Appendix J Indian Trust Assets

This appendix describes Indian Trust Assets (ITAs) in the study area to support the impact analysis in the EIS.

Potential actions that could be implemented under the alternatives evaluated in this EIS could affect ITAs in the areas along the rivers and reservoirs directly affected by changes in the operation of Central Valley Project (CVP) or State Water Project (SWP) reservoirs and in the vicinity of lands served by CVP and SWP water supplies.

The Federal Indian Trust Asset policies, summarized below, have been used to identify potential areas of change to ITAs that could occur due to changes in long-term operation of the CVP and/or SWP facilities.

The ITAs are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. government. The characterization and application of the U.S. trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

The federal government, through treaty, statute or regulation, may take on specific, enforceable fiduciary obligations that give rise to a trust responsibility to federally recognized tribes and individual Indians possessing trust assets. Courts have recognized an enforceable federal fiduciary duty with respect to federal supervision of Indian money or natural resources, held in trust by the federal government, where specific treaties, statutes or regulations create such a fiduciary duty.

Consistent with President William J. Clinton's 1994 memorandum, "Government-to-Government Relations with Native American Tribal Governments," the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) assesses the effect of its programs on tribal trust resources and federally recognized tribal governments. Reclamation is tasked to actively engage federally recognized tribal governments and consult with such tribes on government-to-government level when its actions affect ITAs (*Federal Register*, Vol. 59, No. 85, May 4, 1994, pages 22951–22952). The U.S. Department of the Interior (DOI) Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices. DOI is required to carry out activities in a manner that protects ITAs and avoids adverse effects whenever possible.

J.1 Background Information

The U.S. Government's trust responsibility for Indian resources requires Reclamation and other agencies to take measures to protect and maintain trust resources. These responsibilities include taking reasonable actions to preserve and restore tribal resources.

Table J.1-1. Federally Recognized Tribes in the Vicinity of the Study Area

Federally Recognized Tribe	EIS Geographical Region	County/Counties	In the Vicinity of this Community
Hoopa Valley Tribal Council	Trinity River	Trinity and Humboldt	Hoopa
Resighini Rancheria Tribe	Trinity River	Del Norte	Klamath
Yurok Tribe of the Yurok Reservation	Trinity River	Trinity, Humboldt, and Del Norte	Klamath
Pit River Tribe	Sacramento River	Shasta	Burney
Redding Rancheria Tribe	Sacramento River	Shasta	Redding
Paskenta Band of Nomlaki Indians of California	Sacramento River	Tehama and Glenn	Corning and Orland
Grindstone Indian Rancheria of Wintun-Wailaki Indians of California	CVP and SWP Service Areas, Sacramento River	Glenn	Elk Creek
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community of the Colusa Rancheria	CVP and SWP Service Areas, Sacramento River	Colusa	Colusa
Cortina Indian Rancheria of Wintun Indians of California	CVP and SWP Service Areas, Sacramento River	Colusa	Williams
Tyme Maidu of Berry Creek Rancheria	CVP and SWP Service Areas	Butte	Oroville
Konkow Maidu of Mooretown Rancheria	CVP and SWP Service Areas	Butte	Oroville
Enterprise Rancheria of Maidu Indians of California	CVP and SWP Service Areas, Sacramento River	Butte	Oroville
Mechoopda Indian Tribe of Chico Rancheria	CVP and SWP Service Areas, Sacramento River	Butte	Chico
Miwok Maidu United Auburn Indian Community of the Auburn Rancheria	American River	Placer	Placer
United Auburn Indian Community of the Auburn Rancheria of California	American River	Placer	Rocklin
Shingle Springs Band of Miwok Indians, including Shingle Springs Rancheria	American River	El Dorado and Nevada	Shingle Springs
Buena Vista Rancheria of Me-Wuk	Sacramento River	Sacramento	Sacramento
Wilton Miwok Indians of the Wilton Rancheria	Sacramento River	Sacramento	Elk Grove
Yocha Dehe Wintun Nation	Sacramento River	Yolo	Brooks
Northfork Rancheria of Mono Indians of California	San Joaquin River	Madera	North Fork
Picayune Rancheria of Chukchansi Indians of California	San Joaquin River	Madera	Coarsegold
California Valley Miwok Tribe	San Joaquin River	San Joaquin	Stockton

Federally Recognized Tribe	EIS Geographical Region	County/Counties	In the Vicinity of this Community
Big Sandy Rancheria of Mono Indians of California	San Joaquin River	Fresno	Auberry
Table Mountain Rancheria	San Joaquin River	Fresno	Friant
Santa Rosa Indian Community of Santa Rosa Rancheria	CVP and SWP Service Areas	Kings	Lemoore
Tule River Indian Tribe of the Tule River Reservation of the Yokut Indians	CVP and SWP Service Areas	Tulare	Porterville
Santa Ynez Band of Chumash Mission Indians of Santa Ynez Reservation	CVP and SWP Service Areas	Santa Barbara	Santa Ynez
Cahuilla Band of Mission Indians of the Cahuilla Reservation	CVP and SWP Service Areas	San Diego	Anza
Campo Band of Diegueno Mission Indians of the Campo Indian Reservation	CVP and SWP Service Areas	San Diego	Campo
Capitan Grande Band of Diegueno Mission Indians of California (Barona Reservation and Viejas Reservation)	CVP and SWP Service Areas	San Diego	Alpine
Ewiiaapaayp Band of Kumeyaay Indians	CVP and SWP Service Areas	San Diego	Alpine
Iipay Nation of Santa Ysabel	CVP and SWP Service Areas	San Diego	Santa Ysabel
Inaja Band of Diegueno Mission Indians of the Inaja and Cosmit Reservation	CVP and SWP Service Areas	San Diego	Escondido
Jamul Indian Village of California	CVP and SWP Service Areas	San Diego	Jamul
La Jolla Band of Luiseño Indians	CVP and SWP Service Areas	San Diego	Pauma Valley
La Posta Band of Diegueno Mission Indians of the La Posta Indian Reservation	CVP and SWP Service Areas	San Diego	Boulevard
Los Coyotes Band of Cahuilla and Cupeno Indians	CVP and SWP Service Areas	San Diego	Warner Springs
Manzanita Band of Diegueno Mission Indians of the Manzanita Reservation	CVP and SWP Service Areas	San Diego	Boulevard
Mesa Grande Band of Diegueno Mission Indians of the Mesa Grande Reservation	CVP and SWP Service Areas	San Diego	Santa Ysabel
Pala Band of Luiseño Mission Indians of the Pala Reservation	CVP and SWP Service Areas	San Diego	Pala
Pauma Band of Luiseño Mission Indians of the Pauma & Yuima Reservation	CVP and SWP Service Areas	San Diego	Pauma Valley
Rincon Band of Luiseño Mission Indians of the Rincon Reservation	CVP and SWP Service Areas	San Diego	Valley Center
San Pasqual Band of Diegueno Mission Indians of California	CVP and SWP Service Areas	San Diego	Valley Center
Sycuan Band of the Kumeyaay Nation	CVP and SWP Service Areas	San Diego	El Cajon
Agua Caliente Band of Cahuilla Indians of the Agua Caliente Indian Reservation	CVP and SWP Service Areas	Riverside	Palm Springs

