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The studies near Folsom Reservoir identified 185 prehistoric properties and 59 historic sites (Bureau of Reclamation 2005b; Bureau of Reclamation et al. 2006). The prehistoric sites include habitation sites, middens, groundstones, and artifact and lithic scatters. The historic sites included buildings, mining areas, and refuse dumps. Folsom Dam was determined to be NRHP-eligible.

### ***K.2.2.2 Cultural Resources at CVP and SWP Reservoir and Pumping Plant Facilities in the San Joaquin Valley***

Previous cultural resource studies were conducted at and/or near New Melones Reservoir, San Luis Reservoir, and Millerton Reservoir and San Joaquin River downstream of Friant Dam.

The studies near New Melones Reservoir surveyed approximately 78% of the study area and identified 725 cultural resources within the New Melones Reservoir area or within 0.25 mile of this area (Bureau of Reclamation 2010). The prehistoric sites include habitation sites, artifact and lithic scatters, mortars, caves, rock art, and cemeteries. The historic sites included bridges, buildings, ranches, orchards, towns, water and power systems, transportation infrastructure, and cemeteries. Many of the sites are located within the inundation area. However, a substantial number of surveys, site testing, and data recovery were conducted from the 1940s through the late 1970s prior to operation of New Melones Reservoir in the 1980s.

The studies near San Luis Reservoir identified 51 prehistoric and historic cultural resources (Bureau of Reclamation and California Department of Parks 2013). The prehistoric sites include habitation sites and artifact and lithic scatters. The historic sites included bridges, water infrastructure, buildings, ranches, orchards, towns, and cemeteries. One of the major historic sites in this area is the remnant locations of Rancho San Luis Gonzaga. Many portions of the ranch are located within the inundation area. However, many of the structures were moved to a site near Pacheco Pass. The remaining portions of the ranch were deeded to California in 1992 to become part of the Pacheco State Park. Rancho San Luis Gonzaga, a historic stock ranch landscape, has been designated by the state to be a Historic District/Cultural Landscape that is potentially NRHP-eligible and CRHR-eligible.

Recent studies along the San Joaquin River identified 19 prehistoric sites within the seasonal inundation area of Millerton Lake (Bureau of Reclamation and California Department of Water Resources 2011a; Bureau of Reclamation and California Department of Parks 2013). Additional sites are located within the area of the lake that is constantly inundated. Some of the known sites include the remains of Kuyu Illik; the Dumna “head” village; the Kechaye/“Dumna” village of Sanwo Kianu; remains of Fort Miller, Millerton, and Collins Sulphur Springs; and prehistoric sites with housepits, mortars, grinding sticks, and rock alignments (Bureau of Reclamation and California Department of Parks 2013).

Along the San Joaquin River downstream of Friant Dam (which forms Millerton Lake) to the confluence of the Merced River, 84 prehistoric sites, 18 historic sites, and 7 sites with both prehistoric and historic resources were identified as part of the San Joaquin River Restoration Program efforts. The prehistoric sites include habitation sites, artifact and lithic scatters, and

bedrock milling features. The historic sites included bridges, buildings, ranches, orchards, towns, water and power systems, and transportation infrastructure.

The Friant Dam, Friant-Kern Canal, associated features (berms, siphons, control structures, inlets, outlets, and check structures), approximately 40 bridges that cross the canal, and Little Dry Creek Wasteway Facility are considered historic resources (Bureau of Reclamation and California Department of Parks 2013; Bureau of Reclamation and California Department of Water Resources 2011b). The Friant Dam and Friant-Kern Canal were determined to be NRHP-eligible.

**K.2.2.3 Cultural Resources in the Areas That Use CVP and SWP Water Supplies in the Central Valley**

Numerous cultural and historical resources are in the Central Valley, as summarized in Table K-1. Most of the cultural resources are located within areas that would not be affected by land use changes that could result from changes in CVP and SWP water supplies. The resources listed in Table K-1 also include the sites described above near CVP and SWP facilities.

Table K-1. Previously Recorded Cultural and Historical Resources of the Central Valley Region.

