an important creative individual, or possesses high artistic values (Criterion 3).
    - Has yielded, or may be likely to yield, information important in prehistory or history (Criterion 4).
- A resource that the lead agency otherwise determines is a historical resource as defined by Public Resources Code, Section 5020(j) or Section 5024.1.

As defined in Public Resources Code, Sections 5097.9 and 5097.993, Native American historic, cultural, or sacred sites may be listed or eligible for listing in the CRHR pursuant to Public Resources Code, Section 5024.1.

State CEQA Guidelines (14 Cal. Code Regs., § 15126.4), "Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects," subsection (b) discusses impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource. Subsection (b) also discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

California Public Resources Code

Public Resources Code Section 5024.1 establishes the CRHR; sets forth the criteria to determine significance (detailed above); defines eligible properties; and lists nomination procedures. As described in subsection (d), resources that are automatically listed in the CRHR include those listed in or formally determined eligible for listing in the NRHP ("historic properties") and California Historical Landmarks from Number 770 onward.

Public Resources Code Section 5097.5 states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. "Public lands" is defined as "lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or agency thereof."

Public Resources Code Section 5097.9 prohibits the interference with the free expression of Native American religion as provided in the United States Constitution and the California Constitution, and cause of severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require.

Public Resources Code Section 5097.97 promotes preservation of certain Native American cultural places located on public property, including a sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine, by ensuring access to these places by Native Americans.

Public Resources Code Section 5097.98 requires the Native American Heritage Commission (NAHC), upon notification by a county coroner, to notify the most likely descendants regarding the discovery of Native American human remains; enables the descendants, within 48 hours of the notification by the commission, to inspect the site of the discovery of Native American human remains and to recommend to the landowner or the person responsible for the excavation work means for treating or disposition, with appropriate dignity, the human remains and any associated grave goods; requires the owner of the land upon which Native American human remains were discovered, in the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or the landowner rejects the recommendation of the descendant, to reinter the remains and burial items with appropriate dignity of the property in a location not subject to further disturbance.

Public Resources Code Section 5097.99 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for those actions.

Public Resources Code Section 5097.991 states that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.

Public Resources Code Sections 5097.993–5097.994 (Native American Historic Resource Protection Act) states that it is unlawful to maliciously excavate, remove, destroy, injure, or deface a Native American historic, cultural, or sacred site, that is listed or may be eligible for listing in the CRHR pursuant to Public Resources Code, Section 5024.1, including any historic or prehistoric ruins, any burial ground, any archaeological or historic site, any inscriptions made by Native Americans at such a site, any archaeological or historic Native American rock art, or any archaeological or historic feature of a Native American historic, cultural, or sacred site on public land.

Public Resources Code Section 21083.2 states that if a project may affect a resource that has not met with the definition of a historical resource set forth in Section 21084, then the lead agency may

determine whether a project may have a significant effect on "unique" archaeological resources; if so, an EIR (or, if applicable, an EIR/EIS, or, if authorized, a Substitute Environmental Document [SED]) shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such resources must be avoided; if they cannot be avoided, mitigation measures will be required. The law also discusses excavation as mitigation; discusses the costs of mitigation for several types of projects; sets time frames for excavation; defines unique and non-unique archaeological resources; provides for mitigation of unexpected resources; and sets financial limitations for this section.

Public Resources Code Section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historical resource; the section further defines a "historical resource" and describes what constitutes a "significant" historical resource.

California Administrative Code

California Administrative Code (14 Administrative Code, § 4307) states that no person shall remove, injure, deface, or destroy any object of paleontological, archaeological or historical interest or value.

California Penal Code

California Penal Code Sections 594–625(c) (California Cave Protection Act of 1976, effective 1977) makes it a misdemeanor to perform certain acts that damage cave features, materials, or resources. "Material" means all or any part of any archaeological, paleontological, biological, or historical item including, but not limited to, any petroglyph, pictograph, basketry, human remains, tool, beads, pottery, projectile point, remains of historical mining activity or any other occupation found in any cave.

California Penal Code Section 622.5 establishes as a misdemeanor with willful injury, disfiguration, defacement, or destruction of any object or thing of archaeological or historical interest or value, whether on private or public lands.

California Health and Safety Code

California Health and Safety Code Section 7050.5 requires that if human remains are discovered outside of a dedicated cemetery, the county coroner must be contacted and further excavation or disturbance of the site or area shall cease until the coroner has made a determination. If the coroner determines the remains are Native American, the coroner must contact the NAHC within 24 hours and the procedures outlined in Public Resources Code, Section 5097.98 must be followed.

12.3.3 Regional or Local

Relevant regional or local programs, policies, or regulations related to cultural resource are described below. Although local policies, plans, and regulations are not binding on the State of California, below is a description of relevant ones.

Historic Properties Management Plans

All documented or currently undocumented cultural resources at New Don Pedro Reservoir or Lake McClure/McSwain are be protected and managed under HPMPs. These plans are being prepared

following the Historic Properties Study Plan as part of the FERC hydropower water quality certification for the Don Pedro Dam (FERC Project No. 2299) and the Merced River Hydroelectric Project (FERC Project No. 2179) (TID and MID 2011b and Merced ID 2012a: Exhibit E, 413–415). Requirements to protect cultural resources at New Don Pedro Reservoir and Lake McClure/McSwain include site management measures, training for all operations and maintenance staff, and routine monitoring of known cultural resources. HPMPs also include standard unanticipated discovery and treatment measures should any previously unknown cultural resources, including human remains, be discovered during continued operation of the dams.