Federally Recognized Tribe	EIS Geographical Region	County/Counties	In the Vicinity of this Community
Augustine Band of Cahuilla Indians	CVP and SWP Service Areas	Riverside	Coachella
Cabazon Band of Mission Indians	CVP and SWP Service Areas	Riverside	Indio
Morongo Band of Mission Indians	CVP and SWP Service Areas	Riverside	Banning
Pechanga Band of Luiseño Mission Indians of the Pechanga Reservation	CVP and SWP Service Areas	Riverside	Temecula
Ramona Band of Cahuilla	CVP and SWP Service Areas	Riverside	Anza
Santa Rosa Band of Cahuilla Indians	CVP and SWP Service Areas	Riverside	Mountain Center
Soboba Band of Luiseño Indians	CVP and SWP Service Areas	Riverside	San Jacinto
Torres-Martinez Desert Cahuilla Indians	CVP and SWP Service Areas	Riverside	Thermal
Twenty-Nine Palms Band of Mission Indians of California	CVP and SWP Service Areas	Riverside and San Bernardino	Coachella
Chemehuevi Indian Tribe of the Chemehuevi Reservation	CVP and SWP Service Areas	San Bernardino	Needles
San Manuel Band of Mission Indians	CVP and SWP Service Areas	San Bernardino	Highland
Big Lagoon Rancheria	Not within study area	Humboldt	Arcata
Blue Lake Rancheria	Not within study area	Humboldt	Blue Lake
Karuk Tribe	Not within study area	Siskiyou	Happy Camp
Greenville Rancheria of Maidu Indians	Not within study area	Plumas and Tehama	Greenville
Susanville Indian Rancheria	Not within study area	Lassen	Susanville
Lytton Rancheria	Not within study area	Sonoma	Santa Rosa
Chicken Ranch Rancheria of Me-Wuk Indians of California	Not within study area	Tuolumne	Jamestown
Cold Springs Rancheria of Mono Indians	Not within study area	Fresno	Tollhouse
Colorado River Indian Tribes of the Colorado River Indian Reservation	Not within study area	Riverside	Parker, Arizona

J.2 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.

J.2.1 Methods and Tools

Changes in CVP and SWP operation under the action alternatives, compared to the No Action Alternative, could change water elevations within the CVP and SWP reservoirs, flow patterns in the rivers downstream of CVP and SWP reservoirs, and CVP and SWP water deliveries. Impacts on existing ITAs would be considered adverse if the action:

- Interfered with the exercise of a federally reserved water right, or degrades water quality where there is a federally reserved water right.
- Interfered with the use, value, occupancy, character or enjoyment of an ITA.
- Failed to protect ITAs from loss, damage, waste, depletion, or other negative effects.

J.2.1.1 *Changes in CVP and SWP Reservoir Elevation*

There are no ITAs within any of the reservoir inundation areas (DWR 2005; Reclamation 2010, 2012, 2013a, 2014; Reclamation et al. 2011; USACE et al. 2012). Therefore, any changes in reservoir elevations would not affect ITAs and are not analyzed in this EIS.

J.2.1.2 *Changes in CVP and SWP Water Deliveries*

There are no ITAs that directly receive CVP or SWP water. Municipalities that use CVP or SWP water supplies, including agencies that serve ITAs, would continue to meet water demands in 2030 if CVP and SWP water supplies are reduced through the increased use of non-CVP and SWP water supplies. Therefore, changes in CVP and SWP water deliveries would not affect water supplies to ITAs and are not analyzed in this EIS.

J.2.2 No Action Alternative

The No Action Alternative would generate no changes to water operations and there would be no improvement in existing limits to water supply availability that impact CVP and SWP water users. Therefore, in comparison to existing conditions there would be no impact on water supply. Given the lack of changes under the No Action Alternative to CVP and SWP operations there would also be no change to the water quality conditions. The No Action Alternative would not change the existing impacts on ITAs.

J.2.3 Alternative 1

J.2.3.1 *Project-Level Effects*

Potential changes in erosion or degradation of land or sites of religious or cultural importance to federally recognized Indian tribes

Project-level components of Alternative 1 are primarily operations based and would not involve the use of any land or sites of religious or cultural importance to Native Americans. As described in Appendix X, *Geology and Soils Technical Appendix*, no changes in peak flows are expected under

Alternative 1 relative to the No Action Alternative; therefore, stream channel erosion would not occur under Alternative 1.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix G, *Water Quality Technical Appendix,* changes in flow in the study area rivers due to changes in the operation of CVP/SWP under Alternative 1, relative to the No Action Alternative, would not result in increased frequency of exceedances of water quality standards. Therefore, there would be no degradation of water quality delivered to federally recognized tribes.