County	Historic Site Types	Prehistoric Site Types
Butte	26 NRHP properties, 8 California Historical Landmarks, and 21 California Points of Historical Interest.	1,198 Known Prehistoric Site Types.
Colusa	7 NRHP properties, 3 California Historical Landmarks, and 3 California Points of Historical Interest.	115 Known Prehistoric Site Types.
El Dorado	18 NRHP properties, 30 California Historical Landmarks, 8 California Points of Historical Interest; numerous historic sites, such as mining features, building foundations, trash scatters, and bridges, were inundated by Folsom Lake.	595 Known Prehistoric Site Types.
Fresno	38 NRHP properties, 8 California Historic Landmarks, and 13 of which are California Points of Historical Interest.	2,603 Known Prehistoric Site Types.
Glenn	2 NRHP properties, 2 California Historical Landmarks, and 17 California Points of Historical Interest.	373 Known Prehistoric Site Types.
Kern	20 NRHP properties, 47 California Historic Landmarks, and 11 California Points of Historical Interest.	3,850 Known Prehistoric and Historic Site Types.
Kings	4 NRHP properties, 3 California Historic Landmarks; the San Luis Canal, the only CVP facility in Kings County, has no historic or architectural resources in its vicinity.	56 Known Prehistoric Site Types.
Madera	2 NRHP property, 1 California Historic Landmarks, and 9 California Points of Historical Interest.	2,043 Known Prehistoric Site Types.
Merced	14 NRHP properties, 5 California Historic Landmarks, 1 CRHR properties, and 8 California Points of Historical Interest.	316 Known Prehistoric Site Types.

<b>County</b>	<b>Historic Site Types</b>	<b>Prehistoric Site Types</b>
Napa	76 NRHP properties, 17 California Historical Landmarks, and 13 California Points of Historical Interest.	700 Known Prehistoric Site Types.
Placer	18 NRHP properties, 20 California Historical Landmarks, 21 California Points of Historical Interest; numerous historic sites, such as mining features, building foundations, trash scatters, and bridges, were inundated by Folsom Reservoir, which is a CVP facility.	627 Known Prehistoric Site Types.
Plumas	6 NRHP properties, 13 California Historical Landmarks, and 5 California Points of Historical Interest.	1,639 prehistoric sites in Plumas County.
Sacramento	90 NRHP properties, 56 California Historical Landmarks, 4 CRHR properties, 20 California Points of Historical Interest; numerous historic sites, such as mining features, building foundations, trash scatters, and bridges, were inundated by Folsom Reservoir; the Folsom Mining District surrounds Lake Natoma. There are over 40 historic sites along the Sacramento River between Sutter County boundary and Freeport; including Natomas Main Drainage Canal, Town of Freeport, Sacramento Weir, Yolo Bypass, homes and farms, and a church. There are 14 historic sites along the American River between Folsom Dam and the confluence with the Sacramento River.	407 Known Prehistoric Site Types (Bureau of Reclamation 1997). There are 24 prehistoric sites along the Sacramento River between Sutter County boundary and Freeport. There are 22 prehistoric sites along the American River between Folsom Dam and the confluence with the Sacramento River.
San Joaquin	31 NRHP properties, 25 California Historic Landmarks, 3 CRHR properties, and 7 are California Points of Historical Interest.	189 Known Prehistoric Site Types.
Shasta	26 NRHP properties, 19 California Historical Landmarks, 1 CRHR properties, 15 California Points of Historical Interest. The Anderson-Cottonwood Irrigation District Diversion Dam has been determined to be eligible for NRHP listing.	1,419 Known Prehistoric Site Types. Many of these sites occur along the Sacramento River near Redding and between Battle Creek and Table Mountain.
Solano	23 NRHP properties, 14 California Historical Landmarks, and 9 California Points of Historical Interest.	300 Known Prehistoric Site Types.
Stanislaus	21 NRHP properties, 5 California Historic Landmarks, and 7 are California Points of Historical Interest; the former right-of-way for the Patterson and Western Railroad, which was constructed in 1916, bisects the Delta-Mendota Canal.	280 Known Prehistoric Site Types.
Sutter	7 NRHP properties, 2 California Historical Landmarks, and 22 California Points of Historical Interest.	62 Known Prehistoric Site Types.
Tehama	10 NRHP properties, 3 California Historical Landmarks, and 1 California Point of Historical Interest.	1,415 Known Prehistoric Site Types.