12.4 Impact Analysis

This section lists the thresholds used to define impacts on cultural and paleontological resources. It describes the methods of analysis and the approach to determine the significance of impacts on cultural and paleontological resources. The impact discussion describes the changes to baseline resulting from the alternatives and incorporates the thresholds for determining whether those changes are significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the impact discussion where appropriate.

12.4.1 Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the State Water Board's Environmental Checklist in Appendix A of the board's CEQA regulations (Cal. Code Regs, tit. 23, §§ 3720–3781) and the Environmental Checklist in Appendix G of the State CEQA Guidelines. The thresholds derived from the checklist(s) have been modified, as appropriate, to meet the circumstances of the alternatives. (Cal. Code Regs., tit. 23, § 3777, subd. (a)(2)). Cultural resource impacts were determined to be potentially significant (see Appendix B, *State Water Board's Environmental Checklist* in this SED) and therefore are discussed in the analysis. Impacts would be significant if the LSJR alternatives result in any of the following conditions.

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- Disturb any human remains, including those interred outside of formal cemeteries.

Section 15064.5 provides that, in general, a resource not listed on state or local registers of historical resources shall be considered by the lead agency to be historically significant if the resource meets the criteria for listing on the CRHR. Section 15064.5 also provides standards for determining what constitutes a "substantial adverse change" that must be considered a significant impact on archaeological or historical resources. For example, a "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (State CEQA Guidelines, 14 Cal. Code Regs., § 15064.5 [b][1]).

Section 15064.5 of the State CEQA Guidelines pertains to the determination of the significance of impacts on archaeological and historical resources. Direct and indirect impacts may occur by any of the following.

- Physically damaging, destroying, or altering all or part of the resource.
- Altering characteristics of the surrounding environment that contribute to the resource's significance.
- Neglecting the resource to the extent that it deteriorates or is destroyed.
- The accidental discovery of cultural resources during construction.

12.4.2 Methods and Approach

LSJR Alternatives

Cultural and paleontological resources for this analysis of the LSJR alternatives were identified solely through a review of the location, environmental setting, and available documentation as described above in the environmental setting for the reservoirs and the rivers. No fieldwork was used to confirm the presence or absence of archaeological, architectural, or paleontological resources, nor was any evaluation of known resources accomplished to assess their significance. Unless determined previously, the significance evaluation of documented resources is in progress as part of the HPMPs underway for the FERC hydropower water quality certifications for the Don Pedro Project (FERC Project No. 2299) on the Tuolumne River and the Merced River Hydroelectric Project (FERC Project No. 2179) including Lake McClure, or for the RMP administered by USBR at New Melones Lake (USBR 2010:5.81; Merced ID 2011: Exhibit E, 334–335; TID and MID 2011b:2-3).

Potential direct and indirect impact mechanisms for disturbing, materially altering, or demolishing cultural resources, including buried human remains and paleontological resources, as a result of the LSRJ Alternatives were considered. Providing people access to known or currently unknown cultural resources is the primary direct mechanism to disturb, alter, or demolish cultural resources (e.g., vandalism, authorized collection of artifacts, use of off-highway vehicles). Additionally, cultural resources could be indirectly disturbed, altered, or demolished by activities that would substantially increase natural processes, such as weathering or erosion. Soil disturbance or grading is not considered a direct impact mechanism under the alternatives because soil disturbance or grading would not occur under the alternatives. The LSJR alternatives were evaluated by first determining the potential for significant known and unknown cultural resources to exist at the three reservoirs and along the rivers and then qualitatively analyzing the effects of altering reservoir elevations or modifying flows using the results of the State Water Board's Water Supply Effects (WSE) model. For detailed discussion of results of the WSE model, see Chapter 5, *Water Supply, Surface Hydrology, and Water Quality*, and Appendix F.1, *Hydrology and Water Quality Modeling*. The WSE results used in the cultural resource impact analysis are described below.

The prevalence of cultural resources, within and adjacent to the reservoirs, determines the potential for direct and indirect impacts on cultural resources. There are documented significant cultural resources located at the reservoirs; however, the locations of many significant or potentially significant cultural resources remain unknown because survey of the reservoirs remains incomplete and there is a potential for buried resources. The LSJR alternatives could provide access to people at the reservoirs by exposing known or currently unknown significant cultural resources now underwater as a result of reservoir elevation reductions. Additionally, the LSJR alternatives could

substantially increase natural processes such as weathering or erosion by inundating known or currently unknown significant cultural resources. WSE results were summarized in two ways to characterize the potential reservoir elevation changes.

- First, the modeled ranges of elevation change for LSJR Alternatives 2, 3, and 4 were evaluated to capture both the increase and decrease of the surface water elevations in each reservoir. This characterizes the modeled change that cultural resources could experience as a result of inundation or exposure. This was done by determining the range of elevations between the 10 percent cumulative distribution[3] (i.e., low elevations) and the 90 percent cumulative distribution (i.e., high elevations). These ranges were then compared for the LSJR alternatives to the modeled baseline. The resulting differences were used to calculate the annual average range of elevation change in feet and percent. Table 12-5 summarizes the annual average change in the range of reservoir elevations in feet and the annual average percent change for each alternative. As shown in Table 12-5, generally the annual average change in the range of elevations between the 10 and the 90 percent cumulative distribution under the LSJR alternatives would be less than 20 feet and less than 10 percent. The exception is Lake McClure under LSJR Alternative 2, which would experience an increase in the lower elevations throughout the year (e.g., more water in the reservoir under LSJR Alternative 2), thus reducing the elevation range of the reservoir.