Potential changes to salmonid populations

Detrimental effects to salmonid populations which are an important resource to ITAs would result in an adverse effect to federally recognized Indian tribes which have fishing rights. Effects to salmonids vary in each river in the study area and are summarized by region below. For detailed analysis please refer to Appendix O, *Aquatic Resources Technical Appendix*:

J.2.3.1.1 Trinity River

Effects to fishery operations on the Trinity River would remain the same as those under the Trinity River ROD, and therefore, effects would remain the same as those under the No Action Alternative. There would be no impact to fishery operations and productivity as a result of this project.

Salmon spawning success and salmonid juvenile rearing success could be reduced due to elevated water temperatures during September and October. Modeled maximum water temperatures in September and October under all alternatives would exceed the 55°F USEPA (2003) recommendation for spawning, egg incubation, and fry emergence and could compromise salmonid reproductive success. Temperatures in the Trinity River below Trinity Dam under Alternative 1 would reach maximum temperatures of 63.5°F in September and 56.7°F in October. In addition, modeled water temperatures in September under Alternative 1 exceed the temperatures under the No Action Alternative. Modeled water temperatures in October under Alternative 1 are lower than under the No Action Alternative. Modeled maximum water temperatures under the action alternatives would be at or below the 55°F recommendation for spawning and egg incubation (USEPA 2003) from December through May, which would provide substantial protection for these life stages of Coho Salmon, which begin spawning in November, and Steelhead, which begin spawning in January and February.

Modeled maximum water temperatures during November, however, would slightly exceed the 55°F recommendation under Alternative 1 (55.2°F) which could compromise spawning success by both Chinook and Coho Salmon during November.

Modeled maximum water temperatures would exceed the 55°F recommendation for spawning and incubation during September and October under Alternative 1, likely reducing spawning and incubation success for Spring-Run and Fall-Run Chinook Salmon, which begin spawning in September and October, respectively.

J.2.3.1.2 Clear Creek

In Clear Creek below Whiskeytown Dam, CalSim II modeling results indicate that average flows in most water year types under Alternative 1 would be similar or the same as under the No Action Alternative. In all water year types, Alternative 1 would be similar to the No Action Alternative for instream habitat conditions

J.2.3.1.3 Sacramento River

Changes in summer/fall water temperature management operations under Alternative 1, especially with respect to the Shasta temperature control device (TCD), are expected to improve temperature and dissolved oxygen conditions experienced by incubating Winter-Run Chinook Salmon eggs and alevins.

The proposed Shasta Dam improved TCD under Alternative 1, as well as Rice Decomposition Smoothing, Spring Management of Spawning Locations, Battle Creek Restoration, and Intake Lowering near Wilkins Slough, would further facilitate increased coldwater storage, resulting in greater protection of the Winter-Run and Spring-Run Chinook Salmon population.

J.2.3.1.4 Feather River

Average flows under Alternative 1 are slightly greater than under the No Action Alternative from December to March, so the effects on eggs and rearing juveniles would be negligible and potentially beneficial because of increased availability of habitat for these life stages. Increased flows under the action alternatives from May to June, during Spring-Run Chinook Salmon migration and holding, would provide potential temperature and fish passage benefits.

Modeled maximum water temperatures under Alternative 1 and the No Action Alternative would exceed the 55°F recommendation for spawning, egg incubation, and rearing (USEPA 2003) from September to November, a period of Spring-Run Chinook Salmon egg incubation and juvenile rearing, which could reduce survival of these life stages.

J.2.3.1.5 Stanislaus River

Alternative 1 flows would be slightly reduced but generally similar to the No Action Alternative.

Compared to the No Action Alternative, Alternatives 1 increases the annual storage and, therefore, the size of the coldwater pool in New Melones Reservoir. Temperature modeling for the Stanislaus River at Ripon shows that there is a small increase in overall annual water temperature for Alternatives 1 relative to the No Action Alternative. Reduced flows in above normal water years and water years may increase water temperatures in these less critical hydrologic conditions, however, this promotes additional storage at New Melones Dam for potential future droughts and preserving the cold water pool to benefit downstream salmonids.

Under Alternative 1, the proposed dissolved oxygen compliance point is protective of salmonids because the majority of salmonid eggs, alevin, and/or fry are found in locations where summer dissolved oxygen levels would be expected to be maintained at or near 7 mg/L, although it reduces the area of suitable dissolved oxygen as compared to the No Action Alternative. However, based on the typical seasonal occurrence of the adult life stages in the river (July to October), adult migrating salmonids would potentially be exposed to the effects of relaxing dissolved oxygen requirements at Ripon.

J.2.3.1.6 San Joaquin River

Analyses of flow for Alternatives 1 compared to the No Action Alternative show that releases in the San Joaquin River below Millerton Reservoir would remain the same for all scenarios. Therefore, no change to salmonid populations is anticipated as a result in the upper San Joaquin River.

J.2.3.1.7 Bay-Delta

Under Alternative 1, CVP and SWP exports increase during the migration window for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon as compared to the No Action Alternative. Salvage and loss of juvenile Winter-Run, Spring-Run, and Fall-Run Chinook have been shown to increase as exports increase. However, only a small proportion of the total population is lost at the export facilities. Increased flow in the Sacramento River mainstem would occur under Alternative 1 and higher flow has been shown to increase through-Delta survival of juvenile Chinook Salmon and reduce routing into the interior Delta at Georgiana Slough. The Sacramento River mainstem is the primary migration route for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon, thus a much greater proportion of the population would be exposed to the positive effects of greater Sacramento River flows than would be exposed to the negative effects of increased exports as compared to the No Action Alternative. Under Alternative 1, flows in the Sacramento River would be greater during the Winter-Run migration period which would increase survival and reduce routing into the interior Delta at Georgiana Slough (Perry et al 2015) as compared to the No Action Alternative. San Joaquin River-origin juvenile Spring-Run Chinook Salmon are likely to be entrained at the salvage facilities at higher rates under Alternatives 1 as compared to the No Action Alternative. San Joaquin River-origin juvenile Fall-Run Chinook Salmon are likely to be entrained at the salvage facilities at higher rates under all action alternatives as compared to the No Action Alternative.