County	Historic Site Types	Prehistoric Site Types
Tulare	34 NRHP properties, 8 California Historical Landmarks, and no California Points of Historical Interest.	1,857 Known Prehistoric Site Types.
Yolo	21 NRHP properties, 2 California Historical Landmarks, 1 CRHR properties, and 8 California Points of Historical Interest.	175 Known Prehistoric Site Types. Includes possible fishing stations along Putah and Cache Creeks, the Sacramento, and ephemeral tributaries to these watercourses.
Yuba	10 NRHP properties, 6 California Historical Landmarks, and 14 California Points of Historical Interest.	1,112 Known Prehistoric Site Types.

Sources: Bureau of Reclamation 1997, 2005b, 2013; California State Parks Office of Historic Preservation 2014; Plumas County 2012.

Notes: NRHP = National Register of Historic Places; CRHR = California Register of Historic Resources

### K.2.3 Previously Recorded Cultural Resources in the Bay-Delta Region

The Bay-Delta region is highly urbanized, and that development has affected archaeological resources. Numerous cultural and historical resources are in the Bay-Delta region, as summarized in Table K-2. Most of the cultural resources are located within areas that would not be affected by land use changes that could result from changes in CVP and SWP water supplies.

Table K-2. Previously Recorded Cultural Resources of the Bay-Delta Region.

County	Historic Site Types	Prehistoric Site Types
Alameda	141 NRHP properties, 34 California Historical Landmarks, 2 CRHR properties, and 4 California Points of Historical Interest.	No comprehensive inventory of prehistoric sites in Alameda County.
<i>Contra Costa</i>	40 NRHP properties, 13 California Historical Landmarks, 1 CRHR property, and 12 California Points of Historical Interest.	No comprehensive inventory of prehistoric sites in Contra Costa County. Up to 41 sites were identified in the Kellogg Creek Historic District near Los Vaqueros Reservoir.
San Benito	12 NRHP properties, 5 California Historic Landmarks, and 2 California Points of Historical Interest.	180 Known Prehistoric Site Types.
Santa Clara	101 NRHP properties, 41 California Historical Landmarks, and 58 California Points of Historical Interest.	Between 1912 and 1960, 43 sites were recorded in the Santa Clara Valley portion of Santa Clara County.

Sources: Bureau of Reclamation 1997; California State Parks Office of Historic Preservation 2014; Contra Costa County 2005; Contra Costa Water District et al. 2009; Santa Clara County 1994, 2012; Zone 7 Water Agency 2006.

Notes: NRHP = National Register of Historic Places; CRHR = California Register of Historic Resources

#### **K.2.4 Indian Sacred Sites**

Indian Sacred Sites on federal land or access to sacred sites on federal land under Executive Order 13007 are primarily identified during the process of federally recognized tribal consultation. Because of this, an analysis of Indian Sacred Sites was not possible for the purposes of this document. Once a project is identified, the lead federal agency is required to consult with any tribes that have cultural affiliation with the proposed project area. It is during this process that Indian Sacred Sites that could be affected by the Proposed Action would be identified.

#### **K.2.5 Native American Graves Protection and Repatriation Act**

Under the Native American Graves Protection and Repatriation Act (25 USC 3001) and implementing regulations 43 CFR Part 10, Reclamation is responsible for the protection of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are discovered on Reclamation lands. All human remains and potential human remains will be treated with respect and dignity at all times. In the event that suspected human remains are discovered during proposed project activity on Reclamation land, all activities in the immediate area will cease, and appropriate precautions will be taken to protect the remains and any associated cultural items from further disturbance. Reclamation will follow the procedures outlined in 43 CFR § 10.4 Inadvertent Discoveries.

#### **K.2.6 Archaeological Resources Protection Act**

The Archaeological Resources Protection Act (ARPA, 16 U.S.C 470) applies when a project may involve archaeological resources located on federal or tribal land. The ARPA requires that a permit be obtained before excavation of an archaeological resource on such land can take place. This statute was enacted to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites that are on federally owned lands and Indian lands. It was also enacted to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals.

### **K.3 Evaluation of Alternatives**

This section describes the technical background for the evaluation of environmental consequences associated with the action alternatives and the No Action Alternative.