Table 12-5. Average Annual Change in Elevation Ranges (90 Percent Cumulative Elevation Minus the 10 Percent Cumulative Elevation)

	New Melones		New Don Pedro		Lake McClure	
Alternative	Feet	%	Feet	%	Feet	%
LSJR Alternative 2	5	3.0	-7	-4	-43	-24
LSJR Alternative 3	11	5.9	8	4	9	5
LSJR Alternative 4	17	9.3	1	1	10	5

Note: Negative numbers indicate a reduction in the range of elevation change because of an increase in lower elevation levels at the reservoirs.

- Second, the lowest elevations under LSJR Alternatives 2, 3, and 4 are identified at the 10 percent, 20 percent, and 30 percent cumulative distribution for each alternative, and the difference is calculated. Reporting the results of the cumulative distribution accounts for the interannual variability over the 82-year modeled period in each month. The annual average change in elevation is presented using the 10, 20 and 30 percent cumulative distribution because it is expected that at these lowest elevation levels, there would be the potential to expose more cultural resources located in the reservoirs. Table 12-6 summarizes the results.

[3] The cumulative distribution of a particular variable (e.g., reservoir surface water elevations) is determined by sorting the values from minimum to maximum and graphing them as the percentage of the total number of values. The lowest value is at the left of the graph (e.g., 0 percent) and the highest value is at the right of the graph (100 percent). The cumulative distribution indicates the probability of occurrence for the variable. This term is not referring to, and should not be confused with, the term cumulative impacts, which is a specific CEQA term. A discussion of cumulative impacts for CEQA purposes is provided at the end of each resource chapter, Chapter 4, *Introduction to Analysis*, Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alterantive)*, and Chapter 16, *Cumulative Impact Summary, Growth-Inducting Effects, and Irreversible Commitment of Resources.*

Table 12-6. Average Annual Reservoir Elevations (feet) for all Months at the 10 Percent, 20 Percent, or 30 Percent Cumulative Distribution for New Melones, New Don Pedro, and Lake McClure

Cumulative Distribution	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4
New Melones			
10%	8	-13	-18
20%	14	-2	7
30%	17	-8	-5
New Don Pedro			
10%	9	1	1
20%	18	8	5
30%	14	1	-3
Lake McClure			
10%	44	35	25
20%	36	24	10
30%	24	10	-2

Note: Negative numbers indicate a decrease in annual average reservoir elevations; positive numbers indicate an increase in annual average reservoir elevations.

The prevalence of cultural resources within and adjacent to the three eastside tributaries and the LSJR determines the potential for direct and indirect impacts on cultural resources in and adjacent to the rivers. The potential for currently unknown cultural resources to exist is low and many of the known cultural resources have likely been modified, altered, damaged, or destroyed. The LSJR alternatives' changes in flow would not provide new or expanded access to known or unknown cultural resources. People currently using the rivers would continue to do so and experience the periodic fluctuations and changes in flow. Therefore, general trends for the LSJR alternatives were identified from the WSE and used to analyze impacts on cultural resources along the rivers. They are summarized below.

- The Stanislaus River currently experiences flows that are approximately 40 percent of the average unimpaired flow; the lowest monthly flows on the Stanislaus River would be eliminated under LSJR Alternatives 2, 3, and 4.
- The Merced and Tuolumne Rivers currently experience flows that are approximately 20 percent of the average unimpaired flow; the lowest monthly flows on the Merced and Tuolumne Rivers would be eliminated under LSJR Alternatives 2, 3 and 4.
- The LSJR currently experience flows that are approximately 20 percent of the average unimpaired flow; the lowest monthly flows on the LSJR would be eliminated under LSJR Alternatives 2, 3, and 4.
- None of the alternatives would modify the flood flows or flood releases on the three eastside tributaries or the LSJR.

As described in Chapter 3, *Alternatives Description*, the percent of unimpaired flow requirement, as specified by a particular LSJR alternative, would cease to apply during high flows or flooding to preserve public health and safety. The State Water Board would coordinate with federal, state and local agencies to determine when it is appropriate to waive the requirements. Action stages for the

three eastside tributaries are identified in Table 6-4 and are a reasonable proxy for the purposes of this SED analysis to describe when the unimpaired flow requirements might be waived as a result of public health and safety concerns. The WSE modeling performed for this chapter, and other chapters, uses monthly flow limits derived from observed flows above which the unimpaired flow requirement no longer applies. The modeling and incorporation of the limits is further discussed in Appendix F.1 and Appendix L, *Sensitivity Analyses*.

SDWQ Alternatives

The change to the salinity objective under the SDWQ alternatives would not alter the chemical properties of the baseline water quality conditions in the southern Delta (identified in Chapter 5, *Water Supply, Surface Hydrology, and Water Quality*). Currently, the southern Delta either meets or exceeds the salinity objectives. Water quality is not a parameter that has the ability to destroy or modify significant cultural resources. Salinity has no potential to impact the significance of historical or archaeological resources, to disturb human remains, including those interred outside formal cemeteries, or to directly or indirectly destroy a unique paleontological resource, site or unique geologic feature. Furthermore, there would be no soil disturbance, grading, or other actions that could adversely affect cultural resources under SDWQ alternatives. Therefore, impacts on historical resources, archaeological resources, human remains, or paleontological resources under the SDWQ alternatives would not occur and will not be addressed further in this chapter.

12.4.3 Impacts and Mitigation Measures

CUL-1: Substantial adverse change in the significance of a historical or archaeological resource

There is generally a high potential for significant known and currently unknown cultural resources to exist at the three reservoirs because some resources have already been documented at each of the reservoirs. As described in the environmental setting, two-thirds of the documented cultural resources at New Melones Reservoir are currently located in the permanent pool zone and/or the fluctuation pool zone. Few cultural resources have been documented below the average water level at New Don Pedro Reservoir. Documented archaeological sites and one built resource at Lake McClure are at or below the high water levels and currently experience inundation by water or exposure by receding water. Significant historical and archaeological resources (historic properties) are protected and managed under the HPMPs being prepared as part of the FERC hydropower water quality certifications for the Don Pedro Project (FERC Project No. 2299) on the Tuolumne River and the Merced River Hydroelectric Project (FERC Project No. 2179), including Lake McClure, and by the RMP administered by USBR at New Melones Reservoir.