J.2.3.2 *Program-Level Effects*

Potential changes in erosion or quality of land or sites of religious or cultural importance to federally recognized Indian tribes

As described in Appendix X, *Geology and Soils Technical Appendix*, no changes in peak flows are expected as a result of program-level actions for Alternative 1; therefore, stream channel erosion would be the same as under the No Action Alternative. Proposed restoration components have the potential to be implemented on land or sites of religious or cultural importance. The magnitude of effect would depend upon the size, location, and type of restoration implemented at the land or site and will be examined and evaluated in subsequent analyses. Proposed restoration components are not anticipated to be implemented on any federally recognized tribe's reservation and therefore would have no impact to the access to fishing rights of federally recognized tribes in the project area.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix G, *Water Quality Technical Appendix,* program-level actions and construction activities could have water quality implications. These include increased turbidity, mercury and selenium bioaccumulation, dissolved organic carbon, and increased sedimentation. Implementation of Mitigation Measures WQ-1, WQ-2, WQ-3, and WQ-4 would reduce these water quality effects.

Potential changes to salmonid populations

Alternative 1 proposes to create additional spawning habitat by injecting 15,000 to 40,000 tons of gravel between Keswick Dam and RBDD, which would potentially increase Winter-Run and Spring-Run Chinook Salmon production relative to the No Action Alternative. Alternative 1 also propose to create 40 to 60 acres of side channel and floodplain habitat at approximately 10 sites in the Sacramento River by 2030, which would potentially increase Winter-Run and Spring-Run Chinook

Salmon production relative to the No Action Alternative, thereby benefiting the Winter-Run and Spring-Run Chinook Salmon population.

Alternatives 1 includes implementation of spawning and rearing habitat projects in the American River and its tributaries. These habitat projects would result in improved habitat conditions in the American River, including increased total spawning habitat area, increased and improved side channel habitat, improved intragravel incubation conditions, increased and improved total rearing habitat area, improved overall habitat complexity, and cover and refugia.

Alternative 1 includes a provision for rearing habitat restoration in the lower San Joaquin River. The timing and temporary nature and of restoration activities would limit the potential for lasting impacts on the surrounding aquatic community, and the benefit of the restoration would likely result in long-term improvements to the habitat and aquatic inhabitants.

Although construction under Alternative 1 may temporarily affect certain fish species and their habitat, restoration of spawning and rearing habitat would result in long-term improvements to the habitat and aquatic inhabitants, including an increase in riparian vegetation providing instream objects and overhanging object cover, new shaded riverine habitat, and additional areas for food sources.

The proposed 8,000 acres of tidal habitat restoration of the No Action Alternative and Alternative 1 may provide enhanced availability and quality of rearing habitat for Winter-Run, Spring-Run, and Fall-Run Chinook Salmon rearing in the Delta. Variable fractions of each juvenile cohort leave their natal habitat as fry and rear in the Delta for weeks to months prior to entering the ocean. Enhanced food production in restored habitat may increase growth rates of these fish and physical habitat improvements can provide refuge from nonnative predators in the Delta.

Measures proposed as components of Alternative 1 have the potential to reduce predation. A reduction in predation at key locations identified as predation hot spots has the potential to increase through-Delta survival for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon during their migration. There is considerable uncertainty about the efficacy of predator management for increasing salmonid survival and potential benefits from this action.

Proposed restoration components are not anticipated to be implemented on any federally recognized tribe's reservation and therefore would have no impact to the fishing rights of federally recognized tribes in the project area.

Program level actions under Alternative 1 would generally be beneficial for salmonid populations and the ITAs which rely upon them.

J.2.4 Alternative 2

J.2.4.1 *Project-Level Effects*

Potential changes in erosion or quality of land or sites of religious or cultural importance to federally recognized Indian tribes

Project-level components of Alternative 2 are primarily operations based and would not involve the use of any land or sites of religious or cultural importance to Native Americans. As described in

Appendix X, *Geology and Soils Technical Appendix*, no changes in peak flows are expected under Alternative 1; therefore, stream channel erosion would not occur under Alternative 2.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix G, *Water Quality Technical Appendix,* changes in flow in Clear Creek and the Stanislaus River due to changes in the operation of CVP/SWP under Alternative 2 would result in increased frequency of exceedances of water quality standards. However, there are no ITAs identified in the vicinity of Clear Creek and Stanislaus River. Therefore, there would be no degradation of water quality and subsequent effect on federally recognized tribes.

Potential changes to salmonid populations

Effects to salmonid populations which are an important resource to ITAs would result in an adverse effect to federally recognized Indian tribes which have fishing rights. Effects to salmonids vary in each river in the study area and are summarized by region below. For detailed analysis please refer to Appendix O, *Aquatic Resources Technical Appendix*:

J.2.4.1.1 Trinity River

Effects to fishery operations on the Trinity River would remain the same as those under the Trinity River ROD, and therefore, effects would remain the same as those under the No Action Alternative. There would be no impact to fishery operations and productivity as a result of this project.

Salmon spawning success and salmonid juvenile rearing success could be reduced due to elevated water temperatures during September and October. Modeled maximum water temperatures in September and October under all alternatives would exceed the 55°F USEPA (2003) recommendation for spawning, egg incubation, and fry emergence and could compromise salmonid reproductive success. Temperatures in the Trinity River below Trinity Dam under Alternative 2 would reach maximum temperatures of 63.8°F in September and 57.6°F in October. In addition, modeled water temperatures in September under Alternative 2 exceed the temperatures under the No Action Alternative. Modeled water temperatures in October under Alternative 2 are lower than under the No Action Alternative. Modeled maximum water temperatures under Alternative 2 would be at or below the 55°F recommendation for spawning and egg incubation (USEPA 2003) from December through May, which would provide substantial protection for these life stages of Coho Salmon, which begin spawning in November, and Steelhead, which begin spawning in January and February.