#### **K.3.1 Methods**

The impact assessment considers the potential to effect cultural resources and historic properties related to changes in CVP and SWP operations under the alternatives as compared with the No Action Alternative. This section details methods and tools used to evaluate those effects. It should be noted that Alternative 2 consists of four phases that could be utilized under its implementation. All four phases are considered in the assessment of Alternative 2 to bracket the range of potential impacts. The analysis considers the known historic property environmental setting in the plan area, as well as the potential for previously undocumented historic properties and physical effects on known and previously undocumented properties that could result from implementation of the action alternatives. Because there is no ground disturbance involved in the



action alternatives, the key mechanism for impacts on cultural resources is the potential for inundation and/or exposure of buried archaeological historic properties in a way that can cause damage or destruction to those properties. The analysis is also informed by the requirements of federal and state laws and regulations that apply to cultural resources. Because the coordinated long-term operation of the CVP and SWP is subject to Section 106 of the NHPA, Reclamation is responsible for compliance with Section 106. Compliance with Section 106 follows a series of steps, identified in its implementing regulations found at 36 CFR Part 800, that include identifying consulting and interested parties, delineating an area of potential effects (APE), identifying historic properties within the APE, and assessing effects on any identified historic properties, and resolving adverse effects through consultations with the State Historic Preservation Officer, Indian tribes, and other consulting parties.

### **K.3.2 No Action Alternative**

Under the No Action Alternative, Reclamation would continue with current operation of the CVP, as described in the 2020 Record of Decision and subject to the 2019 Biological Opinions. The 2020 Record of Decision for the CVP and the 2020 Incidental Take Permit for the SWP represent current management direction or intensity pursuant to 43 CFR § 46.30.

Although the No Action Alternative included habitat restoration projects at a programmatic level, the 2020 ROD did not provide environmental coverage for these projects, and all of the habitat projects considered under the No Action required or will require additional environmental documentation. Thus, ground disturbance for habitat restoration projects did not materialize as a result of implementing the No Action Alternative. For the purpose of the analysis, these habitat restoration projects are considered independent projects that will be considered under cumulative effects.

The No Action Alternative is based on 2040 conditions. Changes that would occur over that time frame without implementation of the action alternatives are not analyzed in this technical appendix. However, the changes to cultural resources that are assumed to occur by 2040 under the No Action Alternative are summarized in this section.

Conditions in 2040 would be different than existing conditions because of the following factors:

1. Climate change and sea-level rise
2. General plan development throughout California, including increased water demands in portions of the Sacramento Valley

By the end of September, the surface water elevations at CVP reservoirs generally decline, and bare mineral “bathtub rings” appear as inundated areas drain. It is anticipated that climate change would result in more short-duration high-rainfall events and less snowpack in the winter and early spring months. The reservoirs would be full more frequently by the end of April or May by 2040 than in recent historical conditions, potentially resulting in less exposure of previously inundated areas around reservoirs. However, as the water is released in the spring, there would be less snowpack to refill the reservoirs. This condition would reduce reservoir storage, thereby increasing the vertical height of the exposed but previously inundated around reservoirs, potentially exposing cultural resources.

Under the No Action Alternative, land uses in 2040 would occur in accordance with adopted general plans. Development under the general plans could affect cultural resources, depending on the type and location of development. Infill projects where areas are already developed could increase density but would be done in compliance with applicable zoning and general plan policies around cultural resources. Development in non-urbanized areas could convert natural or rural areas to developed areas, resulting in impacts to cultural resources.

The No Action Alternative would also rely upon increased use of Livingston-Stone National Fish Hatchery during droughts to increase production of winter-run Chinook salmon. However, this component requires no physical changes to the facility and would have no adverse effect on historic properties.

### **K.3.3 Alternative 1**

#### ***K.3.3.1 Project Activities with the Potential to Effect Historic Properties***

Compared with the No Action Alternative, Alternative 1 would make changes to: Keswick Dam release rates (ramping) and releases (Sacramento River/Keswick Reservoir), Shasta Dam releases (Sacramento River/Shasta Reservoir), Whiskeytown Dam releases (Clear Creek/Whiskeytown Lake), American River minimum instream flows (Nimbus Dam, Folsom Dam), Delta Outflow, and New Melones Reservoir releases (Stanislaus River minimum instream flows).