There is a low potential for significant unknown cultural resources to exist on the three eastside tributaries and LSJR because of prior disturbance by agriculture, irrigation practices, mining activities, or development within the riverine floodplains. Since the rivers have experienced extensive disturbances since the start of the historic period 150 years ago, there is a low potential for significant unknown cultural resources to exist within the displaced or reworked soils or sediments in the confined river channels. Furthermore, although a high number of historic period archaeological sites or built resources have been recorded along the rivers, many have been highly disturbed or destroyed by these processes as the natural floodplains and terraces were modified and confined by levees or agricultural fields, or as early settlements or mining prospects were later displaced or buried by hydraulic mining and dredging, which continued into the mid-1900's in some

places, such as the lower Tuolumne River near Waterford, and then by modern large-scale aggregate mining.

LSJR Alternative 1: No Project

The No Project Alternative would result in implementation of flow objectives identified in the 2006 Bay-Delta Plan. See Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project impact discussion and Appendix D, *Evaluation of LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project Alternative technical analysis.

LSJR Alternative 2: 20% Unimpaired Flow (Less than significant)

LSJR Alternative 2 would change reservoir elevations in New Melones Reservoir, New Don Pedro Reservoir, and Lake McClure. Table 12-5 and Table 12-6 summarize the expected changes. Generally, under LSJR Alternative 2 the range of the change in reservoir elevations decreases, indicating a smaller range of elevations experienced by the reservoirs. The annual average reservoir elevations would increase at the 10, 20 and 30 percent cumulative distribution, indicating an increase in the lowest elevations currently experienced and more water in the reservoirs. Depending on location, the resources may experience higher elevations at the reservoirs under this alternative; however, higher elevations would be expected to prevent human disturbance and would provide siltation protection to existing cultural resources. The existing archaeological and built environment resources currently experience, and would continue to experience, fluctuations in water levels at the reservoirs. Furthermore, the existing management plans at the reservoirs would include standard unanticipated discovery and treatment measures should any previously unknown significant or potentially significant cultural resources be discovered during continued operation of the dams. Although cultural resources might experience variation in their physical environment, changes in water level or siltation have an extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of the resources. Accordingly, under LSJR Alternative 2, impacts on historical or archaeological resources at the reservoirs would be less than significant.

The potential for vandalism, unauthorized collection, and other anthropogenic disturbances is considered low along the LSJR and the three tributaries because of the prior anthropogenic and natural disturbance of the rivers and adjacent areas. It is expected that each of the rivers would continue to experience episodic high flows during significant storm events as the flood capacities of the rivers are controlled and managed by USACE. LSJR Alternative 2 would not exceed flood control or management requirements. The Merced and Tuolumne Rivers exhibit flows that are within the range of 20 percent average unimpaired flow, thus, the flows under this alternative are expected to be similar. Flows on the Stanislaus River are generally higher than would be required under LSJR Alternative 2; however, the alternative would remove the lowest monthly flows on the Stanislaus River, thereby preventing exposure of cultural resources. Furthermore, average and seasonal flows are expected to remain within the existing channels that have been previously disturbed by natural flows and anthropogenic activities. The potential for bank erosion for all four rivers under this alternative is expected to be similar to natural storm events, including occasional years with major flood events. In addition, flooding and flood control would continue to be managed at the reservoirs by the USACE and the reservoir operators. Because of the low potential for significant cultural resources to be located within and adjacent to the rivers, and since the expected change in flows has an extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of any resources that may be present, impacts on historical or

archaeological resources located within or adjacent to the rivers under LSJR Alternative 2 would be less than significant.

LSJR Alternative 3: 40% Unimpaired Flow (Less than significant)

Expected conditions under LSJR Alternative 3 flow objectives are described in Table 12-5 and 12-6 for the reservoirs. The range of change in reservoir elevations increases, indicating a wider range in elevations experienced at the reservoirs. The annual average elevations at the 10, 20, and 30 percent cumulative distributions would decrease slightly at New Melones Reservoir, increase slightly at New Don Pedro Reservoir, and increase by up to 35 feet at Lake McClure. Depending on location, cultural resources may experience higher elevations in Lake McClure under this alternative; however, this would be expected to prevent human disturbance and would protect existing cultural resources from siltation. Cultural resources would continue to experience inundation and receding reservoir water levels. As discussed under LSJR Alternative 2, any documented or currently unknown significant cultural resource would be managed by the various plans of the reservoirs. Although cultural resources might experience variation in their physical environment, changes in water level or siltation have an extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of the resources. Accordingly, under LSJR Alternative 3, impacts on historical or archaeological resources at the reservoirs would be less than significant.

As identified in LSJR Alternatives 1 and 2, there is a low potential for significant unknown cultural resources to be located within and adjacent to the rivers due to past anthropogenic and natural modifications within river channels and adjacent to river channels. The Merced and Tuolumne Rivers exhibit flows that are 20 percent of the average unimpaired flow, thus, the flows under LSJR Alternative 3 are expected to be higher. However, average and seasonal flows are expected to remain within the existing channels that have been previously disturbed by natural flows and anthropogenic activities. Flows on the Stanislaus River are generally within the range of 40 percent of the average unimpaired flow and, therefore would be expected to be very similar under LSJR Alternative 3. Because of the low potential for significant cultural resources to be located within or adjacent to the rivers, and since the expected change in flows has an extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of any resources that may be present, impacts on historical or archaeological resources located within or adjacent to the rivers under LSJR Alternative 3 would be less than significant.