Modeled maximum water temperatures during November, however, would slightly exceed the 55°F recommendation under Alternative 2 (55.1°F) which could compromise spawning success by both Chinook and Coho Salmon during November.

Modeled maximum water temperatures would exceed the 55°F recommendation for spawning and incubation during September and October under Alternative 2, likely reducing spawning and incubation success for Spring-Run and Fall-Run Chinook Salmon, which begin spawning in September and October, respectively.

J.2.4.1.2 Clear Creek

In Clear Creek below Whiskeytown Dam, CalSim II modeling results indicate that average flows in all water year types under Alternative 2 would be less than the No Action Alternative.

The flow decreases under Alternative 2 relative to the No Action Alternative and the NMFS (2009) criteria could compromise Spring-Run Chinook Salmon holding and rearing success and potentially lead to increased incidence of disease and physiological stress in holding adults and reduced survival of rearing juveniles, reduced juvenile production, and reduced spawning success by adults. These effects would be most likely to occur in June to August, when water temperatures are predicted to be highest.

J.2.4.1.3 Sacramento River

Changes in summer/fall water temperature management operations under Alternative 2 would potentially result in increased temperature-related mortality of Winter-Run and Spring-Run Chinook Salmon eggs and alevins relative to the No Action Alternative because these action alternatives could result in a depleted coldwater pool in the summer and fall, resulting in reduced protection to incubating Winter-Run Chinook Salmon eggs and alevins.

J.2.4.1.4 Feather River

Average flows under Alternative 2 are slightly greater than under the No Action Alternative from December to March, so the effects on eggs and rearing juveniles would be negligible and potentially beneficial because of increased availability of habitat for these life stages. Increased flows under Alternative 2 from May to June, during Spring-Run Chinook Salmon migration and holding, would provide potential temperature and fish passage benefits.

Modeled maximum water temperatures under Alternative 2 and the No Action Alternative would exceed the 55°F recommendation for spawning, egg incubation, and rearing (USEPA 2003) from September to November, a period of Spring-Run Chinook Salmon egg incubation and juvenile rearing, which could reduce survival of these life stages.

J.2.4.1.5 Stanislaus River

Flows under Alternative 2 would be substantially reduced below Goodwin Dam from February through September, and at the mouth of the Stanislaus River from March through May, as compared to the No Action Alternative. Reduced flows under Alternative 2 would likely result in reductions to suitable habitat area for juvenile salmonids.

Compared to the No Action Alternative, Alternative 2 increases the annual storage and, therefore, the size of the coldwater pool in New Melones Reservoir, with the largest storage quantities occurring under Alternatives 2 and 3. Temperature modeling for the Stanislaus River at Ripon shows that there is a small increase in overall annual water temperature for Alternative 2 relative to the No Action Alternative. Reduced flows in above normal water years and water years may increase water temperatures in these less critical hydrologic conditions, however, this promotes additional storage at New Melones Dam for potential future droughts and preserving the cold water pool to benefit downstream salmonids.

J.2.4.1.6 San Joaquin River

Analyses of flow for Alternative 2 compared to the No Action Alternative show that releases in the San Joaquin River below Millerton Reservoir would remain the same for all scenarios. Therefore, no change to salmonid populations is anticipated as a result in the upper San Joaquin River.

J.2.4.1.7 Bay-Delta

Under Alternative 2, CVP and SWP exports increase during the migration window for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon as compared to the No Action Alternative. Salvage and loss of juvenile Winter-Run, Spring-Run, and Fall-Run Chinook have been shown to increase as exports increase. However, only a small proportion of the total population is lost at the export facilities. Increased flow in the Sacramento River mainstem would occur under Alternative 2 and higher flow has been shown to increase through-Delta survival of juvenile Chinook Salmon and reduce routing into the interior Delta at Georgiana Slough. The Sacramento River mainstem is the primary migration route for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon, thus a much greater proportion of the population would be exposed to the positive effects of greater Sacramento River flows than would be exposed to the negative effects of increased exports. Effects are similar to those under Alternative 1.

J.2.4.2 *Program-Level Effects*

No programmatic components are proposed for Alternative 2. Therefore, there are no program-level effects.

J.2.5 Alternative 3

J.2.5.1 *Project-Level Effects*

Potential changes in erosion or degradation of land or sites of religious or cultural importance to federally recognized Indian tribes

Project-level components of Alternative 3 are primarily operations based and would not involve the use of any land or sites of religious or cultural importance to Native Americans. As described in Appendix X, *Geology and Soils Technical Appendix*, minor changes in peak flows (approximately 4% during the month of January) are expected under Alternative 3 relative to the No Action Alternative; however, stream channel erosion would not be substantial and there would be no subsequent degradation of land or sites of religious or cultural importance as a result of changes in erosion.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix G, *Water Quality Technical Appendix,* changes in flow in Clear Creek and the Stanislaus River due to changes in the operation of CVP/SWP under Alternative 3 relative to the No Action Alternative would result in increased frequency of exceedances of water quality standards. However, there are no ITAs identified in the vicinity of Clear Creek and the Stanislaus River. Therefore, there would be no degradation of water quality and subsequent effect to federally recognized tribe.

Potential changes to salmonid populations

Effects to salmonid populations which are an important resource to ITAs would result in an adverse effect to federally recognized Indian tribes which have fishing rights. Effects to salmonids vary in each river in the study area and are summarized by region below. For detailed analysis please refer to Appendix O, *Aquatic Resources Technical Appendix*:

J.2.5.1.1 Trinity River

Effects to fishery operations on the Trinity River would remain the same as those under the Trinity River ROD, and therefore, effects would remain the same as those under the No Action Alternative. There would be no impact to fishery operations and productivity as a result of this project.