If peak river flows or reservoir levels have substantial increases beyond the No Action Alternative, it could result in erosion in areas with historic properties and has the potential to adversely affect the historic properties. Compared with the No Action Alternative, for example, Alternative 1 would result in the following changes to storage and flow:

3. **Shasta Reservoir:** there would mostly be minor increases in the average storage volumes with a decrease in storage in June compared to the No Action Alternative (see Table F.2.1-3-1c in Appendix F, Modeling Technical Appendix). As a result, with higher storage volume, exposure of new resources is unlikely, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes are minor in intensity, such that adverse effects to historic properties are not expected.
4. **Folsom Reservoir:** In most cases the end of month storage at Folsom Reservoir increases other than for June (see Table F.2.1-7-1b in Appendix F). As a result, there could be longer periods of inundation. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in storage are minor in intensity, such that adverse effects to historic properties are not expected.
5. **New Melones Reservoir:** Average storage would decrease at New Melones Reservoir (see Table F.2.1-13-1c in Appendix F). As a result, the lower storage volumes could expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in highs and lows are minor in intensity, such that adverse effects on historic properties are not expected.

6. **Clear Creek:** The reductions in monthly average flow are substantial compared with the No Action Alternative, with some monthly reductions down to about one-third of the flows of the No Action Alternative. Flow would decrease every month (see Table F.2.2-2-1c in Appendix F). This could result in exposure of previously inundated areas. As an example, flows in October under the No Action Alternative would be about 200 cfs, while under Alternative 1 they would be about 61 cfs. An even larger reduction would occur around June. Under the No Action Alternative, flows would be about 303 cfs in June, and under Alternative 1 they would be about 77 cfs, about one-fourth the flow of the No Action Alternative (see Tables F.2.2-2-1a and F.2.2-2-1b in Appendix F). The proposed monthly average flows under Alternative 1 would be lower than all proposed monthly average flows under the No Action Alternative. For 8 months of the year, these flows are also lower than the lowest monthly flow under the No Action Alternative. As identified in Appendix N, *Visual Resources Technical Appendix*, Section N.1.2.2, *Clear Creek Watershed*, the upper portion of lower Clear Creek is characterized by a deep gorge with flowing, cascading water surrounded by a forested upland landscape. In this area, lower flows are unlikely to expose intact resources because the high flow environment is not conducive to preserving cultural resources. The lower portion is characterized by broad alluvial floodplains, meandering gravel bars, and lush riparian vegetation. Therefore, reduced flows in this area could expose resources. However, the flows would generally stay low such that cycles of inundation would not occur and would not cause damage to resources. Therefore, no adverse effects to historic properties are expected.

Storage changes are relatively small during each year type and follow existing patterns in reservoir storage. Therefore, Alternative 1 does not have the potential to adversely affect historic properties if they are present.

### **K.3.4 Alternative 2**

#### **K.3.4.1 Project Activities with the Potential to Effect Historic Properties**

Compared with the No Action Alternative, Alternative 2 would make changes to: Shasta Dam releases and storage (Sacramento River/Shasta Lake), Whiskeytown Dam releases (Clear Creek/Whiskeytown Lake), and New Melones Reservoir releases (Stanislaus River minimum instream, winter instability, and fall pulse flows).

If peak river flows or reservoir levels have substantial increases beyond the No Action Alternative, it could result in erosion in areas with historic properties and has the potential to adversely affect the historic properties. Compared with the No Action Alternative, for example, Alternative 2 would result in the following changes to storage and flow:

7. **Shasta Reservoir:** The average storage would increase compared to the No Action Alternative (see Tables F.2.1-3-2c, F.2.1-3-3c, F.2.1-3-4c, and F.2.1-3-4d in Appendix F). As a result, the higher storage volumes would not expose resources, though the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes are minor in intensity, such that adverse effects on historic properties are not expected.

8. **New Melones Reservoir:** There would be minor changes in end of month storage volumes compared to the No Action Alternative, as well as some increases in storage volume (see Tables F.2.1-13-2c, F.2.1-13-3c, F.2.1-13-4c, and F.2.1-13-5c in Appendix F). As a result, the lower storage volumes could expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in storage are minor in intensity, such that adverse effects on historic properties are not expected.
9. **Clear Creek:** Flow would both increase and decrease under Alternative 2 depending on the phase and the month. Decreases in flows would be up to 29 percent during June for Alternative 2 Without TUCP Without VA, but there would be flow increases during 6 out of 12 months for this phase of Alternative 2 (see Tables F.2.2-2a, F.2.2-2b, and F.2.2-2-2c in Appendix F). Flows for Alternative 2 Without TUCP Delta VA, Alternative 2 Without TUCP All VA, and Table F.2.2-2-5c would be comparable (see Tables F.2.2-2-3c, Table F.2.2-2-4c, and Table F.2.2-2-5c). These fluctuations could result in the minor exposure of previously inundated areas, although the general pattern in flow changes (i.e., highs and lows over the years) would remain the same. As an example, flows in October under the No Action Alternative would be about 200 cfs, while under Alternative 2 (Alternative 2 With TUCP Without VA) they would be about 174 cfs. Depending on stream geometry, this change in flow could result in decreased river width or reduced flow speed. However, the range in fluctuations under Alternative 2 for the most part is within the range of fluctuations of the No Action Alternative. Therefore, adverse effects on historic properties are not expected.