LSJR Alternative 4: 60% Unimpaired Flow (Less than significant)

Expected conditions under LSJR Alternative 4 flow objectives are described in Table 12-5 and Table 12-6 for the reservoirs. The range of the change in reservoir elevations would increase, indicating a wider range in elevations at the three reservoirs. The annual average elevations at the 10, 20 and 30 percent cumulative distributions would generally decrease at New Melones and increase at New Don Pedro and Lake McClure. Cultural resources would continue to experience inundation and receding reservoir waters. Cultural resources may be exposed at New Melones more throughout the year, but would be managed by the various plans of the reservoirs, such as the New Melones Lake RMP and Resource Protection Plan, and the HPMPs for New Don Pedro and Lake McClure. Although cultural resources might experience variation in their physical environment, changes in water level or siltation have an extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of the resources. Therefore, under LSJR

Alternative 4, impacts on historical or archaeological resources at the reservoirs would be less than significant.

There is a low potential for significant unknown cultural resources to be located within and adjacent to the rivers due to anthropogenic and natural modifications that have occurred over the past within river channels and adjacent to river channels. As discussed under LSJR Alternative 2, any modification of flows has an extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of documented or currently undocumented historical or archaeological resources located within or adjacent to the rivers. Accordingly, impacts on historical or archaeological resources within or adjacent to the rivers under LSJR Alternative 4 would be less than significant.

CUL-2: Disturbance of human remains, including those interred outside formal cemeteries

As described in the setting, human remains interred outside of formal cemeteries have been documented at relatively few archaeological sites at New Melones Reservoir and New Don Pedro Reservoir. No human remains have been documented to date at Lake McClure. Cemeteries have been documented at New Melones Reservoir; however, "cemetery" is not listed as a historic site type at New Don Pedro Reservoir or Lake McClure; furthermore, no evidence of burials was found at a possible cemetery at Lake McClure. In compliance with procedures for the treatment of human remains discovered on state, private, or federal lands, documented human remains would have been left in place, reinterred under the maximum pool or elsewhere, or excavated, curated and/or repatriated at each of the reservoirs if they had been discovered previously. In addition, documented or currently undocumented sites with human remains would be protected under federal and state laws and under the HPMPs being prepared as part of the FERC hydropower water quality certifications for the Don Pedro Project (FERC Project No. 2299) on the Tuolumne River and the Merced River Hydroelectric Project (FERC Project No. 2179), including Lake McClure, and by the RMP administered by USBR at New Melones Reservoir. The potential for the presence of human remains in proximity to the reservoir fluctuation zones is considered low.

The potential for the presence of undocumented human remains within and adjacent to the LSJR and the three eastside tributaries is considered low due to prior disturbance of the riparian corridors by natural and historic-era anthropogenic processes. Any human remains discovered within and adjacent to the LSJR and the three tributaries outside of formal cemeteries would also have been treated in accordance with state or federal regulations.

LSJR Alternative 1: No Project

The No Project Alternative would result in implementation of flow objectives identified in the 2006 Bay-Delta Plan. See Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project impact discussion and Appendix D, *Evaluation of LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project Alternative technical analysis.

LSJR Alternative 2: 20% Unimpaired Flow (Less than significant)

Since the potential for human remains to exist within the fluctuation zone of the reservoirs is low, the change in reservoir elevation described above in CUL-1 would have a low potential to disturb documented or currently undocumented human remains. Considering the prior disturbance by agriculture, irrigation practices, mining activities, and development within the riverine floodplains, the change in flows under LSJR Alternative 2 would have an extremely low potential to disturb

documented or currently undocumented human remains, including those interred outside formal cemeteries. The natural processes of localized soil erosion and siltation could also be beneficial by reducing the potential for access and unauthorized artifact collection or vandalism.
The potential for bank erosion with increased streamflow or reservoir level fluctuation may not be different than past and current conditions. Therefore, under LSJR Alternative 2, impacts on human remains, including those interred outside formal cemeteries, would be less than significant.

LSJR Alternatives 3: 40% Unimpaired Flow and LSJR Alternative 4: 60% Unimpaired Flow (Less than significant)

The impacts on human remains, including those interred outside formal cemeteries, would not differ from those described under LSJR Alternative 2 for the reservoirs or the rivers. Accordingly, impacts on human remains under LSJR Alternatives 3 and 4 would be less than significant.

CUL-3: Disturbance or destruction of a unique paleontological resource or site or unique geologic feature

As described in the setting, the rock units in proximity to the reservoirs have a low potential to contain paleontological resources. No paleontological resources have been documented at New Don Pedro Reservoir or Lake McClure. At New Melones Reservoir, fossils were recovered from more than 12 caves. More than 50 caves at New Melones Reservoir are inundated or subject to inundation. Three of the caves subject to inundation are considered significant paleontological resources. The documented caves are protected and managed under the Cave Management Plan administered by USBR at New Melones Reservoir.

As described in the environmental setting, the potential for paleontological resources within and adjacent to the LSJR and the three eastside tributaries is considered low due to the depth of occurrence of rock units with high paleontological potential below reworked surficial sediments and Holocene-age floodplain and channel deposits. In other words, buried paleontological resources would be found at soil and rock depth too deep for the rivers to modify or change. The potential is also low due to disturbance or destruction of near-surface paleontological resources by historic-era anthropogenic practices or natural processes.