Salmon spawning success and salmonid juvenile rearing success could be reduced due to elevated water temperatures during September and October. Modeled maximum water temperatures in September and October under all alternatives would exceed the 55°F USEPA (2003) recommendation for spawning, egg incubation, and fry emergence and could compromise salmonid reproductive success. In addition, modeled water temperatures in September under Alternative 3 exceed the temperatures under the No Action Alternative. Modeled water temperatures in October under Alternative 3 are similar under the No Action Alternative. Modeled maximum water temperatures under the Alternative 3 would be at or below the 55°F recommendation for spawning and egg incubation (USEPA 2003) from December through May, which would provide substantial protection for these life stages of Coho Salmon, which begin spawning in November, and Steelhead, which begin spawning in January and February. Temperatures in the Trinity River below Trinity Dam under Alternative 3 would reach maximum temperatures of 63.4°F in September and 61.9°F in October.

Modeled maximum water temperatures during November, however, would substantially exceed the recommendation under Alternative 3 (59.3°F), which could compromise spawning success by both Chinook and Coho Salmon during November.

Modeled maximum water temperatures would exceed the 55°F recommendation for spawning and incubation during September and October under Alternative 3, likely reducing spawning and incubation success for Spring-Run and Fall-Run Chinook Salmon, which begin spawning in September and October, respectively.

J.2.5.1.2 Clear Creek, Sacramento River, Feather River, Stanislaus River, San Joaquin River, and Bay-Delta

Project-level effects to salmonid populations under Alternative 3 would be essentially the same as those discussed under Alternative 2 in Clear Creek, Sacrament River, Feather River, Stanislaus River, San Joaquin River, and the Bay-Delta.

J.2.5.2 *Program-Level Effects*

Potential changes in erosion or degradation of land or sites of religious or cultural importance to federally recognized Indian tribes

As described in Appendix X, *Geology and Soils Technical Appendix*, no changes in peak flows are expected as a result of program-level actions under Alternative 3; therefore, stream channel erosion under Alternative 3 would be the same as that under the No Action Alternative. Proposed restoration components have the potential to be implemented on land or sites of religious or cultural importance. The magnitude of effect would depend upon the size, location, and type of restoration implemented at the land or site and will be examined and evaluated in subsequent analyses. Proposed restoration components are not anticipated to be implemented on any federally recognized tribe's reservation and therefore would have no impact to the access to fishing rights of federally recognized tribes in the project area.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix G, *Water Quality Technical Appendix,* program-level actions and construction activities could have water quality implications. These include increased turbidity, mercury and selenium bioaccumulation, dissolved organic carbon, and increased sedimentation.

Potential changes to salmonid populations

Program-level effects would be the same as those discussed under Alternative 1; however the additional 25,000 acres of tidal habitat restoration proposed under Alternative 3 in the Bay-Delta region would provide additional enhanced availability and quality of rearing habitat for Winter-Run, Spring-Run, and Fall-Run Chinook Salmon rearing in the Delta.

J.2.6 Alternative 4

J.2.6.1 *Project-Level Effects*

Potential changes in erosion or degradation of land or sites of religious or cultural importance to federally recognized Indian tribes

Project-level components of Alternative 1 are primarily operations based and would not involve the use of any land or sites of religious or cultural importance to Native Americans. As described in Appendix X, *Geology and Soils Technical Appendix*, under Alternative 4, an increase in releases from Sacramento Valley tributaries will occur, but will be well within the standard bounds of operational peak flows. Delta outflow will also increase, but overall differences are expected to result in negligible differences in the potential for increased erosion from outflow. There may be an increase in erosion under Alternative 4; however, erosion may occur primarily due to crop reduction as a result of reduced water deliveries and would not affect land or sites of religious or cultural importance. There would not be subsequent degradation of land or sites of religious or cultural importance as a result of increases in erosion due to project-level activities.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix F, *Water Quality Technical Appendix,* changes in flow in the study area rivers resulting from changes in the operations of CVP/SWP under Alternative 4 relative to the No Action Alternative would not result in increased frequency of exceedances of water quality standards. Therefore, there would be no degradation of water quality delivered to federally recognized tribes.

Potential changes to salmonid populations

Effects to salmonid populations, which are an important resource to ITAs, would result in an adverse effect to federally recognized Indian tribes that have fishing rights. Effects to salmonids vary in each river in the study area and are described by region below:

J.2.6.1.1 Trinity River

Effects to fishery operations on the Trinity River would remain the same as those under the Trinity River ROD, and therefore, effects would remain the same as those under the No Action Alternative. There would be no impact to fishery operations and productivity as a result of this project.

Modeled maximum water temperatures in September and October under all alternatives would exceed the 55°F USEPA (2003) recommendation for spawning, egg incubation, and fry emergence and could compromise salmonid reproductive success. Temperatures in the Trinity River below

Trinity Dam under Alternative 4 would reach maximum temperatures of 57.4°F in September and 60.3°F in October. Modeled maximum water temperatures under the action alternatives would be at or below the 55°F recommendation for spawning, egg incubation, and fry emergence (USEPA 2003) from December through May (Figure 5.9-4), which would provide substantial protection for these life stages of Coho Salmon, which begin spawning in November, and Steelhead and Coastal Cutthroat Trout, which begin spawning in January and September respectively. While water temperatures under the action alternatives would equal or exceed the No Action Alternative in some months during this period, no adverse effects are expected.

Modeled maximum water temperatures during November, however, would slightly exceed the 55°F recommendation under Alternative 4 (55.1°F) and would substantially exceed the recommendation under Alternative 3 (59.3°F), which could compromise spawning success for Fall-Run Chinook Salmon, Spring-Run Chinook Salmon, Coho Salmon, and Coastal Cutthroat Trout during November. The modeled water temperature exceedances under Alternative 4 are negligible relative to both the USEPA (2003) recommendation and the No Action Alternative (54.8°F), and are likely much less than the uncertainty associated with model results. Consequently, no adverse effects are expected.

J.2.6.1.2 Clear Creek

In Clear Creek below Whiskeytown Dam, CalSim II modeling results indicate that average flows in all water year types under Alternative 4 would be higher than under the No Action Alternative from November to May and would be similar or the same as under the No Action Alternative from June to October.

In all water year types, Alternative 4 would improve instream habitat conditions throughout the year compared to Alternative 2 and Alternative 3.