Storage changes are relatively small during each year type and follow existing patterns in reservoir storage. Therefore, Alternative 2 does not have the potential to adversely affect historic properties if they are present.

### **K.3.5 Alternative 3**

#### ***K.3.5.1 Project Activities with the Potential to Effect Historic Properties***

Compared with the No Action Alternative, Alternative 3 would make changes to: Shasta Dam spring pulse flows and releases (Sacramento River/Shasta Reservoir), Whiskeytown Dam releases (Clear Creek/Whiskeytown Lake), American River minimum instream flows and winter and spring pulse flow (Folsom Reservoir), and New Melones Reservoir releases (Stanislaus River minimum instream flows and fall pulse flows).

If peak river flows or reservoir levels have substantial increases beyond the No Action Alternative, it could result in erosion in areas with historic properties and has the potential to adversely affect the historic properties. Compared with the No Action Alternative, for example, Alternative 3 would result in the following changes to storage and flow:

10. **Shasta Reservoir:** End of month storage would increase compared to the No Action Alternative (see Table F.2.1-3-6c in Appendix F). As a result, the higher storage volumes would not expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the

same as recorded past conditions and the changes are minor in intensity, such that adverse effects on historic properties resources are not expected.

11. **Folsom Reservoir:** Average monthly storage volumes would increase other than for March through May (see Table F.2.1-7-6c in Appendix F). As a result, the lower storage volumes could expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in highs and lows are minor in intensity, such that adverse effects on historic properties are not expected.
12. **New Melones Reservoir:** There would be decreases in storage volumes (see Table F.2.1-13-6c in Appendix F). As a result, the lower storage volumes could expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in highs and lows are minor in intensity, such that adverse effects on historic properties are not expected.
13. **Clear Creek:** The reductions in average monthly flow occur for six months of the year and are minor compared with No Action Alternative, with some monthly reductions of about 13% of No Action Alternative (see Table F.2.2-2-6c in Appendix F). These reductions could result in minor exposure of previously inundated areas, although the general pattern in flow changes (i.e., highs and lows over the years) would remain the same. As an example, flows in October under the No Action Alternative would be about 200 cfs, while under Alternative 3 they would be about 167 cfs, with this difference changing by month. Depending on stream geometry, this change in flow could result in decreased river width or reduced flow speed. However, the range in fluctuations under Alternative 3 for the most part is within the range of fluctuations of the No Action Alternative. Therefore, adverse effects on historic properties are not expected.

Storage changes are relatively small during each year type and follow existing patterns in reservoir storage. Therefore, Alternative 3 does not have the potential to adversely affect historic properties if they are present.

### **K.3.6 Alternative 4**

#### ***K.3.6.1 Project Activities with the Potential to Effect Historic Properties***

Compared with the No Action Alternative, Alternative 4 would make changes to: Keswick Dam releases (Keswick Reservoir/Shasta Reservoir/Sacramento River), Shasta Dam releases (Shasta Reservoir/Sacramento River), Whiskeytown Dam (Clear Creek/Whiskeytown Lake), and New Melones Reservoir releases (Stanislaus River minimum instream flows, winter instability flows, spring pulse flows, and fall pulse flows).