LSJR Alternative 1: No Project

The No Project Alternative would result in implementation of flow objectives identified in the 2006 Bay-Delta Plan. See Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project impact discussion and Appendix D, *Evaluation of LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*, for the No Project Alternative technical analysis.

LSJR Alternative 2: 20% Unimpaired Flow (Less than significant)

As described above under CUL-1, reservoir elevations would continue to fluctuate. Since no paleontological resources have been documented at New Don Pedro Reservoir or Lake McClure, they cannot be affected. Furthermore, the low potential for rock units within proximity of these two reservoirs indicates that the change in elevation under LSJR Alternative 2 would have a low potential to affect unknown paleontological resources. New Melones Reservoir may experience an increase in reservoir elevations, but many of the caves adjacent to the reservoir are currently above the spillway elevation. Of those that are below the spillway elevation, the increase in reservoir elevations could prevent human disturbance of the caves. The documented caves would continue to be protected and managed under the Cave Management Plan administered by USBR at New Melones

Reservoir. Therefore, under LSJR Alternative 2, impacts on paleontological resources or sites or unique geologic features associated with the reservoirs would be less than significant.

The expected change in flows in the LSJR and the three eastside tributaries would have an extremely low potential to disturb paleontological resources. This is because these resources are typically identified at depths below the surficial sediments reworked by historic-era anthropogenic practices and the Holocene-age floodplain and channel deposits along the riparian corridors. In addition, it is likely that near-surface paleontological resources have been previously disturbed or destroyed by agriculture, irrigation practices, mining activities, or other development. Accordingly, impacts on paleontological resources or sites or unique geologic features under LSJR Alternative 2 associated with the rivers would be less than significant.

LSJR Alternative 3: 40% Unimpaired Flow (Less than significant)

Impacts would be the same as described above for LSJR Alternative 2 for New Don Pedro Reservoir and Lake McClure. At New Melones Reservoir, water level fluctuation and drawdown could expose documented caves that may normally be inundated by the reservoir waters because the average annual reservoir elevations would slightly decrease. Such exposure could increase the potential to adversely affect the caves by natural processes as a result of erosion and weathering, and/or increased access and the risk of vandalism or unauthorized collection of undocumented, newly eroded fossils. However, the documented caves would continue to be protected and managed under the Cave Management Plan administered by USBR at New Melones Reservoir. Accordingly, under LSJR Alternative 3, impacts on paleontological resources or sites or unique geologic features would be less than significant.

LSJR Alternative 4: 60% Unimpaired Flow (Less than significant)

Impacts would be the same as described above for LSJR Alternative 2 for New Don Pedro Reservoir and Lake McClure. Impacts would be the same as described above for LSJR Alternative 3 for New Melones Reservoir. Impacts would be the same as described above for LSJR Alternative 2 for the three eastside rivers and the LSJR. Therefore, under LSJR Alternative 4, impacts on paleontological resources or sites or unique geologic features would be less than significant.

12.5 Cumulative Impacts

12.5.1 Definition

Cumulative impacts are defined in the State CEQA Guidelines (14 Cal. Code. Regs., § 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 Cal. Code Regs., § 15355(b)).

Consistent with the State CEQA Guidelines (14 Cal. Code Regs., § 15130(a)), the discussion of cumulative impacts in this chapter focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (14 Cal. Code Regs., § 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.

12.5.2 Past, Present, and Reasonably Foreseeable Projects

Chapter 16, *Cumulative Impact Summary*, *Growth-Inducting Effects, and Irreversible Commitment of Resources* includes a list of past, present, and reasonably foreseeable future projects considered for the cumulative analysis.

Present and reasonably foreseeable probable future projects are projects that are currently under construction, approved for construction, or in final stages of formal planning. These projects were identified by reviewing available information regarding planned projects and are summarized in Chapter 16. Present and reasonably foreseeable future projects related to cultural resources or that could affect cultural resources are listed in Chapter 16 and include the following.

- Almond 2 Power Plant
- Bay-Delta Conservation Plan and Alternative Delta Conveyance Facilities
- City of Stockton DWSP to reduce salinity in the Southern Delta
- City of Tracy Connection to the South San Joaquin Irrigation District
- City of Tracy Desalination and Green Energy Project
- Conditional Waiver of Waste Discharge Requirements for Irrigated Lands
- Contra Costa Alternative Intake Project
- Conveyance of Refuge Water Supply and Mendota Wildlife Area
- Delta-Mendota Canal/California Aqueduct
- Delta Water Supply Project
- FERC Relicensing of the Don Pedro Project (FERC Project No. 2299)
- FERC Relicensing of the Merced River Hydroelectric Project (FERC Project No. 2179)
- In-Delta Storage Program (Delta Wetlands Project)
- Levee Repair-Levee Evaluation Program
- Los Vaqueros Reservoir Expansion Project
- Merced County General Plan Update
- Millerton Lake Resources Management Plan/General Plan
- Modesto Regional Water Treatment Plant Phase Two
- Regional Surface Water Supply Project
- San Joaquin County General Plan Update
- SEWD Dr. Joe Waidhofer Water Treatment Plant Expansion

- South Bay Aqueduct Improvement and Enlargement Project
- South County Water Supply Project
- South Delta Improvements Program
- South Delta Temporary Barriers Project
- Stanislaus County General Plan Update
- Tuolumne County General Plan Update
- USBR New Melones Resource Management Plan

12.5.3 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. (See Cal. Code Regs., tit. 14, §§ 15064, 15065, 15130.) The cumulative analysis uses the impact threshold topics discussed in the impact analysis (i.e., substantial adverse change in the significance of a historical, archeological, paleontological or geological feature; disturb human remains).