Modeled maximum water temperatures under Alternative 4 would be nearly identical to the No Action Alternative in most months but would be slightly less than the No Action Alternative in September and substantially less in October.

J.2.6.1.3 Sacramento River

Changes in summer/fall water temperature management operations under Alternative 1, especially with respect to the Shasta temperature control device (TCD), are expected to improve temperature and dissolved oxygen conditions experienced by incubating Winter-Run Chinook Salmon eggs and alevins. Alternative 4 is expected to provide a similar level of protection against a depleted coldwater pool to Alternative 1 (Appendix O, Figures SR-1 and SR-2).

J.2.6.1.4 Feather River

Modeled maximum water temperatures under the action alternatives and the No Action Alternative would exceed the 55°F recommendation for spawning, egg incubation, and rearing (USEPA 2003) from September to November, a period of Spring-Run Chinook Salmon egg incubation and juvenile rearing, which could reduce survival of these life stages.

Overall, simulated flows under Alternative 4 and No Action Alternative scenarios are similar, but flows under the No Action Alternative are higher in September of wet and above normal years, and flows under Alternative 4 are higher in April and May of wet water years, from March through June

of above normal water years, from January through May of below normal and dry water years, and in June of critically dry water years

Winter-Run Chinook are not likely to be affected by changes in flow under Alternative 4 compared to the No Action Alternative due to their limited distribution in the Feather River. Flow-related actions under Alternative 4 would have beneficial effects on Spring-Run Chinook Salmon and Fall-Run Chinook Salmon.

J.2.6.1.5 Stanislaus River

Alternative 4 flows would be similar to those under Alternative 1 and effects are the same as those described above.

J.2.6.1.6 San Joaquin River

Alternative 4 flows would be similar to those under Alternative 1 and effects are the same as those described above.

J.2.6.1.7 Bay-Delta

Under Alternative 4, CVP and SWP exports are similar to the No Action Alternative during the migration window for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon. Increased flow in the Sacramento River mainstem would occur under all action alternatives, and higher flow has been shown to increase through-Delta survival of juvenile Chinook Salmon and reduce routing into the interior Delta at Georgiana Slough. The Sacramento River mainstem is the primary migration route for juvenile Winter-Run, Spring-Run, and Fall-Run Chinook Salmon, thus a much greater proportion of the population would be exposed to the positive effects of greater Sacramento River flows than would be exposed to the negative effects of increased exports. Under all action alternatives flows in the Sacramento River would be greater during the Winter-Run migration period which would increase survival and reduce routing into the interior Delta at Georgiana Slough (Perry et al 2015). San Joaquin River-origin juvenile Spring-Run Chinook Salmon are likely to be entrained at the salvage facilities at similar rates under Alternative 4 as compared to the No Action Alternative. San Joaquin River-origin juvenile Fall-Run Chinook Salmon are likely to be entrained at the salvage facilities at higher rates under all action alternatives as compared to the No Action Alternative.

J.2.6.2 *Program-Level Effects*

Potential changes in erosion or quality of land or sites of religious or cultural importance to federally recognized Indian tribes

As described in Appendix X, *Geology and Soils Technical Appendix*, no changes in peak flows are expected as a result of program-level actions for Alternative 4; therefore, stream channel erosion would be the same as under the No Action Alternative. Proposed water use efficiency components have little potential to be implemented on land or sites of religious or cultural importance; rather, they would be implemented on agricultural land and for municipal and industrial uses.

Potential changes in quality of water utilized by a federally recognized Indian tribe

As described in Appendix G, *Water Quality,* program-level actions and construction activities under Alternative 4 could have water quality implications. These effects could include increased turbidity,

mercury and selenium bioaccumulation, dissolved organic carbon, and increased sedimentation. However, adverse effects on water quality and violations to water quality standards are not expected to result from the Alternative 4 program-level activities.

Potential changes to salmonid populations

Alternative 4 proposes to implement program-level water use efficiency measures that would improve agricultural and municipal and industrial water use efficiency. Implementation of these measures could reduce reliance upon water supply deliveries, which would reduce the need for exports and provide more water for salmonids in the rivers that supply water to the CVP and SWP. However, this benefit is as yet undefined and would be quantified in subsequent analysis. There are not anticipated to be any construction-related effects to salmonids as a result of implementation of Alternative 4.

J.2.7 Mitigation Measures

Mitigation Measure ITA-1: Consult with Tribal Entities Consistent with Secretarial Order 3175

For programmatic actions, when footprints are determined, and as early as possible in the environmental compliance process, Reclamation will consult with nearby federally recognized Indian tribes in the study area to request their input regarding the identification of any properties to which they might attach religious and cultural significance to within the area of potential effect.

Once these areas are determined, Reclamation will make a good faith effort to avoid land or sites of religious importance and will enter into government-to-government consultations with potentially affected tribes to identify and address concerns for ITAs.

Mitigation Measure WQ-1: Implement a Spill Prevention, Control, and Countermeasure Plan

Mitigation Measure WQ-2: Implement a Stormwater Pollution and Prevention Plan

Mitigation Measure WQ-3: Develop a Turbidity Monitoring Program

Mitigation Measure WQ-4: Develop a Water Quality Mitigation and Monitoring Program

Mitigation Measure AQUA-1: Worker Awareness Training

Mitigation Measure AQUA-2: Construction Best Management Practices and Monitoring

Mitigation Measure AQUA-3: Develop and Implement Program to Expand Adult Holding, Spawning, Egg Incubation, and Fry/Juvenile Rearing Habitat.

Mitigation Measure AQUA-4: Erosion and Sediment Control Plan

Mitigation Measure AQUA-5: Spill Prevention, Containment, and Countermeasure Plan

Mitigation Measure AQUA-6: Disposal of Spoils and Dredged Material

Mitigation Measure AQUA-7: Fish Rescue and Salvage Plan

Mitigation Measure AQUA-8: Underwater Sound Control and Abatement Plan

Mitigation Measure AQUA-9: Methylmercury Management

Mitigation Measure AQUA-10: Noise Abatement

Mitigation Measure AQUA-11: Hazardous Material Management

Mitigation Measure AQUA-12: Construction Site Security

Mitigation Measure AQUA-13: Notification of Activities in Waterways

Mitigation Measure AQUA-14: Fugitive Dust Control

J.2.8 Summary of Impacts

Table J.2-1 includes a summary of impacts, the magnitude and direction of those impacts, and potential mitigation measures for consideration.