If peak river flows or reservoir levels have substantial increases beyond the No Action Alternative, it could result in erosion in areas with historic properties and has the potential to adversely affect the historic properties. Compared with the No Action Alternative, for example, Alternative 4 would result in the following changes to storage and flow:

14. **Shasta Reservoir:** End of month storage would be higher than the No Action Alternative (see Table F.2.1-3-7c in Appendix F). Storage volumes would follow the same historical pattern of storage variation over time. As a result, the higher storage volumes would not expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in highs and lows are minor in intensity, such that adverse effects on historic properties are not expected.
15. **New Melones Reservoir:** There would be increases in average storage volumes, (see Table F.2.1-13-7c in Appendix F). As a result, the higher storage volumes would not expose resources, while the pattern of inundation and drainage may increase erosion. However, the general pattern of fluctuations would remain the same as recorded past conditions and the changes in highs and lows are minor in intensity, such that adverse effects on historic properties are not expected.
16. **Clear Creek:** The reductions in average flow are minor compared with No Action Alternative, and occur for 6 months of the year. Monthly reductions ranging from 6% to 29% of the No Action Alternative flows (see Table F.2.2-2-7c in Appendix F). This could result in minor exposure of previously inundated areas, although the general pattern in flow changes (i.e., highs and lows over the years) would remain the same. As an example, flows in October under the No Action Alternative would be about 200 cfs, while under Alternative 4 they would be about 173 cfs, with this difference changing by month. Depending on stream geometry, this change in flow could result in decreased river width or reduced flow speed. However, the range in fluctuations under Alternative 3 for the most part is within the range of fluctuations of the No Action Alternative. Therefore, adverse effects on historic properties are not expected.

Storage changes are relatively small during each year type and follow existing patterns in reservoir storage. Therefore, Alternative 4 does not have the potential to adversely affect historic properties if they are present.

### **K.3.7 Mitigation Measures**

No avoidance and minimization measures or mitigation measures have been identified.

### **K.3.8 Summary of Impacts**

Table K-3 includes a summary of impacts, the magnitude and the direction of those impacts.

This would require construction activities resulting in ground disturbance potentially affecting historic properties. Consequently, there is a potential for new indirect or direct effects on cultural resources to occur under the No Action Alternative. These activities would be subject to additional environmental compliance procedures and review for compliance with the NHPA, if required.

Table K-3. Impact Summary

Impact	Alternative	Magnitude and Direction of Impacts	Potential Mitigation Measures
Project activities with the potential to affect historic properties	No Action Alternative	Potential indirect or direct effects on cultural resources resulting from continuation of ground disturbance activities e.g., habitat restoration projects, implementation of CA general plan actions. Activities would be subject to additional environmental compliance procedures and review for compliance with the NHPA.	—
	Alternative 1	Within the range of flow fluctuations associated with the No Action Alternative	—
	Alternative 2	Within the range of flow fluctuations associated with the No Action Alternative	—
	Alternative 3	Within the range of flow fluctuations associated with the No Action Alternative	—
	Alternative 4	Within the range of flow fluctuations associated with the No Action Alternative	—

<sup>1</sup> While the evaluation of Alternatives 1 through 4 is completed in comparison to the effects of the No Action Alternative, the No Action Alternative discloses the impacts of not implementing any of the action alternatives.

### K.3.9 Cumulative Impacts

Past, present, and reasonably foreseeable projects, described in Appendix Y, *Cumulative Impacts Technical Appendix*, may have cumulative effects on Cultural Resources, to the extent that they could affect historic properties resulting from ground-disturbing activities.

Past and present actions contribute to the existing condition of the affected environment in the project area while reasonably foreseeable actions are those that are likely to occur in the future that are not speculative. Past, present, and reasonably foreseeable projects include actions to develop water storage capacity, water conveyance infrastructure, water recycling capacity, the reoperation of existing water supply infrastructure, including surface water reservoirs and conveyance infrastructure, and habitat restoration actions. The projects identified in Appendix Y that have the most potential to contribute to cumulative impact on Cultural Resources are related to projects with the potential to cause ground-disturbing activities or peak flows that would contribute to erosion in areas with historic properties (e.g. B.F. Sisk Dam Raise and Reservoir Expansion Project, Cache Slough Area Restoration, Bay-Delta Water Quality Control Plan Update and habitat restoration).

The No Action Alternative would continue with the current operation of the CVP and is not expected to affect historic properties which was described and considered in the 2020 Record of Decision.

Appendix Y lists past, present, and reasonably foreseeable projects that have or may potentially result in cumulative impacts to Cultural Resources. Under Alternatives 1, 2, 3, and 4 there are no activities which include ground disturbing activities and/or alteration to a historic property and the range of flow fluctuations are within the range of flow fluctuations associated with the No Action Alternative. Therefore, as the action alternatives are not anticipated to effect historic properties, no cumulative impacts to cultural resources are expected.

## K.4 References

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