12.5.4 Mitigation Measures for Significant Cumulative Impacts

As specified by Section 15130 of the State CEQA Guidelines (2012) the analysis of cumulative impacts will examine feasible options for mitigating or avoiding a project's contribution to any significant cumulative effects. With some projects, the only feasible mitigation for cumulative impacts may be the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis. Mitigation measures to reduce an alternative's contribution to significant cumulative effects are presented below where feasible and appropriate.

12.5.5 Cumulative Impact Analysis

Methodology

Potential direct and indirect impact mechanisms for disturbing, materially altering, or demolishing cultural resources, including buried human remains and paleontological resources, as a result of the LSRJ alternatives were considered. The SDWQ alternatives would not cause impacts on cultural or paleontological resources in the southern Delta and were not considered.

Geographic Scope

The geographic scope of the area potentially affected by cumulative cultural resources impacts is defined by the cultural setting and ethnographic territory of the prehistoric, ethnohistoric, and historic peoples who have occupied the northern San Joaquin Valley and adjacent Sierra Nevada foothills region of inland California, as well as by accessible, near-surface areas in this region exhibiting a high paleontological potential (e.g., Calaveras Formation caves). The LSJR alternatives would apply to the LSJR up to the confluence with the Merced River and to the lower portions of the three tributaries to the LSJR (Stanislaus, Tuolumne, and Merced Rivers) upstream to and including the reservoirs (New Melones Reservoir, New Don Pedro Reservoir, and Lake McClure), impounded by the three rim dams (New Melones, New Don Pedro, and New Exchequer).

Analysis

Past and present projects have resulted in the destruction or modification of significant cultural resources. Past and present ground-disturbing construction has resulted in disturbance of archaeological resources and demolition of built environment resources. Human remains may be encountered and disturbed where they occur as part of larger archaeological sites, or also as discrete burials. Development for agricultural, transportation, mining or urban purposes has resulted in the conversion of raw land and the associated disturbance of archaeological resources, buried human remains and fossils, and, in some cases, demolition of existing built environment structures and residences. Project proponents that satisfy CEQA are required to implement typical mitigation and avoidance measures for most if not all projects occurring as part of the cumulative context. Some unavoidable effects on cultural resources have nonetheless occurred because it is not always feasible to avoid resources. Treatment such as data recovery or documentation cannot replace the lost resource. In addition, archaeological resources or human remains are encountered or damaged inadvertently during construction because these buried or otherwise obscured resources cannot be identified before construction takes place. Future projects as identified above would have similar ground disturbing and potential effects to known and unknown cultural resources. Reasonably foreseeable future projects constructed and operated at the three reservoirs or adjacent to the four rivers could unearth significant cultural resources; such resources may be subject to resource protection and management plans (e.g., RMPs, HPMPs) and would be treated in accordance with existing federal and state laws that would reduce potential impacts to a less-than-significant level. Therefore, while past projects may have affected cultural resources and had cumulatively considerable effects, present and reasonably foreseeable future probable projects have a low probability of affecting cultural resources and therefore, would not be cumulatively considerable or significant.

Under the LSJR alternatives, known or unknown significant cultural resources are expected to continue to be inundated and exposed at the reservoirs. Furthermore, there is a low potential for cultural resources to be located within and adjacent to the rivers due to prior anthropogenic disturbance and natural modifications along the LSJR and three eastside tributaries. Accordingly, the incremental contribution of LSJR Alternatives 2, 3, or 4 would not be cumulatively considerable and impacts would be less than significant.

12.6 References Cited

12.6.1 Printed References

Arkley, Ronald J. 1962. The Geology, Geomorphology, and Soils of the San Joaquin Valley in the Vicinity of the Merced River, California. In Geologic Guide to the Merced Canyon and Yosemite Valley, California. Reprinted 1966. Bulletin 182. San Francisco, CA: California Division of Mines and Geology. Available: http://www.nps.gov/history/history/online_books/geology/publications/state/ca/cdmg-bul-182/index.htm. Accessed: January 26, 2012.

California Department of Transportation (Caltrans). 2006. A Historical Context and Archaeological Research Design for Townsite Properties in California. Sacramento, CA: Division of Environmental Analysis, Department of Transportation.

California Department of Transportation (Caltrans). 2007. A Historical Context and Archaeological Research Design for Agricultural Properties in California. Sacramento, CA: Division of Environmental Analysis, Department of Transportation.

Creely, Scott, and Eric R. Force. 2007. Type Region of the Ione Formation (Eocene), Central California: Stratigraphy, Paleogeography, and Relation to Auriferous gravels. U.S. Geological Survey Open File Report 2006-1378. Available: http://pubs.usgs.gov/of/2006/1378/. Accessed January 26, 2012.

Dundas, Robert G., Randall B. Smith, and Kenneth L. Verosub. 1996. The Fairmead Landfill Locality (Pleistocene, Irvingtonian), Madera County, California: preliminary report and significance. PaleoBios 17(2-4):50-58.

EA Engineering. 1999. Meeting Flow Objectives for the San Joaquin River Agreement 1999-2010 Environmental Impact Statement and Environmental Impact Report. Prepared for U.S. Department of the Interior Bureau of Reclamation and San Joaquin River Group Authority. Available: http://www.sjrg.org/EIR/eiseir.htm. Accessed: January 17, 2012.

Helley, Edward J., and David S. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. U.S. Geological Survey Miscellaneous Field Studies Map MF-1790 (1:62,500 scale). Available: http://pubs.usgs.gov/mf/1985/1790/. Accessed January 26, 2012.

Hoover, Mildred B., Hero E. Rensch, Ethel G. Rensch, and William N. Abeloe. 2002. Historic Spots in California. 5th ed. Revised by Douglas E. Kyle. Palo Alto, CA: Stanford University Press.