Table J.2-1. Impact Summary

Impact	Alternative	Magnitude and Direction of Impacts	Potential Mitigation Measures
Potential changes in erosion or quality of land or sites of religious or cultural importance to federally recognized Indian tribes (Project-Level)	No Action	No impact	--
	1	No impact	--
	2	No impact	--
	3	No impact	--
	4	No impact	--
Potential changes in quality of water utilized by a federally recognized Indian tribe (Project-Level)	No Action	No impact	--
	1	No impact	--
	2	No impact	--
	3	No impact	--
	4	No impact	--
Potential changes to salmonid populations (Project-Level)	No Action	No impact	--
	1	Trinity River: Possible minimal, negative effect due to increased likelihood of egg mortality due to redd scour, negligible effects from temperature overall. Clear Creek: No effect. Sacramento River: Beneficial effects to tributary species. Feather River: Negligible and potentially beneficial. Stanislaus River: Similar to No Action Alternative. San Joaquin River: Similar to No Action Alternative. Bay-Delta: Negative effects due to increased entrainment rates.	--

Impact	Alternative	Magnitude and Direction of Impacts	Potential Mitigation Measures
	2	Trinity River: Possible minimal, negative effect due to increased likelihood of egg mortality due to redd scour; Possible minimal, negative and positive effects of water temperature, negligible overall effect Clear Creek: Possible minimal negative effects Sacramento River: Potential for various positive and negative effects to reservoir species; potential minimal, beneficial effects to tributary species. Feather River: Negligible and potentially beneficial. Stanislaus River: Potential minimal negative effects and positive effects. San Joaquin River: Similar to No Action Alternative. Bay-Delta: Negative effects due to increased entrainment rates.	--
	3	Trinity River: Possible minimal, negative effect due to increased likelihood of egg mortality due to redd scour; Possible negative effects Clear Creek: Possible minimal negative effects Sacramento River: Potential for various positive and negative effects to reservoir species; potential minimal, beneficial effects to tributary species. Feather River: Negligible and potentially beneficial. Stanislaus River: Similar to No Action Alternative. San Joaquin River: Similar to No Action Alternative. Bay-Delta: Negative effects due to increased entrainment rates.	--

Impact	Alternative	Magnitude and Direction of Impacts	Potential Mitigation Measures
	4	Trinity River: Possible minimal, negative effect due to increased likelihood of egg mortality due to redd scour; Potential beneficial effects Clear Creek: Improved habitat conditions Sacramento River: Beneficial effects to tributary species. Feather River: Beneficial effects to Spring and Fall-Run Chinook Salmon. Stanislaus River: Similar to No Action Alternative. San Joaquin River: Similar to No Action Alternative. Bay-Delta: Negative effects due to increased entrainment rates for Fall-Run Chinook. Similar to No Action Alternative for other salmonids.	--
Potential for erosion or degradation of land or sites of religious or cultural importance to federally recognized Indian tribes (Program-Level)	No Action	No impact	--
	1	Programmatic restoration components have the potential to adversely affect important land and sites depending upon design and location.	MM ITA-1
	2	No impact	--
	3	Programmatic restoration components have the potential to adversely affect important land and sites depending upon design and location.	MM ITA-1
	4	Programmatic water use efficiency components have the potential to adversely affect important land and sites depending upon location; however, they are not anticipated.	--
Potential to degrade quality of water utilized by a federally recognized Indian tribe (Program-Level) Potential to change salmonid populations (Program-Level)	No Action	No impact	--
	1	Potential water quality implications from restoration and construction activities include increased turbidity, mercury and selenium bioaccumulation, dissolved organic carbon, and increased sedimentation.	MM WQ-1 MM WQ-2 MM WQ-3 MM WQ-4

Impact	Alternative	Magnitude and Direction of Impacts	Potential Mitigation Measures
	2	No impact	--
	3	Potential water quality implications from restoration and construction activities include increased turbidity, mercury and selenium bioaccumulation, dissolved organic carbon, and increased sedimentation.	MM WQ-1 MM WQ-2 MM WQ-3 MM WQ-4
	4	Adverse effects on water quality not anticipated.	--
	No Action	No impact	--
	1	Beneficial effect	MM AQUA-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
	2	No impact	
	3	Beneficial effect	MM AQUA-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
	4	No impact	--

J.2.9 Cumulative Effects

J.2.9.1 *No Action Alternative*

The No Action Alternative would not result in any changes to water operations or additions to the currently proposed restoration actions. Continued tidal restoration actions could lead to adverse effects; however, the extent of these affects are uncertain and would be dependent on habitat design and locations. Therefore, the No Action Alternative would not contribute to the cumulative changes to ITAs within the study area.

J.2.9.2 *Alternatives 1, 2, 3, and 4*

Implementation of habitat restoration under Alternative 1 and 3 could potentially lead to water quality effects as well as disturbance of land or sites of importance to federally recognized Indian tribes or impede any tribal fishing rights. Those activities requiring ground-disturbing actions are, at this time, programmatic and their contribution to the cumulative effect is unknown. Tidal habitat design and location considerations will minimize the degree to which new habitat areas will impact ITAs. Alternative 4 may result in adverse effects on federally recognized Indian tribes that have fishing rights resulting from effects on salmonid populations. Any impacts on ITAs would be consulted and coordinated with potentially affected tribes to identify and address concerns for ITAs. Therefore, there is not anticipated to be a substantial effect on ITAs and the potential adverse effect is not considered cumulatively considerable. Any cumulative effects of the Project on salmonids are discussed in detail in Appendix O.

J.3 References

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