ICF Jones & Stokes. 2008. Final Master Environmental Impact Report for the City of Modesto Urban Area General Plan Update. October 2008. Prepared for City of Modesto Community and Economic Development Department. Available: http://www.modestogov.com/ced/documents/planning_general-plan-meir.asp. Accessed March 13, 2012.

Merced Irrigation District (Merced ID). 2008. Relicensing Pre-Application Document: Public Information. Merced River Hydroelectric Project. FERC Project No. 2179. November 2008. Available: http://www.eurekasw.com/MID/default.aspx. Accessed: January 17, 2012.

Merced Irrigation District (Merced ID). 2010a. Initial Study Report. Merced River Hydroelectric Project. FERC Project No. 2179. November 2010. Available: http://www.eurekasw.com/MID/default.aspx. Accessed: January 18, 2012.

Merced Irrigation District (Merced ID). 2010b. Interim Technical Memorandum 12-1: Historic Properties. Merced River Hydroelectric Project. FERC Project No. 2179. November 2010. Available: http://www.eurekasw.com/MID/Technical%20Memoranda/Forms/AllItems.aspx. Accessed: February 24, 2012.

Merced Irrigation District (Merced ID). 2011. Application for New License, Major Project – Existing Dam. Merced River Hydroelectric Project. FERC Project No. 2179. Draft October 2011. Available: http://www.eurekasw.com/MID/default.aspx. Accessed: January 13, 2012.

Merced Irrigation District (Merced ID). 2012a. Application for New License, Major Project – Existing Dam. Merced River Hydroelectric Project. FERC Project No. 2179. Final February 2012. Available: http://www.eurekasw.com/MID/default.aspx. Accessed: March 8, 2012.

Merced Irrigation District (Merced ID). 2012b. Technical Memorandum 12-1: Historic Properties. Merced River Hydroelectric Project. FERC Project No. 2179. February 2012. Available: http://www.eurekasw.com/MID/Technical%20Memoranda/Forms/AllItems.aspx. Accessed: March 14, 2012.

Moratto, Michael J. 1984. California Archaeology. Orlando, FL: Academic Press, Inc.

Moratto, Michael J. 2002. Culture History of the New Melones Reservoir Area, Calaveras and Tuolumne Counties, California. In Essays in California Archaeology: A Memorial to Franklin Fenenga, pp. 25-54. Berkeley, CA: Contributions of the University of California Archaeological Research Facility, No. 60.

Page, R. W. 1986. Geology of the fresh ground-water basin of the Central Valley, California, with texture maps and sections. U.S. Geological Survey Professional Paper 1401-C. Available: http://pubs.er.usgs.gov/publication/pp1401C. Accessed: January 26, 2012.

PMC. 2008. City of Livingston 2025 General Plan. Adopted October 2008. Prepared for City of Livingston. Available: http://www.livingstoncity.com/. Accessed March 12, 2012

Rondeau, Michael F., Jim Cassidy, and Terry L. Jones. 2007. Colonization Technologies: Fluted Projectile Points and the San Clemente Island Woodworking/Microblade Complex. In California Prehistory: Colonization, Culture, and Complexity, edited by Terry L. Jones and Kathryn A. Klar, pp. 63–70. Lanham, Maryland: AltaMira Press.

Rosenthal, Jeffrey S., and Jack Meyer 2004. Landscape Evolution and the Archaeological Record of Central California. Volume III: Geoarchaeological Study. Cultural Resources Inventory of Caltrans District 10 Rural Conventional Highways. June 2004. Prepared by Far Western Anthropological Group, Inc., Davis, CA, for California Department of Transportation, District 10, Stockton, CA.

Rosenthal, Jeffrey S., Gregory G. White, and Mark Q. Sutton. 2007. The Central Valley: A View from the Catbird's Seat. In California Prehistory: Colonization, Culture, and Complexity, edited by Terry L. Jones and Kathryn A. Klar, pp. 147–163. Lanham, Maryland: AltaMira Press.

Turlock Irrigation District and Modesto Irrigation District (TID and MID). 2011a. Pre-Application Document, Don Pedro Project. FERC Project No. 2179. February 2011. Available: http://www.donpedro-relicensing.com/documents.aspx. Accessed: January 16, 2012.

Turlock Irrigation District and Modesto Irrigation District (TID and MID). 2011b. Study Plan CR-1: Historic Properties Study Plan. Appendix B of Revised Study Plan, Don Pedro Project. FERC Project No. 2179. November 2011. Available: http://www.donpedro-relicensing.com/documents.aspx. Accessed: January 16, 2012.

Turlock Irrigation District and Modesto Irrigation District (TID and MID). 2011c. Study Plan CR-2: Native American Traditional Cultural Properties Study Plan. Appendix B of Revised Study Plan, Don Pedro Project. FERC Project No. 2179. November 2011. Available: http://www.donpedro-relicensing.com/documents.aspx. Accessed: January 16, 2012.

University of California, Museum of Paleontology (UCMP). 2012. Specimen Search. Available: http://ucmpdb.berkeley.edu/. Accessed: January 27, 2012.

U.S. Bureau of Reclamation (USBR). 2007. New Melones Lake Area Resource Management Plan and Environmental Impact Statement: Resource Inventory Report. August 2007. Available: http://www.usbr.gov/mp/ccao/newmelones/RMP/RIR/. Accessed: March 8, 2012.

U.S. Bureau of Reclamation (USBR). 2010. New Melones Lake Area Final Resource Management Plan and Environmental Impact Statement. February 2010. Available: www.usbr.gov/mp/ccao/newmelones/rmp.html. Accessed: January 17, 2012.